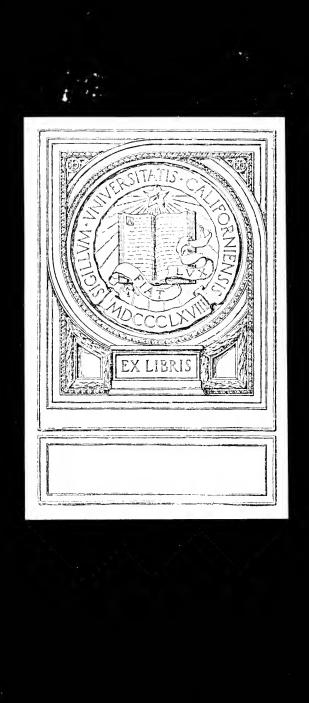
THE EXCELSION AZIMUTED AND POSITION FINDING TABLES

Facilisticond Edition

BLACKBURNE







TABLES OF CALCULATED HOUR-ANGLES AND ALTITUDE AZIMUTH TABLE 30° N. to 30° S.

OPINIONS OF EXPERTS

ON THE

COMBINED HORARY AND AZIMUTH TABLES

By H. S. BLACKBURNE.

From JOHN COLES, Esq., formerly in the R.N.
Instructor in Practical Astronomy and Surveying to the Royal Geographical Society
6TH JUNE 1897.

"As you and I have talked over the utility of your tables, you already know the high opinion I have of them; in proof thereof I endorse a cheque, and I trust they will receive the support they deserve. They are most excellent tables, and will be of great service to Navigators; their arrangement is good, and simple, and that, I think, is about the best thing that can be said of any tables for the use of seafaring men."

From Lieut. VINCENT J. ENGLISH, R.N., Teacher of Navigation.

Author of "Navigation for Yachtsmen."

7TH JUNE 1897.

"Many thanks for the sheets of your new book. I am of opinion that they will be most useful to the overworked Ship Master, and they excel other short methods by their exceeding accuracy."

From A. C. JOHNSON, Esq., R.N.

Formerly Naval Instructor for H.M. Training Ship "Britannia."
Author of several concise Azimuth Tables, and other Nautical Works.

7TH JUNE 1897.

"I have no doubt that Captain Blackburne's Tables for finding the time would be very useful within the limits which they comprise, and that they are sufficiently accurate and safe. The facility they afford for obtaining the Azimuth simultaneously is certainly remarkable."

From Lieut. GEORGE WHITE, R.N., late Navigating Lieut., R.N. 11TH JUNE 1897.

"I have carefully examined the specimen copy of your Horary and Azimuth Tables, and have, as a test of their accuracy, worked several examples. I have therefore much pleasure in stating that I think them (especially the Azimuth Table) admirably adapted for their intended purpose. Having been for many years Navigating Officer in the Telegraph Service, I should have been very glad of such tables, especially when arriving on the intended grappling ground in the early morning, or late in the evening, as they would have so readily given the ship's position by double Altitudes of suitable stars."

From Captain T. S. ANGUS, P. & O. S.S. "Ballaarat." Now Nautical Inspector, P. & O. S. N. Company, London.

28TH JULY 1897.

"I have examined your specimen leaf, and as far as I can see the tables will simplify and shorten the work of finding the hour-angle to a great extent; the Azimuth Table will add much to their value. From your well-known conscientious care, there can be no doubt as to the accuracy of the tables when completed."

TABLES OF CALCULATED HOUR-ANGLES

ALTITUDE AZIMUTH TABLE 30° N. TO 30° S.

EX-MERIDIAN TABLES 70° N. TO 70° S.

CALCULATED REDUCTIONS AND AZIMUTHS OF 30 BRIGHT STARS From 1 HOUR to 3 HOURS from MERIDIAN 64° N. TO 60° S.

BY

H. S. BLACKBURNE

EXTRA MASTER (LONDON)

PRINCIPAL EXAMINER OF MASTER AND MATES IN NEW ZEALAND, AND NAUTICAL ADVISER TO THE GOVERNMENT

SECOND EDITION

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THIS BOOK IS DEDICATED TO

MR CHARLES WESTLAND

OF GLEN MUICK, CANTERBURY, NEW ZEALAND

AS A TOKEN OF GRATITUDE AND ADMIRATION FOR HIS VERY ABLE,
GRATUITOUS, UNSELFISH, PAINSTAKING, AND LABORIOUS WORK IN
HELPING THE WRITER WITH THE COMPILATION OF HIS PREVIOUSLY
PUBLISHED EX-MERIDIAN TABLES, AND OF SEVERAL OF THE STAR
REDUCTION TABLES IN THIS WORK



EXPLANATIONS RE THE PUBLICATION OF THE CALCULATED HOUR-ANGLE TABLES

In view of the fact that other works have been published partly for the same purpose for which these Tables of Calculated Hour-Angles are intended, and especially considering the work which was published only a few years ago by Mr Percy Davis on very similar lines to these (except for Davis's omission to utilise the latitude variations for the azimuth), I feel that it is necessary for me to explain something about the reasons which have led me to publish these tables (which I began many years before Mr Davis thought of publishing his work), lest it should be thought that I was simply following Mr Davis, with some improvements and additions. I am glad to say that Mr Davis has generously mentioned in the Preface to his work that he knew of my MS. and previous efforts in this direction. I began the calculation of these tables about thirty-eight years ago, and worked at them every spare minute of my time for a few years, until (after tabulating about 80,000 calculations, including the variations) I was told about Lynn's famous "Horary" Tables, which were published in 1827, but were even then out of print. This somewhat damped my ardour. I had discovered in the meantime that the latitude variations which had been calculated to three places of decimals gave the azimuth accurately to ½' of arc. This discovery was due to Mr A. C. Johnson's little book, Latitude and Longitude in Cloudy Weather. In this work the latitude and sun's azimuth are used to find the correction of longitude due to I' of error in the latitude. I therefore rightly concluded that, inversely, the azimuth could be obtained if the latitude and longitude correction due to I' of error in the latitude were known; finding how accurately this came out with my Hour-Angle Table, I tried a small skeleton table published by Adams of Southampton without any author's name, which was in general use in some of the mail-steamer lines under the title of A and B Tables for Correcting the Longitude for Error in Latitude.

I found, however, that this table was too inaccurately computed to give a true azimuth, so I determined to compute a table for every four minutes of time, which, with the aid of only half a dozen figures, would give the azimuth as accurately and quickly as by Burdwood's and Davis's tables, and which would include many azimuths that had been omitted in the large tables of inspection, and which I felt were much needed in double altitude work, especially in low latitudes, where no azimuths were given sometimes for two hours on each side of noon, and no azimuths at that time were given when the declination was over 23°. I accordingly then devoted all my spare time to this smaller work, A and B Tables for Time Azimuths., etc., which were published early in 1883, for latitudes from 60° N. to 60° S., and for any hourangle from the meridian. In the Preface to these tables I mentioned that I had begun the calculation of my Horary Tables seven years before. or four years after this I handed over the manuscript of my Horary Table work to Captain Martin, R.N., then Naval Instructor of Greenwich College, with full permission to give them to anyone who was willing to continue the

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work and publish them on the same plan as I had begun them. He had them in his possession for a few years, but after giving up the sea I asked for them again, as no one seemed inclined to take them up, and Captain Martin

returned them to me about eighteen years ago.

A year or two after this Mr Percy Davis, of the Nautical Almanac Office, and author of the famous Time Azimuth Tables, wrote to me of his intention to publish these tables, asking my advice, etc., about them, and I assisted him for a very short time in choosing suitable altitudes, and planning about the variations, etc., which I persuaded him to give for latitude, altitude, and declination. I was unable, however, to persuade him to follow my plan altogether in utilising the tables for azimuths as well. My disappointment that the tables were to be published with their utility so much curtailed led me—after having given Mr Davis full notice of my intention—to endeavour to publish them myself, at any rate for the latitudes of which I had already calculated so much, and which fortunately were of a different zone of latitude from that which Mr Davis was then contemplating publishing for trial. About two years after this I accepted an appointment, which I still hold, under the New Zealand Government, and found that I was not allowed then to publish on my own account, and the Government were not prepared to publish the work themselves. However, about four years ago I received permission from the Minister of Marine to publish the work on my own account, and have also been granted permission to publish with them some Ex-Meridian Tables and Calculated Star Reduction Tables, which, combined with the Hour-Angle Tables, make the work specially valuable for quickly fixing ship's position from two sun or star observations.

Mr Davis, however, was far in advance of me, and published his book

several years ago, and his work now includes latitudes from o° to 50°.

I hope and confidently expect that the publication of these tables will not only not injure the sale of Mr Davis's work, but will actually increase it, as I prominently bring to the notice of navigators by several examples the value of the tables in connection with fixing the ship's position by combined altitudes of either sun or star observations, and the Altitude Azimuth Table may be used with the latitude variations from Davis's table, with amply sufficient accuracy for position-line purposes, though his variations would not give sufficient accuracy for azimuth purposes on account of their having been calculated for the mid-interval of latitude.

HAROLD S. BLACKBURNE.

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WELLINGTON, NEW ZEALAND, June 1914.

PREFACE

The main purpose of these tables is to make as easy as possible the problem of finding the ship's position from combined altitudes of sun, moon, or stars, and especially to encourage the at present much neglected and apparently little valued practice of determining the ship's position from two or three stars at twilight, a few minutes before sunrise, and a few minutes after sunset. The writer, having made a regular practice of such observations for several years of his sea life, is fully alive to the great value of the problem, and considers it to be *the* most valuable problem in navigation, and has consequently for the last thirty and odd years deplored the neglect of the authorities to give it in the Board of Trade examination for masters and mates.

It ought to be the rule, instead of the rare exception, in all seagoing steamers to take such observations daily. In spite of the discouragement I have received from those whom I might most naturally have expected to help and encourage me, and the continued opposition of the authorities to the use of my tables and methods in the examination room, it will be seen that I have not yet given up my efforts to stir up and encourage shipmasters and officers to get out of the rut of relying wholly on their morning longitude and noon latitude position, and am still working to make easier and more popular the above-mentioned problems, and I have been much encouraged of late to find that my methods and tables are now being very generally used by the younger generation of officers, at any rate in the ships which trade regularly to New Zealand, and even by some of our coasting shipmasters.

My greatest incentive, however, to continued effort in this direction has been the knowledge that such observations tend greatly to the saving of lives and ships from destruction. In the course of my duties in the investigation of witnesses' evidence in wreck inquiry cases in New Zealand, I was struck by the fact that within three years no less than three ships were wrecked, and many lives lost, which would in all probability have been saved had the officers been in the habit of determining the ship's position by simultaneous observations of two stars at twilight; but no Court of Inquiry could justly censure the master for neglect to take such observations when the determination of this problem is not provided for in the Board of Trade examination for either the mate or master. At about the same time I also received letters from two shipmasters gratefully acknowledging the value that my books had been to them, and telling me that the determination of their ship's position by stellar observations (after experiencing exceptionally strong currents) had been the means of saving their ships from great risk of stranding, one in the China Sea, and the other in the Bay of Bengal.

By the aid of the Calculated Star Reduction and Azimuth Tables in this work, a latitude and position-line can be obtained at any time when the stars are visible, almost as easily as by a meridian altitude of a star. Nothing, so far as the writer knows, has ever been published to so quickly, simply, and accurately solve the problem of finding the ship's position from two or three stellar observations out of the meridian, or for determining the latitude

and position-line from a single observation, which may often be used in conjunction with a sounding, or the bearing of some mountain peak or light, in determining the actual position of ships, as shown in example on page lii.

The below-Pole reductions and azimuths are of most value when only the azimuth or latitude and position-line are required, as the body is then changing very slowly, both in bearing and altitude; but owing to the small change of bearing, even up to two hours from the meridian, it is seldom that the position-lines resulting from bearings east and west of the meridian from two stars is sufficiently large to give a reliable "cut" for determining the position from two ex-meridian observations; but a good "cut" can always be made by combining a longitude by chronometer with one of these ex-meridian observations. The below-Pole reduction tables are also confined to extra tropical latitudes. The calculated reductions and bearings of stars from upper meridian, however, cover a much wider limit of latitude, and, owing to the much more rapid change of bearing when near the upper meridian, two stars can often be chosen from the Calculated Reduction and Azimuth Tables, where the position-lines cut one another at an angle of from 40° to 50°, which is amply sufficient for a good determination of the ship's position. The reductions and azimuths of twenty-seven of the brightest stars have been tabulated for about one hour from upper meridian, and the reductions of a few of the high declination stars to two and three hours from the meridian. Another great advantage of these tables is that the approximate bearing of the bright stars, and their altitude for setting on the sextant, is determined very simply, so that there can be no mistake in the star, and no need of any star maps, which are, however, of little value when observing stars in twilight. It is my hope, therefore, that the publication of these tables will stimulate and encourage greatly the practice of determining the position of the ship from twilight observations of two or three stars; also of the more frequent determination of the ship's position from combined altitudes of the sun, after considerable change of bearing, or of the sun and moon, and not only in high latitudes but even in the tropics. If this work fulfils its aim in this direction, I shall be gratified by a knowledge that I have helped in some measure to save ships, and lives, from disaster.

Probably owing to the fact that all the "Sumner" problems in our Board of Trade examinations for masters and mates have for many years been set between the parallels of 46° to 52° N. and S. latitudes, an impression exists among many officers in the merchant service that a "Sumner" position is of no value in low latitudes. The lengthy and not very accurate way, especially in low latitudes, by which the candidate is obliged to work the problem in our examinations also tends to the neglect of officers practising the "Sumner" problem at sea. Also another great drawback is the difficulty about the chart: the coast charts are on too large a scale, and the ocean charts too small, and there are comparatively few yet who realise the fact that a plane chart (which does for any latitude) may be used with equal accuracy as a Mercator chart, as shown by examples in these pages. As my method of utilising the plane chart is not allowed in the examination room, none of the

navigational guide-books mention it.

I feel certain, too, that the Altitude Azimuth Table in this work will be much appreciated by navigators, both for compass correction and for laying off position-lines in connection with observations for fixing the ship's position. Excellent as the many Time Azimuth Tables are, especially Burdwood's and Davis's—and nothing can be handier for compass adjusters when the time is correctly known,—yet I have so often seen mistakes made in obtaining the azimuth at sea through using an erroneous time, that I feel sure that a good Altitude Azimuth Table would be much more valued by the ordinary seagoing

officer than the Time Azimuth Tables, and it would certainly ensure greater accuracy. On the other hand, this Hour-Angle Table will make the Time Azimuth Tables of much more value, as the correct apparent time can be found by it at once by simple inspection. It was for this purpose that I first contemplated bringing out these Horary Tables, as many captains under whom I sailed, especially in earlier years, would not allow their officers to use the Time Azimuth Tables. Now, I believe they are almost universally used, and many men become careless about the time being correct, being content to take the time by the ship's clock, which is often several minutes in error, through the ship's change of longitude, or through the change of the clock to mean time before arrival at some by-port.

The following mentioned ladies and gentleman have assisted me in the compilation of these tables:—Miss Elsie Chapman, Miss Marie Moys, Miss Ida Richardson, and Mr C. B. Maltby, and I consider myself most fortunate in having secured the services of such faithful, conscientious, and accurate

assistants.

Although I have had so much assistance in the compilation of the tables, I have personally overlooked every single observation, and can truthfully state that the utmost care has been taken to ensure the most minute accuracy. The hour-angles have been calculated to the nearest decimal of a second by six-figure logarithms, and each one checked by differences. The variations to every degree of latitude, etc., are the variations at the degree, not the midinterval as it is given in Davis's work; they have all been worked out to three places of decimals, and checked by differences, and with such accuracy that I have always found the latitude variation (with three places of decimals) give the azimuth to the nearest ½ of azimuth. The Reduction Tables have been calculated with the same minute carefulness, and I am confident that not one per cent. of the tabulated reductions will be as much as o'i in error. addition to the Hour-Angle and Altitude Azimuth Tables and Star Reduction Tables, there is also a very comprehensive general Ex-Meridian Table, which, though occupying very few pages, yet comprises more extensive limits of use than most other Ex-Meridian Tables. This will be found very useful for facilitating the work of fixing the ship's position by combined altitudes of two sun ex-meridians, or with a chronometer and ex-meridian observation. few other useful tables are also given. The Azimuth Table corresponding to the latitude variation is given from the equator to latitude 60°, so that it may be used also with Davis's Hour-Angle Table for aiding in quickly taking out the position-line for use with either a plane or Mercator chart, when outside the latitude limits of the Hour-Angle Table of this work, which are at present confined to latitudes from 30° N. to 30° S. This table is also used in conjunction with Table VIII., Ex-Meridian Table.

To minimise the need of interpolation as much as possible, the reductions to the meridian and azimuths of all the bright stars have been calculated for the actual declination of the stars for a few years ahead; but as the declination of most of the stars changes so slowly, there will be no appreciable change in the tabulated reductions and azimuths for the next forty or fifty years, and, the results being exhibited in this tabular form, the value of an error in either

the latitude or time is seen at a glance.

In the Hour-Angle and Altitude Azimuth Table a glance at the table will show the best time for observing, viz.—when the lat. var. is o, the body being then on the prime vertical. Also, when the declination is greater than the latitude the lat. var. shows at a glance when the body is nearest to the prime vertical.

In closing, I have much pleasure in acknowledging the kind, gratuitous help voluntarily tendered to me by Mr Charles Westland, and in thanking

xii PREFACE

him for his disinterested labours in the calculation of several star reductions. I would also like to thank the Hon. Ministers of Marine for their permission to publish a few of the smaller tables previously published by the New Zealand Marine Department in their Azimuth and Reduction Tables, also some of their previously published Star Reduction Tables now further extended by myself, and my assistants.

In the words of Raper, the nautical author whose work I have used and valued more than any book on navigation, I would solicit the indulgence of the reader to errors and to deficiencies. As he truly says, absolute correctness, especially in tables, is scarcely attainable, and in a work which contains much that has not appeared before, I cannot reasonably flatter myself that, notwithstanding every care and attention, some small inaccuracies may not be found, especially as in my case, owing to the long distance from my printer, and my desire to keep faith with those who bought copies of the work before publication, I have had to trust to a single correction of the proofs.

Should, however, any errors be discovered in the work, I shall be most

grateful to anyone who will bring such to my notice.

HAROLD S. BLACKBURNE.

WELLINGTON, NEW ZEALAND, June 1914.

PREFACE TO SECOND EDITION

In this Second Edition of these tables over 35,000 new calculations have been made and added to the tabulations of the previous Edition, and some new examples are published with surprising results from ex-meridians with very high altitudes. The Ex-Meridian Table has been considerably enlarged, and the limits of its use increased both in latitude and bearing from the meridian. This is especially the case with high altitudes, when nearly all other Ex-Meridian Tables fail. I am indebted for the idea of the new table to a little book published about two years ago by Captain Cook of Bowden, Jamaica, in which he gives a small table of two half pages giving the reduction to I min., corresponding to a given latitude and azimuth.

I found that although only roughly computed by the traverse table, it often gave very good results, and would be independent of the latitude variation, and I saw that if it were expanded, and accurately computed by a true formula, accompanied by a table giving the limits within which it might be used with safety, it was likely to prove a very useful table; and the results with very high altitudes have far exceeded my expectations, and

I have no doubt will surprise a good many.

A well-known and up-to-date author, in a recent publication, when advocating the claims of the "New Navigation," tells us that an ex-meridian at 22° from the meridian is an impossible thing; but an example is given on p. xxxviii of this book, with a very high altitude, where the latitude and longitude are accurately determined from two ex-meridians, one of them

being over 70° from the meridian.

It is probable that a wrong impression will have been gathered with regard to the immense amount of labour which has been put into this work, on account of the remarks made by the reviewer of one of the principal Nautical Magazines about most of the tables having seen the light in earlier publications, and mention being made of Lynn's and Davis's Hour-Angle Tables having been previously published on the same lines. I may say that although Lynn's tables were very complete in the tabulation of hourangles from sunrise to the meridian, no variations were given for any of the elements, and consequently interpolation was very tedious. With regard to Davis's tables, the variations are only given to one place of decimal, and for the mid-interval, instead of being the variation at the degree of latitude, altitude, and declination; consequently, they could not be expected to give hardly one-tenth of the accuracy obtained by these tables. I, at first, computed several thousand of my own variations for the mid-interval, as it was so much easier to do this, but finding that results did not give the accuracy which I was aiming at, I recomputed them as now published. Neither Lynn's nor Davis's tables give the azimuth, whereas I understand from some of those who have used these tables that the Altitude Azimuth Table in this book is preferred even to the world-famous Red Book Time Azimuth Tables.

I can truthfully state that every tabulated hour-angle and variation in the book has been rigorously calculated, either by myself, or by computers paid by me. No one could contest this, as no other work tabulates the results to the same degree of fineness, viz., to $\frac{1}{10}$ of a second. I alone am responsible for every tabulated result in the book, all the calculations having been

made either by myself, or under my direct supervision and scrutiny, so that I can confidently guarantee the extreme accuracy of all the tabulations.

The Ex-Meridian Table is entirely new, though on the same principle (with an extension of limits) as the Ex-Meridian Table in my book of ABC Azimuth and Reduction Tables; also, about 50,000 new calculations have been made, and tabulated in the Tables of Calculated Reductions and Azimuths of Bright Stars.

These are the main tables in the book; the other small supplementary tables which were previously published in one or two of my earlier works

only comprise a few pages.

I have been disappointed to find that there is small probability of the immense labour and great expense entailed in the production of this work being rewarded by the satisfaction of knowing that the tables and methods advocated in the work will be at all generally used in my own lifetime, as the present authorities prohibit their use in the Board of Trade examinations for masters and mates, and the great majority of ship officers in the merchant service appear to be still ignorant of the value of a position-line in connection with an ex-meridian for position finding, or even in connection with a calculated altitude as taught in the so-called "New Navigation" (now forty years old), owing to the regrettable conservatism of the authorities in only allowing the "Sumner" to be worked from the calculation of four hour-angles, and plotted on the chart from two parallels of latitude, notwithstanding that this method has been frequently shown to give errors of a few miles in the resulting position, besides taking twice as long in the calculation.

Quite naturally the numerous guide-books which are used in preparation for our examinations only present the methods which candidates are expected to use in the examination room, and other improved methods are only taken up by the comparatively few who take a special interest in Navigation.

Such men are usually conversant with all the best and shortest methods; but to ensure the greater safety of navigation generally, it is essential to encourage in every way possible the man who is not fond of lengthy calculations, or who has little time at his disposal to frequently take azimuths, and determine the ship's position by the simplest accurate methods; but when a candidate is given a problem such as our double altitude problem, either by the sun, planet, or a star, and he is required to get a latitude only by the use of numerous logarithms, all rigorously corrected for seconds of arc, it is apt to leave an impression on his mind that the determination of even the latitude at some distance from the meridian is a very difficult, tedious, and uncertain business. As we in New Zealand are bound by the Board of Trade regulations in our examinations for foreign-going certificates, we are unfortunately debarred from making use of our tables for quick position finding by two stars at twilight, or by any of the simple methods of obtaining the azimuth, or position of ship by sun or stars, presented in this book.

Notwithstanding this discouragement, I am still continuing my labours for the sake of the few in my day who will profit by them, and in the assurance that at least some ships and lives will be saved by these efforts, and in the belief that in some future generation these methods, with the tables still further extended in their limits, will be generally adopted.

HAROLD S. BLACKBURNE.

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EXPLANATION AND USE OF TABLES

TABLE I.--FOR FINDING HOUR-ANGLE AND AZIMUTH FROM ALTITUDE (pp. 2-245)

The arrangement of the arguments will be easily followed by attention to the following explanations, viz. :-

The latitude heads each page; the table begins at the equator, and comprises four pages to each latitude up to 30° of latitude and declination of same name, then continues with latitude and declination of contrary names from 1° to 30°, with another four pages to

The declination immediately below the latitude runs horizontally through the four pages of latitude from o° to 23°.

The altitudes are arranged vertically on the left side of each page.

The hour-angle is given to the nearest decimal of a second for the full degrees of

latitude, declination, and altitude.

The variation to I' of declination is given under the declination column on the righthand side of the hour-angle, and the variations to I' of latitude and altitude are given on the lower half of the page, L standing for latitude, and A for altitude. to I' of latitude, etc., are the variations at the degree in the same way as they are given in the Nautical Almanac. For instance, the variation at 8° is found by dividing the difference between the hour-angles at 7° and 9° by 120, and the latitude and altitude variations are computed in the same way. It is important to bear this in mind, as the variations in Davis's Chronometer Tables have been calculated for the mid interval, and the apparent discrepancy between the variations as given in the two works might lead to some want of confidence in either work.

The latitude variation referred to Azimuth Table on pages 258-267 gives the true azimuth, or bearing of the sun or other heavenly body, and on page 270 the position-line for a plane chart; or if the variation, considered as a difference of longitude, is converted

into departure, it will give the true position-line for use on a Mercator chart.

In using the table, enter it with the latitude, declination, and altitude, each to the nearest degree, and take out the recorded hour-angle; correct for the odd minutes of latitude, etc., by the previously mentioned variations. This may be effected either by simple multiplication or by reference to the Proportional Sexagesimal Table on pages 246–251. The resulting hour-angle will seldom be more than ½ second in error, and more often than not it will be within o'r s. of the truth.

Strict attention, however, must be paid to the signs which are given with each of the

variations.

Formula used in the calculation of the table:— Haversine H.A. = $\sec l \cdot \csc p \cdot \cos S \cdot \sin S - a$,

where
$$a = \text{alt.}$$
, $l = \text{lat.}$, $p = P$. Dist., and $S = \frac{a + l + p}{2}$

Examples of Finding the Time and Azimuth from Tables

Example 1.—In latitude 30° 12' S., p.m. at ship, decl. 16° 18' S., and altitude 32° 40'. Required the hour-angle and sun's bearing.

The nearest degrees are L. 30°, D. 16°, and A. 33°.

$$\begin{array}{c} \text{L. \ $\stackrel{\circ}{30}$ S.} \\ \text{D. \ 16 S.} \\ \text{A. \ 33} \end{array} \begin{array}{c} \text{gives H.A. from Table} \\ \text{Cor.} \end{array} \begin{array}{c} \text{H. \ $M.$ \ $s.} \\ \text{4 \ 2 \ $59^{\circ}o$} \\ \text{+2 \ $9^{\circ}2$} \\ \text{True H.A.} \end{array}$$

$$\begin{array}{c} \text{By logarithmic spherical calculation 4 \ 5 \ $8^{\circ}2$} \end{array}$$

Minutes (in excess +, Variations. in defect -). S. D.
$$+2.0 \times +1.8 = +36.0$$
 L. $+0.07 \times +1.2 = +0.8$ A. $-4.62 \times -20 = +92.4$ M. S. Cor. $+1.29.2 = 2.9.2$

For the Azimuth.

L. Var. + 07 gives (p. 258) Azimuth S. 89°.2 W.

Example 2.—In latitude 30° 8' N., P.M. at ship, decl. 14° 48' S., and altitude 20° 12'. Required hour-angle and sun's bearing.

Minutes

$$\begin{array}{c} \text{(in excess +, }\\ Variations. & \text{in defect } -\text{)}.\\ \text{L. 30 N.}\\ \text{D. 12 S.}\\ \text{D. Cor.} \\ \text{D. Cor.} \\ \text{D. Cor.} \\ \text{D. Cor.} \\ \text{II. M. S.}\\ \text{3. } \begin{array}{c} \text{H. M. S.}\\ \text{3. } \begin{array}{c} \text{S.}\\ \text{42} \\ \text{47.4}\\ \text{+42.2} \end{array} \\ \text{A. } \begin{array}{c} \text{S.}\\ \text{L. } -2.84 \times \\ \text{+ } \begin{array}{c} \text{+ 8} \\ \text{= } \end{array} \\ -22.72 \\ \text{A. } -3.52 \times \\ -12 \\ \text{A. } -5.44 \times \\ +12 \\ \text{= } \end{array} \\ \begin{array}{c} \text{-65 28}\\ \text{-88.00} \\ \text{= I } \end{array} \\ \text{28} \\ \text{-} \\ \text{B. A. by spherical calculation} \\ \text{3. } \begin{array}{c} \text{42 I-6}\\ \text{3. } \end{array} \\ \text{42 I-5} \end{array}$$

For the Azimuth.

L. Var. -2.84 gives (p. 258) Azimuth S. 58°.4 W.

These examples were taken at random with the highest latitude of the tables, and with latitude and

decl. of same, and contrary names.

The resulting hour-angle from the tables will seldom be more than $\frac{1}{2}$ second in error, and if the tabulated variations are interpolated, results will seldom be more than $0 \cdot 1$ s. or $0 \cdot 2$ s. in error. Azimuths, if correctly interpolated, should never be more than $0 \cdot 1$ in error, and the azimuth will generally be correctly given by the latitude variation to the nearest minute of arc, if Table V. is used in conjunction with the traverse table.

TABLE II.—SEXAGESIMAL PROPORTIONAL TABLE (pp. 246—251)

This table may be used by those who prefer to look out results from a table instead of making the simple multiplication of the variations. It shows at a glance the error due to $o \cdot i$ s. for any number of minutes.

TABLE III.—TABLE SHOWING THE ERROR IN TIME OR LONGITUDE PRODUCED BY AN ERROR OF 1° IN THE ALTITUDE (pp. 252—257)

The arguments are latitude and azimuth, and with these elements the table shows at a glance the value of any single observation for determination of time when outside the limits of the hour-angle table. The table may also be usefully employed as an azimuth table, with altitude and time, following the rule for which the author is indebted to Mr H. B. Goodwin, R.N.

Formula used in the calculation of the table:— Error in time=sec. of lat.×cosec of azim.×4.

Rule for Finding the Azimuth

With H.A. as azim. and decl. as lat., go to Table III.

Take out co-efficient, call it M.

With alt. as lat. and M, take out azim. at top of page.

EXAMPLE.—In lat. 44° 15′ S., alt. of Canopus 14° 6., H.A. 2 h. 57 m. Find the azimuth.

Lat. (dec.) 52° -6 S., azim. (H.A.) 2 h. 57 m.= $44\frac{1}{4}^{\circ}$, M=9·44. Lat. (alt.) 14-6 and M 9·44 gives azim. 26°.

Table III. will be found very useful in working out separately a set of observations, both with artificial horizon and at sea; or for working out another person's observations, taken within a few minutes of the same time. It also shows at sight the degree of dependence of any observation. And if at any time it is found that an erroneous altitude has been worked with, the longitude will readily be corrected by this table, a greater altitude giving a smaller hour-angle, or with A.M. sights a greater altitude making the longitude more to the eastward and a lesser altitude making the longitude more to the westward—vice versa with P.M. sights.

It will also be found useful when taking time azimuths by the sun or stars (when altitude is low) for readily obtaining the correct hour-angle, as in the following example:—Lat. 20° N., *Arcturus bearing N. 71° E. (true), altitude 5°. Table III. at lat. 20° and azimuth 71° gives 4.5 m. of time to 1° change of alt. Table 26 (Raper), lat. 20° N., decl. 20° N., gives *A's hour-angle at rising or setting 6 h. 30 m.

4.5 m.×5° =
$$-22\frac{1}{2}$$

** H.A. at 5° = $6 \frac{7\frac{1}{2}}{2}$

The results of the table can be easily found by inspection from the traverse table. At the equator, when the sun or any other heavenly body is on the prime vertical, it moves at the rate of 1° in 4 m., or 1' in 4 s. of time; and in any other latitude, when the sun is on the prime vertical, the ratio of its movement will be dep.: diff. long. Having, then, the rate of movement in any latitude on the prime vertical, the rate of movement on any other bearing may be found by the traverse table.

Example.—In latitude 30°, and \odot 's bearing N. 63° E., required the rate at which it moves. In latitude 30°, against 4 in D. lat. column, is 4.62 in dist. column; with \odot 's bearing 63°, and 4.62 in dep. column, we have 5.18 in distance column=5.18 s. to 1' of

altitude.

Further examples in the use of the table are given on page xlii.

TABLE IV.—AZIMUTH TABLE (pp. 258-267)

Enter table with lat. var. to 1' at side, and latitudes on top of page running horizontally. Corresponding azimuth is given to nearest decimal of a degree, and the rule for naming the azimuth is clearly given at head of page.

Formula of calculation:—Cot azim.=lat. var. \times cos lat. \times 4.

Example in Use of Table.—Lat. 20° N., decl. 0°, alt. 50°, lat. var. -2.05 s. gives azim. (page 258) S. $64^{\circ}.25$.

TABLE V.—AZIMUTH CORRESPONDING TO LATITUDE VARIATION IN DEPARTURE (pp. 268-269)

This table is given for cases where the azimuth is required to the nearest minute of arc. Rule.—Consider the lat. var. as a d. long. and convert it into dep. by the traverse table. The azimuth corresponding to this factor may then be taken out to the nearest minute of arc.

Formula of calculation:—Cotan azim.=lat. var. \times 4.

Example in Use of Table.—Lat. 20° N., decl. 0°, lat. var. -2.05 s. = dep. 1.926 s. gives azim. (page 268) S. 64° $17\frac{1}{2}'$.

TABLE VI.—POSITION-LINES CORRESPONDING TO LATITUDE VARIATION FOR USE WITH THE PLANE SCALE CHART IN THE "SUMNER" PROBLEM (p. 270)

This table is given for the purpose of plotting a "Sumner" position on a plane chart. The position-lines corresponding to the lat. var. give the same result as to latitude and longitude on a plane chart as the *true* lines of position would give on a Mercator's chart. One chart, therefore, does for any latitude, or, with the aid of a small 6-inch rule with a protractor and diagonal scale of inches marked on it, the chart may be dispensed with and the position plotted in the work book. To do this, set off the points of two longitudes on the parallel of the D.R. latitude at a distance from one another of, say, I in. to 10' of longitude. From these points lay down the "Sumner" lines, and from the point where they intersect draw a perpendicular to the parallel of D.R. lat. The longitude at the point struck by the perpendicular is the longitude required, and can be measured from either of the points of longitude. The same scale is used for the latitude as for the longitude.

It must be borne in mind that this table does not give the *true* geographical lines of position. If this is required for a Mercator chart, consider the lat. var. as a diff. long. and convert it into dep. by the traverse table. The position-line corresponding to this dep.

will be the true geographical line of position.

Formula of calculation:—Tan position-line=lat. var. $\times 4$.

Example.—a.m. at ship in lat. 30° N., lat. var. was + .75 s.=dep. .650 s., which gives true position-line S. 9°.2 E. and N. 9°.2 W.

TABLE VII. AND VIIa,—LIMITS OF EX-MERIDIAN TABLE (pp. 272 and 292)

These tables show at a glance the hour-angles at which it is safe to use the Ex-Meridian Table so that with the *correct time* the reduction will not be in error more than $\frac{1}{2}$. It must, however, be borne in mind that the resulting latitude is the latitude corresponding to the meridian of longitude used in the deduction of the time. The latitude variation will readily show the line of position which must be laid down on the meridian of the D.R. longitude used in determining the time; or if the azimuth has been determined, Table IX. will show at a glance the error due to 1' of longitude.

TABLE VIII.—AZIMUTH EX-MERIDIAN TABLE (pp. 273-291)

The factors under the heading of Azimuth abreast lat. are the reduction at 1 m. from the meridian to apply to an altitude to reduce it to the meridian altitude.

INSTRUCTIONS CONCERNING THE USE OF TABLE, AND RULE FOR APPLICATION

Multiply the factor corresponding to the latitude and azimuth in Tables VIII. and VIIIa., and abreast lat. var. in Table VIIIb., by the number of minutes and decimals in the hour-angle from the meridian, which gives the correction to apply to the observed altitude to reduce it to the meridian altitude. Add this correction to the observation taken near the upper meridian passage, and subtract the correction when observation is taken near the meridian below the Pole. This reduction will not be more than 1/2 in error when the hour-angle is less than that shown in the preceding Tables VII. and VIIa.; the "g" against the factor in the table signifies that the true reduction will be greater, and "l" less, than the tabular reduction.

The table gives the correct reduction at I min. from the meridian for any azimuth up to 60° from the meridian, and has been rigorously calculated by seven-figure logarithms

from the following formulæ:--

Cot . ZD=Sin Azim. . Cot H.A. I min. Tan . Decl. = Sin H.A. I min. . Cot Azim.

In Lat. o°, Decl.=MZD, and ZD-MZD=Reduction at Lat. o°.

Then Cos Lat. \times Redn. = Redn. for succeeding Latitudes.

TABLES VIIIa. AND VIIIb.—EX-MERIDIAN TABLES (pp. 293-299)

Table VIIIa. gives the reduction at 1 min. to three place of decimals corresponding

to azimuths from 26° 36′ to 74°, in lat. o°.

The reduction for other latitudes may be quickly found by the Traverse Table. By taking the reduction at 1 min. in dist. column, the corresponding reduction for any latitude is found in D. lat. column: or cos . lat. x Redn. at I min. = reduction for latitude required.

Table VIIIb. is a continuation of Table VIIIa., but must be used in conjunction with

Table IV. (Azimuth Table), as shown in the following example.

Example.—Lat. 20° azimuth 9°·3 gives lat. var. 26·00 sec., which gives Redn. at

 $1 \text{ min.} = 1' \cdot 147.$

Pages 296 and 297 of Table VIIIb. have been recalculated with the formula above stated, but as there was no appreciable difference in the results when the azimuth was small between this formula and that employed in the first edition of the book, pages 298 and 299 have been retained. These two pages were calculated by the following formula:—Reduction for $1 \text{ min.} = \frac{30 \text{V}}{4 + \text{V}^2}$ where V = lat. var. in time, *i.e.* the error in time due to 1' of error in lat. Table VIII. will be found the most convenient to use, but a reference to Tables VII. and VIIa. will indicate under different circumstances which table should be used to get the best results.

TABLE IX.—ERROR IN LATITUDE BY EX-MERIDIAN DUE TO 4 SECS. IN TIME, OR 1' OF LONGITUDE (pp. 300-301)

This table (pages 300-301) shows at a glance the error which would result in the latitude from any single observation out of the meridian for every 4 secs. of time, or I' of longitude. When two observations are taken the factors given in this table facilitate the problem of finding the ship's position from two ex-meridian observations, or one chronometer observation and an ex-meridian. See pages xxxiv, xlii, xlviii and xlix.

Formula used in the calculation of table:—Lat. error = long. error × tan azim. × cos lat.

TABLE X.—THE MEAN PLACES OF 108 OF THE BRIGHTEST STARS, IN ORDER OF RIGHT ASCENSION, FOR 1ST JANUARY 1914

On pages 302-303 the mean places of 108 of the brightest stars are given, in the order of their right ascension, for the 1st January 1914. In the column headed "Mag." the adopted unit of brightness is designated 1 o. The magnitudes of stars are determined to tenths of a magnitude with reference to this adopted unit. The magnitudes of the ten stars brighter than the unit are indicated by figures less than 1.0: thus, the value 0.3 for Arcturus indicates that that star is seven-tenths of a magnitude brighter than the unit; the value -1.4 for Sirius that it is 2.4 magnitudes brighter than the unit. As the right ascensions and declinations of the stars do not change uniformly throughout the year, the correction for intermediate months cannot be made accurately by multiplying the annual change by a fraction of the year; but the change is so small that for navigational purposes at sea the right ascensions and declinations here given may be used without appreciable

error for azimuths and latitudes, and even for longitude the error due to using these elements would seldom exceed a mile. When greater accuracy is required the navigator should use the Admiralty *Nautical Almanac* for the year, where the right ascensions and declinations of these and many other stars are given very minutely for every ten days throughout the year.

TABLE XI.—APPROXIMATE APPARENT TIMES OF THE MERIDIAN PASSAGES OF THE PRINCIPAL FIXED STARS (pp. 304-306)

The times are given in this table for the 1st of each month and the meridian of Greenwich. To find the time for any other day, subtract the portion of time corresponding to the day of the month in the day-correction table. Add 1 min. for every 90° of east longitude, and subtract 1 min. for every 90° of west longitude.

The time of the meridian passage of each star has been carefully calculated to the nearest second of time for the year 1910, and is given in the table to the nearest minute.

For the circumpolar stars which never set in higher latitudes than 50° N. or S. the times of the meridian passages of the *inferior* as well as the *superior* transit have been given.

Example and Caution in using this Table

Required the meridian passage of * β Centauri on 31st October, in longitude 10° W.

Mer. pass. of * β Centauri on 1st Oct. is

Cor. for 31st day

Approx. time
2nd cor. required

Approx. mer. pass. * β Centauri

H. M.

1 30 P.M.

1 52

D.

21 23 38=11 38 a.m. on 1st Nov.

- 4

D.

31 23 34 or 11 34 a.m. on 1st Nov.

The interval in this case is within 2 hours of 31 days instead of 30 days, therefore nearly 4 minutes more correction is required to be subtracted. The correction for longitude would be less than 10 seconds.

The table is calculated for the year 1910, but will be within 2 min. for many years, with the single exception of the * Polaris, which has an annual and increasing change in R.A. of over 27 s., and will therefore be about 5 min. later in passing the meridian in 10 years' time.

TABLE XII.—ALPHABETICAL LIST OF 30 OF THE BRIGHTEST STARS WHOSE REDUCTION TO THE MERIDIAN AND AZIMUTH HAS BEEN CALCULATED AND TABULATED IN THE FOLLOWING PAGES. ALSO THE ORDER OF THESE STARS IN R.A., GIVING THE SIDEREAL TIME OF STAR'S MERIDIAN PASSAGE ABOVE AND BELOW THE POLE FOR THE CIRCUMPOLAR STARS (p. 307)

This table will be useful for reference in quickly determining which are the most suitable bright stars for latitude, longitude, azimuth, or position-finding from combined observations of two or three stars.

TABLE XIII.—REDUCTION TO THE MERIDIAN FOR * POLARIS, 1915

This table (page 308) has been calculated for star's declination in 1915, and shows at a glance the reduction to the meridian required for every 10 m. of hour-angle and every 10 m. of latitude from 10° N. to 60° N. latitude.

Examples in the use of the table are given at foot of page under the table.

TABLE XIV.—STAR POLARIS AZIMUTH TABLE (p. 309)

The true bearing to the nearest decimal of a degree is given in this table for every 20 m. of hour-angle from 0° to 60° N. latitude. The declination of the star for the year 1915 was used in the calculation of the azimuth. The table is especially useful between 10° N. and 30° N., as for instance in the Red Sea. In a high latitude the altitude will be too high for compass correction work. It is therefore not given beyond 65° of latitude.

TABLE XV.—REDUCTION TO THE MERIDIAN AND AZIMUTH TABLES FROM 1 HOUR TO 3 HOURS FROM THE MERIDIAN ABOVE AND BELOW THE POLE OF 26 OF THE BRIGHTEST STARS (pp. 310-411)

These tables give at sight the reductions and azimuths of 29 of the brightest stars from about I hour to 3 hours from the meridian above and below the Pole. The reduction must be added to the altitude to reduce it to the meridian above the Pole, and subtracted from the altitude to reduce it to the meridian altitude at the inferior transit.

The azimuth will always be of the same name as the latitude at the inferior transit, and North or South at the superior transit according to whether the star's declination is

North or South of the observer's latitude.

It is hoped that these tables will induce navigators to establish a habit of regular and

systematic observation of stars for position-finding at twilight.

The reduction taken out at sight to the nearest couple of minutes, and applied to the calculated meridian altitude, would give the approximate altitude for setting on the sextant, and the bearing which is given on the same page will give the direction in which to There will be no need of star maps or celestial globes, as the altitude and bearing of

the star will positively determine its identity.

The reductions which have been tabulated to the nearest tenth of a minute have been calculated to the nearest hundredth part of a minute. Most of them were calculated with Shortrede's seven-figure logarithm table, using the star's declination corrected to the nearest second of arc for the year 1920. The below-Pole reductions up to 1 h. 15 m. from the meridian which were calculated at an earlier date, and first published in 1908, have been calculated for the year 1910. The difference would seldom amount to as much as o'·1. The results have been carefully checked by differences of both time and latitudes, and can therefore be relied on for close accuracy.

The formula used in the calculations for the reduction tables is that deduced from dropping a perpendicular on the hour-circle from Z at N inside or outside the usual spherical triangle PZD, using the supplement of P. (H.A.) for below-Pole hour-angles. Then PN (arc $_{\rm I}$)=cos P . tan ZP.

ND (arc 2) = $NP \pm PD$.

 $Cos ZD = cos PZ \cdot cos ND \cdot sec NP$.

Reduction = $ZD \sim MZD$.

TABLE XVI.—ALTITUDE CORRECTIONS OF SUN AND STARS, AND ACCELERATION TABLE (pp. 412-413)

This table (the upper half for the sun, and the lower half for the stars) gives the lump correction to apply to their observed altitudes, involving for the sun dip, refraction, semidiameter, and parallax, and for the stars dip and refraction.

As the correction for very small altitudes changes rapidly, a supplementary table is given on page 413 for the correction of both sun and stars, at a height of 40 feet above sea-level, for altitudes between 3° and 11°, for every few minutes of altitude, and for other

heights greater or less than 40 feet a second correction is given in same table.

Heights are given from 6 feet to 80 feet, so as to meet the need of navigators in every class of vessel, from the smallest to the largest. As standard authorities still slightly differ in their dip and refraction tables, a mean of the dip and refraction given in the three standard works (Raper, Inman, and Norie) has been used in the calculation of the table here given, and great care has been taken to ensure accuracy.

TABLE XVIa.—ACCELERATION TABLE (p. 412)

This table is used for converting intervals of mean solar time into equivalent intervals of sidereal time. The seconds column which is given in most navigational tabular works has here been omitted for the sake of space, and because it is considered quite unnecessary in ordinary practical navigation. In practical navigation it becomes necessary in nearly all the problems where stars are used to convert mean solar time into sidereal time, as, for instance, in the time azimuth, longitude by chronometer, and the ex-meridian problems. In these problems the time is generally taken by a chronometer keeping mean solar time, and to compare this with the sidereal time found by the stellar observation it must be reduced to sidereal time.

Examples will be found among some of the worked-out problems following these explanations.

GENERAL REMARKS, RULES, AND EXAMPLES

GENERAL REMARKS ON THE DOUBLE-ALTITUDE AND "SUMNER" PROBLEM

Many navigators undervalue Sumner's method in low latitudes: first, because of the small change of bearing between the usual times of taking the observations; and secondly, because with a high altitude the circle of altitude or line of position is not to the same extent a straight line on the chart. Those who do not think for themselves are further confirmed in the very common impression which one has so often heard expressed about the uselessness of attempting to get a "Sumner" position in low latitudes, owing to the practice of those who are responsible for setting the papers for the Board of Trade examinations for masters and mates in confining all their examples within the parallels of 46° to 52° of N. or S. latitudes, and compelling candidates to work the "Sumner" problem by the calculation of four hour-angles, plotting the position between two parallels of latitude instead of by the briefer, more accurate, and up-to-date method of working by positionlines taken from azimuth tables, and making the starting-point either from the meridian or parallel of latitude, according to whether the sun is nearest the meridian, or prime vertical. Naturally, all the navigational guide-books for candidates follow suit, and in consequence comparatively few officers in the merchant service know anything about utilising a position-line from an ex-meridian observation, or from the "intercept" of the altitude, as used in the Marcq St Hilaire method.

Some of the problems in this work have been purposely given in low latitudes and with very high altitudes, and it will be seen that a perfectly accurate result is obtained with an altitude as high as 89° and 37° from the meridian, when the same problem worked by the above-mentioned method would be as much as 9' in error in the latitude. If observations are used intelligently, accurate "Sumner" positions may be obtained in any latitude, and no altitude need be considered too high—the only consideration is to make sure that the sun has changed sufficiently in bearing to make a good "cut" of not less than 40°, and, to ensure this, one of the observations should be made within half an hour of noon when in the tropics. In the winter months an hour from noon will sometimes give a sufficiently large angle to make a satisfactory "cut"; but when the observer is nearly under the sun, one of the observations should be taken within a few minutes of noon, and under such conditions a right-angle "cut" may sometimes be obtained within an interval of five to

ten minutes, by A.M. and P.M. observations.

The writer has served a great deal of his sea time in low latitudes, and never found any difficulty in getting good reliable positions from double-altitude observations, although in those days, to the best of the writer's knowledge, there were no ex-meridian tables published which would give a reliable latitude when the sun was over 30° from the meridian. He may, however, be wrong in this surmise, as, notwithstanding the fact that at least three or four such tables are now on the market, a very well-known and up-to-date author of nautical works, as lately as 1913, considered that an altitude of a star which was only 22° from the meridian was an impossible ex-meridian. On page xxxviii of this work an example is given where position of ship is accurately determined by these tables from two ex-meridians, one of them being over 70° from the meridian, and the proof of the accuracy of the determination is verified by other methods.

In obtaining the latitude by the double-altitude or "Sumner" method, it is best if the observations are taken on the same side of the meridian for the same person to observe both; and generally the truest *latitude* will be found if both observations are taken on the *same* side of the meridian, as it is probable that if for any reason the altitude is observed too high, or too low, the same thing will occur in both observations. For the same reason the truest *longitude* will be found from observations taken on *different* sides

of the meridian.

REMARKS ON THE POSITION-LINE AND "SUMNER" PROBLEM IN CONNECTION WITH EX-MERIDIANS

Although most navigators are now fully alive to the value of the position-line in connection with the longitude by chronometer, the value of the position-line in connection with the latitude by ex-meridian is seldom presented in works of navigation. It is generally supposed that an ex-meridian, if taken within a certain time from noon, will give a correct latitude, and that therefore the ship's line of position is anywhere on that parallel of This, however, is only the case when the ship time (which depends on the latitude. longitude) is nearly correct.

The further the object is in bearing away from the meridian, the greater will be the

error due to an error in the time. (See Table IX., pp. 300-301.)

The time, however, might be uncertain to 4 or 5 minutes, and yet the ex-meridian observation may be of great value in connection with the position-line, either when near the land by combining this line of bearing with some sounding (see p. lii), or bearing of the land, or by combining it with another astronomical position-line, as in the "Sumner" When the body which is used as an ex-meridian is within the limits of exmeridian tables, an accurate latitude for a particular meridian may be obtained with very few figures. For cases where the body is outside the usual ex-meridian limits the formula here given (pp. xxv-xxvii) will give a correct latitude for any time from the meridian corresponding to the true hour-angle of the sun, or other heavenly body, and the latitude on an approximate D.R. longitude will give the starting point for the position-line, which these tables give, cutting this longitude meridian at that latitude.

It is very generally believed by navigators than an observation taken near the meridian is of no use in connection with the "Sumner" problem. To some extent this is true when the problem is worked by the usually taught methods and the D.R. latitude is much in error. I have endeavoured to show by the following examples how the ex-meridian problem may be combined with the chronometer observation in the "Sumner" problem; and, if this is done, it matters little how the sun or stars bear when the observations are taken, provided there is a suitable difference in bearing (say 3 points or more) between the

two position-lines.

The ex-meridian and star reduction tables in this work enable the navigator to very readily obtain his position from two ex-meridians or by an ex-meridian and chronometer observation, which may be worked as a double altitude, or plotted on the chart, just as accurately and even more rapidly than it could be worked from two chronometer observations. Tables of still wider limits by Blackburne and Westland were published by the

New Zealand Marine Department in 1908.

When observations are taken at the best possible time—shortly before sunrise and after sunset, when probably only three or four of the brightest stars are visible—we cannot expect always to get two stars sufficiently far from the meridian and prime vertical as is considered by some necessary (vide *Wrinkles*, 9th ed., p. 514) for a satisfactory double altitude to be worked on the "Sumner" principle. However, if advantage is taken of the methods shown in the following examples it will be seen how little this matters. The only necessary condition of importance to ensure good results is that the stars should be sufficiently far apart in bearing to give a good cut; and if one observation be near the prime vertical, and the other one near the meridian, the writer would say so much the better, rather than that this should be looked upon as an objection.

By the following formula a true latitude may be calculated when the correct hourangle is known, and if an approximate longitude is used for finding the hour-angle, the latitude and position-line from this meridian is just as valuable as any position-line drawn

from a given longitude on a D.R. parallel of latitude.

FORMULÆ FOR CALCULATION OF LATITUDE BY EX-MERIDIAN WHEN OUTSIDE THE LIMITS OF EX-MERIDIAN TABLES

Case No. 1.—Object above the Pole. Angle at Z (= bearing of object) more than 90° reckoned from observer's Pole.

In the spherical triangle ZPD, let ZP=co. lat., ZD=co. alt., and PD=P. Dist.

Given ZD, PD, and angle at P: to find PZ=co. lat.

From D drop a perpendicular on the meridian at M, then in the right-angled spherical triangle PMD we have PD and angle at P to find PM=arc (1).

Formula:—Cos $P = \tan \operatorname{arc}(I)$. cot PD : $\tan \operatorname{arc}(I) = \cos P$. $\tan PD$.

Next find ZM = arc (2).

In the spherical triangle PMD, cos PD = cos arc (1). Cos MD.

...
$$\frac{\text{Cos (2)}}{\text{Cos (r)}} = \frac{\cos ZD}{\cos PD}$$
 ... $\cos (2) = \cos (1)$. $\cos ZD$. $\sec PD$.

PZ co. lat. = arc (1) - arc (2).

Case No. 2.—Angle at Z less than 90°. Same formula as in previous case, but PZ = arc(1) + arc(2).

CASE No. 3.—Object below the Pole. In the spherical triangle PMD, angle at P = supplement of hour-angle.

Then follow the same formula as in Case No. 1.

PZ (co. lat.) = arc (2) - arc (1).

By using the complements of PD and ZD and complement of PM for arc (1) when the object is above the Pole, or complement of ZM when object is below the Pole, the formula may be arranged as follows, and the rule as below applied:—

OBJECT ABOVE THE POLE

Cot arc (1) = $\cos H.A.$, cot decl.

Cos arc (2) = cosec decl. . sin arc (1) . sin alt.

Name arc (1) same as decl.

Name arc (2) contrary to bearing of object—i.e. N. or S. of the prime vertical.

Add like and subtract unlike names. Sum or difference of arc (1) and arc (2) = latitude.

OBJECT BELOW THE POLE

Tan arc (1) = \cos supplement of H.A. . \cot decl.

Sin arc (2) = cosec. decl. . cos arc (1) . sin alt.

Name both arc (1) and arc (2) same as the decl.

Latitude = sum of arc (1), and arc (2) always named same as decl.

Note.—It is not advisable to use the formula here given when the declination of object is within 3° or 4° N. or S. decl. If it is then used, six-figure logarithms should be taken out and the corrections made for odd seconds of arc.

In the above-mentioned case it is recommended to calculate arc (2) after the azimuth has been calculated by the following formula as deduced from the spherical triangle MZD, viz.:—

Above-Pole Observation.—Tan arc (2) = $\cos Z$. \cot alt.

Below-Pole Observation.—Cot arc (2) = $\cos Z$. \cot alt.

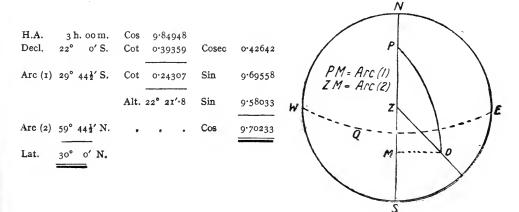
As the azimuth is nearly always required to make use of an observation taken out of the meridian, this last-mentioned formula is preferred to the foregoing one, and is in the writer's opinion the best formula for an ex-meridian latitude that he knows of. For accuracy the azimuth should be calculated by the following formula:—

Sin azim. = sin H.A. . cos decl. . sec alt.

CALCULATION OF EX-MERIDIAN LATITUDES. No. 1 METHOD

Examples to Illustrate Each Case

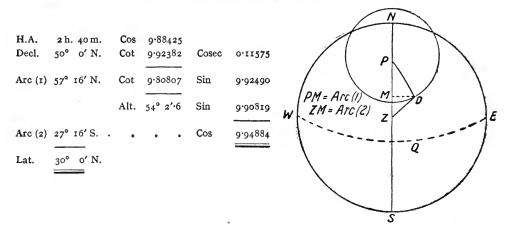
CASE No. 1.—H.A. 3 h. 00 m., decl. 22° 0' S., alt. 22° 21'.8 S.Ely.



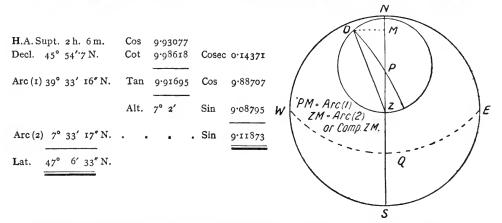
xxvi

EXPLANATION AND USE OF TABLES

CASE No. 2.—H.A. 2 h. 40 m., decl. 50° N., alt. 54° 2'.6 N.Ely.



Case No. 3.- * Capella, H.A. 2 h. 6 m. from lower Pole, decl. 45° 54'.7 N., alt. 7° 2' N.W. (see p.xlviii)



The accuracy of this method may easily be proved by reversing the process, and finding the hourangle from the latitude, declination, and altitude given.

Case No. 3 is especially useful, as with high declination stars the latitude will generally be fairly correct even when the time is in error a couple of minutes, and the body observed is an hour or more from the meridian below the Pole, as may be seen by a glance at the Reduction Tables of some of the high declination stars.

FORMULÆ FOR CALCULATION OF EX-MERIDIAN LATITUDES WHEN AZIMUTH IS KNOWN. No. 2 METHOD

PREVIOUS EXAMPLES WORKED BY THIS ALTERNATE METHOD

Arc (1) is calculated as shown in the preceding examples, and from the foregoing figures it will be apparent that Arc (2) ZM may be found from the right-angled spherical triangle MZD by the following formula:—

Above-Pole Observations . . . Tan Arc (2) = Cos Z · Cot Alt. Below-Pole Observations . . . Cot. Arc (2) = Cos Z · Cot Alt.

Note.—The Supt. of the hour-angle is used for the below-Pole observations, and for convenience of the rules and arrangement of the formula, Comp. of ZM is called Arc (2) in the deduced formula used.

Case No. 1.—H.A. 3 h. 00 m., decl. 22° 0' S., alt. 22° 21'.8 S.Ely.

H.A. Decl.	3 h. oo m. 22° o' S.	Cos Cot	9·84948 0·39359	Alt. 22° 21′·8	Sin Cos	9·8495 9·9672	Azim. Alt.	45° 9′ 22° 21′·8	Cos Cot	9·84835 0·38571
Arc (1)	29° 44½′ S.	Cot	0.24307	Azim. 45° 9′			Arc (2)	59° 44½′	Tan	0.23406
Arc (2)	59° 44½′ N.			712mi. 45 9	SILI	9 0300				

Lat. 30° 0′ N.

Case	No. 2.—H.A. 2 h. 4	o m., e	iecl. 50° o' N	N., alt. 54° 2′·6 N.E ¹	У.			
H.A. Decl.	2 h. 40 m. 50° o' N.					9·8081 9·8081		
Arc (1)	57° 16′ N.		.9.80807	Alt. 54° 2'.6	Sec	0.5315	Cot	9.86057
				Azim. 44° 43½'	Sin	9.8474	Cos	9.85156
Arc (2)	27° 16′ S.					Arc (2) 27° 16′	Tan	9.71213
Lat.	30° o' N.							
Case No. 3.—H.A. 2 h. 6 m. from lower Pole, decl. 45° 54'·7 N., alt: 7° 2' N.W ^{ly} .								

The foregoing formulæ for finding the latitude and azimuth when the body is far from the meridian is, in the writer's opinion, the very best known to him, and would be hard to beat.

Half of the logs are taken out at the same openings, and four figures of logs for the azimuth is amply sufficient.

AN INTERESTING EXPERIENCE OF EXCESSIVE REFRACTION

A few years ago an old pupil of the writer, Captain W. H. Sweny, then commanding the P. & O. s.s. Mooltan, had a remarkable experience of exceptional refraction on the evening before making Rottnest Light. He took observations of four different stars at about 6 p.m. on April 11th, 1910, and afterwards sent to the writer his own observations, asking him to work them out, and let him know what he made the resulting position, but without divulging what he made the result by his own calculations. This was done, and the observations were systematically worked on the plan mentioned at bottom of following page; and when Captain Sweny afterwards sent the results of his work, both observations were in agreement, and evidently not more than about I' in error in either latitude or longitude. The Captain also sent the worked-out observations of the other two officers, and from all these observations the writer was able to deduce fairly accurate separate positions, and it was evident from these observations that refraction was excessive all round the horizon, but greatest to the northward, where it was about 11'0, and in other parts of the horizon averaging about 6\frac{3}{4}', the altitudes being smaller by these amounts than they should have been by allowing the usual tabular corrections. The height of eye when these observations were taken was 50 feet. If the captain had been satisfied with the ex-meridian observations of Procyon and Pollux, and the longitude of & Centauri, he would have been 11' or 12' out in the latitude and 33' out in the longitude. By using the observations intelligently he was practically correct in his position, and made Rottnest Light nearly ahead at 2 a.m. His position at the time was about 30° 4' S. and 113° 47′ E.

The above-related experiences, though undoubtedly very exceptional, should tend to warn navigators not to trust too implicitly even in daylight to observations taken on one side only of the meridian or prime vertical; for though such excessive refraction is very rare, and may not be experienced in the lifetime of a frequent observer, it is probable that such amounts as 2' difference from the tabulated value of refraction are not uncommon.

REMARKS ON P.M. OBSERVATIONS

Anyone who is in the habit of regularly taking p.m. sights must have noticed the large differences which sometimes occur between a.m. and p.m. observations, which is generally attributed to current, and some men have even been led to believe from this that p.m. sights are not of any value, as though the sun—or, rather, the earth—did not move as uniformly in the afternoon as in the forenoon. The principal difference between the results of the two observations is probably generally due to erroneous altitude, especially in rough weather, and sometimes, of course, to erroneous latitude, and the mean of the results from the two observations will generally be nearest the true position. It has often been noticed when there is a heavy sea on that p.m. sights place the longitude a long way to the eastward of the a.m. ones, owing probably to the sun being observed on the top of a wave, and consequently the altitude being too small, an error which in the morning would place the ship to the westward of the true position, but in the afternoon just as much to the eastward of it; so that, supposing the ship to be in latitude 48° and the sun to be 30°

from meridian at each observation, an error in the latitude of 2' too little on both occasions would make a difference of 12' of longitude, as may be seen from Table III., on page 256. Suppose, then, that on the same occasion both observations have been worked with an error of 2' south of the true latitude: this would make another difference of about 10½' of longitude, making the p.m. sights 22½' of longitude to eastward of the a.m. observation, and a slight easterly current in the interval between the two observations might easily make over 30' difference. Generally, no doubt, one of these errors will in a measure counteract another, but exceptional occasions are almost sure to arise when they will all combine in the same direction.

EFFECT OF ALTITUDE ERRORS

With a.m. sights too great an altitude will place a ship to eastward of true position, and *vice versa* with p.m. sights and too small an altitude. The amount of error in longitude or time due to 1' error of altitude is shown in Table III., pages 252-257.

THE UNRELIABILITY OF NOON POSITION FROM SUN OBSERVATIONS

The usually recorded noon position should never be relied on too implicitly, as it is generally liable to be a few minutes in error, and this may happen when three or four persons have taken observations and are all in agreement. The very agreement of so many observers would only give a false confidence, which is the more dangerous as there is no opportunity with the sun observation (except when near land) of checking it and thereby determining the error. Many well-known authorities, however, have recorded their experience of errors in the latitude from sun observations, due to excessive refraction, as amounting to from 7' to 18' (see page 132 of Tables for Azimuths, etc., by Blackburne, and experience mentioned on previous page). Such refraction, however, is undoubtedly very exceptional: the greatest error in the noon latitude that the writer ever experienced was 7'—this was in the Malacca Straits; three observers on this occasion making the altitude practically the same, and at I p.m. the ship was abreast One Fathom Bank Lighthouse. It must be remembered also that the so-called noon longitude generally depends on an observation taken at about 8 a.m. or 9 a.m., and the calculation of the time from this observation is often made with an erroneous latitude, thereby giving a wrong result; and currents, or bad steering, etc., may again combine to still further throw the position out. In the winter months I' of error in the latitude used for the calculation of the time will often throw the longitude out as much as 2'. As the results of errors of both altitude and latitude are reversed with p.m. sights, it would be a good plan to adopt in recording the noon longitude to wait until p.m. sights had been taken for longitude, and then to take the mean of the a.m. and p.m. results, worked up to noon, as the true noon longitude.

As shown, however, in the lower part of this page, with the position obtained by simultaneous observations of three stars, errors resulting from uncertainty of refraction, etc., may be eliminated. The horizon shortly after sunset is generally very clearly defined, without any glare; and the latitude and longitude are obtained at the same instant of time. If shipowners made it compulsory for their officers to obtain the ship's position, whenever possible by stellar observations at twilight, it would, I believe, be the means of saving many ships from disaster, and the saving of not a few lives.

THE SUPERIORITY OF STELLAR OVER SOLAR OBSERVATIONS

The two great advantages of stellar over solar observations are: (1) that by the stars the latitude and longitude can be obtained simultaneously, instead of having an interval of three or four hours between the observations, as is often the case when the sun is used; and (2) that uncertain errors in altitude resulting from personal equation, arc errors of sextant, or exceptional refraction may be practically eliminated by a proper choice of If meridian altitudes can be obtained about the same time to the north and south of observer, it will be apparent to anyone that the errors would be eliminated by taking the mean result of the two observations for the true latitude; and in the same way the true longitude would be found by the mean result of observations taken nearly east and west of meridian. But it may happen that stars are not to be found north, south, east, and west of observer during the short time that the horizon is good for observation. The following is the plan that the writer used for several years with great success:-Take three stars, and of these choose two on the same side of the meridian northward and southward of the observer for a good *latitude*. If they both happen to be the same distance from the meridian, as in the example on page 114 of Blackburne's 1916 edition of Tables for Azimuth, etc., 10' of error in the altitude will make practically no difference in the resulting latitude as found by the "Sumner" or double-altitude problem. Then choose another star on the other side of the meridian, as near as possible the same distance from the meridian; calculate the longitude with the latitude found from the previous observations, and the true longitude will be obtained by taking the mean between the eastern and western stars worked with the correct latitude.

On pages 114 and 115 of the work previously mentioned three stars were taken, and the altitude of each star was 10' in error (too great); but following the plan above mentioned, the calculation of ship's position was made, and did not differ more than o'·1 in either the latitude or longitude from the *correct* position as determined from the correct altitudes of the same three stars.

RULE FOR FINDING THE POSITION OF SHIP FROM TWO OBSERVATIONS BY AID OF THESE TABLES EITHER WITH OR WITHOUT THE USE OF CHART

From Two Chronometer Observations of the Sun

(1) Let two chronometer observations be taken at an interval in time during which the sun has changed at second observation not less than three points, and let the first be worked out with the D.R. latitude at the time of observation, or generally the nearest whole degree of latitude may be used.

(2) Let the D.R. latitude and longitude thus obtained be corrected for the run of the ship in the interval between the observations, and let the second observation be worked

with the corrected latitude. Name these longitudes (1) and (2).

(3) With the hour-angle, latitude, and declination at each observation take out the lat. var. from the lower half of the page, and name the position-lines corresponding to this variation according to the instruction under the heading of Table No. VI. This variation divided by 4 gives the error in longitude due to 1' of error in latitude.

When both Position-Lines go through the Same or Opposite Quadrants

(4) The difference between the two $\frac{\text{lat. vars.}}{4}$ will give the difference in the resulting longitudes due to \mathbf{r}' of error in the latitude. (See fig. 2 below.)

WHEN THE POSITION-LINES GO THROUGH ADJACENT QUADRANTS

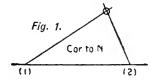
(5) The sum of the two vars. will give the difference in the resulting longitudes due

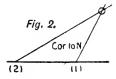
to 1' of error in the latitude. (See example on page xxxi and fig. 1 below.)

The three elements used in the calculation of time, or longitude, are altitude, latitude, and polar distance. Presuming that the altitude and polar distance are correct, the resulting difference in longitude between the two observations must be due to error in the latitude. The sum or difference of the two lat. vars. ÷ 4 gives the difference of longitude in the two observations due to 1' of error in the latitude used in the calculation, and the amount of error in the latitude will therefore be found by a simple proportion sum (see page xxxi), from which it will be seen that the error or correction to be applied to the D.R. latitude will be found by dividing the difference between longitudes (1) and (2) by the sum or difference of the variation corrections. It must be applied to the latitude used in the last observation, and to the N. or S. according to whether the position-lines cut one another N. or S. of the D.R. latitude used in the calculation. The true longitude is then found by multiplying either of the lat. vars. by the latitude error, and applying the

correction according to the trend of the position-line.

To prevent the possibility of making a mistake in the application of the correction to the latitude, a short horizontal line representing the parallel of D.R. latitude may be drawn with a free hand in the work-book; on this line put down longitudes (1) and (2), and roughly draw the position-lines through each longitude, following the rule for naming the position-lines given on page 270, under the heading of Table VI., also bearing in mind that if the line runs in a north-easterly direction it is equally true that the line must also run in the opposite direction or south-westerly. No scale for longitude need be used, or protractor for laying down the bearings, but simply put longitude (1) or (2) to the right or left of the other, as they are to the east or west of one another, then draw the general trend of the position-lines through these two longitudes, thus:—





FOR STELLAR OBSERVATIONS

When finding the position of ship from stellar observations, it is best to observe the altitude of *two* stars which have a considerable difference in bearing from one another, and to take both observations within a few minutes of the same time. If the ship has not appreciably changed her position during the interval between the observations, both observations may be worked with the same latitude, and no correction for run need be applied to the first-observation latitude or longitude. Otherwise the same rules apply as for the observations by the sun.

When the ship has appreciably changed her position during the interval between the

observations, rules Nos. 1 and 2 must be observed as in the sun observations.

From Ex-Meridian and Chronometer Observation Combined, to Plot on Plane Chart

Let two observations be taken with a suitable difference in bearing between them, and let the one nearest the prime vertical be used for a longitude (working it with the D.R. latitude), and the other one for a latitude, using the time deduced from the longitude found by observation in the calculation for latitude; bring both results up to the same instant of time by applying the run in interval between the observations.

Take out the lat. var. for each observation, and with this enter Table VI., page 270, and take out the corresponding position-lines. We have then two latitudes and their corresponding position-lines starting from different points on the same meridian. Where these

lines cut with one another on a plane chart will be the position of the ship.

For the ex-meridian observation, or if outside the limits of the Calculated Hour-Angle Table, the lat. var. must be found from Table IV. (Azimuth Table) from the approximate latitude and azimuth.

From Two Ex-Meridian Observations on Different Sides of the Meridian

Let two observations be taken with a suitable difference in bearing between them, one east and the other west of the meridian, deducing the hour-angle by applying the equation of time and longitude by D.R. Bring both results up to the same instant of time by applying the run in interval between the observations. The latitude from either observation (if worked by a correct method) is the latitude where the circle of altitude of the body observed cuts the meridian used in deducing the time. If both latitudes agree when observations have a considerable difference in bearing between them, the longitude must be correct. If the latitudes do not agree, the true latitude and longitude may readily be found by plotting on the chart, or by the method explained below.

WITHOUT THE AID OF CHART

By aid of Table IX. giving the Error in Latitude by Ex-Meridian due to 4 sec. Error in Time, or 1' of Longitude

By the aid of the above-named table the double-altitude problem may be worked from the meridian, on the same principle as two chronometer observations are worked from a parallel of latitude. If the azimuth is not over 85° (the limit of the table), the problem may be worked from the meridian with either an ex-meridian and chronometer observation combined or from two ex-meridians.

When both observations are on same side of meridian, the difference between the two errors in latitude, due to 1' of error in the longitude, taken from the table, will be the divisor for the two differences of latitude resulting from the two observations, and will give the

correction for the longitude used.

When one observation is east and the other west of meridian, the error of longitude will be found by dividing the differences of latitude resulting from the two observations by the sum of the factors taken from the table. The error in latitude will then be found by multiplying the error in longitude by the correction taken from the table (in preference using the azimuth nearest to the meridian) and applying this to the ex-meridian latitude in the direction of the trend of the position-line, which is always at right angles to the bearing of object.

When the altitude is high and near the meridian the azimuth should be obtained by the time and altitude. This is most satisfactorily done by the rule of sines. (See examples on pages xxxii, xxxiv, xxxvi, etc.)

For examples from chronometer and ex-meridian observation see pages xxxii, xxxiv,

xliv, xlvii.

For examples from two ex-meridian observations see pages xxxvi, xxxviii, xlii, xlviii, xlix, l.

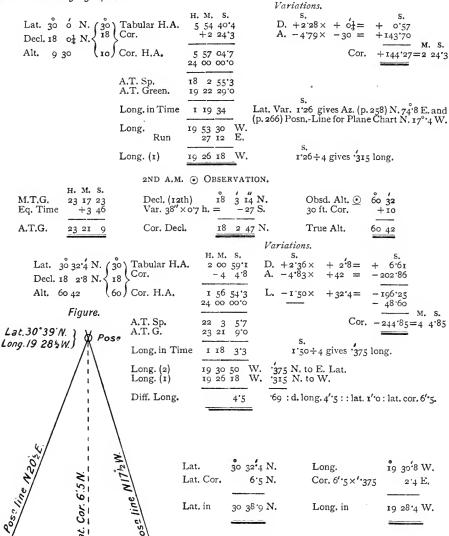
For examples from two longitude observations see pages xxxi, xlvi. For examples by equal altitude and ex-meridian see pages xxxvii, li.

EXAMPLES IN THE USE OF THE TABLES

POSITION FROM TWO A.M. LONGITUDE OBSERVATIONS OF THE SUN

1913.—On May 12th, a m. at ship, in approximate lat. 30° N. and long. 20° W., observed alt. of sun's L.L. was 9° 25' when a chronometer indicated M.T. Green. 19 h. 18 m. 43 s.; and again a.m. at ship, observed alt. of sun's L.L. was 60° 32' when chronometer indicated 23 h. 17 m. 23 s. Course and distance run between observations, N. 36°, E. 40 m.; height of eye, 30 ft. Required position of ship at 2nd Observation, and Azimuth at time of 1st Observation.

Course and distance run between observations N. 36°, E. 40 m.=32'·4 N., 23'·5 E.=d. long. 27'2 E. gives lat. at 2nd Observation 30° 32'·4 N.



xxxi

19°26'3W

var. 1'50 gives Azim. S. 72'0 E. and Posn.-Line for Plane Chart N. 20½° E.

Lat. 30'32'4 N. Long. 19 30.8W.

Cor. 2:4E

FOR STELLAR OBSERVATIONS

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xliv, xlvii.

For examples from two ex-meridian observations see pages xxxvi, xxxviii, xlii, xlviii, xlix, l.

For examples from two longitude observations see pages xxxi, xlvi. For examples by equal altitude and ex-meridian see pages xxxvii, li.

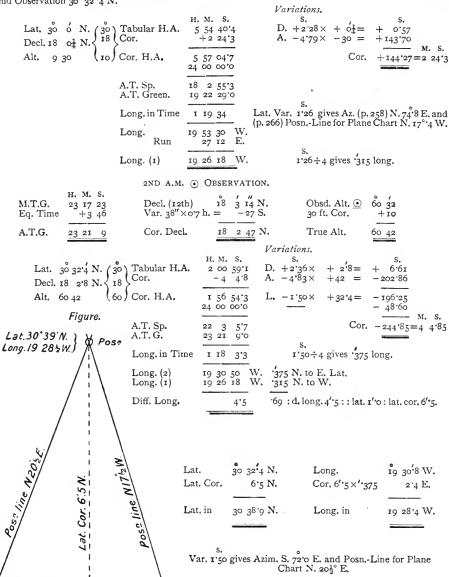
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1913.—On May 12th, a m. at ship, in approximate lat. 30° N. and long. 20° W., observed alt. of sun's L.L. was 9° 25' when a chronometer indicated M.T. Green. 19 h. 18 m. 43 s.; and again a.m. at ship, observed alt. of sun's L.L. was 60° 32' when chronometer indicated 23 h. 17 m. 23 s. Course and distance run between observations, N. 36°, E. 40 m.; height of eye, 30 ft. Required position of ship at 2nd Observation, and Azimuth at time of 1st Observation.

M.T.G.
$$\begin{array}{c} \text{H. M. S.} \\ \text{19 18 43} \\ \text{Eq. Time} \\ \begin{array}{c} +3 \ 46 \\ \end{array} \begin{array}{c} \text{Decl. (12th)} \\ \text{Var. } 38'' \times 47 \text{ h.} \\ \end{array} \begin{array}{c} \overset{\circ}{18} \overset{\circ}{14} \overset{\circ}{14} \overset{\circ}{18} \overset{\circ}{18} \overset{\circ}{14} \overset{\circ}{18} \overset{\circ}{18} \overset{\circ}{14} \overset{\circ}{14} \overset{\circ}{18} \overset{\circ}{14} \overset{\circ}{14} \overset{\circ}{18} \overset{\circ}{14} \overset{\circ}{18} \overset{\circ}{14} \overset{\circ}{18} \overset{\circ}{14} \overset{\circ}{18} \overset{\circ}{14} \overset{\circ}{14} \overset{\circ}{18} \overset{\circ}{14} \overset{\circ}{14$$

Course and distance run between observations N. 36°, E. 40 m.=32'·4 N., 23'·5 E.=d. long. 27'2 E. gives lat. at 2nd Observation 30° 32'.4 N.



19°26'3W *xxi

Lat 30'32:4 N.

Long 19 30.8W.

Cor. 2:4E

H.A.

0 44 25.3

Position by Chart, Lat. 46° 30′·5 N., long. 14° 40′·5 W.* True Posn. by Spherics, 46° 30′ 20″ N., long. 14° 41′·0 W.

"SUMNER" PROBLEM AS GIVEN IN THE BOARD OF TRADE EXAMINATIONS FOR MASTERS AND MATES, WORKED BY THE AID OF DAVIS'S CHRONOMETER TABLES AND BLACKBURNE'S EX-MERIDIAN TABLES

1898.—On June 20th, a.m., at ship, at sea, and uncertain of my ship's position: when a chronometer indicated M.T. Green. 19 d. 22 h. 30 m. the true altitude of sun's centre was 52° 9'; and again, a.m. on same day, when chronometer indicated 20 d. 0 h. 16 m. the true altitude of sun's centre was 65° 18', the ship having made 23 miles on a true N. 24° E. course during the interval between the observations. Required the line of position and true bearing of the sun at time of 1st Observation, and the position of the ship when 2nd Observation was taken, assuming latitudes 46° N. and 47° N.

Variations.

Arc (2)

Arc (1)

Lat.

22 37.6 N.

23 50·8 N.

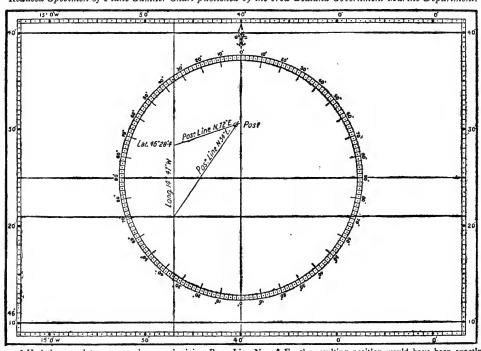
46 28·4 N.

LONGITUDE BY DAVIS'S CHRONOMETER TABLES.

Gives Tabulated H.A.

Lat. 46 6 N. 46 Decl. 23 27 N. 47 Sec. 46 Alt. 52 9 H.A.	D. H. M. S. 2 30 13 +1 57 -2 31 18·7 E.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
A.T. Ship. A.T. Green.	24 0 0 19 21 28 41·3 19 22 28 43·3	s. Lat. Var. 2.7 gives PosnLine for Plane Chart (p. 270) N. 34° E.
Long. in Time Long. Run d. long.	15 0 30 W. 13 36 E.	Run N. 24° E. $^{M.}_{23=21}$ N. 9'4 E.=13'6 d. long. Lat. (1) $^{46}_{23}$ o' N.
Long. (1) Long. in Time of	14 46 54 W. h. 59 m. 7.6 s.	Lat. D.R. 46° 21' N. at time of 2nd Obsn.
2ND OBSERVATION . S.I	Ely. For the Azz	imuth. Lat. by Ex-Meridian Table No. 3.
M.T. Green 20 0 16 0 Eq. T. —1 17.7	H.A. 44 m. 25 s. Decl. 23° 27' Alt. 65° 18'	Cos 9·962 Sec 0·379 Decl. 23 27 N. \ Arc Cor. + 0 23·8
A.T. Green. 20 0 14 42.3 Long. (1) -0 59 7.6		Sin 9.626 H.A. 44.4 m. $\begin{cases} Decl. & 23 & 27.0 \text{ N.} \\ Arc (1) & 23 & 50.8 \text{ N.} \end{cases}$
A.T. Ship 19 23 15 34.7		1Line Azim. 25 1 Arc Cor 2 4.4

Reduced Specimen of Plane Sumner Chart published by the New Zealand Government Marine Department,



* Had the true lat. var. 255. been used, giving Posn.-Line N. 32° E., the resulting position would have been exactly correct. Davis's vars. are calculated for the mid-interval, not as in these tables for the degree.

"SUMNER" PROBLEM AS GIVEN IN THE BOARD OF TRADE EXAMINATIONS

1898.—On June 20th, a.m., at ship, at sea, and uncertain of my ship's position: when a chronometer indicated M.T. Green. 19 d. 22 h. 30 m. the true altitude of sun's centre was 52° 9′; and again, a.m. on same day, when chronometer indicated 20 d. 0 h. 16 m. the true altitude of sun's centre was 65° 18′, the ship having made 23 miles on a true N. 24° E. course during the interval between the observations. Required the line of position and true bearing of the sun at time of 1st Observation, and the position of the ship when 2nd Observation was taken, assuming latitudes 46° N. and 47° N.

IST OBSERVATION.

2ND OBSERVATION.

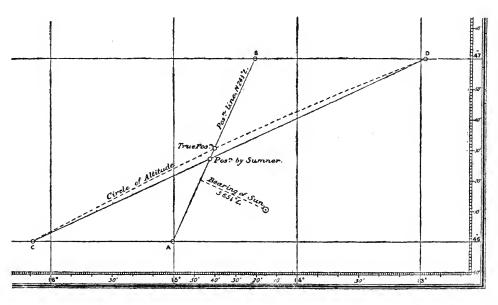
D. H. M. S.
19 22 30 0 20 0 16 0 Decl. 23 27 N.
Eq. of Time -1 16·7 -1 17·7 90 0

A.T. Green. 19 22 28 43·3 A.T. Green. 20 0 14 42·3 P.D. 66 33

Lat. 46 o N. Long. A. 15 o 31 W. Long. C. 16 18 51 W. , 47 o ,, B. 14 20 54 W. ,, D. 12 57 52 W.

Run between Observations N. 24° E. 23 miles was on line of first Position-Line.

Line of position N. 24½ E. Position at 2nd Obsn. Lat. 46 27 N. True Posn. Lat. 46 30 20 N. Sun's bearing S. 65½ E. Long. 14 43 W. Long. 14 41 0 W.



With the desire to show the superiority of the method advocated in these pages for accuracy and brevity over the method still employed in the Board of Trade examinations of masters and mates, for the "Sumner" problem, the above example is given and plotted on the chart by both methods. For the sake of better illustrating the possible error due to the old method, a wider range of latitude has been taken than is usually given in the examination papers, though, considering the high speed of some of the present-day steamers, the range is not excessive, as the run in interval itself might often amount to over r° of latitude. In the tropics, with a much smaller range of latitudes, the error resulting from considering the line of position of the higher altitude as a straight line will sometimes cause an error of half a dozen minutes or more in the latitude, as may be seen from the example on two following pages.

xxxiv

POSITION FROM CHRONOMETER AND EX-MERIDIAN OBSERVATION OF SUN, 2ND ALTITUDE OVER 88°

1913.—6th August, in latitude somewhere between 18° N. and 18° 40′ N., and approximate longitude when first observation was taken 69° 30′ E., between heavy rain squalls in the S.W. monsoon, the sun appeared for a few minutes at about 7 h. 48 m. a.m., and only showed himself for a short space a little after noon. G.M.T. at 1st Observation 15 h. 13 m. 19 s., when true altitude of \oplus was 30° 12′; and again at p.m. M.T.G. was 19 h. 26 m. 4 s., when true altitude of \oplus was 88° 10½ Sa. Run in interval N. 77° E. 56 m. gives 12′.6 N. 54′.6 E.=57′.4 E. d. long. Required the position of ship at time of 2nd Observation.

M.T.G. D. H. M. S. 5 15 13 19 Eq. of Time -5 49 A.T.G. 5 15 7 30	OF \odot A.M. T. Alt. \leftrightarrow 3° 1° Decl. 1° 5° 4° 0° N	M.T.G. Eq. of Time	OBSERVATION H. M. S. 19 26 4 -5 48 19 20 16	N OF \odot P.M. T. Alt. \oplus 88 10.5 S. Decl. 16 51 48 N.
Lat. 18 o N. 18 N. Decl. 16 54.7 N. 17 N. Alt. 30 12 Co	Tabular H.A. H. M. S. 4 12 55.1 r. —55.7	Decl. (de Alt. (exc	fect) - 5.3 ess) + 12	Variations. S. S. S. $\times + 0.84 = -4.45$ $\times -4.27 = -51.24$
Cor. H.A. A.T. at Ship A.T. at Green. Long, in Time	4 11 59.4 E. 24 0 0.0 19 48 0.6 15 7 30.0	(p. 2		Cor. — <u>55.69</u> es Azimuth N. 80°·6 E. Line for Plane Chart
Long. at 1st Obsn. Run between Obsns. Long. at Time of 2nd Obsn.	70° 7'·6 E. Lat. 57'·4 E. Run	18 0'0 N. 12.6 N. ————————————————————————————————————	T. Alt. \varTheta	atitude. 88 10·5 S.
A.T.G.		1zim. and Redn.	Mer. Alt.	88 32.5
Decl Alt.	16° 52′ N. C 88° 10½′ S. Se	n 8·3025 os 9·9809 ec 1·4969 n 9·7803	M.Z.D. Decl. Latitude	1 27.5 N. 16 51.8 N. 18 19.3 N.

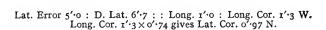
Lat. Var. 5.56 s. gives Posn.-Line (p. 270) N. 54.2° W. for Plane Chart.

Azim. 37°·1 gives from Table VIII. (Azimuth Ex-Meridian Table, p. 284) 4'·78 to 1 m.×4·6 m. gives Redn. 22'·0.

Prent

Table IX.

Lat. (1) 18 12.6 N. Azim. N. 80.6 E. gives 5.74 to 1 long. N. to W. (2) 18 19.3 N. , S. 37 W. , 0.74 , N. to W. D. Lat. 6.7 Lat. Error 5.00



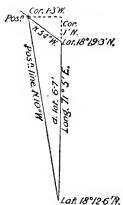


FIGURE.

Note.—The resulting latitude by spherical calculation only differs by o': 1, and the proof of correctness of position is established by recalculating the longitude, using the latitude found at 2nd Observation, and the same resulting longitude is obtained. Now, many navigators would have considered that an altitude of over 88°, more than four minutes after noon, and 37° from the meridian, was of no use for anything; it is outside the limits of such well-known and excellent Ex-Meridian Tables as Brent, Raper, or Davis, and most of the formulæ given in the navigational guide-books for the calculation of latitude by ex-meridian methods would give very erroneous results; the Summer as taught through our examinations would be hopelessly out, giving over 9' of error in the latitude, and even the "New Navigation" method if worked as advocated by some authors would be 7½' in error in the latitude. Possibly this is such a case as Lieutenant Simpson Baikie had in mind when he wrote (p. 8 of his book of Tables for working Combined Altitudes): "The azimuth of an object is such that an ex-meridian altitude is impossible, and a chronometer sight worse than useless." Personally the writer knows of no such cases. No observation, if used intelligently, is without value.

EXAMPLE ON PREVIOUS PAGE WORKED BY THE "OLD SUMNER METHOD" AND ALSO BY THE MARCQ ST HILAIRE SYSTEM

"OLD SUMNER METHOD"

IST OBSERVATION.

2ND OBSERVATION.

A. Lat. 18 o N. gives Long. 70 7.6 E. B. ,, 18 40 ,, ,, 70 0.7 E.

Gives Long. C. 71 25.7 E. Run in interval. ,, ,, D. 70 13.7 E. N. 77° E. 56 m.

Resultant Position plotted on the Chart at 2nd Observation: Lat. 18° 11' N., Long. 71° 6' E.

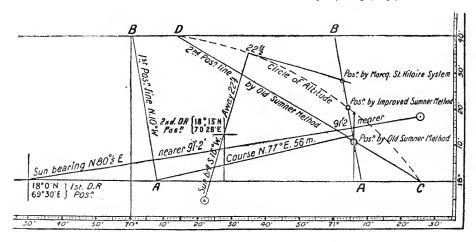
MARCO ST HILAIRE SYSTEM

IST OBSERVATION.

D.R. at 2nd Obsn.: Lat. 18 13 N., Long. 70 28 E. D.R. Posn. Lat. 18 o N., Long. 69 30 E. H. M. S. H. M. S. A.T.G. 15 7 30 +4 38 0 30 12.0 A.T.G. 19 20 16 True Alt. Long. E. Run Cor. Long. E. +4 41 52 +∘ 55∙9 T.Z.D. I 49½ o 2 8 W. A.T. Sp. 19 45 30 Alt. at 2nd Obsn. 31 H.A. Gives cal. Z.D. 1 27 90 0.0 H.A. 14 30 Z.D. at 2nd Obsn. 58 52-1 Away from (o 221 Gives cal. Z.D. 60 23.3 1 31.2=91'.2 Nearer (•) Azimuth S. 164° W.

Azimuth N. 801° E.

Resultant Position plotted on the Chart: Lat. 18 28 N., Long. 12 25 E. True Position Lat. 18 20 N., Long. 71 3.7 E.



Note.—The St Hilaire system would have given the same accuracy as by the Improved Sumner Method if the problem were worked by the method shown by Brent in his ex-meridian book (combining chronometer observation and the St Hilaire method), and no chart is needed; or an accurate result would also be obtained if the first observation had been plotted on the chart before the second observation was taken, and the approximate longitude from this position-line had been used in obtaining the hour-angle and azimuth for second observation.

The plotting on the chart, in a somewhat extreme case, has been here given to clearly illustrate the possible errors which may arise from following the plan as given above, and advocated by some recent authors. Although one of these authors, in a little work which has attracted some attention in the Merchant Service, gives examples where the D.R. lat. is over 40 and 50 miles in error, he was wise enough when advocating the above plan never to give much error in the D.R. long., although it is undoubtedly a much more uncertain element than the latitude.

With the methods advocated in this work it is quite immaterial what the D.R. latitude is, as no difference would result if it were 2° or more in error.

POSITION FROM TWO EX-MERIDIAN OBSERVATIONS OF SUN WITH ALTITUDES ONLY 1° FROM ZENITH

1914.—12th May, in approximate lat. 19° N. and long. 72° E., making Bombay. From the following observations find the position of ship. Work the problem first from the two ex-meridian latitudes and position-lines, and confirm resulting position by other methods.

1st Obsn. M.T. Green. (a.m. at ship) 19 5 20 True Alt. of Sun's centre 89 0' 2nd " (p.m. ") 19 9 38 " 19 5 20 True Alt. of Sun's centre 89 0' 89 0 Run in interval East r'o of Long. Long. D.R. 1st Obsn. 71° 59' E." Long. (2) 72° E.

A	.M. (OBSERVATION.	P.M. OBSERVATION.					
M.T. Green. Eq. Time	H. M. S. 19 5 20 True Alt. 89° o' S.Ed. +3 46	M.T. Green. 19 9 38 Eq. Time +3 46	True Alt. 89° o' S.Wd.				
A.T. Green. Long. (1)	19 9 06 4 47 56	A.T. Green. Long. 72° E. 19 13 24 4 48 00	For the Azimuth.				
A.T. Ship	23 57 2 For the Azimuth.	A.T. Ship (H.A.) o 1 24	Sin 7.786				
H.A. East	0 2 58 Sin 8·1121	Decl. 17 56 20 Alt. 80 0 0	Cos 9.978				
Decl. Alt.	17 56 20 N. Cos. 9.9784 89 0 0 Sec 1.7581	Alt. 89 0 0	Sec 1.758				
Azim.	S. $\overset{\circ}{44}$ 53 E. Sin 9.8486	Azim. S. fg 26 W.	Sin <u>9.522</u>				

Gives (p. 286) Redn. at 1 m.=5'.86 × 3 m.= 17'.58.

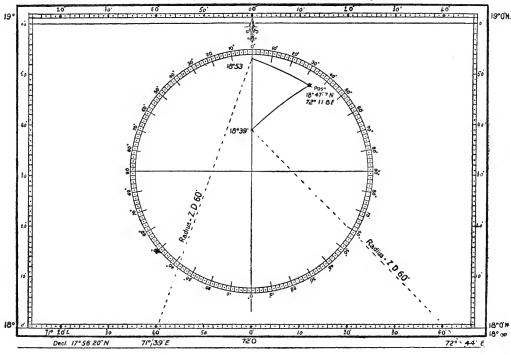
Gives (p. 278) Redn. at 1 m. = $2' \cdot 43 \times 1 \cdot 4$ m. =

Redn.	+17.6		Redn.	°+3 ['] 4
True Alt.	→ 89 0.0 S.		True Alt.	→ 89 ° 0 ° S.
Mer. Alt.	89 17·6 S.	Position plotted on Chart.	Mer. Alt.	89 3·4 S.
M.Z.D.	0 42·4 N.	Lat. 18 47.7 N.	M.Z.D.	o 56·6 N.
Decl.	17 56·3 N.	Long. 72 11.8 E.	Decl.	17 56·3 N.
Lat. (1)	18 38·7 N.	To find position on Chart.	Lat. (2)	18 52·9 N.

On the Meridian of 72 o'E. in Lat. (1) 18 39 N. ① bore S. 45 E. Z.D.=60

Take 60' in the dividers, and with one leg on the ② and the other leg on latitudes (1) and (2), sweep two arcs from these latitudes. The intersection of these arcs gives the position of ship.

Note.—This method may be used with very high altitudes when the D.R. longitude is uncertain, and if the D.R. longitude is in error more than 6' or 7' it will give a more accurate result than by the ordinary method of position-lines at right angles to the bearing of object, but in such cases the longitude will seldom be in error more than 3' or 4', as the sun would be nearly on the prime vertical throughout the whole day, except within a quarter of an hour from noon. If the true bearing of the sun could be accurately observed at the same instant as the altitude, the position of ship would be determined by one altitude and azimuth.



POSITION OF SHIP BY SHORT EQUAL ALTITUDE OF SUN AND EX-MERIDIAN LATITUDE

1914.—May 12th, in approximate lat. 19° N. and long. 72° E. From the following observations find the position of ship by equal altitude method:—

D. H. M. S.

True Alt. 😛 89 o 1st Obsn. M.T.G. (a.m. at ship) 11 19 5 20 ⊕ 89 o and ,, M.T.G. (p.m. ,,) 11 19 9 38 Run in interval 1'0 of long. East (true). н. м. s. M. S. T. Alt. - 89 o S. M.T. Green (a.m.). Interval 4 18 19 5 20) 9 38 \$ M.T. Green (p.m.). Run E. Redn. +8.8 IQ +4 2) 4 22 Mer. Alt. 8.8 2)38 14 58 89 0 M. S. For the Azimuth. Middle Time by Chron. 19 7 29 H.A. 2 11 Sin 7.979 Mer. Z.D. 0 51.2 N Eq. of Time Decl. 17°561' Decl. 17 56.4 N. +346Cos 9.978 Alt. 89 o Sec 1.758 A.T. Green. 19 11 15 18 47.6 N. Lat. A.T. Ship Azim. 31 16 24 00 00 Sin 9.715 Long. in Time 4 48 45 Gives (p. 282) Redn. at 1 m.= $3' \cdot 98 \times 2 \cdot 2$ m. = Redn. $8' \cdot 76$. 72° 11′ 15″ E. Longitude Run 30 E. 72° 11′ 45″ E. Long. at 2nd Obsn.

POSITION OF SHIP FROM ABOVE OBSERVATIONS DETERMINED INDEPENDENTLY, FROM THE CHART

We are indebted for this method to the writer's old friend, Captain T. S. Angus, Nautical Inspector for the P. & O. S. N. Company, one of the keenest and most enthusiastic navigators he ever met. It is as follows:—When the sun's decl. or that of any other heavenly body is within r° or $r_{\frac{1}{2}}^{\circ}$ of the latitude of ship, observations may be taken as soon before noon as the Z.D. is small enough to be conveniently measured on the chart with a pair of dividers, and again shortly after noon. Plot the geographical position of the sun (lat. = decl. long. = A.T.G.) (applying the run to position of first observation to bring both observations to same instant of time), and from this position as centre sweep an arc with Z.D. as radius in a direction opposite to the rough bearing of object. This is a position-line. The intersection of the two position-lines is the position of the ship. With an altitude of 89° a right-angle cut can be obtained in just under 6 minutes, and with an altitude of 89½° a right-angle cut may be obtained in less than 3 minutes.

The following figures give all that is necessary for plotting on the chart :-

Lat. Decl. 17° 56′ 20″ N.		ıst Obsn. A.T.G.	н. м. s. 19 9 б	2nd Obsn.	H. M. S. 19 13 24
			24 0 0		24 0 0
Z.D.	1° 00' as radius.	Long. in Time	4 50 54 E.		4 46 36
		Long. (1) Run	72 43 30 E. 1 00 E.	Long. (2)	71 39 00 E.
Long. (1)		at time of 2nd Obsn.		on. on Chart La Lon	at. 18° 47′·7 N. g. 72° 11′·8 E.

The chartlet on previous page shows the G.A.T. longitudes on the parallel of the \odot 's decl. corresponding with the positions drawn from the azimuths from the calculated latitudes on the mer. of 72° E.

POSITION FROM TWO EX-MERIDIAN OBSERVATIONS OF SUN WITH ALTITUDES LESS THAN 1½° FROM ZENITH

1917.—March 19th, in approximate position in lat, o° and long. 45° W.
With the following observations find the position of ship at time of second observation:

D. H. M. S.

(A.M. at ship) M.T. Green. 19 3 2 51 True Alt. of \oplus 88 41 S.E⁴. (P.M. at ship) ,, 19 3 9 27 ,, 88 47.4 S.W⁴. Run in interval between observations West. 1½ miles.

A.M. Observation.

M.T. Green. Eq. of Time		M. S. 2 51 7 57	T. Alt. ↔ Redn.	88 41 S. + 54.2
A.T. Green. Long. 44° 58½′ W.		54 54 59 54	Mer. Alt.	89 35·2
A.T. Ship	23	55 00	M.Z.D. Decl.	o 24·8 N. o 37·o S.
	in ec	8·3388 1·6387	Lat.	0 12·2 S.
A7 S 71° 42' E. S	in	0.0775		

Gives (p. 293) Redn. at 1 m.=10.845 s. ×5 m.= Redn. 54'.2.

Posn. on chart o 21.0 N. 44 38.7 W.

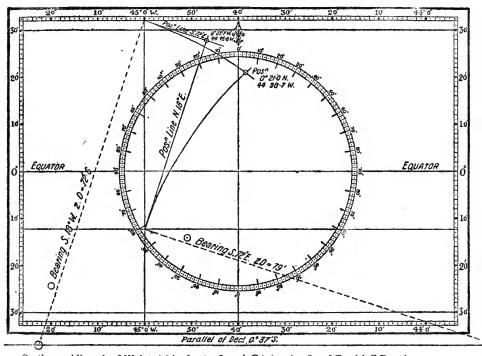
P.M. Observation.

	3	9 7	27			
A.T. Green. Long. 45° W.	3	0	30 00	•		
H.A. West Alt. 88° 47'•4	0	I	30		Sin. Sec.	7·8159 1·6754
Az. S. 18° 3½′	W				Sin.	9.4913
Gives Redn. Redn. 3'·6. True Alt. ⊕ Redn.	. {	38 A	m. 47.4 3.6		·38×1½	m.=
Mer. Alt.	8	38	51.0			

Mr. Alt. 88 51.0

M.Z.D. 1 9.0 N. 0 37.0 S.

Lat. 0 32.0 N.



On the meridian of 45° W. lat. (1) is 0° 12′·2 S. and ⊙'s bearing S. 72° E. with Z.D. 79′.

", (2) ,, 0 32 N. ,, S. 18 W. ,, 72·6

With one leg of the dividers on the \odot , in decl. o° 37' S., and the Z.D. at time of each observation sweep two arcs from the latitudes found on the meridian of 45° W. The intersection of the two arcs is the true position of ship.

Note.—This example, as an extreme case where both altitudes were near the zenith, and the D.R. position considerably in error, illustrates clearly the errors which would result from considering the position-lines as straight lines A perfectly true position, however, is obtained by the method here shown. In such an extreme case, if it is inconvenient to adopt this method, a second calculation could very quickly be made by the use of the Ex-Meridian Table with a new hour-angle deduced from the approximate longitude obtained by the first calculation.

DOUBLE PROOF OF CORRECTNESS OF POSITION AS DETERMINED BY THE METHOD AND CALCULATION OF PREVIOUS EXAMPLE

The following is a very good and simple-way of proving the accuracy of double altitude observations, viz.:-

With the resulting longitude deduce a new hour-angle, and recalculate the latitude by a true method from the observations. If both latitudes are the same as from previous determinations, it is a good guarantee of the correctness of position; or

With the resulting latitude recalculate the longitude from both observations. If they both agree with previous results we may rely with confidence on the correctness of the calculations, but of course this will not guarantee the correctness of position if a wrong altitude has been observed or a wrong declination used in the calculations.

A.M.	Observation.		$P.M.\ Observation.$				
A.T. Green. Long. 44° 37′·2 W	H. M. S. 2 54 54 2 58 29			A.T. Green. Long. 44° 38′·7 \	H. M. S. 3 I 30 W. 2 58 35		e.
A.T. Ship	23 56 25			A.T. Ship Alt.	0 2 55 88° 47'·4	Sin Sec	8·1047 8·6754
H.A. Alt.	0 3 35 88° 41'	Sin Sec	8·1941 1·6387	Azim. S. 37° 4′ V		Sin	6.7801
Azim. S. 42° 53′ F	C:n	Sin 9.8328 Gives Redn. at $1 \text{ m.} = 5' \cdot 03 \times 2$				- Rodn	
Azim. 0. 42 33 1	۵.	Sill	9.0320		1 m.=5 ·03 ×	2 92 111.	- Keuii.
Gives Redn. at 1 m.=				14'.7.	1 m.=5 ⋅03 ×	2 92 III.	- Redui.
Gives Redn. at 1 m.=		m = R			88° 47'4 + 14'7	S.	. Reun.
Gives Redn. at 1 m.= 21'·1 True Alt. ↔	5'·89×3·58 88°41.0	m.=R S.		14'·7. True Alt. ↔	88° 47'-4	. S.	. Acuil.
Gives Redn. at r m.= 21'·1 True Alt. ⊕ Redn.	88° 41.0 + 21.1	m.=R S		14'.7. True Alt. ⊕ Redn.	88° 47′4 + 14°7	S.	·

DETERMINATION OF LONGITUDES

A L P	88 41 0 21 90 37	Sec Cosec	0.0000	A L P	0	47 21 37	24 0 0	Sec		
	179 39				17 9	45	24			
S S-A	89 49½ 1 8½	Cos Sin	7·4849 8·2994	S S-A	89 1	52 5	42 18	Cos		7·3270 8·2786
		Sin²	5.7843					Sin	2	5.6056
A.T. Ship A.T. Green	1.	н. м. 23 56 26 54		A.T. Ship A.T. Green	a.			н. о 3		s. 54·6 30·0
Long. in T	ime	2 58	3 28.5	Long. in T	ime			2	58	35.4
Longitude Run		44° 32	7'·1 W. 1·5 W.	Longitude				44	38	<u>′·8</u> W.

Long. at time of 2nd Obsn. 44° 38'.6 W.

Note.—The determination of latitude by the use of Table VIII. should only be made within the limits of time given in Tables VII. and VIIa., as it will not give a true result outside these limits.

POSITION FROM TWO COMBINED ALTITUDES OF THE SUN DEDUCED BY TWO DIFFERENT METHODS

1917.—On May 21st, in approximate position 18° 30' W. and 72° 0' E. at time of second observation.

With the following observations find the position of ship at time of second observation, First by ex-meridian method, and then by two longitude observations.

D. H. M. S. True Alt. Sun's L.L. 87 14.2 N.Ed. (A.M. at ship) M.T.G. 20 18 50 24 20 19 12 42 (P.M. at ship) 88 7.0 N.W4.

Run in interval between observations, N. 77° E. 3·5 m. = 0'·8 N. 3'·4 E. = d. long. 3'·6 E. Gives position at 1st observation lat. 18° 29'.2 N. and long. 71° 56½' E.

A.M. Observation. D. H. M. S. M.T.G. Eq. Time 20 18 58 24 + 3 38 19 2 2 A.T.G. Long. 71° 561' E. +4 47 46 A.T. Ship 23 49 48 9.6483 Sin H.A. 0 10 12 20° 5′ N. Cos Decl. 9.9727 87 14 12 Sec A1t 1.3169 Azim. N. 60° 5 E. . Sin 9.9379

87 14·2 N. zim. 60°·1 gives (Table VIII., p. 291) Redn. at 1 m. 8'·23 True Alt. Azim. Redn. +I 24 Mer. Alt. 88 38.2 $\times 10^{\circ}2$ m. = 83'.95 or 1° 24'. M.Z.D. 1 21.8 S Decl. 20 5.0 N. Lat. 18 43.2 N. 0.8 N. Run Lat. at time of 2nd Obsn. } 18 44.0 N. and Posn.-Line S. 31½° E.

Latitudes by Ex-Meridian.

Gives (p. 258) 2.44 s. Lat. Var., which gives (p. 270) Posn.-Line for Plane Chart S. 31°.4 E. P.M. Observation.

H. M. S. M.T.G. 19 12 42 Eq. Time + 3 38 A.T.G. 19 16 20 4 48 00 Long. 72° E. 0 4 20 20° 5′ 88 7 A.T. Sp. Sin 9.2766 Cos Decl. 9.9727 1.4833 Sec Alt.

Azim. N. 32° 42′ W. Sin 9.7326 Gives (p. 259) Lat. Var. 6.60 s., which gives (p. 270) Posn.-Line N. 59° E.

zim. 32°·7 gives (Table VIII., p. 283) Redn. Redn. at Redn. at I m. 4.17 s. $\times 4\frac{1}{3}$ m. = Mer. Alt. 88 25 18'07. M.Z.D. 1 35 S 5 N. Decl. 20 Lat. 18 30 N. and Posn.-Line N. 59° E.

Azim.

7 N.

88

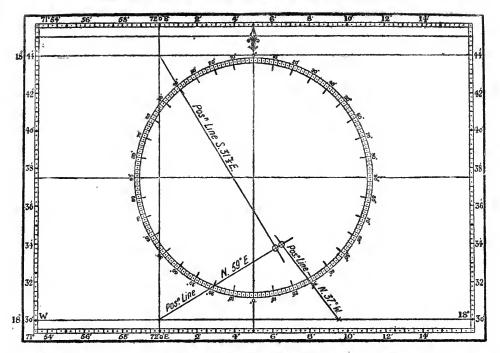
True Alt. @

Posn. on Chart, Lat. 18° 33'.8 N. Long. 72 6.2 E.

POSITION FROM TWO CALCULATED LONGITUDES ON PARALLEL OF LAT. 18° 30' N.

A 87 L 18 P 69	14 12 29 12 55 0	Sec Cosec	0·0230 0·0272		A L P	88 7 18 30 69 55	Sec Cosec	0·0230 0·0272	
S 87	38 24 49 12 35 0	Cos Sin	8·5802 8·0078		S S-A	176 32 88 16 0 9	Cos Sin	8·4807 7·4180	
H.A. E. A.T. Sp. A.T.G. Long. in Ti Longitude Run Long. at tin 2nd Obsr	me	23 50 19 2 4 48 72° 6'	33·5 S. 26•5	For Azimuth. Sin H.A. 8-6200 Cos Dl. 9-9728 Sec Alt. 1-3169 Sin 9-9097 Az. N. 54° 19' E. gives Lat. Var. 30-03 s., gives PosnLine N. 37°-2 W.	H.A. A.T.G Long	in Time	19 16	20 20 00 0'E.	For Azimuth. Sin H.A. 8·2766 Cos Dl. 9·9727 Sec Alt. 1·4833 Sin 9·7326 Az. N. 32° 42′ W. gives Lat. Var. 6·60 s., gives PosnLine N. 59° E.

. Lat 18° 34' N., long. 72° 6'.5 E. Posn, on Chart. Posn. by Spherical Calculation ,, 18 34.3 N., ,, 72 6.2 E.



POSITION REWORKED AND PROVED WITH THE NEWLY FOUND LONGITUDE, 72° 6½ E.

н. м.			0 /		H. M. S.		0 /
A.T.G. 19 2	2 H.A. Sin 8.6294	Alt.	87 14.2 N.	A.T.G.	19 16 20	Alt.	88 ź N.
Long. 72° 3′ E. 4 48 1	2 Dl. Cos 9.9727	Redn.	I 14·I	Long. 72° 61' E.	4 48 26	Redn.	+ 22.4
	 Alt. Sec 1.3169 						
A.T. Ship. 23 50 1	4	Mer. A.	88 28.3	H.A.	0 4 46	Mer. Alt.	88 29.4
	– Sin 9.9190						
H.A. 0 9 4	6	M.Z.D.	1 31·7 S.	Sin H.A.	8.3180	M.Z.D.	1 30·6 S.
	Az. N. 56° 5' E.	Decl.	20 5.0 N.	Cos Decl.	9.9727	Decl.	20 5·0 N.
				Sec Alt.	1.4833		
Gives Redn. at 1 m.:	$=7'\cdot58\times9\cdot77=\text{Redn}.$	Lat.	18 33 3 N.			Lat.	18 34.4 N.
74.1.		Run	+ .8	Sin Az.	9.7740	Cor.	∙1 S.
		*					
		Lat. at time		N. 36° 28′ W. g		Lat.	18 34·3 N.
No - A- #60 /Table		of 2nd Obsn.	73-1	at 1 m.=4.69	′×4.77 m.		
No. 1. Az. 56° (Table	NT A- 332 Y-4 S	0 1 - 37		=22'.4 Redn.			
IX.) gives	1.40 N. to W., Lat. 1	8 34·1 N.					
No. 2. Az. 361° (Table	.ma C +a 337 -c	D A NT					
IX.) gives	·70 S. to W., ,, 18	34·4 N.					
	2·1 2·1)	0.3(Cor. 0'.1	4 307 54.55				
	2.1 2.1)	0.3(001.0.1	4 W.X.7				
			-0.0				

PREVIOUS CALCULATION PROVED BY DETERMINATION OF LONGITUDE WITH NEWLY FOUND LATITUDE

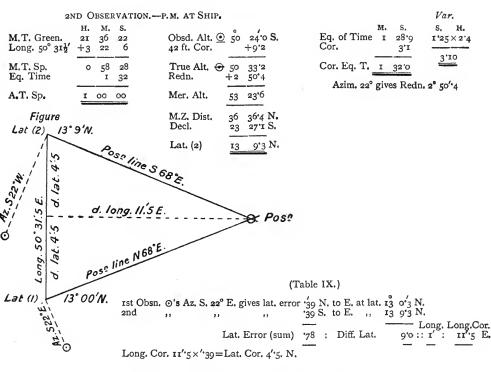
	A.M. Obse	rvation.			P.M. Obser	vation.	
A L P	87 14 12 18 33 30 69 55 00	Sec Cosec	0·0232 0·0272	A L P	88 7 00 18 34 18 69 55 00	Sec Cosec	0·0232 0·0272
	175 42 42				176 36 18		
S S-A	87 51 21 0 37 9	Cos Sin	8·5730 8·0337	S S-A	88 18 9 0 11 9	Cos Sin	8·4716 7·5110
		Sin^2	6.6571			Sin ²	6.0330
A.T. Sp. A.T. Green.		H. M. S. 23 50 14 19 2 2			Ship Green.		H. M. S. 0 4 46 19 16 20
Long. in Time Run	e	4 48 12 =	= 72 3 0 H 3 30 H	E. Lon	g. in Time		4 48 26
Longitude at	time of 2nd Ol	osn.	72 6 30 1	E. Lor	ıgitude		72° 6′ 30″ E.

Note.—The higher the altitude the greater will be the error in the resulting position due to considering the position-lines as straight lines when the D.R. position is much in error. The very small error in the resulting position of this example is due to the slight curvature in the short distance of 12'.

POSITION OF SHIP FROM TWO EX-MERIDIAN SUN OBSERVATIONS, USING THE EX-MERIDIAN TABLES:

1913.—On December 22nd, in approximate lat. 13° N. and long. 51° E. Find ship's position from the following observations of the sun:—

Run in interval between the observations N. 86° W. (true) distance 28 m. =2' o N. 27° 9 W.=d. long. 28' 5 W. gives long. at 2nd Observation 50° 31' 5 E.; height of eye, 42 ft.



Lat. (1) 13 00'3 N. Long. (2) 50 31'5 E. Cor. 11'5 E.

Lat. in 13 4'8 N. Long. in 50 43'0 E.

Note.—True Position by rigorous calculation (by spherics) 13° 4′'9 N., long. 50° 44′'1 E.

Greater accuracy would have been obtained by calculating the Azimuth to the nearest minute of arc at both observations by the rule of sines formula; the use of Table III. is here given by way of example.

15.8

EXAMPLE OF FINDING THE ERROR OF CHRONOMETER BY OBSERVATIONS IN ARTIFICIAL HORIZON. SHOWING THE USE OF THE ALTITUDE VARIATIONS IN WORKING OUT SEVERAL OBSERVATIONS SEPARATELY.

-On April 16th, at about 7 h. 10 m. a.m. M.T. at place. Suppose the following observations to have been taken at Observation Spot, Suez Dock. Index Error of Sextant -o' 34", Lat. 29° 56' 3" N., Long. 32° 33' 12" E.=2 h. 10 m. 12.8 s.

Alt. Diff. H. M. S. Obsd. Alt. \odot (1) 39 38 40 = (2) 39 49 20 16 59 33 Approximate times at Green. by chronometer 10 40 11 0 16 59 57.5 (3) 0 20 17 0 23 40 10 30 (4) 40 10 50 17 0 47 10 20 17 I II 40 21 10 10 30 (6) 40 31 40 17 I 35.5 11 40 40 43 20 2 Required the error of chronometer MIDDLE SIGHT (No. 4). M. S. D. H. M. S. Alt. <u>●</u> 40 10 50 Decl. 16th 10 o 28 N. Eq. of Time M.T.G. 0 47 0 5.26 15 17 -o 34 53"·3×7h. Cor. −6 13 Var. $0.6 \text{ s.} \times 7 \text{ h. Cor.} - 4.2$ 24 0 0 2)40 10 16 From Noon of 16th 7 hrs. 9 54 15 N. Cor. Eq. Time Cor. Dl. o 1.06-App. T. App. Alt. 20 5 8 Ref. and Par. -2 30 2 38 20 Semi. D. +155720 18 35 T. Alt. 🕣 Gives from Table-Variations. Lat. 29 56 N. 30 N. 30 N. 10 N. Alt. 20 18.6 H. M. S. S. S. 4 50 21.4 D. $+2.2 \times (defect) - 5.7 =$ -12.54 A. $-4.62 \times (excess) + 18.6 =$ -ī 38·5 -85.93 Cor. M S Cor. -98.47 = 1 38.5H.A. 4 48 42.9 L. 0.0 A.T. Place Eq. Time 19 11 17.1 =2.31 s., because altitude is doubled - r·r A. Var. 4.62 s.÷ in artificial horizon. M.T. Place 19 II 16·0 Long. E. -2 IO I2·8 H. M. S. H. M. S. M.T.G. (No. 4) M.T.G. (No. 3) 17 M.T. Green. 17 т 3.5 1 3.5 0 39.0 17 Chron. (4) 17 0 47.0 2.31 S. X 101 = -24.2 2.31 S. X 11'= -25.4 Chron. slow (No. 4) 0 16.2 M.T.G. (No. 3) M.T.G. (No. 2) 17 0 39.0 0 13.6 Chron. 0 23.0 Chron. 16 17 59 57.5 Chron, slow o 16·0 - Chron. slow 0 16.1 H. M. S. H. M. S. H. M. S. M.T.G. (No. 4) M.T.G. (No. 2) M.T.G. (No. 5) 0 13.6 I 3.2 I 27.I 17 17 2.31 S. × 10%'= -24.6 2.31 S. X 101 = +23.9 $2.318. \times 10\frac{1}{2} =$ +24.2 M.T.G. (No. 5) M.T.G. (No. 6) M.T.G. (No. 1) 16 59 49.0 17 I 27·I 17 I 51.3 16 59 33.0 Chron. I II.0 Chron. Chron. 17 17 I 35.5 0 16.0 Chron. slow 0 16.1 o 15·8 Chron, slow Chron, slow H. M. S. It is evident that the last observation was in error, probably M.T.G. (No. 6) 1 51.3 RESILTS. +27.0 2.31 S. × 113 owing to the altitude having been either read off or put down Chron. Slow. incorrectly. It is therefore rejected, and a mean taken of the s. other six. 16.2

2 18.3 M.T.G. (No. 7) 17 Chron. 17 2 0.0 o 18·3

Chron. slow

Observations with artificial horizon are not so much needed 16.0 as they were twenty or thirty years ago, as of late years time signals giving G.M.T. have been established at most places of 16.1 16.0 importance, and G.M.T. is also frequently given to steamers at sea from wireless stations. Still, it is well to be independent 16.1

of such aids. In the first place, they are not always reliable, and, secondly, in these days of steam and rush a vessel sometimes arrives at and leaves a port again, as at Port Said, before 6)96.2 the time when the signal is given; and there are still many places where such aids are not to Mean 16.03 be found. The writer, when second officer, used sometimes to check the chronometer by observations of stars in the quicksilver, in his middle watch at night, when tied up in the Suez Canal or at anchor in the Bitter Lakes. Results were very satisfactory, as proved by observations east and west of the meridian which did not generally differ poors than we from one another

east and west of the meridian, which did not generally differ more than 1 s. from one another. He never found it possible to get such observations of the sun on board ship, as in the daytime so many people are moving about; but in a large ship at anchor in smooth water observations in the quicksilver can often be taken at night, when all on board except the observer and time-taker are in bed, and everything is quiet.

Note.—Sets of sights at sea may be worked out separately in the same way.

POSITION OF SHIP BY COMBINED OBSERVATIONS OF SUN AND PLANET VENUS. LONGITUDE AND EX-MERIDIAN OBSERVATIONS

1917.—December 29th P.M. at ship in approximate latitude 30° S. the true altitude of sun's centre was 52° 3' when a chronometer (corrected) indicated M.T.G. 1 h. 51 m. 58 s., and about the same time the true altitude of planet Venus (centre) was 74° 43' N. when chronometer (corrected) indicated M.T.G. 1 h. 53 m. 15 s. Run in interval N. 41° W. o.3 m.=d. long. o' 15" W. Required position of ship at time of second observation.

(P.M. Observation for Longitude.

A.T. Green. 1 49 56

0

By Hour-angle Tables.

Lat.
$$30^{\circ} \circ S$$
. Decl. $23 ext{ 15} S$. Alt. $52^{\circ} 3$ Dl. $Var. + 1 \cdot 56 \times 15 = +23 \cdot 40$ Alt. $-4 \cdot 62 \times 3 = -13 \cdot 86$

+ 9.54 Cor. to Tabular H.A.

Planet Venus. Ex-Meridian for Latitude.

Longitude at time of 2nd Obsn. 14 31 40 E.

For Azimuth and Reduction.

H.A. Dl. Alt.	M. s. 10 30 15° 5' 74 43	Sin Cos Sec	8·6609 9·9848 0·5791
Az.	N. 9 39½ E	. Sin	9.2248

Az. 9° .7 (Table VIII. p. 275) gives Red. at 1 m.= $1' \cdot 10 \times 10 \cdot 5$ m.= Red. $11' \cdot 55$.

Latitude by Spherical Calculation.

H.A. Dl.	н. м. s. о 10 30 15° 4'48"	Cos Cot	9·999544 o·569527	Cosec	0.584747	True	Position.
Arc (1)	15° 5′42½″ S.	Cot	0.569071	Sin;	9.415679	Lat.	30 10·3 S.
		Alt	74° 43′	Sin	9.984363	Long.	14 31•7 E.
Arc (2)	15 4 33 S.			Cos	9.984789		
Latitude	30 10 15½ S.						

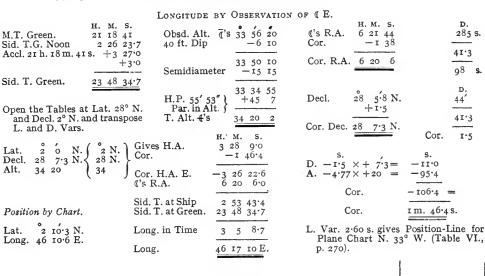
Note.—As the sun was on the prime vertical when the observation for longitude was taken, 10' of error in the latitude worked with makes no difference in the longitude; the hour-angle deduced from the longitude for calculation of ex-meridian would be correct, and consequently the latitude by ex-meridian will also be correct without any further plotting on the chart, or further calculation. The hour-angle worked by direct spherics by logarithms gives exactly the same result as by the table to the decimal of a second.

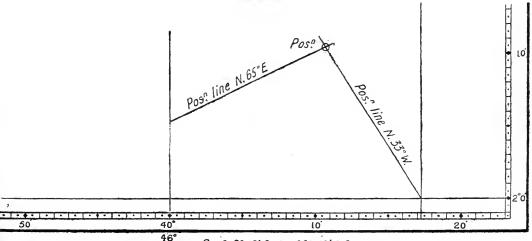
EXAMPLES IN THE USE OF THE TABLES

POSITION FROM COMBINED ALTITUDES OF SUN AND MOON

		Ex-Mer.	Observation of	F ⊙.		Var. h.
M.T. Green. Long. 46° E.	H. M. S. 21 17 15 +3 4 00	Alt. o 40 ft. Cor.	76 2.0 N. +9.7	Decl. Cor.	14 35.9 N. -2.1 S.	
Eq. T.	24 2I I5 +2 45	T. Alt. ⊕ Redn.	76 11.7 N. +1 20.0	Decl.	14 33.8 N. M. s.	s. н.
A.T. Ship	0 24 00	Mer. Alt.	77 31·7 N.	Eq. T.	2 45.7	$\frac{\cdot 35 \times 2.7}{\cdot 945}$ s.
For the Azin H. M. H.A. 0 24	nuth.	M.Z.D. Decl. Lat.	12 28·3 S. 14 33·8 N. 2 5·5 N.	Cor. Eq. T		+M. Time.
0 /		200.				
Dl. 14 34 Alt. 77 11.7	Cos 9.9858 Sec 0.6223					
Azim. N. 25° 5′ W.	Sin 9.6273		M			

Gives (Table VIII., p. 280) Redn. at 1 m. 3'.335 × 24 = Redn. 80'.0 = 1° 20'. Lat. Var. 8.54 s. gives Posn.-Line for Plane Chart N. 65° E. (Table VI., p. 270).





Pos? 2° 10:3 N. 46° 10:6 E.

\$ 30

178°50 E

EXAMPLES IN THE USE OF THE TABLES

POSITION FROM COMBINED LONGITUDE OBSERVATIONS OF TWO STARS

1913.—On January 7th, in approximate position lat. 30° S. and long. 179° E.

Soon after sunset, at about 7.15 p.m. A.T. Sp., the observed altitude of * Sirius was 30° 19′ 30″ E. of mer., when a chronometer indicated M.T.G. 6 d. 19 h. 23 m. 39 s., and after running on a true S. 10° W. course 0′3 m., observed altitude of * Aldebaran was 34° 57′ 10″ E. of mer., when a chronometer indicated M.T.G. 6 d. 19 h. 25 m. 23 s.; height of eye, 35 ft. Required position of ship at 2nd Observation.

d. 1	9 h. 25 m. 23 s.; height of e	ve, 35 ft. Required	position	of shi	p at	2nd	Observation.		
	* Sirius to Eastward	•					* ALDEBA	l or nas	V.E.
	M.T.G. 6 19 23 3	s. 9 Sid. T. (G 1 Accl.	. noon)			s. 49'9 11'1	M.T.G. M. ⊙'s R.A.	H. M. 19 25 19 5	s. 23 1.3
5	Sid. T. Green. 14 28 4	o M. ⊙'s R. = Accl, 2 m.	A. (1)	19	5	+ . 3	Sid. T.G.	14 30	24'3
		M. ⊙'s R.	A. (2)	19	5	1,3			
	35 ft. Cor	- o'•3	10° W. 0'3 3 S., 0''05	3 m. g W.	ives		*'s Obsd. Alt. 35 ft. for Cor.	34 57'2 -7'2	
	True Alt. 30 1	2.0					True Alt.	34 50'0	
		Long. By	* Sirius	s TO	Eas		RD. riations.		
	Lat. 3° 6 S. (3° S.	Gives H.A.	н. м.	S.		<i>D</i>	S.	S.	
	Decl. 16 35.7 S. { 16 S.	Cor.	4 16 +	50°5			+2.0 × +35.7= -4.62 × +12.0=	+ 71.4 + 71.4	
	Alt. 30 12 30	Cor. H.A. %'s R.A.	-4 17 6 41	6°5	E.		Cor.	+ 16.0	
		Sid. T. at Sp. Sid. T. Green.	2 24 -14 28	13 . 5		L. V	s. ar.+21 gives Pos	nLine f	or Plane
		Long. in Time -	-11 55	33.2			Chart N. 3° E. a	nd S. 3° V	v.
		Long. (1)	ı ₇₈ 53	22	E.				
	Lo	ONG. BY * ALDEB	ARAN TO	Nor	RTH-		WARD. ariations.		
	Lat. 30 03 S. 30 Decl. 16 203 N. 16	Gives H.A.	H. M. 2 5	s. 9'5 55'3			s. -6.43 × +20.3 = -7.70 × -10.0 =	s. - 130'5; + 77'0	3
	Alt. 34 50 (35)	Cor. H.A. **'s R.A.		14 '2 56 '6		L.	-6.12× + 0.3=	- 53.5 - 1.8	
		Sid. T. at Ship Sid. T. at Green.	2 26 14 30	42°4 24°4			Cor.	- 55'3	
		Long. in Time	11 56	18.0		L. V	s. ar. – 6·15 gives Pos Chart S. 57° E. an	nLine f	or Plane W.
	1 A	Long. (2)	179	4'5 l	E.		Chart 2. 37 2. a.i	4 11. 37	
				Po	sitio	on by	Chart Lat. 29 Long. 178		
29	50		With	out t	he a	id of	Chart, Posn. is fou	nd a s foll	ows:—
			Long.	(I)+	21:	= '0	5 long. N. to E. to	r'o lat.	
		Pose 29"53:35. 178 53.7E					4 ,, N. to W. to – Lat. Diff. L	ong. La	
		9	T /				9 : 1'0 :: 11': o''3 to E.	: 7	o N. :
		Post line			La	t. 3	o o'3 S. Lon	g. (1) 178	53'4 E.
			152		Со	r.	7'0 N. Cor		o'3 E.

29 53'3 S.

Lat.

179°0

Long. in 178 53'7 E.

POSITION BY STARS SIRIUS AND ALDEBARAN FROM CHRONOMETER AND EX-MERIDIAN OBSERVATIONS

1913.—Shortly after sunset, at about 6 h. 55 m. p.m. A.T. Sp., on January 27th, in approximate latitude 30° S. and longitude 106° E. Suppose a chronometer to indicate M.T.G. o h. 2 m. 52 s. when true altitude of # Sirius was 44° 48′ E. of meridian, and after running East (true) 0.7 m. the chronometer indicated o h. 8 m. 12 s. when the true altitude of # Aldebaran was 41° 22′ S.E. Required position of ship at time of 2nd Observation.

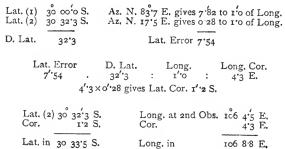
when the true attitud	* Sirius to	ran was 41 22 S.E. Require Eastward.	a position of ship at time of	and Observation.
M.T.G. M. ⊙'s R.A.	H. M. S. 0 2 52 +20 24 38	True Alt. 44 48 Decl. 16 35.8 S.	Sid. T. (Green, noon) Accl. 3m.	H. M. S. 20 24 37.65 +.47
Sid. T. G.	20 27 30	*'s R.A. '6 h. 41 m. 20'0 s.	M. ⊙'s R.A. Accl. 5⅓m.	20 24 38.12
M. Run East 0'7:	=d. long. o'8 E.	ν	M. ©'s R.A. (2nd Obs.)	20 24 39'0
	es tabular H.A.	н. м. s. 3 9 28 ³ D	s.	13
A. 45) * 's	H.A. R.A.	3 9 35'0 6 41 20'0	Cor. + 6.0	57 =
Sid. Sid.	T. at Sp. T. at Green.	3 31 45.0 20 27 30.0	L. Var-'51 gives Posi Chart (Table VI	nLine for Plane .) S. 74° E.
Lor	g. in Time	7 4 15'0	106°1	o o
Lor	rg. Run E.	106 3 45 E. 45 E.		3 d s.
* ALD M.T.G. Long. M.T. Sp.		M. S. d Obs. 106 4 30 E. 7 4 18 ORTH-EASTWARD. True Alt. 41 22'0 N +1 46'7 Mer. Alt. 43 8'7 M.Z. Dist. 46 51'3 S. Decl. 16 20'3 N Approx. Lat. Cor. for 31' (interpolation) Lat. in 30 32'3 S.		10
Chart S. 74°½′ E. To make certain mate altitudes and bor taken from the tak	that the right searing of both sole almost at sig	ition may be calculated readi	Pose lin	20

106°4'30"E

30

10

Pose 30° 33:55 106° 8':7 E.



TO FIND APPROXIMATE ALTITUDES AND BEARINGS OF SUITABLE STARS FOR OBSERVATION TO QUICKLY OBTAIN POSITION OF SHIP

1913.—On July 9th, soon after sunset, at about 7 h. 50 m. p.m. and 7 h. 54 m., in approximate latitude 47° N. and longitude 7° W., find what stars of first magnitude within the limits of the Reduction and Azimuth Tables would be suitable for quickly determining the ship's position, and the approximate altitudes and bearings of the stars. Height of eye, 40 ft.

First find the Sid. Time at ship=A.T. Sp. + A. O's R.A.

н. м. Next look up Table of Stars in order of R.A. (p. 307) and see what stars in adjacent quadrants come within the limits of this Sid. Time. A.T. Sp. 7 50 A. @'s R.A. +7 13 It will be seen at a glance that Capella to N.W. and Arcturus to S.W. are the two most suitable stars. Sid. T. Sp. 15 3 н. м. H. M. Sid. Time * Capella 45 54.7 N. 19 38 N. * 's Decl. Sid. Time *'s Decl. 15 3 15 7 17 to below * Acturus 14 12 Lat. o N. 47 P.D. Pole. 5.3 N. Mer. Pass. Mer. Pass. 2 7 } 47° N. } *'s H.A. Lat. 0.0 N. *'s H.A. 0 55 } 47° N. } 2° 13′ M.Z.D. 47 27 22 Lat. Lat. and Azim. N. 21½° Gives Redn. Mer. Alt. Gives Redn. 2 54.7 N. Mer. Alt. 62 38 S. and Azim. S. 27° Redn. +4 5.0 +13.7 Redn. -2 13 Cor. 40 ft. True Alt. 60 25 Alt. for

POSITION FROM COMBINED ALTITUDES OF TWO EX-MERIDIAN STARS

40 ft. Cor.

Sextant

Alt. for

+7

60 32 S.

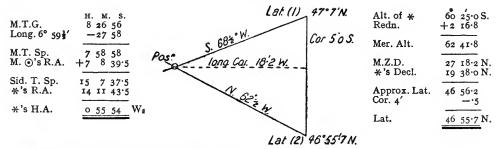
7 13.4 N.

Sextant

1913.—On July 9th, soon after sunset, at about 7h. 50 m. p.m., in approximate latitude 47° N. and longitude 7° W., the true altitude of % Capella was 7° 2' N.W., when chronometer showed M.T.G. 8 h. 23 m. 37 s., and true altitude of % Arcturus was 60° 25' S.W., when chronometer showed M.T.G. 8 h. 26 m. 56 s. Run in interval N. 32° E. 0.7 m. Required position of ship at time of 2nd Observation.

		* CAPELLA	A TO IN. VV.		
M.T.G. Long. 7° W.	H. M. S. 8 23 37 -28 0	Alt. of * Redn.	7 2·0 N. -4 1·3	Sid. T.G. Noon Accl. 8h. 23½ m.	H. M. S. 7 7 16·3 +1 22·7
M.T. Sp. M. ⊙'s R.A.	7 55 37 +7 8 39	Mer. Alt. *'s P.D.	3 0·7 44 5·3 N.	M. ⊙'s R.A. (1) Accl. 3 m.	7 8 39.0
Sid. T. Sp. *'s R.A.	15 4 16 -5 10 16	Approx. Lat. Cor. for 6'	47 6·0 N. +0·4	M. ⊙'s R.A. (2)	7 8 39.5
*'s H.A.	-9 54 0 W.	Lat. Run	47 6·4 N. o·6 N.	*'s Decl. 45 54	.7 N.
	eduction and Azim. To 3, Azim. N. 211 W.;	of 2nd Obsn. able (p. 346)		P.D. 44 5 Run N. 32° E. o. o'.4 E. d. lon	5:3 N. 7 m. = 0.′6 N. g. o'.5 E.

* ARCTURUS TO S.W.



Gives from Reduction and Azimuth Table (p. 325) Redn. 2° 16'·8 and Azim. S. 27½° W.; Posn.-Line N. 62½° W.

(Table IX. p. 301)

Long. (2) 6 59.5 W. Cor. 18.2 W. 1st Obs. Lat. 47 7.0 N. Azim. N. 21.5 W. gives Lat. 47 7 N. 0.27 S. to W. 2nd ,, ,, 46 55.7 N. 5 S. " S. 27·5 W. " 0.35 N. to W. Diff. Lat. 11.3 Lat. Error 0.62 to 1' of long. Lat. 47 2 N. Long. 7 17·7 W.

Lat. Error. D. Lat. Long. Error. D. Lat. Long. Long. Cor. Lat. Cor $0'\cdot 62$: $11\cdot 3$: $1'\cdot 0$: $18'\cdot 2$ W. $\times 0'\cdot 27 = 5'\cdot 01$ S. Lat. Cor.

POSITION FROM COMBINED EX-MERIDIAN OBSERVATIONS OF TWO STARS, USING STAR REDUCTION TABLES

1913.—March 11th, shortly after sunset, at about 6 h. p.m., A.T. at ship, at approximate lat. 47° N. and long. 6° W. Suppose a chronometer to indicate M.T. Green. 6 h. 35 m. 47 s., when the true altitude of # Aldebaran was 57° 6′ to south-westward of mer.; and again, after running N. 28° E. (true) for 1 mile the chronometer indicated M.T. Green. 6 h. 40 m. 55 s., when the true altitude of # Sirius was 24° 14′ southeastward of mer. Required the position of ship at time of 2nd Observation.

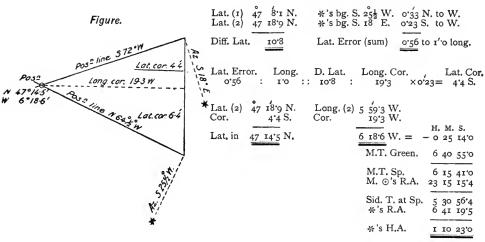
* ALDEBARAN TO SOUTH-WESTWARD.

M.T. Green. Long. 6° W.	H. M. S. 6 35 47 -24 0	Sid. T. (Green. noon) Accl. 6 h. 35\frac{3}{4} m.	H. M. S. 23 14 9'53 1 5'02	Alt. of * Redn. from Table	57 6 S. +2 76
M.T. Sp. M. ⊙'s R.A.	6 11 47 23 15 14·6	M. ⊙'s R.A. Accl.	23 15 14.55 + 0.8	Mer. alt. M.Z. Dist.	59 13'6
Sid T. at Sp. ** 's R.A.	5 27 1.6 4 30 55.9	2nd Obsn.	23 15 15'4	Decl.	30 46'4 N. 16 20'2 N. 47 6'6 N.
*'s H.A.	o 56 5'7 W.	* 's bearing from Tab Position-Line	ole S. 25°5 W. N. 64°5 W.	Approx. Lat. Cor. for $6\frac{1}{2}$	+0.6
Run	N. 28 E. 1'0=0'9	E. o'5=d. long. o'7 E.		Lat. Run Lat. at time of 2nd Obsn.	47 7'2 N. 0'9 N. 47 8'I N.

* SIRIUS TO SOUTH-EASTWARD.

M.T. Green. Long. 5° 59' 3 W.	H. M. S. 6 40 55°0 -23 57°0	∦s' Alt. Redn.	24 14'0 S. +1 52'2	
M.T. Sp. M. ⊙'s R.A.	6 16 58°0 23 15 15°4	Mer. Alt. M.Z. Dist.	26 6·2 63 53·8 N.	*'s bearing from Tables S. 18 PosnLine S. 72
Sid. T. at Sp. **'s R.A.	5 32 13'4 6 41 19'5	Decl.	16 35.8 S.	PosnLine S. 72
%'s H.A.	1 9 6.0 E.	Cor. for 18'	+0'9	
		Lat. in	47 18'9 N.	/m

(Table IX.)



Tables further tested by Spherical Calculation.
2nd Observation * Sirius.

Lat.	47° 14′ 31″ N.				
Arc (2)	64° 36′ 21″ N.			Cos	9.632297
		Alt.	24° 14′	Sin	9.613264
Arc (1)	17° 21′ 50″ S.	Cot	0.204886	Sin	9*474856
H.A. Decl.	1 h. 10 m. 23 s. 16° 35′ 50″ S.	Cos Cot	9°979190 0°525696	Cosec	0°544177

To prove Correctness of Work.

	Work.			
Alt. Redn. from	m Table	° 24 + I	14 ['] ·o 55'7	s.
Mer. Alt.		26	9'7	S.
M D	I.Z. Dist. ecl.	63 16	35.8 20.3	N. S.
L	at. in	47	14.2	N.

POSITION OF SHIP FROM COMBINED EX-MERIDIAN OBSERVATIONS OF TWO STARS, USING STAR-REDUCTION AND AZIMUTH EX-MERIDIAN TABLES

1917.—On March 26th, soon after sunset, at about 6 h. 5 m. and 6 h. 12 m. p.m., in approximate latitude 18° S., and longitude D.R. 3° 36′ W., the true altitude of **Capella was 24° 5′ N.W^d., when chronometer showed M.T.G. 6 h. 24 m. 18 s., and after running N. 45° W. 1½ miles the true altitude of **Sirius was 87° 10½′ N.E^d. when chronometer showed 6 h. 31 m. 17 s. Required, the position of ship at 2nd observation. Run N. 45° W. 1·5 m.=1·0′ N. 1·1′ W.

* CV	PELLA TO NO	RTH-WESTWARD.	
M.T. Green. Long. 3° 36' W.	H. M. S. 6 24 18 -0 14 24	% 's Alt. Redn.	24 5.0 N. +2 9.1
M.T. Ship Sid. T.G. Noon	6 9 54 0 13 26	Mer. Alt.	26 14.1
Accl.	+ 1 3	M.Z.D. Decl.	63 45 9 S. 45 55 1 N.
Sid. T. Ship	6 24 23		73 33
*'s R.A.	5 10 35	Lat. Run	17 50·8 S. 1·0 N.
*'s H.A. W.	1 13 48	Lat. at time of 2nd Obsn.	} 17 49.8 S.
Gives (p. 319) Re Azim. N.	edn. 2° 9'•1 an . 14° W.	đ	

For Position-line on Plane Chart.

Az. N. 14° W. gives (Table IV., p. 260) Lat. Var. 17.0 s., which gives (p. 270) Posn.-Line S. 76.8° W.

Position on Chart 17 51.4 S. and 3 43.5 W. True Position 17 51.1 S. and 3 43.3 W.

* Sirius to North-Eastward.

H. M. S.

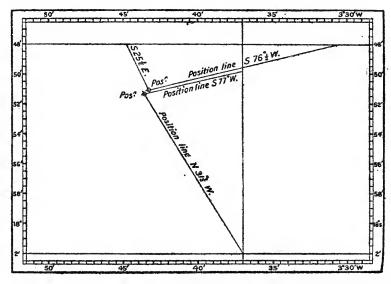
M.T.G. Long. 3° 37'	W 14 28	*'s Alt. Redn.		87 16.5 N +1 23.8
M.T. Sp. S.T.G.N.	6 16 49 0 13 26	Mer. Alt.		88 34.3
Accl.	+ 1 4	M.Z.D. Decl.		I 25.7 S. I6 36.3 S.
S.T. Sp. **'s R.A.	6 31 19 6 41 31	Latitude		18 2.0 S.
% 's H.A. E.	0 10 12	Sin	8-6483	
Decl. Alt.	16 36.3 S. 87 10.5 N.	Cos Sec	9·9815 1·3073	
Anim N ro	P w ./ To misson	Sin	9.9371	
Azim. N. 59	54' E. gives	91.00 1/ 70	a m 1	Dodn 90'-9

(p. 291) Redn. at 1 min. 8'-22 × 10-2 m. = Redn. 83'-8

For Position-Line on Plane Chart.

Az. N. 59.9° E. gives (p. 258) Lat. Var. 2.44 s., which gives (p. 270) Posn,-Line N. 31.4° W.

Note.—The calculated reductions of stars are not given when altitude is over 65°. Table VIII. (Azimuth Ex-Meridian Table) is therefore used for Star Sirius.



The calculation from two longitudes, using latitude 17° 48′ S. at time of second observation, gave longitudes 3° 30′ 20″ W. and 3° 44′ 45″ W., with resulting position 17° 51′·1 S. and 3° 43′·3 W.

The slight error (o_1^{1}) in latitude from the ex-meridian observation is due to neglect to interpolate in the reduction table for X Capella for 10' of error in the D.R. latitude, and the o'·3 of error in the longitude is due to curvature in the position-line in 12½' of arc, with a small Z.D.

LATITUDE BY EX-MERIDIAN AND LONGITUDE BY EQUAL ALTITUDE OF ** PROCYON. WORK ALSO PROVED BY DOUBLE ALTITUDE METHOD OF CALCULATION

1917.—April 5th, at 6 h. 30 m. and 6 h. 50 m. p.m. in lat. by D.R. 6° 10′ N. and long. 93° 30′ E. Suppose observed alt. of ** Procyon to S.Eª. 87° 28′ when a chronometer which was 5 m. 10 s. fast on M.T. Green. showed 0 h. 22 m. 34 s., and again after an interval of about 20 m. the same alt. of the ** Procyon was observed to S.Wª. when chronometer showed 0 h. 42 m. 11 s. Run in interval east 5 m. Height of eye 26 ft. Required position of ship at time of 2nd observation.

ist Obsern. Chron. 2nd " "	H. M. S. 0 22 34 0 42 11 2)1 4 45	M.T. Interva Accl. Run East	M. S. 1 19 37 + 3 + 20			Obsd. Alt. of $\underset{26}{\times}$ ft. cor.	87 28.0 S. - 5 - 5
		Num Last		r	4	Redn.	I 48·4
Mean of Times Chron. Error	O 32 22·5 - 5 IO	C11 TT 4	2)20 00		Azim.	Mer. Alt.	89 11.4
M.T.G. of Transit Sid. T.G. Noon Accl. 27 m. 12 s.	0 27 12·5 0 52 52	Sid. H.A. Alt. Decl.	10 00 87°23′ 5 26	Sin Sec Cos	8·63968 1·34053 9·99804	M.Z.D. Decl.	o 48·6 N. 5 26·2
Sid. T. Green. Sid. T. Ship (**, R.A.)	+ 4.5 1 20 9 7 34 59	Az. 72° 1′		Sin	9.97825	Latitude	6 14·8 N.
	6 14 50	Gives (p. 293 Reduce for I	at. 6° 10'	by Tr	averse Ta	ble, or	-0.04
Long. at Mid Time Run	93° 42′ 30″E. 2 30 E.	Redn. at 0°	Cos Lat.	=10.4	84×10 mi	n. = Redn. 108'-4	=1~45~4.
Long. at Time of 2nd } Obsn.	93 45 00 E.						

PROOF OF FOREGOING WORK BY DOUBLE ALTITUDE METHOD

A L P	87 23 0 6 10 0 84 33 49	Sec Cosec	0·0025 0·0020	rst Chron. 7 Chron. Erro		H. M. S. 0 22 34 - 5 10	2nd Chron Chron, Er		H. M. S. 0 42 II - 5 IO
	178 6 49			M.T. Green Sid. T.G. N Accl. 17 m.	oon	0 17 24 0 52 52 + 3	M.T. Gree Sid. T.G. Accl. 37 n	Noon	0 37 I 0 52 52 + 6
S S-A	89 3 24½ 1 40 24½	Cos Sin	8·2164 8·4654	Sid. T. Gre	en.	1 10 19	Sid. T Gr	een.	I 29 59
		Sin ²	6.6863						
☆ 's H.A. ☆ 's R.A.		H. M. s. o 10 6 7 34 59	A 2 B 2	·48 S. ·18 N.	※ 's F ※ 's F	H.A. West R.A.	н. м. s. о 10 6 7 34 59	C. o'·30	S. to E ^d .
Sid. T. Sh Sid. T. Gi		7 24 53 I IO IQ	C	30 S. to Wd.		C. Ship	7 45 5 I 29 59		
		6 14 34				., 0.100	6 15 6		
Longitude Run	е	93° 38′ 30″ 5 0			Long	. (2)	93°46′30″E	•	
	at time of }	93 43 30 E	E. 0'·30 S	S. to Wd.					
(2) Long.	at time of	93 46 30 I	E. 0'.30 S	S. to E.					
Diff. Long	g.	3.00	÷ ·6=	Cor. 5'∙o N.×	·3'=Co	r. for Long.	1'·5 E.		
			•						
	Lat. wor Cor.	ked with	6 16	o N. 5 N.		Long. (1) Cor.	93 43	30 E. 30 E.	
	Latitude	in	6 r	5 N.	;	Long. in	93 45	00 E.	

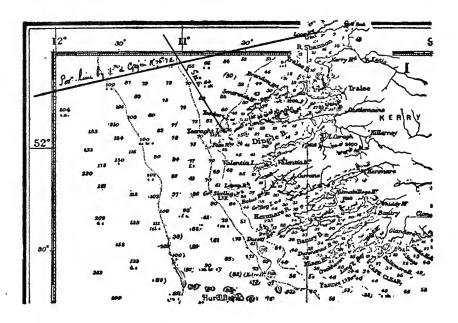
Note.—Longitude re-worked with lat. 6° 14'·8 N. gives long. 93° 45' E. at 2nd observation.

BELOW POLE EX-MERIDIAN AND POSITION-LINE

1910.—On April 1st, soon after sunset, at 6 h. 42 m. p.m., observed altitude of * a Cygni (Deneb) 8° 46′ W. of meridian when a chronometer indicated mean time at Greenwich 7 h. 34 m. 13 s. Approximate latitude 52° N. and longitude 12° W. Required latitude of meridian and position-line from it.

* a CYGNI TO NORTHWARD.

M.T. Green. Long. 12° W.	H. M. S. 7 34 13 -48 0	Sid. T. (Green. noon) Accl. 7 h. 34 m.	H. M. S. O 35 51·6 +I I4·6	Obsd. alt. of * Cor. (40 ft.)	8 46.0 N. -12.3
M. T. Sp. M. ⊙'s R.A.	6 46 13 +0 37 6	M. •)'s R.A.	0 37 6.2	T. Alt Redn. (p. 358)	8 33.7 N. -1 20.2
Sid. T. at Sp. *'s R.A.	7 23 19 20 38 21	Azimuth from table	N. 13·3 W.	Mer. alt. P.D.	7 13·5 N. 45 2·9 N.
*'s H.A. Supt. or	10 44 58 W.	(p. 358)	90.0	Lat. Cor. for 16'	52 16·4 N. +0·4 N.
H.A. at <i>Inferi</i> o Transit.	or 1 15 2 W.	Position-line	N. 76·7 E.	Lat.	52 16·8 N.



The above example is given to draw special attention to the great value of the ex-meridian problem when near the meridian below the pole. The observation gives with a minimum amount of work (when within the limits of these tables) the latitude on a certain meridian, and the position-line from this meridian. The curvature of this position-line is seen at a glance from the Azimuth Table, which is given on the same page as the Reduction Table. In this example the change of azimuth only amounts to 0.7 of a degree in 4 m. of time, or r° of longitude.

The position-line at Loop Head would be N. 78° E.

This position-line crossed by a bearing of Tearaght Island light (if sighted) would give a good reliable position, provided the observation was good. A sounding in conjunction with this position-line would also give a fairly accurate position.

The latitude and position-line could also have been quickly found at the same time by * Sirius, through the use of the Reduction and Azimuth Tables in this work, the position-line of which would have then been S. 79° E. The crossing of these two position-lines would give an excellent latitude, but the longitude would not be reliable, as the angle is small, and both observations are west of the meridian.



HOUR-ANGLE AND ALTITUDE AZIMUTH TABLE 30° N. to 30° S.

2 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 0° EQUATOR.

		. "	*)	4	1	,					11	עט	E4 '	U	Li 6	(UI	110	n.											
	DECLINATION. Grue O Decl. O Decl. O Decl. O Decl. C D																												
True Alt.	0°			ecl. ar.		1	•		ecl. ar.		2	•		ecl. Var.		3	•		ecl.		4	•		ecl. ar.		5°	,		ecl. 'ar.
0 10 12 14 16	H. M. 6 0 5 20 5 12 5 4 4 56	s. 0.0 0.0 0.0 0.0	_	s. ·00 ·00 ·00 ·00	6 5 5 5	3	s. 0.0 59.6 59.6 59.5 59.4	_	S. •00 •01 •01 •02 •02	6 5 5 5	3	58·5 58·2 57·9		s. ·00 ·02 ·03 ·03 ·04	6 5 5 5	3	s. 0.0 56.7 56.0 55.3 54.6	_	s. •00 •04 •04 •05 •06	6 5 5 5	3	s. 0·0 54·1 52·8 51·6 50·4	_	s. •00 •05 •06 •07 •08	6 5 5 5	3	s. 0.0 50.7 48.9 46.9 45.0	_	s. ·00 ·06 ·08 ·09 ·10
18 20 22 24 26	4 48 4 40 4 32 4 24 4 16	0.0 0.0 0.0	-	.00 .00	4 4 4	23 15	59.0	-	·02 ·03 ·03 ·03	4 4 4	23	57.3 57.0 56.6 56.3 55.9	5	·04 ·05 ·05 ·06 ·07		39 31 23	53·9 53·1 52·4 51·6 50·8	-	.07 .08 .09 .10	4 4 4	39 31 23	49·1 47·8 46·5 45·0 43·6	-	·09 ·10 ·11 ·12 ·14	4 4 4	39 31 23	42·9 40·9 38·8 36·6 34·4		·11 ·13 ·14 ·15 ·17
28 30 32 33 34	4 8 4 0 3 52 3 48 3 44	0.0 0.0 0.0 0.0	_	•00 •00 •00	3	59 51 47 43	58·9 58·8 58·7 58·6 58·6	_	·04 ·04 ·04 ·05	3 3	7 59 51 47 43	54·6 54·3	3	·07 ·08 ·09 ·09 ·09	3 3	47 43	50·0 49·I 48·2 47·7 47·3	-	·11 ·12 ·13 ·14 ·14	3	7 59 51 47 43	38·2 37·3	-	·15 ·16 ·17 ·18 ·19	3 3	51 47 43	32·I 29·7 27·I 25·9 24·6		·19 ·20 ·22 ·23 ·24
35 36 37 38 39	3 40 3 36 3 32 3 28 3 24	0.0 0.0 0.0 0.0	_	.00 .00	3 3 3	27 23	58·5 58·5 58·4 58·4 58·3		•05 •05 •05 •06	3	39 35 31 27 23	53·5 53·2	7 5 2	·10 ·10 ·10	3	35 31 27 23	46·8 46·3 45·8 45·3 44·7	_	·15 ·16 ·16 ·17	3 3 3 3	39 35 31 27 23	36·5 35·6 34·7 33·7 32·8		·20 ·20 ·21 ·22 ·23	3 3 3	35 31 27 23	23·2 21·8 20·4 18·9 17·4		·25 ·25 ·26 ·27 ·28
40 41 42 43 44	3 20 3 16 3 12 3 8 3 4	0.0 0.0 0.0 0.0	_	•00 •00 •00	3 3 3 3 3	15 11 7	58·2 58·1 58·0 58·0		·06 ·06 ·06 ·06	3 3 3	19 15 11 7 3	53.0 52.7 52.4 52.2 51.0	7 	·12 ·12 ·13 ·14	3 3	15 11 7	44.2 43.6 43.0 42.4 41.7		·18 ·19 ·20 ·20	3	19 15 11 7 3	31.8 30.8 29.7 28.6 27.5		·23 ·24 ·25 ·26 ·27	3	15	15·9 14·3 12·6 10·9 9·2		·30 ·31 ·32 ·33 ·34
45 46 47 48 49	3 0 2 56 2 52 2 48 2 44	0.0 0.0 0.0		•00 •00 •00	2 2 2	55 51 47	57·9 57·8 57·7 57·7 57·6	-	·07 ·07 ·08 ·08	2 2 2	47	51.6 51.6 50.7 50.3	3	·14 ·15 ·16 ·16	2	55 51 47	41.0 40.4 39.8 39.0 38.3		·21 ·22 ·23 ·23 ·24	2		26·4 25·2 23·9 22·6 21·3		·28 ·29 ·30 ·31 ·32	2 2 2	59 55 51 47 42	7·4 5·5 3·5 1·5 59·4		·35 ·37 ·38 ·39 ·41
50 51 52 53 54	2 40 2 36 2 32 2 28 2 24	0.0 0.0 0.0 0.0	_	.00 .00	2 2 2	31 27	57·5 57·4 57·3 57·2 57·1	-	.09 .09 .09	2 2 2	31	50.0 49.6 49.3 48.9 48.5	5	·17 ·17 ·18 ·19	2	35 31 27	37·5 36·7 35·8 34·9 34·0	_	·25 ·26 ·27 ·28 ·29	2 2 2	27	19·9 18·5 16·9 15·3 13·7		·33 ·35 ·36 ·37 ·39	2 2 2	30 26	57·2 54·9 52·6 50·1 47·4		·42 ·44 ·45 ·47 ·49

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
	s. s.	s. s.	s. s.	s. s.	S. S.	s. s.
0	·00 -4·00	+ .07 -4.00	+ .14 -4.00	+ ·2I -4·0I	+ ·28 -4·01 ·28 4·01	+ .35 -4.01
2	·00 4·00	·07 4·00 ·07 4·00	•14 4.00	·2I 4·0I	·28 4·01 ·28 4·01	·35 4·01
6	·00 4·00	·07 4·00 ·07 4·00	·14 4·00	·21 4·01	28 4.01	·35 4·01
8		•07 4•00		·21 4·01	·28 4·01	
°	•00 4•00		·I4 4·00	·		,
10	·00 4·00	+ .07 4.00	+ .14 4.00	+ .21 4.01	+ .28 4.01	+ .35 4.02
12	·00 4·00	·07 4·00	·14 4·00	·2I 4·0I	·28 4·01	•36 4.02
14	·00 4·00	·07 4·00	·I4 4·00	·21 4·0I	·29 4·01	.36 4.02
16	.00 4.00	·07 4·00	·14 4·00	·22 4·0I	·29 4·01	•36 4.02
18	.00 4.00	·07 4·00	.14 4.00	·22 4·0I	·29 4·01	.37 4.03
20	·00 4·00	+ .07 4.00	+ .15 4.00	+ .22 4.01	+ .30 4.01	+ .37 4.02
22	•00 4•00	•07 4•00	·15 4·00	·23 4·0I	·30 4·01	•38 4.02
24	•00 4•00	•07 4.00	·15 4·00	·23 4·0I	·31 4·01	.38 4.02
26	.00 4.00	.08 4.00	·15 4·00	·23 4·0I	·31 4·01	•39 4.02
28	•00 4•00	·08 4·00	·16 4·00	·24 4·0I	·32 4·0I	*39 4.02
30	·00 4·00	+ .08 4.00	+ 16 4.00	+ .24 4.01	+ .32 4.01	+ .40 4.02
32	·00 4·00	.08 4.00	·16 4·00	·25 4·0I	·33 4·01	·4I 4·02
34	•00 4•00	·08 4·00	·17 4·00	·25 4·01	·34 4·0I	.42 4.02
36	.00 4.00	·09 4·00	·17 4·00	·26 4·01	·34 4·01	.43 4.02
38	·00 4·00	•09 4•00	·17 4·00	·26 4·0I	.35 4.02	.44 4.03
40	·00 4·00	+ .09 4.00	+ .18 4.00	+ .27 4.01	+ .36 4.02	+ .46 4.03
42	.00 4.00	•09 4•00	·19 4·00	•28 4•01	.38 4.02	.47 4.03
44	·00 4·00	·10 4·00	.10 4.00	·29 4·0I	.39 4.02	·49 4·03
46	.00 4.00	.10 4.00	20 4.00	·30 4·01	.40 4.02	·51 4·03
48	·00 4·00	·10 4·00	·2I 4·00	·31 4·01	·42 4·02	.23 4.03
50	·00 4·00	+ .10 4.00	+ .22 4.01	+ .33 4.01	+ .44 4.02	+ .55 4.04
52	.00 4.00	·II 4·00	.23 4.01	·34 4·01	46 4.03	.57 4.04
54	.00 4.00	·12 4·00	·24 4·0I	.36 4.02	·48 4·03	·60 4·04

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 3

LATITUDE 0° EQUATOR.

DECLINATION.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 46.6 5 11 43.9 5 3 41.1 4 55 38.3	s. - ·00 ·09 ·09 ·10 ·12		s. - ·00 ·09 ·10 ·12 ·14	H. M. S. 6 0 0.0 5 19 36.2 5 11 31.3 5 3 26.3 4 55 21.2	s. - ·00 ·10 ·12 ·14 ·16	H. M. S. 6 0 0.0 5 19 29.8 5 11 23.5 5 3 17.2 4 55 10.8	S. ·00 ·11 ·14 ·16 ·18	H. M. S. 6 0 0.0 5 19 22.6 5 11 14.9 5 3 7.1 4 54 59.2	s. ·00 ·13 ·15 ·18 ·20	H. M. S. 6 0 0.0 5 19 14.6 5 11 5.2 5 2 55.8 4 54 46.1	S. - ·00 ·14 ·17 ·20 ·23
18 20 22 24 26	4 47 35.4 4 39 32.4 4 31 29.4 4 23 26.3 4 15 23.0	- ·14 ·15 ·17 ·19 ·21	4 39 22·4 4 31 18·3	- ·16 ·18 ·20 ·22 ·24	4 47 16·1 4 39 10·8 4 31 5·4 4 22 59·8 4 14 54·0	- ·18 ·21 ·23 ·25 ·28	4 47 4·2 4 38 57·6 4 30 50·7 4 22 43·6 4 14 36·3	- ·21 ·23 ·26 ·29 ·31	4 46 51.0 4 38 42.7 4 30 34.2 4 22 25.4 4 14 16.4	- ·23 ·26 ·29 ·32 ·35	4 46 36·3 4 38 26·2 4 30 15·8 4 22 5·2 4 13 54·2	- ·26 ·29 ·32 ·35 ·39
28	4 7 19.7	- ·22	4 7 5.0	- ·26	4 6 48·0	- ·30	4 6 28·7	- ·34	4 6 7·0	- ·38	4 5 42·8	- ·42
30	3 59 16.2	·24	3 59 0.3	·28	3 58 41·9	·33	3 58 20·8	·37	3 57 57·2	·41	3 57 30·9	·46
32	3 51 12.6	·26	3 50 55.4	·31	3 50 35·4	·36	3 50 12·6	·40	3 49 47·0	·45	3 49 18·6	·50
33	3 47 10.8	·27	3 46 52.8	·32	3 46 32·1	·37	3 46 8·4	·42	3 45 41·8	·47	3 45 12·2	·52
34	3 43 8.8	·28	3 42 50.2	·33	3 42 28·6	·38	3 42 4·1	·43	3 41 36·4	·49	3 41 5·6	·54
35	3 39 6·9	- ·30	3 38 47·5	- ·35	3 38 25·1	- ·40	3 37 59·6	- ·45	3 37 30·9	- ·50	3 36 58·9	- ·56
36	3 35 4·9	·31	3 34 44·8	·36	3 34 21·5	·41	3 33 55·0	·47	3 33 25·2	·52	3 32 52·1	·58
37	3 31 2·8	·32	3 30 42·0	·37	3 30 17·9	·43	3 29 50·3	·49	3 29 19·4	·54	3 28 45·0	·60
38	3 27 0·7	·33	3 26 39·1	·39	3 26 14·1	·45	3 25 45·5	·50	3 25 13·5	·56	3 24 37·7	·63
39	3 22 58·5	·34	3 22 36·1	·40	3 22 10·2	·46	3 21 40·6	·52	3 21 7·3	·58	3 20 30·3	·65
40	3 18 56·3	- ·36	3 18 33·1	- ·42	3 18 6·2	- ·48	3 17 35·5	- ·54	3 17 1.0	- ·61	3 16 22.6	- ·67
41	3 14 54·0	·37	3 14 30·0	·43	3 14 2·1	·50	3 13 30·3	·56	3 12 54.5	·63	3 12 14.6	·70
42	3 10 51·7	·38	3 10 26·7	·45	3 9 57·8	·51	3 9 24·9	·58	3 8 47.8	·65	3 8 6.4	·72
43	3 6 49·2	·40	3 6 23·4	·46	3 5 53·4	·53	3 5 19·3	·60	3 4 40.8	·68	3 3 57.9	·75
44	3 2 46·7	·41	3 2 19·9	·48	3 1 48·9	·55	3 1 13·5	·63	3 0 33.6	·70	2 59 49.2	·78
45	2 58 43.9	- ·43	2 58 16·3	- ·50	2 57 44·2	- ·57	2 57 7.5	- ·65	2 56 26·2	- ·73	2 55 40·I	- ·81
46	2 54 41.3	·44	2 54 12·6	·52	2 53 39·3	·59	2 53 1.3	·67	2 52 18·5	·75	2 5I 30·7	·84
47	2 50 38.5	·46	2 50 8·8	·54	2 49 34·2	·62	2 48 54.9	·70	2 48 10·5	·78	2 47 20·9	·87
48	2 46 35.7	·47	2 46 4·8	·56	2 45 29·0	·64	2 44 48.1	·72	2 44 2·1	·81	2 43 I0·7	·90
49	2 42 32.5	·49	2 42 0·6	·57	2 41 23·5	·66	2 40 41.1	·75	2 39 53·4	·84	2 39 0·I	·93
50	2 38 29·4	- ·51	2 37 56·3		2 37 17·8	- ·69	2 36 33·9	- ·78	2 35 44·3	- ·87	2 34 49.0	- ·97
51	2 34 26·1	·53	2 33 51·7		2 33 11·8	·71	2 32 26·3	·81	2 31 34·9	·91	2 30 37.5	I·01
52	2 30 22·6	·55	2 29 47·0		2 29 5·6	·74	2 28 18·3	·84	2 27 25·0	·94	2 26 25.3	I·05
53	2 26 18·9	·57	2 25 42·0		2 24 59·1	·77	2 24 9·9	·87	2 23 14·5	·98	2 22 12.6	I·09
54	2 22 15·2	·59	2 21 36·8		2 20 52·2	·80	2 20 1·2	·90	2 19 3·6	I·02	2 17 59.2	I·13

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
0 2 4 6 8	s. s. + ·42 -4·02 ·42 4·02 ·42 4·02 ·42 4·02 ·42 4·02 ·42 4·02	s. s. + ·49 -4·03 ·49 4·03 ·49 4·03 ·49 4·03 ·50 4·03	s. s. + ·56 -4·04 ·56 4·04 ·56 4·04 ·56 4·04 ·57 4·04	s. s. + ·63 -4·05 ·63 4·05 ·64 4·05 ·64 4·05 ·64 4·05	s. s. + '70 -4'06 '70 4'06 '71 4'06 '71 4'06 '71 4'06	s. s. + ·78 -4·07 ·78 4·07 ·78 4·07 ·78 4·08 ·78 4·08
10	+ ·43 4·02	+ ·50 4·03	+ ·57 4·04	+ ·64 4·05	+ ·72 4·06	+ ·79 4·08
12	·43 4·02	·50 4·03	·57 4·04	·65 4·05	·72 4·06	·79 4·08
14	·43 4·02	·50 4·03	·58 4·04	·65 4·05	·73 4·06	·80 4·08
16	·44 4·02	·51 4·03	·58 4·04	·66 4·05	·73 4·07	·81 4·08
18	·44 4·02	·52 4·03	·59 4·04	·67 4·05	·74 4·07	·82 4·08
20	+ '45 4'02	+ ·52 4·03	+ ·60 4·04	+ ·67 4·06	+ ·75 4·07	+ ·83 4·08
22	'45 4'02	·53 4·03	·61 4·05	·68 4·06	·76 4·07	·84 4·09
24	'46 4'03	·54 4·04	·62 4·05	·69 4·06	·77 4·07	·85 4·09
26	'47 4'03	·55 4·04	·63 4·05	·71 4·06	·79 4·08	·87 4·09
28	'48 4'03	·56 4·04	·64 4·05	·72 4·06	·80 4·08	·88 4·10
30	+ ·48 4·03	+ ·57 4·04	+ ·65 4·05	+ ·73 4·07	+ ·82 4·08	+ ·90 4·10
32	·49 4·03	·58 4·04	·66 4·05	·75 4·07	·84 4·09	·92 4·10
34	·51 4·03	·59 4·04	·68 4·06	·77 4·07	·86 4·09	·94 4·11
36	·52 4·03	·61 4·05	·70 4·06	·79 4·08	·88 4·09	·97 4·11
38	·53 4·04	·63 4·05	·72 4·06	·81 4·08	·90 4·10	1·00 4·12
40	+ ·55 4·04	+ ·64 4·05	+ ·74 4·07	+ ·83 4·09	+ ·93 4·II	+1.03 4.13
42	·57 4·04	·66 4·05	·76 4·07	·86 4·09	·96 4·II	1.06 4.14
44	·59 4·04	·69 4·06	·79 4·08	·89 4·10	·99 4·I2	1.10 4.15
46	·61 4·04	·71 4·06	·82 4·08	·92 4·10	I·03 4·I3	1.14 4.16
48	·63 4·05	·74 4·07	·85 4·09	·96 4·11	I·08 4·I4	1.19 4.17
50	+ ·66 4·05	+ ·77 4·07	+ ·89 4·10	+1.00 4.12	+1·12 4·15	+1·24 4·19
52	·69 4·06	·81 4·08	·93 4·11	1.05 4.14	1·18 4·17	1·30 4·21
54	·72 4·06	·85 4·09	·97 4·12	1.10 4.15	1·24 4·19	1·37 4·23

4 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 0° EQUATOR.

DECLINATION.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 5.8 5 10 54.7 5 2 43.4 4 54 31.8	S. - ·00 ·15 ·18 ·22 ·25	H. M. S. 6 0 0.0 5 18 56.2 5 10 43.1 5 2 29.7 4 54 16.2	S. - ·00 ·17 ·20 ·24 ·27	H. M. S. 6 0 0.0 5 18 45.7 5 10 30.5 5 2 14.9 4 53 59.1	s. - ·00 ·18 ·22 ·26 ·29		s. - ·00 ·19 ·24 ·28 ·32	H. M. S. 6 0 0.0 5 18 22.2 5 10 2.1 5 1 41.6 4 53 20.8	s. - ·00 ·21 ·25 ·30 ·34	H. M. S. 6 0 0.0 5 18 9.1 5 9 46.3 5 1 23.1 4 52 59.5	s. - ·00 ·22 ·27 ·32 ·37
18 20 22 24 26	4 46 20·1 4 38 8·0 4 29 55·6 4 21 42·9 4 13 29·8	- ·28 ·32 ·35 ·39 ·43	4 46 2·3 4 37 48·1 4 29 33·5 4 21 18·5 4 13 3·0	- ·31 ·34 ·38 ·42 ·46		- ·33 ·37 ·42 ·46 ·50		- ·36 ·40 ·45 ·50 ·54	4 44 59·5 4 36 37·7 4 28 15·4 4 19 52·3 4 11 28·4	- ·39 ·44 ·48 ·53 ·59	4 44 35.4 4 36 10.6 4 27 45.2 4 19 19.0 4 10 51.8	- ·42 ·47 ·52 ·57 ·63
28 30 31 32 33	4 5 16·1 3 57 2·0 3 52 54·7 3 48 47·2 3 44 39·6	- ·46 ·50 ·53 ·55 ·57	4 4 46·9 3 56 30·3 3 52 21·6 3 48 12·8 3 44 3·8	- ·51 ·55 ·57 ·60 ·62	4 4 15·2 3 55 55·7 3 51 45·6 3 47 35·3 3 43 24·8	- ·55 ·60 ·62 ·65 ·68	4 3 40.8 3 55 18.2 3 51 6.6 3 46 54.7 3 42 42.6	·65 ·67 ·70	4 3 3.6 3 54 37.8 3 50 24.5 3 46 10.9 3 41 57.0	- ·64 ·70 ·73 ·76 ·79	4 2 23.7 3 53 54.4 3 49 39.3 3 45 23.8 3 41 7.9	- ·69 ·75 ·78 ·81 ·85
34 35 36 37 38	3 40 31·7 3 36 23·7 3 32 15·5 3 28 7·0 3 23 58·3	- ·59 ·61 ·64 ·66 ·69	3 39 54·5 3 35 45·1 3 31 35·3 3 27 25·3 3 23 15·1	- ·65 ·67 ·70 ·72 ·75	3 39 14·0 3 35 3·0 3 30 51·6 3 26 39·9 3 22 27·9	- ·70 ·73 ·76 ·79 ·82	3 38 30·1 3 34 17·3 3 30 4·2 3 25 50·7 3 21 36·8	- ·76 ·79 ·82 ·85 ·89	3 37 42.7 3 33 28.0 3 29 12.9 3 24 57.4 3 20 41.5	- ·82 ·85 ·89 ·92 ·96	3 36 51·6 3 32 34·9 3 28 17·8 3 24 0·1 3 19 42·0	- ·88 ·92 ·95 ·99 ɪ·03
39 40 41 42 43	3 19 49.4 3 15 40.1 3 11 30.6 3 7 20.8 3 3 10.7	- ·71 ·74 ·77 ·80 ·83		- ·78 ·81 ·84 ·87 ·91	3 18 15 6 3 14 2 8 3 9 49 7 3 5 36 1 3 1 22 0	- ·85 ·88 ·91 ·95 ·99	3 17 22·5 3 13 7·7 3 8 52·5 3 4 36·7 3 0 20·4	1.03	3 16 25·1 3 12 8·1 3 7 50·6 3 3 32·5 2 59 13·7	- ·99 1·03 1·07 1·11 1·15	3 15 23·2 3 11 3·9 3 6 43·9 3 2 23·2 2 58 1·8	-1.07 1.11 1.15 1.20 1.24
44 45 46 47 48	2 59 0·1 2 54 49·3 2 50 38·0 2 46 26·2 2 42 13·9	- ·86 ·89 ·92 ·96 ·99	2 58 6·3 2 53 53·3 2 49 40·0 2 45 26·0 2 41 11·5	- ·94 ·97 ·01 ·05 ·09	2 57 7·4 2 52 52·3 2 48 36·6 2 44 20·2 2 40 3·2	-1.02 1.06 1.10 1.14 1.19	2 47 27·7 2 43 8·7	I·20 I·24	2 46 13·0 2 41 51·1	1·20 1·25 1·29 1·35 1·40	2 44 52·3 2 40 27·2	1·29 1·34 1·40 1·45 1·51
49 50 51 52 53	2 38 1·2 2 33 47·8 2 29 33·9 2 25 19·3 2 21 3·9	1.16	2 36 56·3 2 32 40·5 2 28 23·9 2 24 6·5 2 19 48·2	- 1·13 1·17 1·22 1·27 1·32	2 31 26·8 2 27 7·3	1·23 1·33 1·39 1·45	2 21 19.8	1.40 1.45 1.51	2 24 12.9	-1:45 1:51 1:58 1:64 1:71	2 27 4·8 2 22 34·5 2 18 2·7	

		((,
Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.
° 0 2 4 6 8	s. s. + ·85 -4·09 ·85 4·09 ·85 4·09 ·85 4·09 ·86 4·09	s. s. + '92 -4'10 '92 4'10 '92 4'10 - '93 4'10 '93 4'11	S. S. + ·99 -4·12 I·00 4·12 I·00 4·12 I·01 4·12	s. s. +1.07 -4.14 1.07 4.14 1.07 4.14 1.08 4.14 1.08 4.14	S. S. / +1·15 -4·16 1·15 4·16 1·15 4·16 1·15 4·16 1·16 4·16	S. S. +1·22 -4·18 1·22 4·18 1·22 4·18 1·23 4·18 1·23 4·19
10 12 14 16 18	+ ·86 4·09 ·87 4·09 ·88 4·09 ·88 4·10 ·89 4·10	+ '94 4'II '94 4'II '95 4'II '96 4'II '97 4'I2	+1.01 4.13 1.02 4.13 1.03 4.13 1.04 4.13 1.05 4.14	+1.09 4.14 1.10 4.15 1.11 4.15 1.12 4.15 1.13 4.16	+1·16 4·17 1·17 4·17 1·18 4·17 1·20 4·17 1·21 4·18	+1·24 4·19 1·25 4·19 1·26 4·19 1·28 4·20 1·29 4·20
20 22 24 26 28	+ '91 4'10 '92 4'10 '93 4'11 '95 4'11 '97 4'11	+ ·98 4·12 1·00 4·12 1·02 4·13 1·03 4·13 1·05 4·13	+1.06 4.14 1.08 4.14 1.10 4.15 1.12 4.15 1.14 4.16	+1·14 4·16 1·16 4·16 1·18 4·17 1·20 4·18 1·22 4·18	+1·23 4·18 1·24 4·19 1·26 4·19 1·29 4·20 1·31 4·21	+1·31 4·21 1·33 4·21 1·35 4·22 1·37 4·23 1·40 4·24
30 32 34 36 38	+ '99 4'12 1'01 4'13 1'04 4'13 1'06 4'14 1'09 4'14	+1.07 4.14 1.10 4.15 1.13 4.16 1.16 4.16 1.19 4.17	+1·16 4·16 1·19 4·17 1·22 4·18 1·25 4·19 1·29 4·20	+1·25 4·19 1·28 4·20 1·31 4·21 1·35 4·22 1·39 4·23	+1·34 4·22 1·37 4·23 1·41 4·24 1·45 4·25 1·49 4·27	+1·43 4·25 1·47 4·26 1·51 4·27 1·55 4·29 1·60 4·31
40 42 44 46 48 50 52	+1·13 4·15 1·17 4·16 1·21 4·18 1·26 4·19 1·31 4·21 +1·37 4·23 1·44 4·25	+1·23 4·18 1·27 4·19 1·32 4·21 1·37 4·23 1·43 4·25 +1·49 4·27 1·57 4·30	+1·33 4·21 1·38 4·23 1·43 4·25 1·49 4·27 1·55 4·29 +1·63 4·32 1·71 4·35	+1·44 4·25 1·49 4·27 1·54 4·29 1·61 4·31 1·68 4·34 +1·76 4·37 1·86 4·41	+1.54 4.29 1.60 4.31 1.66 4.33 1.73 4.36 1.81 4.39 +1.90 4.43 2.01 4.47	+1.65 4.33 1.71 4.35 1.78 4.38 1.86 4.41 1.94 4.45 +2.04 4.49 2.16 4.55

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 5

LATITUDE 0° EQUATOR.

DECLINATION.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16 18 20	H. M. S. 6 0 0.0 5 17 55.1 5 9 29.4 5 1 3.3 4 52 36.6 4 44 9.4 4 35 41.5	s. - ·00 ·24 ·29 ·34 ·39 - ·45 ·50	H. M. S. 6 0 0.0 5 17 40.2 5 9 11.3 5 0 42.1 4 52 12.3 4 43 41.7 4 35 10.5	s. - ·00 ·26 ·31 ·36 ·42 - ·48 ·53	4 51 46·2 4 43 12·2 4 34 37·4	- ·51 - ·57	H. M. S. 6 0 0.0 5 17 7.3 5 8 31.7 4 59 55.5 4 51 18.6 4 42 40.9 4 34 2.2	s. - ·00 ·29 ·35 ·41 ·47 - ·54 ·60	H. M. S. 6 0 0.0 5 16 49.4 5 8 10.0 4 59 30.1 4 50 49.3 4 42 7.6 4 33 24.8	s. - ·oo ·31 ·37 ·44 ·50 - ·57 ·64	H. M. S. 6 0 0.0 5 16 30.3 5 7 47.1 4 59 3.1 4 50 18.2 4 41 32.3 4 32 45.2	- ·60 ·68
22 24 26	4 27 12·9 4 18 43·3 4 10 12·7	·56 ·61 ·67	4 26 38·3 4 18 5·1 4 9 30·8	.66	4 26 1·5 4 17 24·5 4 8 46·1	·63 ·70 ·77	4 25 22·4 4 16 41·2 4 7 58·6	·67 ·74 ·82	4 24 40·8 4 15 55·2 4 7 8·1	·71 ·79 ·87		·76 ·84 ·92
28 30 31 32 33	4 I 40·9 3 53 7·8 3 48 50·7 3 44 33·2 3 40 I5·2	- ·74 ·80 ·84 ·87 ·91		.93	4 0 6·3 3 51 24·8 3 47 3·3 3 42 41·3 3 38 18·7	- ·84 ·91 ·95 ·99 1·03	3 59 14·3 3 50 28·1 3 46 4·2 3 41 39·7 3 37 14·6	- ·89 ·97 ·01 ·06 ·1·10		- ·95 1·03 1·08 1·12 1·17	3 43 54.6	1·10 1·15 1·19 1·25
34 35 36 37 38	3 35 56·8 3 31 38·0 3 27 18·6 3 22 58·6 3 18 38·0	- ·94 ·98 I·02 I·06 I·10		-1.01 1.05 1.09 1.14 1.18	3 20 42.1	-1.08 1.12 1.17 1.21 1.26	3 32 48.8 3 28 22.3 3 23 55.0 3 19 26.9 3 14 57.9	-1·15 1·19 1·24 1·29 1·35	3 27 8·2 3 22 37·9 3 18 6·7	1·22 1·32 1·38 1·44	3 25 49.5 3 21 16.0 3 16 41.3	-1·30 1·35 1·41 1·47 1·53
39 40 41 42 43	3 14 16·8 3 9 54·8 3 5 32·2 3 1 8·7 2 56 44·4	-1·15 1·19 1·24 1·29 1·34	3 4 15.2	-1·23 1·28 1·33 1·38 1·44	3 2 52.8	-1·31 1·36 1·42 1·48 1·54	3 10 27·9 3 5 56·9 3 1 24·8 2 56 51·4 2 52 16·8	-1.40 1.46 1.52 1.58 1.64	3 4 26·5 2 59 50·7 2 55 13·6		3 2 50·2 2 58 10·5 2 53 29·1	-1.59 1.66 1.73 1.80 1.87
44 45 46 47 48	2 52 19·1 2 47 52·8 2 43 25·4 2 38 56·8 2 34 26·9	1.56	2 50 52.7 2 46 22.9 2 41 51.9 2 37 19.5 2 32 45.6	1.62 1.68		-1.60 1.66 1.73 1.81 1.88	2 47 40·8 2 43 3·2 2 38 23·9 2 33 42·8 2 28 59·7	-1.71 1.78 1.86 1.94 2.02	2 41 12·6 2 36 28·6 2 31 42·6		2 39 14·4 2 34 25·3	2.13
49 50 51 52 53	2 29 55·6 2 25 22·7 2 20 48·1 2 16 11·6 2 11 33·1	-1.70 1.77 1.84 1.92 2.01	2 23 32·7 2 18 53·3 2 14 11·7	1.90 1.99 2.08	2 16 49·4 2 12 2·2	-1.96 2.05 2.14 2.24 2.35	2 14 36·0 2 9 42·5	-2·11 2·21 2·31 2·42 2·54	2 17 9·4 2 12 12·4 2 7 11·9	2·37 2·49 2·61	2 14 41.9	2·55 2·68 2·81

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
0 2 4 6 8	S. S. +1·30 -4·20 1·30 4·21 1·30 4·21 1·31 4·21 1·31 4·21	s. s. +1·38 -4·23 1·38 4·23 1·38 4·23 1·38 4·23 1·39 4·23	S. S. +I·45 -4·26 I·46 4·26 I·46 4·26 I·46 4·26 I·47 4·26	S. S. +1·53 -4·28 1·53 4·28 1·54 4·28 1·54 4·29 1·55 4·29	S. S. +1.61 -4.31 1.61 4.31 1.62 4.31 1.62 4.32 1.63 4.32	s. s. +1·70 -4·34 1·70 4·35 1·70 4·35 1·71 4·35 1·71 4·35
10 12 14 16 18	+1·32 4·21 1·33 4·21 1·34 4·22 1·36 4·22 1·37 4·23	+1·40 4·24 1·41 4·24 1·42 4·24 1·44 4·25 1·46 4·26	+1·48 4·26 1·49 4·27 1·51 4·27 1·52 4·28 1·54 4·29	+1·56 4·29 1·57 4·30 1·59 4·30 1·61 4·31 1·63 4·32	+1.64 4.32 1.66 4.33 1.67 4.34 1.69 4.34 1.71 4.35	+1·73 4·36 1·74 4·36 1·76 4·37 1·78 4·38 1·80 4·39
20	+1·39 4·23	+1·48 4·26	+1.56 4.29	+1.65 4.33	+1.74 4.36	+1.83 4.40
22	1·41 4·24	1·50 4·27	1.59 4.30	1.67 4.34	1.77 4.37	1.86 4.41
24	1·44 4·25	1·52 4·28	1.61 4.31	1.70 4.35	1.80 4.39	1.89 4.42
26	1·46 4·26	1·55 4·29	1.64 4.32	1.74 4.36	1.83 4.40	1.93 4.44
28	1·49 4·27	1·59 4·30	1.68 4.34	1.78 4.37	1.87 4.42	1.97 4.46
30	+1·53 4·28	+1·62 4·31	+1·72 4·35	+1.82 4.39	+1·92 4·44	+2·02 4·48
32	1·56 4·29	1·66 4·33	1·76 4·37	1.86 4.41	1·97 4·46	2·07 4·50
34	1·60 4·31	1·71 4·35	1·81 4·39	1.92 4.43	2·03 4·48	2·14 4·53
36	1·65 4·33	1·76 4·37	1·87 4·41	1.98 4.46	2·09 4·51	2·20 4·57
38	1·70 4·35	1·81 4·39	1·93 4·44	2.04 4.49	2·16 4·55	2·28 4·61
40	+1.76 4.37	+1.88 4.42	+2.00 4.47	+2·12 4·52	+2·24 4·59	+2·37 4·65
42	1.83 4.40	1.95 4.45	2.07 4.50	2·20 4·57	2·34 4·63	2·47 4·70
44	1.90 4.43	2.03 4.49	2.16 4.55	2·30 4·61	2·44 4·69	2·59 4·76
46	1.99 4.47	2.12 4.53	2.26 4.60	2·41 4·67	2·56 4·75	2·72 4·84
48	2.08 4.51	2.23 4.58	2.38 4.65	2·54 4·74	2·70 4·83	2·88 4·93
50	+2·19 4·56	+2·35 4·64	+2.51 4.72	+2.69 4.82	+2.86 4.92	+3.05 5.04
52	2·32 4·62	2·49 4·71	2.67 4.81	2.85 4.92	3.05 5.04	3.24 5.18

6 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 1°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 59.6 5 11 59.6 5 3 59.5 4 55 59.4	s. + ·07 ·07 ·07 ·07	H. M. S. 6 0 4.2 5 20 3.5 5 12 3.4 5 4 3.3 4 56 3.1	s. + •07 •06 •06 •05 •05	H. M. S. 6 0 8.4 5 20 6.7 5 12 6.4 5 4 6.0 4 56 5.7	s. + ·07 ·05 ·04 ·04 ·03	H. M. S. 6 0 12.6 5 20 9.1 5 12 8.4 5 4 7.7 4 56 7.1	s. + ·07 ·03 ·03 ·02 ·01		s. + ·07 ·02 ·01 + ·00 - ·01	H. M. S. 6 0 21·0 5 20 11·7 5 12 9·9 5 4 8·0 4 56 6·2	s. + ·07 ·01 - ·00 ·01 ·03
18 20 22 24 26	4 47 59.3 4 39 59.2 4 31 59.1 4 23 59.0 4 15 59.0	+ ·07 ·07 ·07 ·07 ·08	4 48 3.0 4 40 2.9 4 32 2.8 4 24 2.7 4 16 2.6	+ ·05 ·05 ·05 ·04 ·04	4 48 5·4 4 40 5·1 4 32 4·8 4 24 4·5 4 16 4·2	+ ·03 ·02 ·01 ·01	4 48 6·4 4 40 5·8 4 32 5·1 4 24 4·4 4 16 3·7	+ ·00 - ·01 ·02 ·02	4 40 4·9 4 32 3·7 4 24 2·5	- ·02 ·03 ·04 ·05 ·06	4 48 4·3 4 40 2·5 4 32 0·6 4 23 58·7 4 15 56·7	- ·04 ·05 ·06 ·08 ·09
28 30 32 33 34	4 7 58.9 3 59 58.8 3 51 58.7 3 47 58.6 3 43 58.6	+ ·08 ·08 ·08 ·08 ·08	4 8 2·5 4 0 2·4 3 52 2·3 3 48 2·3 3 44 2·2	+ ·04 ·04 ·04 ·04		.01 00 00 + .00	4 8 3·I 4 0 2·4 3 52 I·7 3 48 I·4 3 44 I·0	- ·03 ·04 ·05 ·05 ·06	3 47 56 8	- ·07 ·08 ·09 ·10 ·10	4 7 54·7 3 59 52·7 3 51 50·6 3 47 49·6 3 43 48·5	- ·11 ·12 ·14 ·14 ·15
35 36 37 38 39	3 39 58·5 3 35 58·4 3 31 58·4 3 27 58·3 3 23 58·3	+ ·08 ·09 ·09 ·09	3 40 2·2 3 36 2·1 3 32 2·1 3 28 2·0 3 24 2·0	+ ·04 ·03 ·03 ·03		- ·01 ·01 ·02 ·02 ·02	3 40 0.7 3 36 0.3 3 31 59.9 3 27 59.6 3 23 59.2	- ·06 ·07 ·07 ·07 ·08	3 35 54·8 3 31 54·1 3 27 53·4	- ·II ·I2 ·I2 ·I3 ·I4	3 39 47.4 3 35 46.3 3 31 45.1 3 27 43.9 3 23 42.8	- ·16 ·18 ·18 ·18
40 41 42 43 44	3 19 58·2 3 15 58·2 3 11 58·1 3 7 58·0 3 3 58·0	+ .09 .09 .09 .09	3 20 1.9 3 16 1.9 3 12 1.8 3 8 1.8 3 4 1.8	+ ·03 ·03 ·03 ·03	3 20 2·I 3 16 2·0 3 I2 I·9 3 8 I·7 3 4 I·6	- ·03 ·03 ·03 ·03 ·04	3 19 58·8 3 15 58·4 3 11 58·0 3 7 57·6 3 3 57·2	- ·08 ·09 ·10 ·11	3 11 50.4	- ·14 ·15 ·16 ·17	3 19 44.6 3 15 40.3 3 11 39.0 3 7 37.7 3 3 36.4	- ·20 ·21 ·22 ·23 ·24
45 46 47 48 49	2 59 57.9 2 55 57.8 2 51 57.7 2 47 57.7 2 43 57.6	·10 ·10 ·10 ·10	3 0 1.7 2 56 1.6 2 52 1.6 2 48 1.5 2 44 1.5	+ ·03 ·03 ·03 ·03	2 48 0.9	- ·04 ·04 ·05 ·05 ·05	2 59 56·8 2 55 56·4 2 51 55·9 2 47 55·5 2 43 55·0	- ·II ·I2 ·I3 ·I3	2 55 47·2 2 51 46·3 2 47 45·4	- ·18 ·19 ·20 ·21 ·22	2 59 34·9 2 55 33·6 2 51 32·2 2 47 30·7 2 43 29·1	- ·25 ·26 ·27 ·29
50 51 52 53 54	2 39 57.5 2 35 57.4 2 31 57.3 2 27 57.2 2 23 57.1	+ ·II ·II ·II ·I2 ·I2	2 40 1·5 2 36 1·5 2 32 1·5 2 28 1·4 2 24 1·4	+ ·03 ·02 ·02 ·02 ·02	2 40 0.5 2 36 0.4 2 32 0.2 2 28 0.0 2 23 59.9	- ·06 ·06 ·07 ·07 ·07	2 39 54.6 2 35 54.1 2 31 53.6 2 27 53.1 2 23 52.5	- ·14 ·15 ·15 ·16 ·17	2 35 42·5 2 31 41·6 2 27 40·5	- ·23 ·23 ·25 ·26 ·27	2 39 27·5 2 35 25·9 2 31 24·1 2 27 22·3 2 23 20·5	- ·31 ·32 ·34 ·35 ·37
	·	V	ARIATIO	ON TO	ı' OF	LAT	TUDE A	AND	ALTITU	DE.	•	

Alt.	L. 0° A.	L. 1 ° A.	L. 2° A.	L. 3° A.	L. 4 ° A.	L. 5° A.
° 0 2 4 6 8	s. s. - ·00 -4·00 ·00 4·00 ·01 4·00 ·01 4·00	s. s. + ·07 -4·00 ·07 4·00 ·06 4·00 ·06 4·00 ·06 4·00	S. S. + ·14 -4·00 ·14 4·00 ·13 4·00 ·13 4·00 ·13 4·00	s. s. + ·21 -4·01 ·21 4·01 ·20 4·01 ·20 4·01 ·20 4·01	s. s. + ·28 -4·01 ·28 4·01 ·27 4·01 ·27 4·01 ·27 4·01	s. s. + ·35 -4·02 ·35 4·02 ·35 4·02 ·34 4·02 ·34 4·02
10 12 14 16 18	- ·01 4·00 ·01 4·00 ·02 4·00 ·02 4·00 ·02 4·00	+ ·06 4·00 ·06 4·00 ·05 4·00 ·05 4·00 ·05 4·00	+ ·13 4·00 ·13 4·00 ·13 4·00 ·12 4·00 ·12 4·00	+ ·20 4·01 ·20 4·01 ·20 4·01 ·20 4·01 ·20 4·01	+ ·27 4·01 ·27 4·01 ·27 4·01 ·27 4·01 ·27 4·01	+ ·34 4·02 ·34 4·02 ·34 4·02 ·34 4·02 ·34 4·02
20 22 24 26 28	- ·02 4·00 ·03 4·00 ·03 4·00 ·03 4·00 ·04 4·00	+ ·05 4·00 ·05 4·00 ·04 4·00 ·04 4·00 ·04 4·00	+ ·12 4·00 ·12 4·00 ·12 4·00 ·12 4·00 ·12 4·00	+ ·20 4·01 ·20 4·01 ·20 4·01 ·20 4·01 ·20 4·01	+ ·27 4·01 ·27 4·01 ·27 4·01 ·28 4·01 ·28 4·01	+ ·35
30 32 34 36 38	- ·04 4·00 ·04 4·00 ·05 4·00 ·05 4·00 ·05 4·00	+ ·04 4·00 ·04 4·00 ·04 4·00 ·03 4·00 ·03 4·00	+ ·12 4·00 ·12 4·00 ·12 4·00 ·12 4·00 ·12 4·00	+ ·20 4·01 ·20 4·01 ·20 4·01 ·21 4·01 ·21 4·01	+ ·28 4·0I ·29 4·0I ·29 4·0I ·29 4·0I ·30 4·0I	+ ·36 4·02 ·37 4·02 ·37 4·02 ·38 4·02 ·39 4·02
40 42 44 46 48	06 4.00 .06 4.00 .07 4.00 .07 4.00 .08 4.00	+ ·03 4·00 ·03 4·00 ·03 4·00 ·03 4·00 ·03 4·00	+ ·12 4·00 ·12 4·00 ·13 4·00 ·13 4·00 ·13 4·00	+ ·2I 4·0I ·22 4·0I ·23 4·0I ·24 4·0I	+ ·3I 4·0I ·3I 4·0I ·32 4·0I ·33 4·0I ·34 4·0I	+ ·40 4·02 ·41 4·02 ·42 4·02 ·43 4·02 ·45 4·03
50 52 54	- ·08 4·00 ·10 4·00	+ ·03 4·00 ·02 4·00 ·02 4·00	+ ·13 4·00 ·14 4·00	+ ·24 4·01 ·25 4·01 ·26 4·01	+ ·35 4·02 ·37 4·02 ·38 4·02	+ ·46 4·03 ·48 4·03 ·50 4·03

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 7 LATITUDE 1°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 25.2 5 20 11.9 5 12 9.2 5 4 6.6 4 56 3.9	s. + ·07 - ·00 ·02 ·03 ·05	H. M. S. 6 0 29.4 5 20 11.3 5 12 7.7 5 4 4.1 4 56 0.4	s. + ·07 - ·01 ·03 ·05 ·07	H. M. S. 6 0 33.7 5 20 10.0 5 12 5.3 5 4 0.5 4 55 55.7	s. + ·07 - ·03 ·05 ·07 ·09	H. M. S. 6 0 38.0 5 20 8.0 5 12 1.9 5 3 55.9 4 55 49.8	s. + ·07 - ·04 ·06 ·08 ·11	H. M. S. 6 0 42·3 5 20 5·2 5 II 57·7 5 3 50·2 4 55 42·6	s. + ·07 - ·05 ·08 ·10 ·13	H. M. S. 6 0 46.6 5 20 1.6 5 11 52.5 5 3 43.4 4 55 34.1	- ·06 ·09 ·12
18 20 22 24 26	4 48 1·2 4 39 58·5 4 31 55·8 4 23 53·0 4 15 50·1	- ·06 ·08 ·09 ·11	4 47 56·8 4 39 53·0 4 31 49·2 4 23 45·3 4 15 41·4	- ·08 ·10 ·12 ·14 ·16	4 47 50·9 4 39 45·9 4 31 40·9 4 23 35·8 4 15 30·6	- ·II ·I3 ·I5 ·I7 ·20	4 31 30.9	- ·13 ·16 ·18 ·21 ·23	4 47 34.9 4 39 27.1 4 31 19.1 4 23 10.9 4 15 2.5	- ·16 ·18 ·21 ·24 ·27	4 47 24.7 4 39 15.1 4 31 5.4 4 22 55.4 4 14 45.2	·21 ·24 ·27
28 30 32 33 34	4 7 47·2 3 59 44·2 3 51 41·1 3 47 39·5 3 43 37·9	- ·14 ·16 ·18 ·19 ·20	4 7 37·3 3 59 33·2 3 51 28·9 3 47 26·7 3 43 24·4	- ·18 ·20 ·22 ·24 ·25	4 7 25·2 3 59 19·6 3 51 14·0 3 47 11·0 3 43 8·0	- ·22 ·24 ·27 ·28 ·30	4 7 10·7 3 59 3·7 3 50 56·3 3 46 52·5 3 42 48·7	- ·26 ·29 ·32 ·33 ·35	4 6 53.9 3 58 45.0 3 50 35.9 3 46 31.1 3 42 26.3	- ·30 ·33 ·36 ·38 ·40	4 6 34.7 3 58 23.8 3 50 12.6 3 46 6.8 3 42 0.9	*37 *41 *43
35 36 37 38 39	3 39 36·3 3 35 34·6 3 31 32·9 3 27 31·2 3 23 29·4	- ·21 ·22 ·23 ·24 ·25	3 39 22·1 3 35 19·8 3 31 17·4 3 27 15·0 3 23 12·5	- ·26 ·27 ·28 ·30 ·31	3 39 5.0 3 35 1.9 3 30 58.7 3 26 55.5 3 22 52.1	- ·31 ·32 ·34 ·35 ·37	3 38 44.7 3 34 40.7 3 30 36.6 3 26 32.4 3 22 28.1	- ·36 ·38 ·39 ·41 ·43	3 38 21·4 3 34 16·4 3 30 11·2 3 26 5·9 3 22 0·5	- ·41 ·43 ·45 ·47 ·49	3 37 54.8 3 33 48.7 3 29 42.3 3 25 35.8 3 21 29.2	·49 ·51 ·53
40 41 42 43 44	3 19 27.6 3 15 25.7 3 11 23.8 3 7 21.8 3 3 19.8	- ·26 ·27 ·29 ·30 ·31	3 19 9.9 3 15 7.3 3 11 4.5 3 7 1.9 3 2 59.1	- ·32 ·34 ·35 ·37 ·38	3 18 48·7 3 14 45·2 3 10 41·6 3 6 37·9 3 2 34·1	- ·38 ·40 ·42 ·43 ·45		- ·45 ·46 ·48 ·50 ·52	3 17 55.0 3 13 49.3 3 9 43.4 3 5 37.4 3 1 31.1	- ·51 ·53 ·55 ·57 ·60	3 17 22.4 3 13 15.4 3 9 8.1 3 5 0.7 3 0 53.0	·60 ·62 ·65
45 46 47 48 49	2 59 17·8 2 55 15·6 2 51 13·4 2 47 11·1 2 43 8·8	- ·32 ·34 ·35 ·37 ·38	2 58 56·1 2 54 53·1 2 50 50·0 2 46 46·8 2 42 43·4	- ·40 ·41 ·43 ·45 ·46	2 58 30·2 2 54 26·1 2 50 21·9 2 46 17·5 2 42 13·0	- ·47 ·49 ·51 ·53 ·55	2 57 59.7 2 5 3 54.4 2 49 49.0 2 45 43.3 2 41 37.5	- ·55 ·57 ·59 ·61 ·64	2 57 24.7 2 53 18.0 2 49 11.2 2 45 4.0 2 40 56.6		2 56 45·I 2 52 36·9 2 48 28·4 2 44 I9·5 2 40 I0·4	·73 ·76 ·79 ·82
50 51 52 53 54	2 39 6·3 2 35 3·8 2 31 1·2 2 26 58·4 2 22 55·5	- ·40 ·41 ·43 ·45 ·47	2 38 40·0 2 34 36·4 2 30 32·6 2 26 28·7 2 22 24·6	- ·48 ·50 ·52 ·54 .57		- ·57 ·59 ·62 ·64 ·67		·72	2 32 40·9 2 28 32·5 2 24 23·8	·78 ·82 ·85	2 36 0.8 2 31 50.9 2 27 40.5 2 23 29.6 2 19 18.2	·88 ·92 ·96

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
0 2 4 6 8	s. s. + ·42 -4·02 ·42 4·02 ·42 4·02 ·41 4·02 ·41 4·02	s. s. + ·49 -4·03 ·49 4·03 ·49 4·03 ·48 4·03 ·48 4·03	s. s. + ·56 -4·04 ·56 4·04 ·56 4·04 ·56 4·04 ·56 4·04	s. s. + ·63 -4·05 ·63 4·05 ·63 4·05 ·63 4·05	S. S. + ·70 -4·06 ·70 4·06 ·70 4·06 ·70 4·06 ·70 4·06	s. s. + ·78 -4·07 ·77 4·07 ·77 4·07 ·77 4·07 ·77 4·07
10	+ ·41 4·02 ·41 4·02 ·41 4·02 ·42 4·02 ·42 4·02	+ '49 4'03	+ ·56 4·04	+ ·63 4·05	+ ·70 4·06	+ ·78 4·07
12		'49 4'03	·56 4·04	·63 4·05	·71 4·06	·78 4·07
14		'49 4'03	·56 4·04	·63 4·05	·71 4·06	·78 4·08
16		'49 4'03	·56 4·04	·64 4·05	·71 4·06	·79 4·08
18		'49 4'03	·57 4·04	·64 4·05	·72 4·06	·79 4·08
20	+ ·42 4·02	+ ·50 4·03	+ ·57 4·04	+ ·65 4·05	+ ·72 4·06	+ ·80 4·08
22	·42 4·02	·50 4·03	·58 4·04	·65 4·05	·73 4·07	·81 4·08
24	·43 4·02	·51 4·03	·58 4·04	·66 4·05	·74 4·07	·82 4·08
26	·43 4·02	·51 4·03	·59 4·04	·67 4·06	·75 4·07	·83 4·09
28	·44 4·02	·52 4·03	·60 4·04	·68 4·06	·76 4·07	·84 4·09
30	+ ·44 4·02	+ ·53 4·03	+ ·61 4·05	+ ·69 4·06	+ ·78 4·07	+ .86 4.09
32	·45 4·03	·53 4·04	·62 4·05	·70 4·06	·79 4·08	.88 4.09
34	·46 4·03	·55 4·04	·63 4·05	·72 4·06	·81 4·08	.89 4.10
36	·47 4·03	·56 4·04	·65 4·05	·73 4·07	·82 4·08	.91 4.10
38	·48 4·03	·57 4·04	·66 4·05	·75 4·07	·84 4·09	.94 4.11
40	+ ·49 4·03	+ ·58 4·04	+ ·68 4·06	+ ·77 4·07	+ ·87 4·09	+ ·96 4·II
42	·50 4·03	·60 4·05	·70 4·06	·79 4·08	·89 4·10	·99 4·I2
44	·52 4·03	·62 4·05	·72 4·06	·82 4·08	·92 4·11	I·03 4·I3
46	·53 4·04	·64 4·05	·74 4·07	·85 4·09	·95 4·11	I·06 4·I4
48	·55 4·04	·66 4·05	·77 4·07	·88 4·10	·99 4·12	I·I0 4·I5
50	+ '57 4'04	+ ·68 4·06	+ ·80 4·08	+ ·9I 4·I0	+1.03 4.13	+1·15 4·16
52	'60 4'04	·71 4·06	·83 4·09	·95 4·II	1.08 4.14	1·20 4·18
54	'62 4'05	·75 4·07	·87 4·09	I·00 4·I2	1.13 4.16	1·26 4·19

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT.

LATITUDE 1°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 51·0 5 19 57·3 5 11 46·4 5 3 35·5 4 55 24·4	s. + ·07 - ·08 ·11 ·14 ·17	H. M. S. 6 0 55.5 5 19 52.1 5 11 39.3 5 3 26.4 4 55 13.3	s. + ·07 - ·09 ·12 ·16 ·19	H. M. S. 6 0 59·8 5 19 46·1 5 11 31·2 5 3 16·2 4 55 0·9	s. + ·07 - ·10 ·14 ·18 ·22	H. M. S. 6 I 4·3 5 I9 39·4 5 II 22·2 5 3 4·7 4 54 47·I	S. + ·07 - ·12 ·16 ·20 ·24	H. M. S. 6 I 8·8 5 I9 3I·8 5 II I2·I 5 2 52·2 4 54 32·0	s. + .07 13 .18 .22 .26	H. M. S. 6 I 13.4 5 I9 23.4 5 II I.0 5 2 38.4 4 54 15.4	s. + ·08 - ·15 ·19 ·24 ·29
18 20 22 24 26	4 47 13·1 4 39 1·7 4 30 50·0 4 22 38·0 4 14 25·7	- ·20 ·24 ·27 ·31 ·34	4 47 0.0 4 38 46.5 4 30 32.6 4 22 18.5 4 14 3.9	- ·23 ·27 ·30 ·34 ·38	4 46 45 4 4 38 29 6 4 30 13 4 4 21 56 9 4 13 39 8	- ·26 ·30 ·33 ·38 ·42	4 46 29·2 4 38 10·9 4 29 52·2 4 21 33·1 4 13 13·4	- ·28 ·32 ·37 ·41 ·46	4 37 50·5 4 29 29·1 4 21 7·1	- ·31 ·35 ·40 ·45 ·50	4 45 52·I 4 37 28·3 4 29 3·9 4 20 38·9 4 12 13·2	- ·34 ·38 ·44 ·49 ·54
28 30 31 32 33	4 6 13·1 3 58 0·0 3 53 53·3 3 49 46·5 3 45 39·5	- ·38 ·42 ·44 ·46 ·48	4 5 48·9 3 57 33·4 3 53 25·5 3 49 17·4 3 45 9·1	- ·42 ·46 ·49 ·51 ·53	4 5 22·3 3 57 4·2 3 52 54·9 3 48 45·3 3 44 35·6	- ·46 ·51 ·53 ·56 ·58	4 4 53·1 3 56 32·0 3 52 21·2 3 48 10·1 3 43 58·9	- ·51 ·56 ·58 ·61 ·64	3 51 44.6	- ·55 ·61 ·64 ·66 ·69	4 3 46·6 3 55 19·0 3 51 4·8 3 46 50·3 3 42 35·5	- ·60 ·66 ·69 ·72 ·75
34 35 36 37 38	3 41 32·3 3 37 25·1 3 33 17·6 3 29 10·0 3 25 2·1	- ·50 ·52 ·55 ·57 ·59	3 41 0.6 3 36 51.9 3 32 43.1 3 28 34.0 3 24 24.7	- ·55 ·58 ·60 ·63 ·65	3 40 25.6 3 36 15.5 3 32 5.1 3 27 54.4 3 23 43.5	- ·61 ·64 ·66 ·69 ·72	3 39 47·3 3 35 35·5 3 31 23·4 3 27 11·0 3 22 58·3	- ·67 ·69 ·72 ·75 ·79	3 39 5.6 3 34 52.0 3 30 38.1 3 26 23.8 3 22 9.1	- ·72 ·75 ·79 ·82 ·85	3 38 20·4 3 34 4·8 3 29 48·9 3 25 32·6 3 21 15·8	- ·78 ·82 ·85 ·89 ·92
39 40 41 42 43	3 20 54·I 3 16 45·9 3 12 37·4 3 8 28·6 3 4 19·6	- ·62 ·64 ·67 ·69 ·72	3 20 15·I 3 16 5·3 3 II 55·2 3 7 44·8 3 3 34·0	- ·68 ·71 ·74 ·77 ·80	3 19 32·2 3 15 20·7 3 11 8·8 3 6 56·5 3 2 43·8	- ·75 ·78 ·81 ·84 ·88	3 18 45:2 3 14 31:8 3 10 17:9 3 6 3:6 3 1 48:9		3 13 38·5 3 9 22·5 3 5 6·0	- ·89 ·92 ·96 1·00 1·04	3 16 58·6 3 12 40·8 3 8 22·5 3 4 3·5 2 59 43·9	- ·96 1·00 1·04 1·08 1·13
44 45 46 47 48	3 0 10·3 2 56 0·7 2 51 50·8 2 47 40·4 2 43 29·7	- ·75 ·78 ·81 ·84 ·88	2 59 22·9 2 55 11·4 2 50 59·5 2 46 47·2 2 42 34·4	- ·83 ·86 ·90 ·93 ·97	2 58 30·7 2 54 17·2 2 50 3·2 2 45 48·6 2 41 33·4	- ·91 ·95 ·98 I·02 I·06	2 57 33.6 2 53 17.8 2 49 1.3 2 44 44.3 2 40 26.6	- ·99 1·03 1·08 1·12 1·16	2 56 31·3 2 52 13·0 2 47 54·0 2 43 34·2 2 39 13·7	- 1·08 1·13 1·17 1·22 1·27	2 55 23.7 2 51 2.7 2 46 40.8 2 42 18.1 2 37 54.4	- 1·17 1·22 1·27 1·32 1·37
49 50 51 52 53	2 39 18·6 2 35 7·0 2 30 54·8 2 26 42·2 2 22 28·9	- ·91 ·95 ·99 1·03 1·07	2 38 21·0 2 34 7·1 2 29 52·6 2 25 37·4 2 21 21·5	1.01 1.05 1.09 1.13 1.18	2 37 17·6 2 33 1·2 2 28 44·0 2 24 26·0 2 20 7·0	1·11 1·20 1·25 1·30	2 36 8·1 2 31 48·8 2 27 28·6 2 23 7·5 2 18 45·3			I·43	2 33 29.7 2 29 3.8 2 24 36.8 2 20 8.3 2 15 38.3	-1.43 1.49 1.56 1.62 1.69

Alt.	L. 12°	A.	L. 13	° A.	L. 14	° A.	L. 15	° A.	L. 16	° A.	L. 17	° A.
	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
0		-4.09	+ .92	-4.11	+1.00	-4.13	+1.07	-4.14	+1.15	-4.16	+1.22	-4.18
2	∙85	4.09	.92	4.11	•99	4.12	1.07	4.14	1.14	4.16	1.22	4.18
4	·85	4.09	•92	4.10	.99	4.12	1.07	4.14	1.14	4.16	1.22	4.18
6	·8 ₅	4.09	.92	4.10	•99	4.12	1.07	4.14	1.15	4.16	1.22	4.18
8	-85	4.09	.92	4.10	1.00	4.13	1.07	4.14	1.12	4.16	1.22	4.18
10	+ .85	4.09	+ .92	4.11	+1.00	4.12	+1.07	4.14	+1.15	4.16	+1.23	4.18
12	-85	4.09	•93	4.11	1.00	4.12	1.08	4.14	1.16	4.16	1.24	4.19
14	∙86	4.09	.93	4.11	1.01	4.12	1.00	4.14	1.17	4.17	1.24	4.19
16	∙86	4.09	•94	4.11	1.02	4.13	1.10	4.12	1.17	4.17	1.25	4.19
18	·8 ₇	4.09	•95	4.11	1.03	4.13	1.10	4.12	1.18	4.17	1.27	4.19
20	+ .88	4.10	+ .96	4.11	+1.04	4.13	+1.12	4.15	+1.20	4.17	+1.28	4.20
22	-89	4.10	97	4.12	1.05	4.13	1.13	4.16	1.21	4.18	1.30	4.20
24	.90	4.10	198	4.12	1.06	4.14	1.15	4.16	1.23	4.18	1.31	4.21
26	.91	4.10	1.00	4.12	1.08	4.14	1.16	4.16	1.25	4.19	1.34	4.22
28	.93	4.11	1.01	4.13	1.10	4.15	1.18	4.17	1.27	4.20	1.36	4.22
30	+ .94	4.11	+1.03	4.13	+1.12	4.15	+1.21	4.18	+1.30	4.30	+1.39	4.23
32	∙96	4.11	1.05	4.14	1.14	4.16	1.23	4.18	1.32	4.21	1.42	4.24
34	-98	4.12	1.07	4.14	1.17	4.17	1.26	4.19	1.35	4.22	1.45	4.25
36	1.01	4.12	1.10	4.12	1.20	4.17	1.20	4.20	1.39	4.23	1.49	4.27
38	1.03	4.13	1.13	4.16	1.23	4.18	1.33	4.21	1.43	4.25	1.23	4.28
40	+1.06	4.14	+1.16	4.16	+1.26	4.10	+1.37	4.23	+1.47	4.26	+1.58	4.30
42	1.09	4.12	1.20	4.17	1.30	4.31	1.41	4.24	1.52	4.28	1.63	4.32
44	1.13	4.16	1.24	4.19	1.35	4.22	1.46	4.26	1.58	4.30	1.69	4.34
46	1.17	4.17	1.28	4.20	1.40	4.24	1.52	4.28	1.64	4.32	1.76	4.37
48	1.22	4.18	1.34	4.22	1.46	4.26	1.58	4.30	1.71	4.35	1.84	4.40
50	+1.27	4.20	+1.39	4.24	+1.52	4.28	+1.65	4:33	+1.79	4.38	+1.93	4.44
52	1.33	4.22	1.46	4.26	1.60	4.31	1.74	4.36	1.88	4.42	2.03	4.49

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 9 LATITUDE 1°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	, 22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 1 18·0 5 19 14·0 5 10 48·8 5 2 23·3 4 53 57·4	s. + ·08 - ·16 ·21 ·26 ·31	H. M. S. 6 I 22.7 5 I9 3.8 5 I0 35.5 5 2 6.9 4 53 37.9	s. + ·08 - ·18 ·23 ·28 ·34	H. M. S. 6 I 27·3 5 I8 52·7 5 IO 2I·2 5 I 49·3 4 53 I6·9	s. + ·08 - ·19 ·25 ·30 ·36	H. M. S. 6 I 32·I 5 I8 40·6 5 IO 5·7 5 I 30·2 4 52 54·3	s. + ·08 - ·21 ·27 ·33 ·39	H. M. S. 6 I 37.0 5 I8 27.6 5 9 49.0 5 I 9.8 4 52 30.1	s. + ·08 - ·22 ·29 ·35 ·42	H. M. S. 6 I 41.9 5 18 13.6 5 9 31.1 5 0 48.0 4 52 4.2	s. + ·08 - ·24 ·31 ·38 ·44
18 20 22 24 26	4 45 31·1 4 37 4·2 4 28 36·7 4 20 8·5 4 11 39·3	- ·36 ·42 ·47 ·53 ·59	4 45 8·4 4 36 38·2 4 28 7·3 4 19 35·6 4 II 2·8	- ·39 ·45 ·51 ·57 ·63	4 44 43.9 4 36 10.2 4 27 35.7 4 19 0.2 4 10 23.6	- ·42 ·48 ·54 ·61 ·67	4 44 17.7 4 35 40.2 4 27 1.8 4 18 22.4 4 9 41.6	- ·45 ·52 ·58 ·65 ·72	4 17 42·0 4 8 56·8	- ·48 ·55 ·62 ·70 ·77	4 34 33.9 4 25 47.1 4 16 58.8 4 8 9.0	- ·52 ·59 ·66 ·74 ·82
28 30 31 32 33	4 3 9·3 3 54 38·0 3 50 21·9 3 46 5·5 3 41 48·7	- ·65 ·71 ·74 ·77 ·81	4 2 29.0 3 53 53.8 3 49 35.7 3 45 17.2 3 40 58.3	- ·70 ·76 ·80 ·83 ·87		- ·74 ·82 ·85 ·89 ·93	4 0 59·5 3 52 15·6 3 47 53·0 3 43 29·9 3 39 6·2	- ·80 ·87 ·91 ·96 1·00	3 51 21·4 3 46 56·3 3 42 30·6	- ·85 ·93 ·98 I·02 I·07	3 50 23·6 3 45 55·8	- ·9i ·99 ··04 ··09 ··14
34 35 36 37 38	3 37 31·5 3 33 13·9 3 28 55·8 3 24 37·3 3 20 18·2	- ·84 ·88 ·92 ·96 I·00	3 36 38·9 3 32 19·0 3 27 58·7 3 23 37·7 3 19 16·2	- ·91 ·95 ·99 1·03 1·07	3 35 42.4 3 31 20.1 3 26 57.3 3 22 33.7 3 18 9.5	- ·97 1·02 1·06 1·10 1·15		-1.04 1.09 1.13 1.18 1.23	3 29 9.6 3 24 41.2 3 20 11.9	- 1·11 1·16 1·21 1·26 1·32	3 32 28·3 3 27 57·6 3 23 26·1 3 18 53·6 3 14 20·1	1.29
39 40 41 42 43	3 15 58·6 3 11 38·4 3 7 17·5 3 2 55·9 2 58 33·7	-1.04 1.08 1.12 1.17 1.22	3 14 54.0 3 10 31.1 3 6 7.5 3 1 43.1 2 57 17.9	1·12 1·16 1·21 1·26 1·31	3 13 44.6 3 9 18.9 3 4 52.3 3 0 24.8 2 55 56.3	1·20 1·25 1·30 1·35 1·41	3 8 1.4	-1·28 1·34 1·39 1·45 1·51	3 6 38·5 3 2 5·2 2 57 30·8 2 52 55·1		3 0 32·8 2 55 54·5	1·53 1·66
44 45 46 47 48	2 54 10·5 2 49 46·6 2 45 21·6 2 40 55·6 2 36 28·7	1·37 1·37 1·43 1·49	2 52 51·6 2 48 24·4 2 43 56·1 2 39 26·6 2 34 55·8	-1·36 1·42 1·48 1·54 1·61	2 37 50·7 2 33 15·8	-1·47 1·53 1·59 1·66 1·73	2 31 28.1	1.64	2 43 39·I 2 38 58·8 2 34 16·5	1.69 1.76 1.83 1.92 2.00	2 41 49·9 2 37 4·8 2 32 17·5	2.05
49 50 51 52 53	2 32 0·3 2 27 30·6 2 22 59·6 2 18 26·9 2 13 52·4	1·69 1·76	2 30 23·6 2 25 49·8 2 21 14·3 2 16 36·9 2 11 57·4		2 24 0·9 2 19 20·5 2 14 38·0	1·97 2·06		-1.94 2.03 2.13 2.23 2.34	2 19 56·9 2 15 5·3 2 10 10·7	-2.09 2.19 2.29 2.40 2.53	2 12 42·6 2 7 40·9	2·47 2·60

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
° 0 2 4 6 8	s. s. +1·30 -4·21 1·30 4·21 1·30 4·20 1·30 4·20 1·30 4·21	s. s. +1·38 -4·23 1·38 4·23 1·37 4·23 1·38 4·23 1·38 4·23	s. s. +1·46 -4·26 1·45 4·26 1·45 4·26 1·46 4·26 1·46 4·26	s. s. +1·53 -4·28 1·53 4·28 1·53 4·28 1·54 4·28 1·54 4·29	S. S. +1.62 -4.31 1.61 4.31 1.61 4.31 1.62 4.31 1.62 4.32	s. s. +1.70 -4.34 1.70 4.34 1.70 4.34 1.70 4.34 1.70 4.35
10	+1·31 4·21	+1·39 4·23	+1·47 4·26	+1·55 4·29	+1.63 4.32	+1·71 4·35
12	1·31 4·21	1·39 4·24	1·47 4·26	1·56 4·29	1.64 4.32	1·72 4·35
14	1·32 4·21	1·40 4·24	1·49 4·27	1·57 4·30	1.65 4.33	1·74 4·36
16	1·33 4·22	1·41 4·24	1·50 4·27	1·58 4·30	1.67 4.33	1·75 4·37
18	1·35 4·22	1·43 4·25	1·51 4·28	1·60 4·31	1.68 4.34	1·77 4·38
20	+1·36 4·22	+1:45 4:25	+1·53 4·28	+1.62 4.31	+1·71 4·35	+1.79 4.38
22	1·38 4·23	1:47 4:26	1·55 4·29	1.64 4.32	1·73 4·36	1.82 4.39
24	1·40 4·24	1:49 4:27	1·58 4·30	1.67 4.33	1·76 4·37	1.85 4.41
26	1·42 4·24	1:51 4:28	1·60 4·31	1.70 4.34	1·79 4·38	1.88 4.42
28	1·45 4·25	1:54 4:29	1·63 4·32	1.73 4.36	1·82 4·40	1.92 4.44
30	+1·48 4·26	+1·57 4·30	+1.67 4.33	+1·77 4·37	+1.86 4.41	+1.97 4.45
32	1·51 4·27	1·61 4·31	1.71 4.35	1·81 4·39	1.91 4.43	2.01 4.48
34	1·55 4·29	1·65 4·33	1.75 4.37	1·85 4·41	1.96 4.45	2.07 4.50
36	1·59 4·30	1·69 4·34	1.80 4.39	1·91 4·43	2.02 4.48	2.13 4.53
38	1·64 4·32	1·74 4·36	1.85 4.41	1·97 4·46	2.08 4.51	2.20 4.56
40	+1.69 4.34	+1.80 4.39	+1·91 4·43	+2·03 4·49	+2·16 4·54	+2·28 4·61
42	1.75 4.36	1.86 4.41	1·98 4·46	2·11 4·52	2·24 4·58	2·37 4·65
44	1.81 4.39	1.94 4.44	2·06 4·50	2·20 4·56	2·33 4·63	2·48 4·71
46	1.89 4.42	2.02 4.48	2·16 4·54	2·30 4·61	2·44 4·69	2·60 4·77
48	1.97 4.46	2.11 4.52	2·26 4·59	2·41 4·67	2·57 4·75	2·74 4·85
50	+2·07 4·51	+2·22 4·58	+2·38 4·66	+2·55 4·74	+2·72 4·84	+2·90 4·94
52	2·19 4·56	2·35 4·64	2·52 4·73	2·70 4·83	2·90 4·94	3·10 5·06

10 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 2°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 58.5 5 11 58.2 5 3 57.9 4 55 57.6	S. + ·14 ·14 ·14 ·14	H. M. S. 6 0 8.4 5 20 6.7 5 12 6.4 5 4 6.0 4 56 5.7	s. + ·14 ·13 ·13 ·13	H. M. S. 6 0 16.8 5 20 14.0 5 12 13.6 5 4 13.1 4 56 12.6	s. + ·14 ·12 ·11 ·11	H. M. S. 6 0 25·2 5 20 20·8 5 12 20·0 5 4 19·2 4 56 18·4	s. + ·14 ·10 ·10 ·09 ·08	5 12 25.4 5 4 24.1	s. + ·14 ·09 ·08 ·07 ·06	H. M. S. 6 0 42·0 5 20 32·0 5 12 30·0 5 4 28·1 4 56 26·2	s. + ·14 ·08 ·07 ·06 ·04
18 20 22 24 26	4 47 57·3 4 39 57·0 4 31 56·6 4 23 56·3 4 15 55·9	+ ·15 ·15 ·15 ·15 ·15	4 48 5.4 4 40 5.1 4 32 4.8 4 24 4.5 4 16 4.2	+ ·12 ·12 ·12 ·12 ·12	4 48 12·2 4 40 11·7 4 32 11·3 4 24 10·9 4 16 10·5	+ ·10 ·09 ·09		+ ·08 ·07 ·07 ·06 ·05	4 24 18.1	+ ·06 ·05 ·04 ·03 ·02	4 48 24·4 4 40 22·5 4 32 20·7 4 24 18·9 4 16 17·0	.02
28 30 32 33 34	4 7 55.6 3 59 55.2 3 51 54.8 3 47 54.6 3 43 54.3	+ ·16 ·16 ·16 ·17 ·17	4 8 3.9 4 0 3.6 3 52 3.3 3 48 3.2 3 44 3.0	+ ·12 ·12 ·12 ·12 ·12	4 8 10·1 4 0 9·7 3 52 9·3 3 48 9·1 3 44 8·9	+ ·08 ·08 ·08 ·07 ·07	4 8 14.0 4 0 13.3 3 52 12.6 3 48 12.3 3 44 12.0	·04 ·03 ·03	4 0 14·5 3 52 13·3 3 48 12·8	+ ·01 - ·01 - ·01 ·02	4 8 15·2 4 0 13·3 3 52 11·5 3 48 10·5 3 44 9·6	- ·03 ·04 ·05 ·06 ·07
35 36 37 38 39	3 39 54·1 3 35 53·9 3 31 53·7 3 27 53·5 3 23 53·2	+ ·17 ·17 ·17 ·18 ·18	3 40 2·9 3 36 2·7 3 32 2·6 3 28 2·4 3 24 2·3	+ ·12 ·12 ·12 ·12 ·12	3 40 8.8 3 36 8.6 3 32 8.4 3 28 8.2 3 24 8.0	+ ·07 ·07 ·07 ·07	3 40 11.6 3 36 11.3 3 32 11.0 3 28 10.6 3 24 10.3	·02	3 36 II·0 3 32 IO·4	- ·02 ·03 ·03 ·04 ·05	3 40 8·6 3 36 7·7 3 32 6·7 3 28 5·7 3 24 4·7	- ·07 ·08 ·09 ·09 ·10
40 41 42 43 44	3 19 53.0 3 15 52.7 3 11 52.4 3 7 52.2 3 3 51.9	+ ·18 ·19 ·19 ·19	3 20 2·1 3 16 2·0 3 12 1·9 3 8 1·7 3 4 1·6	+ ·12 ·12 ·12 ·13 ·13	3 20 7.8 3 16 7.6 3 12 7.5 3 8 7.3 3 4 7.1	+ ·06 ·06 ·06 ·06	3 20 10·0 3 16 9·6 3 12 9·3 3 8 9·0 3 4 8·7	00	3 20 8·6 3 16 8·0 3 12 7·4 3 8 6·7 3 4 6·1	- ·05 ·06 ·06 ·07 ·08	3 20 3.7 3 16 2.7 3 12 1.7 3 8 0.6 3 3.59.5	- ·II ·I2 ·I3 ·I4
45 46 47 48 49	2 59 51·6 2 55 51·3 2 51 51·0 2 47 50·7 2 43 50·3	+ ·20 ·20 ·20 ·21 ·21	3 0 1.4 2 56 1.2 2 52 1.0 2 48 0.9 2 44 0.7	+ ·13 ·13 ·13 ·13 ·13	3 0 6·9 2 56 6·8 2 52 6·6 2 48 6·4 2 44 6·3	+ ·06 ·06 ·06 ·05 ·05	3 0 8·3 2 56 8·0 2 52 7·7 2 48 7·3 2 44 7·0	·02 ·02 ·02		- ·08 ·09 ·10 ·11	2 59 58·5 2 55 57·4 2 51 56·3 2 47 55·1 2 43 53·9	- ·15 ·16 ·17 ·18 ·19
50 51 52 53 54	2 39 50·0 2 35 49·6 2 31 49·3 2 27 48·9 2 23 48·5	+ ·22 ·22 ·23 ·23 ·24	2 40 0.5 2 36 0.4 2 32 0.2 2 28 0.0 2 23 59.9	+ ·13 ·14 ·14 ·14 ·14	2 40 6·1 2 36 5·9 2 32 5·8 2 28 5·6 2 24 5·5		2 40 6.6 2 36 6.3 2 32 6.0 2 28 5.6 2 24 5.3	·04 ·04 ·05	2 32 0·8 2 28 0·1	- ·12 ·12 ·13 ·14 ·15	2 39 52·7 2 35 51·5 2 31 50·2 2 27 48·9 2 23 47·6	- ·20 ·21 ·22 ·23 ·24

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
۰	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
0	— ·00 —4·00	+ .07 -4.00	+ .14 -4.00	+ .21 -4.01	+ .28 -4.01	+ .35 -4.02
2	·00 4·00	·06 4·00	·13 4·00	·20 4·0I	·27 4·0I	*34 4.02
4	·01 4·00	·06 4·00	·13 4·00	·20 4·0I	·27 4·0I	*34 4.02
6	·01 4·00	·05 4·00	·I3 4·00	·19 4·01	·27 4·0I	*34 4.02
8	·02 4·00	·05 4·00	·12 4·00	•19 4•01	·26 4·0I	.33 4.03
10	- ∙02 4⋅00	+ .05 4.00	+ .12 4.00	+ .19 4.01	+ .26 4.01	+ .33 4.02
12	.03 4.00	·04 4·00	·II 4·00	·18 4·01	·26 4·0I	*33 4.02
14	.03 4.00	•04 4.00	·11 4·00	·18 4·01	·25 4·0I	·33 4·01
16	.04 4.00	•03 4.00	·10 4·00	·18 4·01	·25 4·0I	·32 4·0I
18	•04 4•00	·03 4·00	·10 4·00	·17 4·01	.25 4.01	·32 4·0I
20	- 05 4.00	+ .02 4.00	+ .10 4.00	+ .17 4.01	+ .25 4.01	+ .32 4.01
22	·05 4·00	.02 4.00	•09 4•00	17 4.01	·24 4·0I	·32 4·0I
24	·06 4·00	·01 4·00	·09 4·00	17 4.00	·24 4·0I	'32 4'0I
26	·07 4·00	·OI 4·00	109 4.00	•16 4•00	·24 4·0I	·32 4·0I
28	.07 4.00	•00 4•00	·08 4·00	•16 4•00	·24 4·0I	·32 4·01
30	— ·08 4·00	+ .00 4.00	+ .08 4.00	+ .16 4.00	+ .24 4.01	+ .32 4.01
32	·09 4·00	.00 4.00	·08 4·00	•16 4.00	·24 4·0I	·32 4·0I
34	·09 4·00	- ·OI 4·OO	.07 4.00	•16 4.00	·24 4·0I	·33 4·0I
36	·10 4·00	·OI 4·00	•07 4.00	•16 4•00	·24 4·01	·33 4·0I
38	·II 4·00	·02 4·00	.07 4.00	·16 4·00	.24 4.01	.33 4.0I
40	- ·12 4·00	03 4.00	+ .06 4.00	+ .16 4.00	+ .25 4.01	+ ·34 4·01
42	·12 4·00	.03 4.00	•06 4.00	·16 4·00	·25 4·0I	·34 4·0I
44	·I4 4·00	.04 4.00	•06 4.00	•16 4.01	·25 4·0I	.35 4.02
46	·14 4·00	.04 4.00	•06 4.00	·16 4·01	•26 4.01	.36 4.02
48	·16 4·00	·05 4·00	•05 4.00	.16 4.01	•26 4•01	.37 4.02
50	- ·17 4·01	 06 4.00	+ .05 4.00	+ .16 4.01	+ .27 4.01	+ .38 4.02
52	·18 4·01	.07 4.00	.02 4.00	.16 4.01	•28 4.01	.39 4.02
54	19 4.01	.07 4.00	.04 4.00	·16 4·01	·28 4·0I	'40 4'02

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 11 LATITUDE 2°.

DECLINATION-SAME NAME AS-LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 50·5 5 20 36·4 5 12 33·7 5 4 31·0 4 56 28·4	s. + ·14 ·07 ·05 ·04 ·02		s. + ·14 ·06 ·04 ·02 ·00	H. M. S. 6 I 7·5 5 20 43·2 5 I2 38·5 5 4 33·7 4 56 29·0	s. + ·14 ·04 ·02 + ·00 - ·01	H. M. S. 6 I 16·I 5 20 45·5 5 I2 39·5 5 4 33·5 4 56 27·5	s. + ·14 ·03 + ·01 - ·01 ·03	H. M. S. 6 I 24.7 5 20 47.1 5 I2 39.7 5 4 32.3 4 56 24.8	s. + ·14 ·02 ·00 - ·03 ·05	H. M. S. 6 I 33·3 5 20 47·9 5 I2 38·9 5 4 29·9 4 56 20·9	s. + ·14 + ·01 - ·02 ·05 ·07
18 20 22 24 26	4 48 25.7 4 40 23.1 4 32 20.4 4 24 17.8 4 16 15.1	+ ·01 - ·02 - ·03 ·05	4 48 25.7 4 40 22.1 4 32 18.5 4 24 14.8 4 16 11.1	- ·oɪ ·oʒ ·o5 ·o6 ·o8	4 48 24·3 4 40 19·6 4 32 14·8 4 24 9·9 4 16 5·0	- ·03 ·05 ·07 ·10 ·12	4 48 21·5 4 40 15·4 4 32 9·3 4 24 3·2 4 15 56·9	06 .08 .10 .13	4 48 17·3 4 40 9·8 4 32 2·2 4 23 54·4 4 15 46·6	- ·08 ·11 ·13 ·16 ·19	4 48 11.7 4 40 2.5 4 31 53.2 4 23 43.8 4 15 34.2	- ·10 ·13 ·16 ·19 ·22
28 30 32 33 34	4 8 12·4 4 0 9·7 3 52 6·9 3 48 5·5 3 44 4·1	06 .08 .10	3 51 59·7 3 47 57·7	- ·10 ·12 ·14 ·15 ·16	4 8 0·1 3 59 55·0 3 51 49·8 3 47 47·2 3 43 44·5	- ·14 ·16 ·19 ·20 ·21	4 7 50·5 3 59 43·9 3 51 37·3 3 47 33·8 3 43 30·4	- ·18 ·20 ·23 ·24 ·26	4 7 38·6 3 59 30·4 3 51 21·9 3 47 17·6 3 43 13·3	- ·22 ·25 ·28 ·29 ·31	4 7 24·3 3 59 14·2 3 51 3·8 3 46 58·5 3 42 53·1	·34 ·36
35 36 37 38 39	3 40 2.7 3 36 1.2 3 31 59.8 3 27 58.3 3 23 56.8	- ·12 ·13 ·14 ·15 ·16		- ·17 ·18 ·19 ·21 ·22	3 39 41·8 3 35 39·1 3 31 36·3 3 27 33·4 3 23 30·5	- ·22 ·24 ·25 ·26 ·28	3 39 26·9 3 35 23·3 3 31 19·6 3 27 15·9 3 23 12·1	- ·27 ·29 ·30 ·32 ·33	3 39 8·8 3 35 4·3 3 30 59·7 3 26 54·9 3 22 50·1	- ·33 ·34 ·36 ·38 ·40	3 38 47.6 3 34 42.0 3 30 36.3 3 26 30.5 3 22 24.5	·42 ·44 ·46
40 41 42 43 44	3 19 55·3 3 15 53·7 3 11 52·1 3 7 50·5 3 3 48·9	- ·17 ·18 ·19 ·20 ·21	3 19 43.2 3 15 41.0 3 11 38.7 3 7 36.4 3 3 34.0	- ·23 ·24 ·25 ·27 ·28	3 19 27·5 3 15 24·5 3 11 21·5 3 7 18·3 3 3 15·1	- ·29 ·30 ·32 ·34 ·35	3 19 8·2 3 15 4·3 3 11 0·2 3 6 56·1 3 2 51·8	- ·35 ·37 · ·39 ·40 ·42	3 18 45·2 3 14 40·2 3 10 35·0 3 6 29·7 3 2 24·3	- ·41 ·43 ·45 ·47 ·49	3 18 18·4 3 14 12·1 3 10 5·7 3 5 59·2 3 1 52·4	- ·48 ·50 ·52 ·54 ·57
45 46 47 48 49	2 59 47·2 2 55 45·5 2 51 43·7 2 47 42·0 2 43 40·1	- ·22 ·23 ·25 ·26 ·27	2 59 31.6 2 55 29.1 2 51 26.6 2 47 24.0 2 43 21.3	- ·29 ·31 ·32 ·34 ·35	2 59 11:8 2 55 8:3 2 51 4:8 2 47 1:2 2 42 57:5	- ·37 ·38 ·40 ·42 ·44	2 58 47.5 2 54 43.0 2 50 38.4 2 46 33.6 2 42 28.6	- ·44 ·46 ·48 ·50 ·52	2 46 0.9	- ·52 ·54 ·56 ·59 ·61	2 57 45.4 2 53 38.2 2 49 30.8 2 45 23.2 2 41 15.2	·65
50 51 52 53 54	2 39 38·2 2 35 36·2 2 31 34·2 2 27 32·1 2 23 29·9	- ·28 ·30 ·31 ·33 ·34	2 31 12·7 2 27 9·6	·39 ·40 ·42	2 38 53.7 2 34 49.7 2 30 45.6 2 26 41.3 2 22 36.8	- ·46 ·48 ·50 ·52 ·54	2 38 23·5 2 34 18·2 2 30 12·8 2 26 7·0 2 22 1·1	- ·55 ·57 ·60 ·62 ·65	2 25 26.8	- ·64 ·66 ·69 ·72 ·75	2 37 7.0 2 32 58.4 2 28 49.6 2 24 40.3 2 20 30.6	·76 ·79 ·83

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
0 2 4 6 8	s. s. + '42 -4·02 '42 4·02 '41 4·02 '41 4·02 '40 4·02	s. s. + '49 -4'03 '49 4'03 '48 4'03 '48 4'03 '47 4'03	s. s. + ·56 -4·04 ·56 4·04 ·55 4·04 ·55 4·04 ·55 4·04	s. s. + ·63 -4·05 ·63 4·05 ·62 4·05 ·62 4·05 ·62 4·05	s. s. + '71 -4'06 '70 4'06 '70 4'06 '69 4'06 '69 4'06	s. s. + ·78 -4·08 ·77 4·08 ·77 4·07 ·77 4·07 ·76 4·07
10	+ '40 4'02 '40 4'02 '40 4'02 '40 4'02 '40 4'02	+ '47 4'03	+ ·55 4·04	+ ·62 4·05	+ ·69 4·06	+ ·76 4·07
12		'47 4'03	·54 4·04	·62 4·05	·69 4·06	·76 4·07
14		'47 4'03	·54 4·04	·62 4·05	·69 4·06	·77 4·07
16		'47 4'03	·54 4·04	·62 4·05	·69 4·06	·77 4·07
18		'47 4'03	·54 4·04	·62 4·05	·70 4·06	·77 4·08
20 22 24 26 28	+ ·40 4·02 ·40 4·02 ·40 4·02 ·40 4·02 ·40 4·02	+ ·47	+ ·55 4·04 ·55 4·04 ·56 4·04 ·56 4·04	+ ·62 4·05 ·63 4·05 ·63 4·05 ·64 4·05 ·64 4·05	+ ·70 4·06 ·70 4·06 ·71 4·06 ·72 4·06 ·72 4·06	+ ·78 4·08 ·78 4·08 ·79 4·08 ·80 4·08 ·81 4·08
30	+ ·40 4·02	+ '49 4'03	+ ·57 4·04	+ ·65 4·05	+ ·73 4·07	+ ·82 4·08
32	·4I 4·02	'49 4'03	·57 4·04	·66 4·06	·74 4·07	·83 4·09
34	·4I 4·02	'50 4'03	·58 4·04	·67 4·06	·76 4·07	·84 4·09
36	·42 4·02	'50 4'03	·59 4·04	·68 4·06	·77 4·07	·86 4·09
38	·42 4·02	'51 4'03	·60 4·05	·69 4·06	·79 4·08	·88 4·10
40	+ '43 4'02	+ ·52 4·03	+ ·62 4·05	+ ·7I 4·06	+ ·81 4·08	+ ·90 4·10
42	'44 4'02	·53 4·04	·63 4·05	·73 4·07	·83 4·08	·93 4·11
44	'45 4'03	·55 4·04	·65 4·05	·75 4·07	·85 4·09	·95 4·11
46	'46 4'03	·56 4·04	·67 4·06	·77 4·08	·88 4·10	·98 4·12
48	'47 4'03	·58 4·04	·69 4·06	·80 4·08	·91 4·10	1·02 4·13
50	+ *49 4.03	+ ·60 4·05	+ ·71 4·06	+ ·82 4·09	+ ·94 4·11	+1.06 4.14
52	*50 4.03	·62 4·05	·74 4·07	·86 4·09	·98 4·12	1.10 4.15
5 4	*52 4.04	·65 4·05	·77 4·08	·89 4·10	1·02 4·13	1.15 4.17

12 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT.

LATITUDE 2°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 I 42·I 5 20 48·0 5 I2 37·2 5 4 26·5 4 56 I5·7	s. + ·15 - ·00 ·03 ·07 ·10	H. M. S. 6 I 50·9 5 20 47·3 5 I2 34·6 5 4 21·9 4 56 9·1	s. + ·15 - ·02 ·05 ·08 ·12	H. M. S. 6 I 59.8 5 20 45.8 5 I2 31.I 5 4 I6.3 4 56 I.4	s. + ·15 - ·03 ·07 ·10	H. M. S. 6 2 8.7 5 20 43.6 5 12 26.6 5 4 9.5 4 55 52.3	s. + ·15 - ·04 ·08 ·12 ·16	H. M. S. 6 2 17.7 5 20 40.6 5 12 21.1 5 4 1.6 4 55 41.8	s. + ·15 - ·06 ·10 ·14 ·18	H. M. S. 6 2 26.8 5 20 36.7 5 12 14.7 5 3 52.5 4 55 30.1	s. + ·15 - ·07 ·11 ·16 ·21
18 20 22 24 26	4 48 4·7 4 39 53·7 4 31 42·5 4 23 31·1 4 15 19·5	- ·13 ·16 ·19 ·23 ·26	4 47 56·3 4 39 43·2 4 31 30·0 4 23 16·5 4 15 2·7	- ·15 ·19 ·22 ·26 ·30	4 47 46·3 4 39 31·0 4 31 15·5 4 22 59·7 4 14 43·6	- ·18 ·22 ·26 ·30 ·34	4 47 34·8 4 39 17·2 4 30 59·2 4 22 40·9 4 14 22·2	- ·20 ·24 ·29 ·33 ·38	4 47 21.8 4 39 1.6 4 30 41.0 4 22 19.9 4 13 58.4	- ·23 ·27 ·32 ·37 ·41	4 47 7·3 4 38 44·3 4 30 20·8 4 21 56·8 4 13 32·3	- ·25 ·30 ·35 ·40 ·46
28 30 31 32 33	4 7 7.6 3 58 55.4 3 54 49.2 3 50 42.9 3 46 36.5	- ·30 ·33 ·35 ·37 ·39	4 6 48·6 3 58 34·1 3 54 26·6 3 50 19·1 3 46 11·4	- ·34 ·38 ·40 ·42 ·44	4 6 27.0 3 58 10.0 3 54 1.2 3 49 52.3 3 45 43.3	- ·38 ·42 ·45 ·47 ·49	4 6 2·9 3 57 43·1 3 53 33·0 3 49 22·6 3 45 12·1	- ·42 ·47 ·50 ·52 ·55		- ·46 ·52 ·54 ·57 ·60	4 5 7.0 3 56 40.9 3 52 27.5 3 48 13.9 3 44 0.0	- ·51 ·57 ·59 ·62 ·66
34 35 36 37 38	3 42 29·9 3 38 23·3 3 34 16·5 3 30 9·5 3 26 2·4	- ·41 ·43 ·45 ·47 ·50	3 42 3.6 3 37 55.6 3 33 47.5 3 29 39.2 3 25 30.7	- ·46 ·49 ·51 ·53 ·56	3 41 34·1 3 37 24·7 3 33 15·1 3 29 5·3 3 24 55·3	- ·52 ·54 ·57 ·59 ·62	3 41 1.4 3 36 50.4 3 32 39.2 3 28 27.8 3 24 16.1	.66	3 3I 59·7 3 27 46·4		3 39 45.8 3 35 31.3 3 31 16.5 3 27 1.3 3 22 45.7	- ·69 ·72 ·75 ·79 ·82
39 40 41 42 43	3 21 55·2 3 17 47·7 3 13 40·1 3 9 32·3 3 5 24·3	- ·52 ·54 ·57 ·59 ·62	3 21 22·0 3 17 13·1 3 13 4·0 3 8 54·6 3 4 44·9	- ·58 ·61 ·64 ·66 ·69		- ·65 ·68 ·71 ·74 ·77	3 20 4·I 3 I5 5I·7 3 II 39·I 3 7 26·I 3 3 I2·7	·75 ·78 ·81	3 15 4·7 3 10 50·1 3 6 35·0	·82 ·85 ·89	3 18 29·8 3 14 13·4 3 9 56·5 3 5 39·1 3 1 21·2	- ·86 ·89 ·93 ·97
44 45 46 47 48	3 I 16·0 2 57 7·5 2 52 58·7 2 48 49·6 2 44 40·2	- ·64 ·67 ·70 :73 ·76	3 0 35.0 2 56 24.7 2 52 14.2 2 48 3.3 2 43 51.9	- ·72 ·75 ·78 ·82 ·85	2 59 49.4 2 55 37.2 2 51 24.6 2 47 11.6 2 42 58.1	- ·80 ·83 ·87 ·91 ·94	2 54 44·5 2 50 29·8 2 46 14·5	·92 ·96	2 53 46·7 2 49 29·5 2 45 II·7	1.01 1.05	2 48 23·7 2 44 3·1	-1.05 1.10 1.15 1.19 1.24
49 50 51 52 53	2 40 30·5 2 36 20·4 2 32 9·8 2 27 58·9 2 23 47·5	- ·79 ·83 ·86 ·90 ·93	2 31 15·2 2 27 1·9	- ·89 ·96 ·96 ·05	2 38 44·I 2 34 29·3 2 30 I4·3 2 25 58·5 2 2I 4I·9	- ·98 1·02 1·07 1·11 1·16	2 33 24.9	1·13 1·18 1·23	2 32 13.9	1·24 1·29 1·35	2 26 31·9 2 22 6·5	1.41

Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.				
° 0 2 4 6 8	s. s. + ·85 -4·09 ·85 4·09 ·84 4·09 ·84 4·09 ·84 4·09	s. s. + '92 -4'11 '92 4'11 '92 4'10 '91 4'10 '91 4'10	s. s. +1.00 -4.12 .99 4.12 .99 4.12 .99 4.12 .99 4.12	s. s. +1.07 -4.14 1.07 4.14 1.06 4.14 1.06 4.14 1.06 4.14	S. S. +1·15 -4·16 1·14 4·16 1·14 4·16 1·14 4·16 1·14 4·16	S. S. +1·22 -4·18 1·22 4·18 1·21 4·18 1·21 4·18				
10	+ ·84 4·09	+ ·91 4·10	+ ·99 4·12	+1.06 4.14	+1·14 4·16	+1·22 4·18 1·22 4·18 1·22 4·19 1·23 4·19 1·24 4·19				
12	·84 4·09	·91 4·10	·99 4·12	1.06 4.14	1·14 4·16					
14	·84 4·09	·92 4·10	·99 4·12	1.07 4.14	1·15 4·16					
16	·84 4·09	·92 4·10	I·00 4·12	1.07 4.14	1·15 4·16					
18	·85 4·09	·92 4·11	I·00 4·12	1.08 4.15	1·16 4·17					
20	+ ·85 4·09	+ ·93 4·11	+1.01 4.13	+1.09 4.15	+1·17 4·17	+1·25 4·19 1·26 4·20 1·28 4·20 1·30 4·21 1·32 4·21				
22	·86 4·09	·94 4·11	1.02 4.13	1.10 4.15	1·18 4·17					
24	·87 4·09	·95 4·11	1.03 4.13	1.11 4.15	1·20 4·18					
26	·88 4·10	·96 4·11	1.04 4.13	1.13 4.16	1·21 4·18					
28	·89 4·10	·97 4·12	1.06 4.14	1.14 4.16	1·23 4·19					
30	+ ·90 4·10	+ ·99 4·12	+1.07 4.14	+1·16 4·17	+1·25 4·19 1·27 4·20 1·30 4·21 1·33 4·22 1·36 4·23	+1·34 4·22				
32	·92 4·10	1·00 4·13	1.09 4.15	1·18 4·17		1·37 4·23				
34	·93 4·11	1·02 4·13	1.11 4.15	1·21 4·18		1·39 4·24				
36	·95 4·11	1·05 4·14	1.14 4.16	1·23 4·19		1·43 4·25				
38	·97 4·12	1·07 4·14	1.17 4.17	1·26 4·20		1·47 4·26				
40	+1.00 4.12	+1·10 4·15	+1·20 4·18	+1·30 4·21	+1.40 4.24	+1·51 4·28				
42	1.03 4.13	1·13 4·16	1·23 4·19	1·34 4·22	1.44 4.25	1·55 4·29				
44	1.06 4.14	1·16 4·17	1·27 4·20	1·38 4·23	1.49 4.27	1·61 4·31				
46	1.09 4.15	1·20 4·18	1·32 4·21	1·43 4·25	1.55 4.29	1·67 4·34				
48	1.13 4.16	1·25 4·19	1·37 4·23	1·49 4·27	1.61 4.31	1·74 4·36				
50	+1.18 4.17	+1·30 4·21	+1·42 4·25	+1·55 4·29	+1.68 4.34	+1·82 4·40				
52	1.23 4.19	1·36 4·23	1·49 4·27	1·62 4·32	1.76 4.37	1·91 4·43				

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 13

LATITUDE 2°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 2 36·1 5 20 32·1 5 12 7·2 5 3 42·2 4 55 16·8	s. + ·15 - ·08 ·13 ·18 ·23	H. M. S. 6 2 45.4 5 20 26.6 5 11 58.7 5 3 30.6 4 55 2.2	s. + ·15 - ·10 ·15 ·20 ·25	H. M. S. 6 2 54·8 5 20 20·3 5 II 49·2 5 3 17·8 4 54 46·1	s. + ·16 - ·11 ·17 ·22 ·28	H. M. S. 6 3 4·3 5 20 13·1 5 11 38·6 5 3 3·8 4 54 28·6	s. + ·16 - ·13 ·18 ·24 ·30	H. M. S. 6 3 14.0 5 20 5.0 5 11 26.9 5 2 48.4 4 54 9.4	s. + ·16 - ·14 ·20 ·27 ·33	H. M. S. 6 3 23.9 5 19 56.0 5 11 14.0 5 2 31.6 4 53 48.7	s. + ·16 - ·16 ·22 ·29 ·36
18 20 22 24 26	4 46 51·2 4 38 25·1 4 29 58·6 4 21 31·4 4 13 3·6	- ·28 ·33 ·39 ·44 ·50	4 46 33.5 4 38 4.1 4 29 34.3 4 21 3.8 4 12 32.4	- ·31 ·36 ·42 ·48 ·54	4 46 14·0 4 37 41·3 4 29 7·9 4 20 33·7 4 11 58·6	- ·34 ·40 ·46 ·52 ·58	4 20 I·3 4 II 22·2	- ·37 ·43 ·49 ·56 ·63	4 45 29.9 4 36 49.6 4 28 8.4 4 19 26.3 4 10 42.9	- ·40 ·46 ·53 ·60 ·68	4 45 5·1 4 36 20·7 4 27 35·3 4 18 48·8 4 10 0·8	- ·43 ·50 ·57 ·65 ·73
28 30 31 32 33	4 4 34.9 3 56 5.3 3 51 50.2 3 47 34.7 3 43 18.9	- ·56 ·62 ·65 ·68 ·71	4 4 · 0·1 3 55 26·8 3 51 9·6 3 46 52·1 3 42 34·3	.74	4 3 22.4 3 54 45.0 3 50 25.8 3 46 6.2 3 41 46.1	- ·65 ·72 ·76 ·79 ·83	3 54 0·I 3 49 38·6 3 45 I6·7	- ·70 ·78 ·81 ·85 ·90	4 I 58·I 3 53 II·7 3 48 47·9 3 44 23·5 3 39 58·6	·83 ·87 ·92	4 I II·3 3 52 20·0 3 47 53·5 3 43 26·5 3 38 58·9	- ·81 ·89 ·94 ·98 I·03
34 35 36 37 38	3 39 2.8 3 34 46.3 3 30 29.4 3 26 12.1 3 21 54.4	- ·75 ·78 ·82 ·85 ·89	3 25 18.8	·85 ·88 ·92	3 37 25.7 3 33 4.7 3 28 43.3 3 24 21.2 3 19 58.6	- ·87 ·91 ·95 ·99 1·04	3 36 31·4 3 32 7·9 3 27 43·9 3 23 19·3 3 18 53·9	- ·94 ·98 I·02 I·07 I·12	3 22 12.7	1.10	3 34 30.6 3 30 1.6 3 25 31.9 3 21 1.3 3 16 29.9	-1.08 1.13 1.18 1.23 1.28
39 40 41 42 43	3 17 36·2 3 13 17·5 3 8 58·2 3 4 38·4 3 0 17·9	- ·93 ·97 ·01 ·05 ·105	3 12 16·9 3 7 55·1 3 3 32·5	1.05 1.14	3 15 35.4 3 11 11.5 3 6 46.8 3 2 21.4 2 57 55.1	-1.08 1.13 1.18 1.23 1.28	3 14 27.9 3 10 1.0 3 5 33.4 3 1 4.8 2 56 35.2	-1·17 1·22 1·27 1·32 1·38	3 8 45·3 3 4 14·4 2 59 42·4	1·31 1·36 1·42	3 7 24·2 3 2 49·7 2 58 14·0	
44 45 46 47 48	2 55 56·7 2 51 34·8 2 47 12·0 2 42 48·4 2 38 23·9	-1·15 1·19 1·24 1·30 1·35	2 50 20·2 2 45 54·3 2 41 27·4	1.35 1.40	2 53 27·8 2 48 59·6 2 44 30·3 2 39 59·8 2 35 28·0	-1.34 1.40 1.45 1.52 1.58	2 42 59·6 2 38 25·2	-1.44 1.50 1.57 1.64	2 45 59·2 2 41 22·0 2 36 43·3	1.62 1.69 1.76	2 39 37·I 2 34 53·6	-1.66 1.74 1.81 1.90 1.98
49 50 51 52 53	2 33 58·3 2 29 31·5 2 25 3·6 2 20 34·2 2 16 3·4	- 1·41 1·47 1·54 1·60 1·68	2 18 53.9	1.60 1.67 1.74	2 21 43·4 2 17 5·0	- 1.66 1.73 1.81 1.89 1.98		-1.79 1.87 1.95 2.05 2.14	2 22 35.8 2 17 48.9 2 12 59.5	2·01 2·11 2·21	2 15 37·5 2 10 41·6	-2.07 2.17 2.28 2.39 2.51

Alt.	L. 18	° A.	L. 19	° A.	L. 20	° A.	L. 21	° A.	L. 22	° A.	L. 23	° A.
	S.	s.	S.	s.	S.	s.	s.	s.	s.	s.	S.	s.
0		-4·2I		-4.23		-4.26		-4.29	+1.62 1.61	-4·31	+ 1·70	-4.35
2	1.30	4.21	1.37	4.23	1.45	4.26	1.53	4.28	1.01	4.31	1.60	4.34
6	1.29	4.21	1.37	4.23	1.45	4·26 4·26	1.53	4.28	1.61	4.31	1.69	4.34
8	1·29 1·29	4.20	1·37	4.23	I·45	4.26	I·53	4.28	1.61	4.31 4.31	1.69	4·34 4·34
1											_	
10	+1.29	4.51	+1.32	4.23	+1.45	4.26	+1.23	4.29	+1.62	4.35	十1.70	4.32
12	1.30	4.51	1.38	4.23	1.46	4.26	1.54	4.29	1.62	4.35	1.71	4.35
14	1.30	4.51	1.38	4.23	1.47	4.26	1.55	4.29	1.63	4.35	1.72	4.35
16	1.31	4.31	1.39	4.24	1.48	4.26	1.56	4.29	1.64	4.35	1.73	4.36
18	1.32	4.21	1.40	4.54	1.49	4.27	1.57	4.30	1.66	4.33	1.74	4.36
20	+1.33	4.22	+1.42	4.24	+1.50	4.27	+1.59	4.30	+1.67	4.34	+1.76	4.37
22	1.35	4.22	1.43	4.25	1.52	4.28	1.61	4.3I	1.69	4.35	1.79	4.38
24	1.36	4.23	1.45	4.26	1.54	4.29	1.63	4.32	1.72	4.35	r.8r	4.39
26	1.38	4.23	1.47	4.26	1.56	4.29	1.65	4.33	1.75	4.37	1.84	4.41
28	1.41	4.24	1.50	4.27	1.59	4.30	1.68	4.34	1.78	4.38	1.87	4.42
30	+1.43	4.25	+1.52	4.28	+1.62	4.31	+1.71	4:35	+1.81	4:39	+1.01	4.43
32	1.46	4.26	1.56	4.29	1.65	4.33	1.75	4:37	1.85	4.41	1.96	4.45
34	1.49	4.27	1.59	4.31	1.69	4.34	1.79	4.38	1.00	4.43	2.01	4.48
36	1.53	4.28	1.63	4.32	1.73	4.36	1.84	4.40	1.95	4.45	2.06	4.50
38	1.57	4.30	1.67	4.34	1.78	4.38	1.89	4.43	2.01	4.48	2.12	4.53
40	+1.61	4.31	+1.72	4.36	+1.84	4.40	+1.95	4.45	+2.07	4.51	+2.20	4.56
42	1.67	4.33	1.78	4.38	1.90	4.43	2.02	4.48	2.15	4.54	2.28	4.60
44	1.73	4.36	1.85	4.41	1.97	4.46	2.10	4.52	2.23	4.58	2.37	4.65
46	1.79	4.39	1.92	4.44	2.05	4.50	2.10	4.56	2.33	4.63	2.48	4.71
48	1.87	4.42	2.01	4.48	2.15	4.54	2.29	4.61	2.45	4.69	2.61	4.78
50	+1.96	4.46	+2.10	4.52	+2.26	4.59	+2.41	4.67	+2.58	4.76	+2.75	4.86
52	2.06	4.20	2.22	4.57	2.38	4.66	2.55	4.75	2.74	4.85	2.93	4.96
1 34	2 00	+ 30	1	7 37	1 - 30	7 00	1 - 33	7/3	1 -7-	+ •3	1 33	

14 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 3°.

DECLINATION—SAME NAME AS—LATITUDE.

77.	DECLINATION—SAME NAME AS—LATITUDE.									l p :		
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 56.7 5 11 56.0 5 3 55.3 4 55 54.6	S. + ·2I ·2I ·2I ·2I ·22	H. M. S. 6 0 12.6 5 20 9.1 5 12 8.4 5 4 7.7 4 56 7.1	s. + ·21 ·20 ·20 ·20 ·20	H. M. S. 6 0 25·2 5 20 20·8 5 12 20·0 4 4 19·2 4 56 18·4	s. + ·21 ·19 ·18 ·18 ·18	H. M. S. 6 0 37·8 5 20 31·7 5 12 30·6 5 4 29·5 4 56 28·5	s. + ·21 ·17 ·17 ·16 ·16	H. M. S. 6 0 50·6 5 20 41·9 5 12 40·4 5 4 38·8 4 56 37·4	s. + ·21 ·16 ·15 ·15 ·14	H. M. S. 6 I 3·I 5 20 5I·4 5 I2 49·2 5 4 47·I 4 56 45·I	s. + ·21 ·15 ·14 ·13 ·12
18 20 22 24 26	4 47 53.9 4 39 53.1 4 31 52.4 4 23 51.6 4 15 50.8	+ ·22 ·22 ·22 ·23 ·23	4 48 6·4 4 40 5·8 4 32 5·1 4 24 4·4 4 16 3·7	+ ·20 ·20 ·20 ·20 ·2·	4 24 15·4 4 16 14·7	+ ·17 ·17 ·17 ·17 ·16	4 48 27.5 4 40 26.5 4 32 25.5 4 24 24.5 4 16 23.6		4 48 35·9 4 40 34·5 4 32 33·1 4 24 31·8 4 16 30·5	+ ·13 ·12 ·11 ·10 ·10	4 48 43.0 4 40 41.1 4 32 39.1 4 24 37.2 4 16 35.3	+ ·11 ·10 ·08 ·07 ·06
28 30 31 32 33	4 7 50·0 3 59 49·1 3 55 48·7 3 51 48·2 3 47 47·7	+ ·24 ·24 ·24 ·25 ·25	4 8 3·I 4 0 2·4 3 56 2·I 3 52 I·7 3 48 I·4	+ ·20 ·20 ·20 ·20 ·20 ·20	4 8 14·0 4 0 13·3 3 56 13·0 3 52 12·6 3 48 12·3	+ ·16 ·16 ·16 ·16 ·16	4 8 22.7 4 0 21.8 3 56 21.4 3 52 20.9 3 48 20.5	+ ·13 ·12 ·12 ·12 ·11	4 8 29·I 4 0 27·9 3 56 27·2 3 52 26·6 3 48 26·0	+ ·09 ·08 ·08 ·07 ·07	4 8 33.4 4 0 31.5 3 56 30.6 3 52 29.7 3 48 28.7	+ ·05 ·04 ·03 ·03 ·02
34 35 36 37 38	3 43 47·3 3 39 46·8 3 35 46·3 3 31 45·8 3 27 45·3	+ ·25 ·25 ·26 ·26 ·26	3 44 1.0 3 40 0.7 3 36 0.3 3 32 0.0 3 27 59.6	+ ·20 ·21 ·21 ·21 ·21	3 44 12·0 3 40 11·6 3 36 11·3 3 32 11·0 3 28 10·6	+ ·16 ·16 ·16 ·16 ·16	3 44 20·1 3 40 19·7 3 36 19·3 3 32 18·8 3 28 18·4	.10 .11 .11 .11	3 44 25.4 3 40 24.7 3 36 24.1 3 32 23.5 3 28 22.9	+ ·06 ·06 ·05 ·05 ·05	3 44 27.8 3 40 26.9 3 36 26.0 3 32 25.1 3 28 24.2	+ ·02 ·01 ·00 - ·00 ·01
39 40 41 42 43	3 23 44.7 3 19 44.2 3 15 43.6 3 11 43.0 3 7 42.4	+ ·27 ·27 ·28 ·28 ·29	3 23 59·2 3 19 58·8 3 15 58·4 3 11 58·0 3 7 57·6	+ ·21 ·21 ·22 ·22 ·22	3 24 10·3 3 20 10·0 3 16 9·6 3 12 9·3 3 8 9·0	+ ·16 ·16 ·16 ·16 ·16	3 24 18·0 3 20 17·6 3 16 17·2 3 12 16·8 3 8 16·4	+ ·10 ·10 ·09 ·09	3 24 22·3 3 20 21·7 3 16 21·1 3 12 20·5 3 8 19·9	+ ·04 ·04 ·03 ·03 ·03	3 24 23·2 3 20 22·3 3 16 21·4 3 12 20·5 3 8 19·5	- ·01 ·02 ·02 ·03 ·04
46 47	3 3 41·7 2 59 41·1 2 55 40·4 2 51 39·8 2 47 39·0	+ ·29 ·30 ·30 ·31 ·31	3 3 57·2 2 59 56·8 2 55 56·4 2 51 55·9 2 47 55·5	+ ·22 ·23 ·23 ·23 ·24	3 4 8·7 3 0 8·3 2 56 8·0 2 52 7·7 2 48 7·3	+ ·16 ·16 ·16 ·16	3 4 16·0 3 0 15·7 2 56 15·3 2 52 14·9 2 48 14·5	+ ·09 ·08 ·08 ·08	3 4 19·3 3 0 18·8 2 56 18·2 2 52 17·6 2 48 17·0	+ ·02 ·02 ·01 ·01 + ·00	3 4 18·6 3 0 17·7 2 56 16·7 2 52 15·8 2 48 14·8	- ·05 ·05 ·06 ·07 ·07
52	2 43 38·3 2 39 37·5 2 35 36·7 2 31 35·8 2 27 34·9	.34	2 43 55.0 2 39 54.6 2 35 54.1 2 31 53.6 2 27 53.1	.25	2 44 7.0 2 40 6.6 2 36 6.3 2 32 6.0 2 28 5.6	+ ·16 ·16 ·16 ·16	2 44 14·1 2 40 13·7 2 36 13·4 2 32 13·0 2 28 12·6	+ ·08 ·08 ·07 ·07 ·07	2 44 16·4 2 40 15·8 2 36 15·2 2 32 14·7 2 28 14·1	- ·00 ·01 ·01 ·02 ·02	2 44 13·8 2 40 12·9 2 36 11·9 2 32 10·9 2 28 9·9	- ·08 ·09 ·10 ·11
56 57	2 23 34.0 2 19 33.0 2 15 32.0 2 11 30.9 2 7 29.8	·36	2 23 52·5 2 19 52·0 2 15 51·4 2 11 50·8 2 7 50·2		2 20 4·9 2 16 4·6 2 12 4·2	17	2 24 12·3 2 20 11·9 2 16 11·6 2 12 11·2 2 8 10·8	+ ·07 ·07 ·06 ·06 ·06	2 24 13·5 2 20 12·9 2 16 12·3 2 12 11·6 2 8 11·1	- ·03 ·03 ·04 ·05 ·05	2 24 8·9 2 20 7·9 2 16 6·8 2 12 5·7 2 8 4·6	- ·12 ·13 ·14 ·15 ·16
		V.A	RIATIO	N TO	ı' OF	LATI	TUDE A	ND A	ALTITUI	E.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	Α.	L. 3°	Α.	L. 4°	A	L. 5°	Α.
0 4 8 12 16	·01 ·03 ·04 ·06	s. -4.00 4.00 4.00 4.00 4.00	s. + ·07 - ·05 ·04 ·03 ·01	s. -4.00 4.00 4.00 4.00 4.00	s. + ·14 - ·12 ·11 ·10 ·08	s. -4.01 4.01 4.01 4.00	·19 ·18 ·17 ·16	s. -4.01 4.01 4.01 4.01 4.01	s. + ·28 - ·27 ·25 ·24 ·23	s. -4.02 4.01 4.01 4.01 4.01	s. + ·35 - ·34 ·32 ·31 ·30	s. -4·02 4·02 4·02 4·02 4·02
20 22 24 26 28	- ·08 ·09 ·10 ·11	4.01 4.01 4.00 4.00	- ·00 ·01 ·02 ·02 ·03	4·00 4·00 4·00 4·00	+ ·07 ·07 ·06 ·05 ·05	4·00 4·00 4·00 4·00	+ ·15 ·14 ·14 ·13 ·13	4·01 4·01 4·01 4·01	+ ·22 ·22 ·21 ·21 ·20	4.01 4.01 4.01 4.01	+ ·30 ·29 ·29 ·29 ·28	4·02 4·02 4·02 4·02 4·02
30 32 34 36 38	- ·12 ·13 ·14 ·15 ·16	4.01 4.01 4.01 4.01	- ·04 ·05 ·06 ·07 ·07	4.00 4.00 4.00	+ ·04 ·03 ·03 ·02 ·01	4.00 4.00 4.00 4.00	+ ·12 ·12 ·11 ·11 ·10	4.01 4.01 4.01 4.01	+ ·20 ·20 ·19 ·19 ·19	4.01 4.01 4.01 4.01	+ ·28 ·28 ·28 ·28 ·28	4.01 4.01 4.01 4.01
40 42 44 46 48	- ·18 ·19 ·20 ·22 ·23	4.01 4.01 4.01 4.01	- ·08 ·09 ·11 ·12 ·13	4.01 4.01 4.01	+ ·01 - ·00 ·01 ·02 ·02	4·00 4·00 4·00	+ ·10 ·09 ·08 ·08	4·01 4·00 4·00	+ ·19 ·19 ·19 ·19	4.01 4.01 4.01 4.01	+ ·28 ·28 ·28 ·29 ·29	4.01 4.01 4.02 4.02
50 52 54 56 58	- ·25 ·27 ·29 ·31 ·34	4.01 4.01 4.02 4.02 4.02	- ·14 ·15 ·17 ·19 ·20	4.01 4.01 4.01 4.01	- ·03 ·04 ·05 ·06 ·07	4.00 4.00 4.00 4.00	+ ·08 ·07 ·07 ·06 ·06	4·00 4·00 4·00 4·00	+ ·19 ·19 ·19 ·19	4.01 4.01 4.01 4.01	+ ·29 ·30 ·31 ·31 ·32	4·02 4·02 4·02 4·02 4·02

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 15 LATITUDE 3°.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 I 15.7 5 2I 0.2 5 I2 57.3 5 4 54.5 4 56 51.6	S. + ·21 ·14 ·12 ·11	H. M. S. 6 I 285. 5 2I 8.3 5 I3 4.4 5 5 0.7 4 56 56.9	s. + ·21 ·13 ·11 ·09 ·08	H. M. S. 6 I 41·3 5 2I I5·6 5 I3 I0·8 5 5 5·9 4 57 I·I	s. + ·21 ·12 ·10 ·08 ·06	H. M. S. 6 I 54·I 5 2I 22·3 5 I3 I6·2 5 5 I0·I 4 57 4·I	s. + ·21 ·10 ·08 ·06 ·04	H. M. S. 6 2 7·I 5 2I 28·2 5 I3 20·7 5 5 I3·3 4 57 5·8	s. + ·22 ·09 ·07 ·04 + ·02	H. M. S. 6 2 20·I 5 2I 33·4 5 I3 24·4 5 5 I5·4 4 57 6·4	s. + ·22 ·08 ·05 ·02 ·00
18 20 22 24 26	4 48 48·9 4 40 46·1 4 32 43·4 4 24 40·7 4 16 38·1	+ ·08 ·07 ·06 ·04 ·03	4 48 53·3 4 40 49·6 4 32 46·0 4 24 42·4 4 16 38·8	+ ·06 ·04 ·03 + ·01 ·00	4 48 56·4 4 40 51·6 4 32 46·9 4 24 42·2 4 16 37·5	+ ·04 ·02 ·00 - ·02 ·04	4 48 58·I 4 40 52·I 4 32 46·I 4 24 40·I 4 16 34·0	+ ·02 ·00 - ·03 ·05 ·07	4 48 58·5 4 40 51·0 4 32 43·6 4 24 36·1 4 16 28·6	- ·01 ·03 ·06 ·08 ·11	4 48 57.4 4 40 48.4 4 32 39.3 4 24 30.1 4 16 20.9	- ·03 ·06 ·08 ·11 ·14
28 30 31 32 33	4 8 35.4 4 0 32.8 3 56 31.4 3 52 30.1 3 48 28.8	+ ·01 - ·01 - ·01 ·02	4 8 35·2 4 0 31·6 3 56 29·7 3 52 27·9 3 48 26·1	- ·02 ·04 ·05 ·06 ·07	4 8 32·7 4 0 27·9 3 56 25·5 3 52 23·0 3 48 20·6	- ·06 ·09 ·10 ·11	4 8 28·0 4 0 21·8 3 56 18·7 3 52 15·6 3 48 12·4	- ·10 ·12 ·13 ·15 ·16	4 8 20·9 4 0 13·2 3 56 9·3 3 52 5·3 3 48 1·3	- ·14 ·16 ·18 ·19 ·21	4 8 II·6 4 0 2·I 3 55 57·2 3 5I 52·3 3 47 47·4	- ·17 ·21 ·22 ·24 ·25
34 35 36 37 38	3 44 27·5 3 40 26·1 3 36 24·8 3 32 23·4 3 28 22·1	- ·03 ·04 ·04 ·05 ·06	3 44 24·2 3 40 22·4 3 36 20·5 3 32 18·6 3 28 16·7	- ·08 ·09 ·10 ·11	3 44 18·1 3 40 15·7 3 36 13·2 3 32 10·6 3 28 8·1	- ·12 ·14 ·15 ·16 ·17	3 44 9·2 3 40 5·9 3 36 2·7 3 31 59·4 3 27 56·0	- ·17 ·19 ·20 ·21 ·23	3 43 57·3 3 39 53·2 3 35 49·0 3 31 44·8 3 27 40·6	- ·22 ·24 ·25 ·27 ·29	3 43 42.4 3 39 37.3 3 35 32.2 3 31 26.9 3 27 21.6	- ·27 ·29 ·31 ·32 ·34
39 40 41 42 43	3 24 20·7 3 20 19·4 3 16 18·0 3 12 16·6 3 8 15·2	- ·07 ·08 ·09 ·10 ·10	3 24 14·8 3 20 12·9 3 16 10·9 3 12 9·0 3 8 6·9	- ·13 ·14 ·15 ·16 ·17	3 24 5.4 3 20 2.8 3 16 0.2 3 11 57.4 3 7 54.7	- ·18 ·20 ·21 ·22 ·24	3 23 52 6 3 19 49 1 3 15 45 6 3 11 42 0 3 7 38 4	- ·24 ·16 ·27 ·29 ·31	3 23 36·2 3 19 31·8 3 15 27·3 3 11 22·7 3 7 18·0	- ·30 ·32 ·34 ·35 ·37	3 6 53.4	·38 ·40 ·42 ·44
44 45 46 47 48	3 4 13·8 3 0 12·4 2 56 11·0 2 52 9·5 2 48 8·0	·14 ·15	2 56 0·8 2 51 58·6 2 47 56·4	- ·18 ·19 ·21 ·22 ·23	3 3 51·9 2 59 49·0 2 55 46·1 2 51 43·1 2 47 40·1	- ·25 ·27 ·28 ·30 ·31	3 34.7 2 59 30.9 2 55 27.0 2 51 23.0 2 47 18.9	- ·32 ·34 ·36 ·37 ·39	3 3 13·2 2 59 8·3 2 55 3·3 2 50 58·2 2 46 52·8	.43 .45 .48	2 54 35.0 2 50 28.5 2 46 21.8	- ·47 ·49 ·51 ·54 ·56
49 50 51 52 53	2 44 6·5 2 40 5·0 2 36 3·4 2 32 1·8 2 28 0·2	- ·16 ·17 ·19 ·20 ·21	2 43 54·2 2 39 51·9 2 35 49·6 2 31 47·2 2 27 44·8	- ·25 ·26 ·27 ·29 ·30	2 43 36·9 2 39 33·8 2 35 30·5 2 31 27·1 2 27 23·6	- ·33 ·35 ·36 ·38 ·40	2 43 14·7 2 39 10·4 2 35 6·0 2 31 1·4 2 26 56·7	- ·41 ·43 ·45 ·48 ·50	1	*52 *55 *57 *60	2 38 7·7 2 34 0·4 2 29 52·7 2 25 44·9	·61 ·64 ·67 ·70
54 55 56 57 58	2 23 58·5 2 19 56·8 2 15 55·0 2 11 53·2 2 7 51·4	- ·22 ·24 ·25 ·26 ·28	2 15 36·9 2 11 34·3	- ·32 ·34 ·35 ·37 ·39	2 23 20·0 2 19 16·3 2 15 12·4 2 11 8·4 2 7 4·2		2 22 51·7 2 18 46·6 2 14 41·3 2 10 35·8 2 6 30·0	- ·52 ·55 ·57 ·60 ·63	2 18 10·6 2 14 3·6 2 9 56·3	·65 ·69 ·72	2 13 19·0 2 9 9·6	•77 •80 •84
	,	V.	ARIATIO	ON TO	ı' OF	LAT	TUDE A	AND	ALTITU			
Alt.	L. 6°	A.	L. 7°	A.	L. 8°	Α.	L. 9°		L. 10		L. 11	
0 4 8 12 16	s. + ·42 - ·41 ·39 ·38 ·38	s. -4·03 4·02 4·02 4·02	s. + '49 '48 '47 '46 '45	s. -4·03 4·03 4·03 4·03	s. + ·56 ·55 ·54 ·53 ·52	s. 4.04 4.04 4.04 4.04 4.04	s. + .63 .62 .61 .60	s. -4.05 4.05 4.05 4.05 4.05	s. + ·71 ·69 ·68 ·67 ·67	s. -4·07 4·06 4·06 4·06 4·06	**************************************	s. -4.08 4.08 4.08 4.07 4.07
20 22 24 26 28	+ ·37 ·37 ·37 ·36 ·36	4·02 4·02 4·02 4·02 4·02	+ '45 '44 '44 '44 '44	4·03 4·03 4·03 4·03	+ ·52 ·52 ·52 ·52 ·52 ·52	4.04 4.04 4.04 4.04 4.04	+ ·60 ·60 ·60 ·60 ·60	4.05 4.05 4.05 4.05 4.05	+ ·67 ·67 ·68 ·68 ·69	4.06 4.06 4.06 4.06 4.06	+ ·75 ·75 ·76 ·76 ·77	4.07 4.07 4.07 4.08 4.08
30 32 34 36 38	+ ·36 ·36 ·36 ·37 ·37	4.02 4.02 4.02 4.02 4.02	+ '44 '45 '45 '45 '46	4.03 4.03 4.03 4.03	+ ·53 ·53 ·54 ·54 ·55	4.04 4.04 4.04 4.04	+ ·61 ·62 ·63 ·64	4.05 4.05 4.05 4.05 4.06	+ ·69 •70 •71 •72 •73	4.06 4.06 4.07 4.07 4.07	+ ·78 ·79 ·80 ·81 ·82	4.08 4.08 4.08 4.08 4.09
40 42 44 46 48	+ ·37 ·38 ·38 ·39 ·39	4·02 4·02 4·02 4·02 4·02	+ ·46 ·47 ·48 ·49 ·50	4·03 4·03 4·04 4·04	+ ·56 ·57 ·58 ·59 ·61	4.04 4.05 4.05 4.05 4.05	+ ·65 ·66 ·68 ·70 ·72	4.06 4.06 4.06 4.07 4.07	+ '74 '76 '78 '80 '82	4.07 4.08 4.08 4.08 4.09	+ ·84 ·86 ·88 ·91 ·93	4.09 4.10 4.11 4.11
50 52 54 56 58	+ ·40 ·41 ·43 ·44 ·46	4·03 4·03 4·03 4·03	+ ·51 ·53 ·55 ·57 ·59	4·04 4·04 4·04 4·05	+ ·62 ·65 ·67 ·70 ·73	4·05 4·06 4·06 4·07 4·07	+ ·74 ·76 ·79 ·83 ·87	4.07 4.08 4.08 4.09 4.10	+ ·85 ·88 ·92 ·96 I·01	4.09 4.10 4.11 4.12 4.13	+ '97 1'00 1'05 1'10 1'15	4·12 4·13 4·14 4·15 4·17

16 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 3°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 2 33·2 5 21 37·9 5 13 27·2 5 5 16·4 4 57 5·7	s. + ·22 ·07 ·04 + ·01 - ·02	H. M. S. 6 2 46·4 5 21 41·7 5 13 29·0 5 5 16·4 4 57 3·8	s. + ·22 ·06 + ·02 - ·01 ·04	H. M. S. 6 2 59.7 5 21 44.7 5 13 30.0 5 5 15.3 4 57 0.6	s. + ·22 ·04 + ·01 - ·03 ·06	H. M. S. 6 3 13·2 5 21 47·0 5 13 30·1 5 5 13·1 4 56 56·1	s. + ·22 + ·03 - ·01 ·04 ·08	H. M. S. 6 3 26·7 5 21 48·6 5 13 29·3 5 5 9·9 4 56 50·4	s. + ·22 + ·02 - ·02 ·06 ·11	H. M. S. 6 3 40·3 5 21 49·4 5 13 27·5 5 5 5·5 4 56 43·4	s. + ·23 + ·01 - ·04 ·08 ·13
18 20 22 24 26	4 48 54.9 4 40 44.2 4 32 33.3 4 24 22.3 4 16 11.2	- ·05 ·08 ·11 ·15 ·18	4 48 51·1 4 40 38·3 4 32 25·5 4 24 12·5 4 15 59·3	- ·08 ·11 ·14 ·18 ·22	4 48 45·8 4 40 30·9 4 32 15·9 4 24 0·6 4 15 45·1	- ·10 ·14 ·17 ·21 ·25	4 48 39·1 4 40 21·8 4 32 4·4 4 23 46·7 4 15 28·7	- ·12 ·16 ·21 ·25 ·29	4 48 30·8 4 40 II·I 4 3I 5I·0 4 23 30·7 4 I5 I0·0	- ·15 ·19 ·24 ·28 ·33	4 48 21·1 4 39 58·6 4 31 35·8 4 23 12·6 4 14 49·0	- ·17 ·22 ·27 ·32 ·37
28 30 31 32 33	4 7 59·9 3 59 48·4 3 55 42·5 3 51 36·6 3 47 30·6	•29	4 7 45.8 3 59 32.1 3 55 25.1 3 51 18.0 3 47 10.9	- ·25 ·29 ·31 ·33 ·35	4 7 29·3 3 59 13·2 3 55 4·9 3 50 56·6 3 46 48·1	·36 ·38	4 7 10·3 3 58 51·5 3 54 41·9 3 50 32·2 3 46 22·3	- ·34 ·38 ·41 ·43 ·45	4 6 48·8 3 58 27·2 3 54 16·1 3 50 4·8 3 45 53·4	- ·38 ·43 ·45 ·48 ·51	4 6 24·8 3 58 0·0 3 53 47·3 3 49 34·4 3 45 21·3	- ·42 ·48 ·50 ·53 ·56
34 35 36 37 38	3 43 24·5 3 39 18·4 3 35 12·1 3 31 5·7 3 26 59·2	- ·32 ·34 ·36 ·38 ·40	3 43 3.6 3 38 56.2 3 34 48.7 3 30 41.0 3 26 33.2	- ·37 ·40 ·42 ·44 ·46	3 42 39·5 3 38 30·8 3 34 21·9 3 30 12·8 3 26 3·5	•47	3 42 12·3 3 38 2·0 3 33 51·6 3 29 41·0 3 25 30·2	- ·48 ·51 ·53 ·56 ·59	3 33 17·8 3 29 5·5	- ·54 ·56 ·59 ·62 ·65	3 41 7.9 3 36 54.3 3 32 40.5 3 28 26.3 3 24 11.8	- ·59 ·62 ·65 ·68 ·72
39 40 41 42 43	3 22 52·6 3 18 45·8 3 14 39·0 3 10 31·9 3 6 24·7		3 22 25·2 3 18 17·1 3 14 8·8 3 10 0·3 3 5 51·6	- ·49 ·51 ·54 ·56 ·59	3 21 54·1 3 17 44·5 3 13 34·6 3 9 24·4 3 5 14·1	- ·55 ·58 ·60 ·63 ·66	3 21 19·1 3 17 7·7 3 12 56·1 3 8 44·2 3 4 32·0	- ·62 ·65 ·68 ·71 ·74	3 20 40·1 3 16 26·9 3 12 13·4 3 7 59·5 3 3 45·3	.82	3 19 57.0 3 15 41.8 3 11 26.2 3 7 10.2 3 2 53.8	- ·75 ·79 ·82 ·86 ·90
44 45 46 47 48	3 2 17·3 2 58 9·7 2 54 1·9 2 49 53·9 2 45 45·6	•59	3 I 42.6 2 57 33.4 2 53 24.0 2 49 I4.2 2 45 4.2	- ·62 ·64 ·67 ·70 ·73		- ·69 ·72 ·76 ·79 ·83	3 0 19·4 2 56 6·5 2 51 53·1 2 47 39·3 2 43 25·1	- ·77 ·81 ·84 ·88 ·92	2 50 59·9 2 46 43·8	- ·85 ·89 ·93 ·97 1·02	2 58 36·8 2 54 19·3 2 50 1·2 2 45 42·5 2 41 23·1	- ·94 ·98 I·02 I·07 I·12
49 50 51 52 53	2 4I 37·0 2 37 28·2 2 33 I9·I 2 29 9·6 2 24 59·7	- ·67 ·71 ·74 ·77 ·81	2 40 53·8 2 36 43·0 2 32 31·8 2 28 20·2 2 24 8·2	- ·77 ·80 ·84 ·87 ·91	2 40 4.9 2 35 52.0 2 31 38.6 2 27 24.6 2 23 10.2	- ·86 ·90 ·94 ·98 I·03	2 39 IO·3 2 34 55·0 2 30 39·0 2 26 22·4 2 22 5·I	- ·96 1·00 1·05 1·09 1·14	2 33 51·7 2 29 33·0	-1.06 1.11 1.16 1.21 1.26	2 37 3.0 2 32 42.1 2 28 20.3 2 23 57.5 2 19 33.6	-1·16 1·22 1·27 1·33 1·39
54 55 56 57 58	2 20 49.4 2 16 38.7 2 12 27.4 2 8 15.7 2 4 3.3	.92	2 19 55·5 2 15 42·4 2 11 28·6 2 7 14·1 2 2 58·8	- ·95 1·00 1·04 1·09 1·14	2 18 54·8 2 14 38·9 2 10 22·2 2 6 4·6 2 1 46·1	-1.07 1.12 1.17 1.23 1.28	2 4 46.9	1·25 1·30 1·37	2 16 31·7 2 12 9·2 2 7 45·6 2 3 20·7 1 58 54·2	1·44 1·51		-1.45 1.52 1.59 1.67 1.75
		VA	RIATIO	N TC	ı' OF	LATI	TUDE A	ND .	ALTITUI	DE.		
Alt.	L. 12°	Α.	L. 13°	Α	L. 14°	Α.	L. 15°	Α.	L. 16°	Α.	L. 17°	Α.
0 4 8 12 16	s. + .85 - .84 .83 .82 .82	s. -4·09 4·09 4·09 4·09	s. + ·92 - ·91 ·90 ·90 ·90	s. -4·II 4·II 4·IO 4·IO	s. +1.00 - .99 .98 .97 .98	S. -4·13 4·12 4·12 4·12 4·12	s. +1.07 · 1.06 1.05 1.05	s. -4·15 4·14 4·14 4·14	s. +1·15 - 1·14 1·13 1·13 1·13	s. -4·17 4·16 4·16 4·16 4·16	S. +1·23 - 1·21 1·21 1·20 1·21	s. -4·19 4·18 4·18 4·18 4·18
20 22 24 26 28	+ ·83 ·83 ·84 ·84 ·85	4·09 4·09 4·09 4·09	+ ·91 ·91 ·92 ·92 ·93	4·II 4·II 4·II 4·II	+ ·98 ·99 I·00 I·01 I·02	4·12 4·13 4·13 4·13	+1.06 1.07 1.08 1.09 1.10	4·14 4·15 4·15 4·15	+1·14 1·15 1·16 1·17 1·19	4·16 4·17 4·17 4·18	+1·22 1·23 1·25 1·26 1·28	4·19 4·19 4·19 4·20 4·20
30 32 34 36 38	+ ·86 ·87 ·88 ·90 ·92	4.10 4.10 4.10 4.11	+ ·94 ·96 ·97 ·99 I·01	4·II 4·I2 4·I3 4·I3	+1.03 1.05 1.06 1.08 1.11	4·13 4·14 4·15 4·15	+1·12 1·14 1·15 1·18 1·20	4·16 4·17 4·17 4·18	+1·21 1·23 1·25 1·27 1·30	4·18 4·19 4·19 4·20 4·21	+1·29 1·32 1·34 1·37 1·40	4·21 4·22 4·23 4·24
40 42 44 46 48	+ ·94 ·96 ·98 I·01 I·05	4·II 4·I2 4·I3 4·I4	+1.03 1.06 1.09 1.12 1.16	4·14 4·15 4·16 4·17	+1·13 1·16 1·20 1·23 1·28	4·16 4·17 4·18 4·19 4·20	+1·23 1·27 1·30 1·35 1·40	4·19 4·20 4·21 4·23 4·24	+1·33 1·37 1·41 1·46 1·52	4·22 4·23 4·25 4·26 4·28	+1.44 1.48 1.53 1.58 1.64	4·26 4·27 4·29 4·31 4·33
50 52 54 56 58	+1.08 1.13 1.18 1.24 1.30	4·15 4·16 4·17 4·19 4·21	+1·20 1·25 1·31 1·38 1·46	4·18 4·20 4·21 4·24 4·26	+1·33 1·38 1·45 1·52 1·61	4·22 4·24 4·26 4·29 4·32	+1·45 1·52 1·59 1·68 1·78	4·26 4·28 4·31 4·34 4·38	+1·58 1·65 1·74 1·83 1·95	4·31 4·33 4·37 4·40 4·45	+1·71 1·79 1·89 2·00 2·13	4·36 4·39 4·43 4·47 4·53

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 17 LATITUDE 3°.

		DECLIN	ATIO	N—SAM	E NA	IME AS	LA7	TITUDE.			
True Alt.	18° Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. S. 6 3 54·2 + ·23 5 21 49·5 ·00 5 13 24·7 - ·05 5 4 59·9 ·10 4 56 35·0 ·15	5 21 48·7 5 13 21·0 5 4 53·2 4 56 25·2	+ ·23 - ·02 ·07 ·12 ·17	H. M. S. 6 4 22·3 5 21 47·1 5 13 16·3 5 4 45·3 4 56 14·1	s. + ·24 - ·03 ·09 ·14 ·20	H. M. S. 6 4 36·7 5 21 44·8 5 13 10·5 5 4 36·1 4 56 1·5	S. + ·24 - ·04 ·10 ·16 ·22	H. M. S. 6 4 51.2 5 21 41.6 5 13 3.8 5 4 25.7 4 55 47.4	s. + ·24 - ·06 ·12 ·18 ·25	H. M. S. 6 5 5.9 5 21 37.6 5 12 55.9 5 4 14.0 4 55 31.8	s. + ·25 - ·07 ·14 ·21 ·27
18 20 22 24 26	4 48 9.8 - ·20 4 39 44.4 ·25 4 31 18.6 ·30 4 22 52.4 ·36 4 14 25.6 ·41	4 39 28·4 4 30 59·4 4 22 29·8	·28 ·34 ·39	4 47 42.6 4 39 10.6 4 30 38.1 4 22 5.1 4 13 31.2	- ·25 ·31 ·37 ·43 ·49	4 47 26.4 4 38 50.9 4 30 14.7 4 21 37.9 4 13 0.2	- ·28 ·34 ·41 ·47 ·54	4 47 8.6 4 38 29.2 4 29 49.2 4 21 8.4 4 12 26.5	- ·31 ·38 ·44 ·51 ·58	4 46 49·I 4 38 5·7 4 29 2I·5 4 20 36·3 4 II 50·0	- ·34 ·41 ·48 ·55 ·63
28 30 31 32 33	4 5 58·I - ·47 3 57· 29·9 ·52 3 53 15·5 ·56 3 49 0·8 ·59 3 44 45·9 ·62	3 56 56·9 3 52 40·5 3 48 24·0	·57 ·61 ·64	4 4 56·5 3 56 20·7 3 52 2·4 3 47 43·8 3 43 24·8	- ·56 ·63 ·66 ·70 ·73	4 4 21.4 3 55 41.5 3 51 21.0 3 47 0.2 3 42 38.9	- ·61 ·68 ·72 ·76 ·79	4 3 43.4 3 54 59.0 3 50 36.3 3 46 13.0 3 41 49.4	- ·66 ·73 ·77 ·82 ·86	4 3 2·4 3 54 13·2 3 49 47·9 3 45 22·2 3 40 55·9	- ·71 ·79 ·83 ·89 ·92
34 35 36 37 38	3 40 30·7 - ·65 3 36 15·2 3 31 59·3 ·72 3 27 43·2 ·75 3 23 26·6 ·79	3 35 32·3 3 31 14·4 3 26 56·0	·74 ·78 ·82	3 39 5·4 3 34 45·7 3 30 25·4 3 26 4·8 3 21 43·6	- ·77 ·81 ·85 ·89 ·93	3 38 17·3 3 33 55·1 3 29 32·4 3 25 9·3 3 20 45·5	- ·83 ·88 ·92 ·96 I·01	3 37 25·2 3 33 0·5 3 28 35·2 3 24 9·3 3 19 42·7	- ·90 ·94 ·99 I·04 I·08	3 36 29·1 3 32 1·6 3 27 33·5 3 23 4·7 3 18 35·2	- ·96 1·02 1·06 1·11 1·17
39 40 41 42 43	3 19 9.782 3 14 52.3 .86 3 10 34.5 .90 3 6 16.2 .94 3 1 57.3 .98	3 13 58·3 3 9 38·0 3 5 17·2	·98	3 17 21·9 3 12 59·6 3 8 36·6 3 4 13·0 2 59 48·7	- ·97 1·02 1·06 1·11 1·16	3 16 21·1 3 11 56·0 3 7 30·2 3 3 3·6 2 58 36·2	-1.05 1.10 1.15 1.20 1.26	3 6 18·5 3 1 48·7	1·13 1·24 1·30 1·36	3 5 1·2 3 0 27·9	1·22 1·28 1·33 1·39 1·46
44 45 46 47 48	2 57 37·8 — I·03 2 53 17·7 I·07 2 48 57·0 I·12 2 44 35·4 I·17 2 40 13·1 I·22	2 52 10·5 2 47 46·8 2 43 22·2	I·17 I·22 I·27	2 55 23.5 2 50 57.5 2 46 30.6 2 42 2.6 2 37 33.5	-1·21 1·27 1·32 1·38 1·44	2 54 7·8 2 49 38·5 2 45 8·0 2 40 36·3 2 36 3·4	-1·31 1·37 1·43 1·50 1·56	2 39 3·I	-1·42 / 1·48 1·55 1·61 1·69		- 1·52 1·59 1·66 1·74 1·82
49 50 51 52 53	2 35 49·9 -1·27 2 31 25·7 1·33 2 27 0·5 1·39 2 22 34·1 1·45 2 18 6·5 1·52	2 30 2·3 2 25 33·4 2 21 3·0	-1.39 1.45 1.52 1.59 1.66	2 33 3·2 2 28 31·6 2 23 58·5 2 19 23·8 2 14 47·3	1.51 1.58 1.65 1.72 1.81	2 3I 29·0 2 26 53·I 2 22 I5·5 2 I7 36·0 2 I2 54·3	1.71		-1.77 1.85 1.94 2.03 2.13	2 18 23·1 2 13 32·4	2.00 2.09 2.20 2.31
54 55 56 57 58	2 13 37·5 —1·59 2 9 6·9 1·67 2 4 34·6 1·75 2 0 0·3 1·83 1 55 24·0 1·93	2 7 22.2	1.91 2.01		1.89 1.99 2.09 2.32		2.40	2 6 1.7 2 1 8.6 1 56 11.9 1 51 11.4 1 46 6.3	2.62	I 53 36.7	2.56
	V	ARIATIO	N TO	ı' OF	LATI	TUDE A	AND .	ALTITU	DE.		
Alt.	L. 18° A.	L. 19°	Α.	L. 20	° A.	L. 21	° A.	L. 22	° A.	L. 23	° A.
0 4 8 12 16	S. S. +1·30 -4·21 1·29 4·21 1·28 4·20 1·28 4·21 1·29 4·21	s. +1·38 1·37 1·36 1·36 1·37	s. -4·24 4·23 4·23 4·23 4·23	S. + 1·46 1·45 1·44 1·44	s. -4·26 4·26 4·26 4·26 4·26	s. +1·54 1·53 1·52 1·52 1·54	s. -4·29 4·29 4·28 4·28 4·29	s. +1.62 1.61 1.60 1.61 1.62	s. -4·32 4·31 4·31 4·32	s. +1.70 1.69 1.68 1.69	s. -4·35 4·35 4·34 4·35 4·35
20 22 24 26 28	+1·31 4·21 1·32 4·21 1·33 4·22 1·35 4·22 1·36 4·23	+1·39 1·40 1·42 1·43 1·45	4·24 4·24 4·25 4·25 4·26	+1.47 1.49 1.50 1.52 1.54	4·27 4·27 4·28 4·28 4·29	+1·56 1·57 1·59 1·61 1·64	4·30 4·31 4·32 4·33	+1.65 1.66 1.68 1.70 1.73	4·33 4·34 4·35 4·36	+1.73 1.75 1.77 1.80 1.83	4·36 4·37 4·38 4·39 4·40
30 32 34 36 38	+1·38 4·24 1·41 4·25 1·44 4·25 1·47 4·27 1·50 4·28	+1.48 1.50 1.53 1.57 1.61	4·27 4·28 4·29 4·30 4·32	+1.57 1.60 1.63 1.67	4·30 4·31 4·32 4·34 4·36	+1.67 1.70 1.73 1.78 1.82	4·33 4·35 4·36 4·38 4·40	+1.76 1.80 1.84 1.88 1.93	4·37 4·39 4·41 4·43 4·45	+1.86 1.90 1.94 1.99 2.05	4·41 4·43 4·45 4·47 4·50
40 42 44 46 48	+1·54 4·29 1·59 4·31 1·64 4·33 1·70 4·35 1·77 4·38	+1.65 1.70 1.76 1.83 1.90	4·33 4·35 4·38 4·40 4·43	+1.76 1.82 1.88 1.96 2.04	4·38 4·40 4·43 4·46 4·49	+1.88 1.94 2.01 2.09 2.18	4·42 4·45 4·48 4·52 4·56	+1.99 2.06 2.14 2.23 2.33	4:47 4:50 4:54 4:58 4:63	+2·II 2·I9 2·27 2·37 2·48	4·53 4·56 4·60 4·65 4·71
50 52 54 56 58	+1.85 4.41 1.94 4.45 2.04 4.50 2.17 4.55 2.31 4.63	+1.99 2.09 2.21 2.35 2.51	4.47 4.52 4.57 4.64 4.73	+2·14 2·25 2·38 2·54 2·73	4·54 4·59 4·66 4:74 4·84	+2·29 2·41 2·56 2·74 2·95	4.61 4.68 4.75 4.85 4.98	+2·45 2·58 2·75 2·95 3·20	4·69 4·77 4·86 4·98 5·12	+2.61 2.77 2.96 3.19 3.47	4·78 4·87 4·98 5·12 5·30

18 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 4°.

True Alt,	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14	H. M. S. 6 0 0.0 5 19 54.1 5 11 52.8 5 3 51.6	s. + ·28 ·28 ·28 ·29	H. M. S. 6 0 16·8 5 20 10·7 5 12 9·5 5 4 8·4	s. + ·28 ·27 ·27 ·27	H. M. S. 6 0 33.6 5 20 26.7 5 12 25.4 5 4 24.1	s. + ·28 ·26 ·26 ·25	H. M. S. 6 0 50·6 5 20 41·9 5 12 40·4 5 4 38·8	s. + ·28 ·25 ·24 ·23	H. M. S. 6 I 7·2 5 20 56·4 5 I2 54·4 5 4 52·5	s. + ·28	H. M. S. 6 I 24·I 5 2I 10·2 5 I3 7·7 5 5 5·2	S. + ·28 ·22 ·21 ·20
16 18 20 22 24 26	4 55 50·4 4 47 49·1 4 39 47·8 4 31 46·4 4 23 45·0 4 15 43·6	·29 + ·29 ·30 ·30 ·31 ·31	4 56 7·2 4 48 6·0 4 40 4·9	·27 + ·27 ·27 ·27 ·27 ·28	4 56 22.9 4 48 21.7 4 40 20.5	·25	4 56 37.4 4 48 35.9 4 40 34.5 4 32 33.1 4 24 31.8 4 16 30.5	·23 + ·22 ·22 ·22 ·21 ·21	4 56 50.6 4 48 48.8 4 40 47.0 4 32 45.3 4 24 43.6 4 16 42.0	·19	4 57 2·8 4 49 0·4 4 40 58·1	·19 + ·18 ·17 ·16 ·15 ·14
28 30 31 32 33	4 7 42·I 3 59 40·6 3 55 39·8 3 5I 30·0 3 47 38·2	+ ·32 ·32 ·33 ·33	4 8 0.0 3 59 58.8 3 55 58.1 3 51 57.5 3 47 56.8	+ ·28 ·28 ·28 ·29 ·29	3 52 13·3 3 48 12·8	+ ·24 ·24 ·24 ·24 ·24	4 8 29·I 4 0 27·9 3 56 27·2 3 52 26·6 3 48 26·0	+ ·20 ·20 ·20 ·20 ·20	3 48 36.5	+ ·17 ·16 ·16 ·15 ·15	4 8 49·4 4 0 47·3 3 56 46·3 3 52 45·3 3 48 44·3	+ ·13 ·12 ·12 ·11 ·11
34 35 36 37 38 39	3 43 37·3 3 39 36·5 3 35 35·6 3 31 34·7 3 27 33·7 3 23 32·8	+ ·34 ·34 ·35 ·35 ·35 + ·36	3 43 56·2 3 39 55·5 3 35 54·8 3 31 54·1 3 27 53·4 3 23 52·7	+ ·29 ·29 ·30 ·30 + ·30	3 36 11·0 3 32 10·4 3 28 9·8	+ ·24 ·24 ·24 ·24 ·24 + ·25	3 44 25.4 3 40 24.7 3 36 24.1 3 32 23.5 3 28 22.9 3 24 22.3	.19 .19	3 40 35·0 3 36 34·2 3 32 33·5	•14	3 44 43 3 3 40 42 3 3 36 41 3 3 32 40 3 3 28 39 3 3 24 38 4	+ ·10 ·09 ·09 ·08 + ·08
40 41 42 43 44	3 19 31·8 3 15 30·8 3 11 29·7 3 7 28·6 3 3 27·5	·36 ·37 ·38 ·38 + ·39	3 19 52·0 3 15 51·2 3 11 50·4 3 7 49·6 3 3 48·9	·31 ·31 ·32 + ·32	3 20 8·6 3 16 8·0 3 12 7·4 3 8 6·7 3 4 6·1	·25 ·25 ·25 ·25 ·25 + ·25	3 20 21·7 3 16 21·1 3 12 20·5 3 8 19·9 3 4 19·3	+ ·19	3 20 31·3 3 16 30·6 3 12 29·9 3 8 29·4 3 4 28·5	·13 ·13 ·12 ·12 + ·12	3 20 37·4 3 16 36·5 3 12 35·5 3 8 34·6 3 4 33·6	·07 ·07 ·06 ·05 + ·05
45 46 47 43 49 50	2 59 26·4 2 55 25·2 2 51 23·9 2 47 22·6 2 43 21·3 2 39 19·9	-40 -40 -41 -42 + -43	2 59 48·0 2 55 47·2 2 51 46·3 2 47 45·4 2 43 44·5 2 39 43·5	·33 ·34 ·34 ·35 ·35	3 0 5.5 2 56 4.9 2 52 4.2 2 48 3.5 2 44 2.9 2 40 2.2	·26 ·26 ·26 ·26 ·27	3 0 18·8 2 56 18·2 2 52 17·6 2 48 17·0 2 44 16·4 2 40 15·8	+ ·19	2 56 27·I 2 52 26·4	-12 -11 -11 -10 -10	2 44 29.0	·05 ·04 ·04 ·03 + ·02 ·02
51 52 53 54 55	2 35 18·5 2 31 16·9 2 27 15·3 2 23 13·7 2 19 11·9	*45 *46 *47 + *48 *49	2 35 42·5 2 31 41·6 2 27 40·5 2 23 39·4 2 19 38·3	·36 ·37 ·37 + ·38 ·39		·27 ·28 ·28 ·28 + ·28 ·29	2 36 15·2 2 32 14·7 2 28 14·1 2 24 13·5 2 20 12·9	·19	2 36 23·8 2 32 23·1 2 28 22·5 2 24 21·8	·10 ·09 + ·09	2 36 27·2 2 32 26·2 2 28 25·3 2 24 24·4 2 20 23·5	- 00 -00 -00 -00
56 57 58	2 15 10·1 2 11 8·1 2 7 .6·1	·50 ·51 ·53	2 15 37·1 2 11 35·9 2 7 34·6 ARIATIO	.40 .41 .42 ON TO	2 II 57·0 2 7 56·2	.29 .30 .30		.19		·08 ·08	2 16 22·6 2 12 21·6 2 8 20·7	·02 ·03
Alt.	L. 0°	A.	L. 1°	A.	L. 2°	A.	L. 3°	A.	L. 4°	Α.	L. 5°	Α.
0 4 8 12 16	s. ·02 ·04 ·06 ·08	s. -4.01 4.01 4.01 4.01 4.01	- ·oɪ - ·oɪ	s. -4.01 4.01 4.01 4.01	·12 ·10 ·08 ·06	s. -4·01 4·01 4·01 4·01	·19 ·17 ·15 ·14	s. -4·02 4·01 4·01 4·01 4·01	s. + ·28 ·26 ·24 ·23 ·21	s. -4.02 4.02 4.02 4.02 4.01	·33 ·31 ·30 ·28	s. -4.02 4.02 4.02 4.02 4.02
20 22 24 26 28	- ·10 ·11 ·12 ·14 ·15 - ·16	4.01 4.01 4.01 4.01 4.01	- ·03 ·04 ·05 ·06 ·07 - ·08	4.01 4.01 4.01 4.01 4.01	+ ·05 ·04 ·03 ·02 + ·01	4.01 4.01 4.01 4.01 4.01	+ ·12 ·11 ·10 ·10 ·09 + ·08	4.01 4.01 4.01 4.01 4.01	+ ·20 ·19 ·18 ·17 ·17 + ·16	4.01 4.01 4.01 4.01 4.01	+ ·27 ·26 ·26 ·25 ·25 ·25	4·02 4·02 4·02 4·02 4·02
32 34 36 38 40	·17 ·19 ·20 ·22 — ·23	4.01 4.01 4.01 4.01	·09 ·10 ·12 ·13 — ·14	4.01 4.01 4.01 4.01	- ·01 ·02 ·03 ·04 - ·05	4.01 4.01 4.01 4.01	·07 ·06 ·05 ·05 + ·04	4.01 4.01 4.01 4.01	·15 ·15 ·14 ·14 + ·13	4.01 4.01 4.01 4.01	·24 ·23 ·23 ·22 + ·22	4.02 4.02 4.01 4.01 4.01
42 44 46 48 50	·25 ·27 ·29 ·31 — ·33	4·02 4·02 4·02 4·02	·16 ·17 ·19 ·21 - ·23	4·01 4·01 4·01 4·01	·06 ·08 ·09 ·10 — ·12	4·01 4·01 4·01 4·01	·03 ·02 ·01 ·00	4.01 4.01 4.01 4.01	·12 ·12 ·11 ·11 + ·10	4.01 4.01 4.01 4.01	·22 ·22 ·21 ·21 + ·21	4.01 4.02 4.02 4.02 4.02
52 54 56 58	•36 •39 •42 •45	4.03 4.03 4.03 4.03	·25 ·27 ·29 ·32	4·02 4·02 4·02 4·02	•13 •15 •16 •18	4.01 4.01 4.01	·02 ·03 ·04 ·05	4.01 4.01 4.01	·10 ·09 ·08	4.01 4.01 4.01	*21 *21 *21 *21	4·02 4·02 4·02 4·02

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 19 LATITUDE 4°.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 I 41.0 5 2I 23.3 5 I3 20.0 5 5 I6.8 4 57 I3.7	s. + ·28 ·21 ·20 ·18 ·17	H. M. S. 6 I 58.0 5 2I 35.6 5 I3 3I.5 5 5 27.4 4 57 23.4	s. + ·28 ·20 ·18 ·17 ·15	H. M. S. 6 2 15·1 5 21 47·3 5 13 42·1 5 5 37·0 4 57 32·0	s. + ·28 ·19 ·17 ·15 ·13	H. M. S. 6 2 32·3 5 21 58·3 5 13 52·0 5 5 45·6 4 57 39·4	s. + ·29 ·18 ·16 ·13 ·11	H. M. S. 6 2 49.5 5 22 8.6 5 14 0.9 5 5 53.2 4 57 45.6	s. + ·29 ·17 ·14 ·12 ·09	5 5 59.8	s. + ·29 ·15 ·13 ·10
18 20 22 24 26	4 49 10.6 4 41 7.6 4 33 4.7 4 25 1.8 4 16 59.0	+ ·16 ·15 ·13 ·12 ·11	4 49 19.5 4 41 15.7 4 33 11.9 4 25 8.1 4 17 4.4	+ ·14 ·12 ·10 ·09 ·07	4 49 27·1 4 41 22·2 4 33 17·4 4 25 12·6 4 17 7·8	+ ·II ·09 ·08 ·06 ·04	4 49 33.3 4 41 27.2 4 33 21.2 4 25 15.2 4 17 9.2	+ ·09 ·07 ·05 ·03 + ·01	4 49 38·2 4 4I 30·7 4 33 23·3 4 25 I5·9 4 I7 8·5	+ ·07 ·04 + ·02 ·00 - ·03	4 49 41.7 4 41 32.7 4 33 23.7 4 25 14.7 4 17 5.7	+ ·05 ·02 - ·01 ·03 ·06
28 30 31 32 33	4 8 56·2 4 0 53·4 3 56 52·0 3 52 50·7 3 48 49·4	+ ·09 ·08 ·07 ·07 ·06	4 9 0.7 4 0 57.1 3 56 55.3 3 52 53.5 3 48 51.7	+ ·06 ·04 ·03 ·02 ·01	4 9 3·1 4 0 58·4 3 56 56·0 3 52 53·6 3 48 51·2	+ ·02 ·00 - ·01 ·02 ·03	4 9 3.2 4 0 57.2 3 56 54.2 3 52 51.1 3 48 48.1	- ·02 ·04 ·05 ·06 ·07	4 9 1.0 4 0 53.6 3 56 49.8 3 52 46.0 3 48 42.2	- ·05 ·08 ·09 ·11 ·12	4 8 56·6 4 0 47·4 3 56 42·8 3 52 38·1 3 48 33·5	- ·09 ·12 ·14 ·15 ·17
34 35 36 37 38	3 44 48·0 3 40 46·7 3 36 45·3 3 32 44·0 3 28 42·6	+ ·05 ·05 ·04 ·03 ·03	3 44 49.9 3 40 48.1 3 36 46.3 3 32 44.4 3 28 42.7	+ ·01 - ·01 - ·01 ·02 ·03	3 44 48.9 3 40 46.5 3 36 44.1 3 32 41.8 3 28 39.3	- ·04 ·05 ·06 ·07 ·08	3 44 45·I 3 40 42·0 3 36 39·0 3 32 35·8 3 28 32·7	- ·09 ·10 ·11 ·12 ·14	3 44 38·4 3 40 34·6 3 36 30·6 3 32 26·7 3 28 22·8	- ·13 ·15 ·16 ·18 ·19		- ·18 ·20 ·22 ·23 ·25
39 40 41 42 48	3 24 41·3 3 20 40·0 3 16 38·7 5 12 37·4 5 8 36·0	+ ·02 ·01 ·00 ·00 - ·01	3 24 40·8 3 20 39·0 3 16 37·2 3 12 35·4 3 8 33·6	- ·03 ·04 ·05 ·06 ·07	3 24 37.0 3 20 34.5 3 16 32.0 3 12 29.6 3 8 27.1	- ·09 ·10 ·12 ·13 ·14	3 24 29.6 3 20 26.4 3 16 23.2 3 12 20.0 3 8 16.7	- ·15 ·16 ·18 ·19 ·21	3 24 18·8 3 20 14·7 3 16 10·6 3 12 6·4 3 8 2·2	- ·21 ·23 ·24 ·26 ·28		- ·27 ·29 ·30 ·32 ·34
44 45 46 47 48	3 4 34.7 3 0 33.4 2 56 32.0 2 52 30.7 2 48 29.4	- ·02 ·02 ·03 ·04 ·05	3 4 31·7 3 0 29·8 2 56 28·0 2 52 26·1 2 48 24·1	- ·08 ·09 ·10 ·12 ·13	3 4 24.6 3 0 22.0 2 56 19.4 2 52 16.8 2 48 14.2	- ·15 ·16 ·18 ·19 ·20	3 4 13·3 3 0 10·0 2 56 6·5 2 52 3·0 2 47 59·5	- ·22 ·24 ·25 ·27 ·29	3 3 58·0 2 59 53·6 2 55 49·1 2 51 44·5 2 47 39·9	- ·29 ·31 ·33 ·35 ·37	2 55 27·0 2 51 21·3	- ·36 ·38 ·41 ·43 ·45
49 50 51 52 53	2 44 28·0 2 40 26·7 2 36 25·3 2 32 24·0 2 28 22·6	- ·06 ·06 ·07 ·08 ·09	2 44 22·3 2 40 20·3 2 36 18·3 2 32 16·3 2 28 14·2	- ·14 ·15 ·16 ·17 ·19	2 44 11·5 2 40 8·7 2 36 6·0 2 32 3·1 2 28 0·2	- ·22 ·23 ·25 ·26 ·28	2 43 55·8 2 39 52·1 2 35 48·3 2 31 44·5 2 27 40·4	- ·30 ·32 ·34 ·36 ·38	2 35 25·3 2 3I 20·2	- ·39 ·41 ·43 ·45 ·48	2 30 50.2	- ·47 ·50 ·52 ·55 ·58
54 55 56 57 58	2 24 21·2 2 20 19·8 2 16 18·4 2 12 16·9 2 8 15·5	- ·10 ·11 ·12 ·13 ·14	2 20 10·0 2 16 7·9 2 12 5·6	- ·20 ·21 ·23 ·24 ·26	2 23 57·2 2 19 54·2 2 15 51·0 2 11 47·8 2 7 44·5	- ·30 ·32 ·33 ·35 ·37	2 11 23.2	- ·40 ·42 ·44 ·47 ·49	2 19 3·8 2 14 57·9 2 10 51·9		2 18 29.0 2 14 21.4 2 10 13.5	- ·60 ·63 ·66 ·70 ·73
		VA	ARIATIO	N TC	ı' OF	LATI	TUDE A	ND .	ALTITUI	Œ.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	Α.	L. 9°	Α.	L. 10	A.	L. 11°	Α.
°0 4 8 12 16	s. + ·42 ·40 ·39 ·37 ·36	s. -4·03 4·03 4·03 4·03 4·02	s. + '49 '47 '46 '44 '43	s. -4.04 4.04 4.03 4.03 4.03	s. + .56 .55 .53 .51 .50	s. -4.05 4.05 4.04 4.04 4.04	s. + .64 .62 .60 .59	s. -4.06 4.06 4.05 4.05 4.05	s. + ·71 ·69 ·67 ·66 ·65	s. -4·07 4·07 4·06 4·06	s. + ·78 ·76 ·75 ·74 ·73	s. -4.08 4.08 4.08 4.08 4.07
20 22 24 26 28	+ ·35 ·34 ·34 ·33 ·33	4·02 4·02 4·02 4·02 4·02	+ ·42 ·42 ·41 ·41 ·41	4·03 4·03 4·03 4·03	+ ·50 ·49 ·49 ·49 ·49	4·04 4·04 4·04 4·04	+ ·57 ·57 ·57 ·57 ·57 ·57	4.05 4.05 4.05 4.05 4.05	+ ·65 ·65 ·65 ·65 ·65	4.06 4.06 4.06 4.06 4.06	+ ·72 ·72 ·73 ·73 ·73	4.07 4.07 4.07 4.07 4.07
30 32 34 36 38	+ ·32 ·32 ·32 ·32 ·31	4·02 4·02 4·02 4·02 4·02	+ ·40 ·40 ·40 ·40 ·40	4·03 4·03 4·03 4·03	+ '49 '49 '49 '49 '49	4·04 4·04 4·04 4·04	+ ·57 ·57 ·57 ·58 ·58	4.05 4.05 4.05 4.05 4.05	+ ·65 ·66 ·66 ·67 ·67	4·06 4·06 4·06 4·06	+ ·73 ·74 ·75 ·76 ·77	4.08 4.08 4.08 4.08 4.08
40 42 44 46 48	+ ·31 ·31 ·31 ·32	4·02 4·02 4·02 4·02 4·02	+ '41 '41 '41 '42 '42	4.03 4.03 4.03 4.03	+ ·50 ·50 ·51 ·52 ·53	4·04 4·04 4·04 4·04	+ ·59 ·60 ·61 ·62 ·64	4·05 4·06 4·06 4·06	+ ·68 ·70 ·71 ·73 ·74	4.07 4.07 4.07 4.07 4.08	+ ·78 ·79 ·81 ·83 ·85	4.08 4.09 4.09 4.10
50 52 54 56 58	+ ·32 ·32 ·33 ·34 ·35	4·02 4·02 4·02 4·02 4·02	+ '43 '44 '45 '46 '48	4.03 4.03 4.04 4.04	+ ·54 ·55 ·57 ·59 ·61	4.04 4.05 4.05 4.05 4.05	+ ·65 ·67 ·69 ·72 ·75	4.06 4.07 4.07 4.07 4.08	+ ·76 ·79 ·82 ·85 ·89	4.08 4.09 4.10 4.10	+ ·88 ·91 ·94 ·98 1·03	4·I0 4·I1 4·I2 4·I4

20 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 4°.

DECLINATION—SAME NAME AS—LATITUDE.

			DECLIN	AIIO	N—SAM	1, 1,7	11/125 210	1211	TTUDE.			
True Alt.	12°	Decl. Var.	.13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Deci. Var.
0 10 12 14 16	H. M. S. 6 3 24'4 5 22 27'2 5 14 16'2 5 6 5'4 4 57 54'6	s. + ·29 ·14 ·11 ·08	H. M. S. 6 3 42·0 5 22 35·4 5 14 22·5 5 6 9·8 4 57 57·2	s. + ·29 ·13 ·10 ·06 + ·03	H. M. S. 6 3 59.7 5 22 43.0 5 14 28.1 5 6 13.3 4 57 58.6	s. + ·30 ·12 ·08 ·05 + ·01	H. M. S. 6 4 17.7 5 22 49.7 5 14 32.7 5 6 15.7 4 57 58.8	s. + ·30 ·11 ·07 + ·03 - ·01	H. M. S. 6 4 35.7 5 22 55.9 5 14 36.5 5 6 17.1 4 57 57.7	s. + ·30 ·09 ·05 + ·01 - ·03	H. M. S. 6 4 54.0 5 23 1.3 5 14 39.4 5 6 17.4 4 57 55.5	s. + ·30 ·08 + ·04 ·00 - ·05
18 20 22 24 26	4 49 43·8 4 41 33·1 4 33 22·3 4 25 11·6 4 17 0·7	+ ·02 ·01 - ·04 ·07 ·10	4 25 6·5 4 16 53·7	- ·00 - ·03 ·07 ·10 ·13	4 24 59·5 -4 16 44·5	- ·02 ·06 ·09 ·13 ·17	4 49 41·9 4 41 24·8 4 33 7·8 4 24 50·5 4 16 33·1	- ·04 ·08 ·12 ·17 ·21	4 49 38·4 4 41 18·9 4 32 59·3 4 24 39·5 4 16 19·4	- ·07 ·11 ·16 ·20 ·25	4 49 33.4 4 41 11.3 4 32 49.0 4 24 26.4 4 16 3.5	- ·09 ·14 ·19 ·23 ·28
28 30 31 32 33	4 8 49·8 4 0 38·8 3 56 33·3 3 52 27·6 3 48 21·9	- ·13 ·16 ·18 ·20 ·22	4 8 40·7 4 0 27·5 3 56 20·9 3 52 14·2 3 48 7·4	- ·17 ·21 ·23 ·25 ·26	4 8 29·3 4 0 13·8 3 56 6·0 3 51 58·0 3 47 50·0	- ·21 ·25 ·27 ·29 ·31	4 8 15·4 3 59 57·4 3 55 48·2 3 15 39·0 3 47 29·6	- ·25 ·29 ·32 ·34 ·36	4 7 59·0 3 59 38·3 3 55 27·7 3 51 17·0 3 47 6·1	- ·29 ·34 ·36 ·39 ·42	4 7 40·2 3 59 16·4 3 55 4·3 3 50 52·0 3 46 39·5	- ·33 ·39 ·41 ·44 ·47
34 35 36 37 38	3 44 16·1 - 3 40 10·4 3 36 4·5 3 31 58·6 3 27 52·5	·31	3 35 46·6 3 31 39·4 3 27 32·2	·35 ·37	3 27 8.2	- ·34 ·36 ·38 ·40 ·43	3 43 20·1 3 39 10·5 3 35 0·7 3 30 50·7 3 26 40·6	- ·39 ·41 ·46 ·46 ·49	3 42 55·1 3 38 43·9 3 34 32·6 3 30 21·1 3 26 9·3	- ·44 ·47 ·50 ·52 ·55	3 42 26·9 3 38 14·0 3 34 1·0 3 29 47·7 3 25 34·1	- ·50 ·53 ·56 ·59 ·62
39 40 41 42 43	3 23 46·5 3 19 40·2 3 15 33·9 3 11 27·5 3 7 20·9	- ·23 ·35 ·37 ·39 ·42	3 23 24·8 3 19 17·3 3 15 9·7 3 11 1·9 3 6 53·7	- ·39 ·41 ·44 ·46 ·48	3 14 41·4 3 10 32·2 3 6 22·7	- ·45 ·48 ·50 ·53 ·56	3 22 30·3 3 18 19·8 3 14 9·1 3 9 58·1 3 5 46·9	- ·52 ·54 ·57 ·60 ·63	3 21 57·3 3 17 45·1 3 13 32·5 3 9 19·7 3 5 6·6	- ·58 ·61 ·64 ·68 ·71	3 21 20·3 3 17 6·1 3 12 51·7 3 8 36·9 3 4 21·7	- ·65 ·68 ·72 ·75 ·79
44 45 46 47 48	3 3 14·2 - 2 59 7·4 2 55 0·4 2 50 53·3 2 46 45·9	•53	3 2 45·8 2 58 37·5 2 54 29·0 2 50 20·3 2 46 11·3	.62	2 58 3·0 2 53 52·7 2 49 42·2 2 45 31·4	1	3 I 35·4 2 57 23·6 2 53 II·5 2 48 59·0 2 44 46·2	- ·66 ·70 ·73 ·76 ·80	3 0 53·2 2 56 39·4 2 52 25·1 2 48 10·5 2 43 55·4	- ·74 ·78 ·82 ·85 ·89	3 0 6·1 2 55 50·0 2 51 33·5 2 47 16·5 2 42 58·9	- ·83 ·87 ·91 ·95 ·99
49 50 51 52 53	2 42 38·4 2 38 30·6 2 34 22·6 2 30 14·3 2 26 5·8		2 42 2·0 2 37 52·5 2 33 42·6 2 29 32·5 2 25 21·9	- ·65 ·68 ·71 ·75 ·78	2 32 56·9 2 28 44·5 2 24 31·7	·85 ·89	2 40 32·9 2 36 19·2 2 32 4·9 2 27 50·2 2 23 34·9	- ·84 ·88 ·92 ·96 I·00	2 39 39·7 2 35 23·5 2 31 6·8 2 26 49·3 2 22 31·2	- ·94 ·98 I·02 I·07 I·12	2 38 40·6 2 34 21·7 2 30 2·1 2 25 41·7 2 21 20·2	1.04 1.08 1.13 1.19 1.24
54 55 56 57 58	2 21 56·9 - 2 17 47·7 2 13 38·1 2 9 28·0 2 5 17·6	- ·71 ·74 ·78 ·82 ·86		- ·82 ·86 ·90 ·94 ·99	2 7 34.7	- ·93 ·98 ·1·02 ·1·07 ·1·13	2 19 18·9 2 15 2·1 2 10 44·7 2 6 26·3 2 2 7·0	-1.05 1.10 1.15 1.21 1.27	2 18 12·2 2 13 52·3 2 9 31·3 2 5 9·6 2 0 46·6	-1·17 1·23 1·29 1·35 1·42	2 16 58·0 2 12 34·7 2 8 10·2 2 3 44·3 1 59 17·0	1·30 1·36 1·43 1·50 1·57
		V.	ARIATIC	N TO	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 12°	A.	L. 13°	A.	L. 14°	Α.	L. 15°	Α.	L. 16°	Α.	L. 17°	Α.
° 0 4 8 12 16	s. + ·85 - ·83 ·82 ·81 ·80	s. 4·10 4·09 4·09 4·09	s. + '93 - '91 '89 '88 '88	S. -4·II 4·II 4·II 4·II 4·IO	s. +1.00 - .98 .97 .96 .96	S. -4·13 4·13 4·12 4·12 4·12	s. +1.08 1.06 1.04 1.04 1.03	s. -4·15 4·14 4·14 4·14	s. +1·15 1·13 1·12 1·11	s. -4·17 4·16 4·16 4·16	s. +1·23 - 1·21 1·20 1·19 1·19	s. -4·19 4·19 4·18 4·18 4·18
20 22 24 26 28	+ ·80 ·80 ·81 ·81	4·09 4·09 4·09 4·09	+ ·88 ·88 ·88 ·89 ·90	4·10 4·10 4·10 4·10	+ ·96 ·96 ·97 ·97 ·98	4·12 4·12 4·12 4·13	+1.04 1.04 1.05 1.05 1.06	4·14 4·14 4·14 4·15	+1·12 1·12 1·13 1·14 1·15	4·16 4·16 4·17 4·17	+1·20 1·20 1·21 1·22 1·24	4·19 4·19 4·19 4·19
30 32 34 36 38	+ ·82 ·83 ·84 ·85 ·86	4·09 4·09 4·10 4·10	+ ·90 ·91 ·92 ·94 ·95	4·II 4·II 4·I2 4·I2	+ ·99 1·00 1·01 1·03 1·05	4·13 4·13 4·14 4·14	+ 1.08 1.09 1.10 1.12 1.14	4·15 4·16 4·16 4·17	+1·16 1·18 1·20 1·22 1·24	4·17 4·18 4·19 4·20	+1·25 1·27 1·29 1·31 1·34	4·20 4·21 4·21 4·22 4·23
40 42 44 46 48	+ ·87 ·89 ·91 ·94 ·96	4·I0 4·II 4·II 4·I2 4·I2	+ 97 -99 1 02 1 04 1 08	4·13 4·13 4·14 4·15	+1.07 1.09 1.12 1.15 1.19	4·15 4·16 4·17 4·18	+1·17 1·20 1·23 1·27 1·31	4·18 4·19 4·20 4·22	+1·27 1·30 1·34 1·38 1·43	4·20 4·21 4·23 4·24 4·26	+1·37 1·41 1·45 1·50 1·55	4·24 4·25 4·26 4·28 4·30
50 52 54 56 58	+1.00 1.03 1.07 1.12 1.18	4·13 4·14 4·15 4·16 4·18	+ 1·11 1·16 1·20 1·26 1·32	4·16 4·17 4·19 4·20 4·22	+1·23 1·28 1·34 1·40 1·48	4·19 4·21 4·23 4·25 4·27	+ 1·36 1·41 1·47 1·55 1·64	4·23 4·25 4·27 4·30 4·33	+1.48 1.54 1.62 1.70 1.80	4·27 4·30 4·36 4·39	+1.61 1.68 1.76 1.86 1.97	4·32 4·35 4·38 4·42 4·47

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 21 LATITUDE 4°.

True	100	Decl.		Decl.	ON—SAW	Decl.	21°	Decl.	22°	Decl.	000	Decl.
Alt.	18°	Var.	19°	Var.	20°	Var.	21	Var.		Var.	23°	Var.
0 10 12 14 16	H. M. S. 6 5 12·4 5 23 6·0 5 14 41·3 5 6 16·6 4 57 51·8	s. + ·31 ·07 + ·02 - ·02 ·07	H. M. S. 6 5 31·1 5 23 10·0 5 14 42·3 5 6 14·6 4 57 46·9	s. + ·31 ·06 + ·01 - ·04 ·09	H. M. S. 6 5 50·0 5 23 13·2 5 14 42·4 5 6 11·6 4 57 40·7	s. + ·32 + ·05 - ·01 ·06 ·11	H. M. S. 6 6 9·I 5 23 I5·7 5 I4 4I·5 5 6 7·4 4 57 33·I	s. + ·32 + ·03 - ·02 ·08 ·14	H. M. S. 6 6 28·5 5 23 17·4 5 14 39·7 5 6 2·0 4 47 24·0	s. + ·32: + ·02 - ·04 ·10 ·16	H. M. S. 6 6 48·2 5 23 18·4 5 14 36·9 5 5 55·3 4 57 13·6	s. + ·33 + ·01 - ·05 ·12 ·19
18 20 22 24 26	4 49 27.0 4 41 2.0 4 32 36.8 4 24 11.2 4 15 45.2	- ·12 ·17 ·22 ·27 ·32	4 49 19·1 4 40 51·0 4 32 22·6 4 23 53·8 4 15 24·6	- ·14 ·20 ·25 ·31 ·36	4 49 9.5 4 40 38.2 4 32 6.5 4 23 34.2 4 15 1.5	- ·17 ·23 ·28 ·34 ·41	4 48 58·5 4 40 23·6 4 31 48·4 4 23 12·4 4 14 35·8	- ·20 ·26 ·32 ·38 ·45	4 48 45·8 4 40 7·2 4 31 28·0 4 22 48·2 4 14 7·6	1	4 48 31·4 4 39 48·8 4 31 5·6 4 22 21·6 4 13 36·8	- ·25 ·32 ·39 ·46 ·54
28 30 31 32 33	4 7 18·8 3 58 51·7 3 54 37·9 3 50 23·9 3 46 9·7	- ·38 ·43 ·46 ·49 ·52	4 6 54·7 3 58 24·2 3 54 8·5 3 49 52·7 \$ 45 36·7	- ·42 ·48 ·51 ·55 ·58	4 6 28·0 3 57 53·6 3 53 36·1 3 49 18·3 3 45 0·2	- ·47 ·53 ·57 ·60 ·64	4 5 58·4 3 57 20·1 3 53 0·5 3 48 40·5 3 44 20·2	- ·51 ·58 ·62 ·66 ·69	4 5 26·1 3 56 43·4 3 52 21·5 3 47 59·3 3 43 36·7	- ·56 ·64 ·68 ·72 ·76	4 4 50·7 3 56 3·4 3 51 39·2 3 47 14·5 3 42 49·5	- ·61 ·69 ·73 ·78 ·82
34 35 36 37 38	3 41 55·3 3 37 40·7 3 33 25·8 3 29 10·5 3 24 55·0	- ·55 ·58 ·62 ·65 ·68	3 41 20·3 3 37 3·7 3 32 46·8 3 28 29·5 3 24 11·8	- ·61 ·65 ·68 ·72 ·75	3 40 41·8 3 36 23·1 3 32 4·0 3 27 44·5 3 23 24·5	- ·67 · ·71 ·75 ·78 ·82	3 39 59·6 3 35 38·6 3 31 17·2 3 26 55·3 3 22 32·9		3 39 13·7 3 34 50·2 3 30 26·3 3 26 1·8 3 21 36·8	- ·80 ·84 ·88 ·93 ·97	3 38 23.9 3 33 57.8 3 29 31.2 3 25 3.9 3 20 36.0	- ·86 ·91 ·95 1·00
39 40 41 42 43	3 20 39·2 3 16 23·0 3 12 6·4 3 7 49·4 3 3 31·9	- ·72 ·76 ·79 ·83 ·87	3 19 53·8 3 15 35·4 3 11 16·5 3 6 57·1 3 2 37·1	- ·79 ·83 ·87 ·91 ·96	3 19 4·1 3 14 43·3 3 10 21·9 3 5 59·8 3 1 37·2	- ·86 ·91 ·95 I·00 I·04	3 4 57·5 3 0 32·0	1.03 1.03	3 17 11·1 3 12 44·7 3 8 17·7 3 3 49·8 2 59 21·1	1.02 1.07 1.12 1.17 1.23	3 16 7·3 3 11 38·0 3 7 7·7 3 2 36·5 2 58 4·5	-1·10 1·16 1·21 1·27 1·33
44 45 46 47 48	2 59 13·9 2 54 55·5 2 50 36·4 2 46 16·8 2 41 56·4	I.00	2 58 16·7 2 53 55·5 2 49 33·7 2 45 11·1 2 40 47·8	-1.00 1.05 1.09 1.14 1.20	2 57 13·9 2 52 49·9 2 48 25·1 2 43 59·4 2 39 32·7	1·14 1·19 1·25 1·31	2 56 5.6 2 51 38.4 2 47 10.3 2 42 41.2 2 38 11.0	1·24 1·30 1·36 1·42	2 50 20·9 2 45 49·2 2 41 16·3 2 36 42·2	1·47 1·54	2 53 31·3 2 48 57·0 2 44 21·4 2 39 44·4 2 35 6·0	-1·39 1·45 1·52 1·59 1·67
49 50 51 52 53	2 37 35·3 2 33 13·4 2 28 50·6 2 24 26·9 2 20 2·1	1.31	2 36 23·5 2 31 58·3 2 27 32·1 2 23 4·7 2 18 36·1	-1.25 1.31 1.37 1.43 1.50	2 35 5.0 2 30 36.2 2 26 6.2 2 21 34.8 2 17 1.8	-1·37 1·43 1·50 1·57 1·64		1.63 1.71 1.79	2 27 29·4 2 22 50·6 2 18 9·8 2 13 27·0	-1.61 1.69 1.77 1.86 1.95	2 11 25·3 2 11 25·3	- 1·75 1·83 1·92 2·01 2·11
54 55 56 57 58	2 15 36·1 2 11 8·9 2 6 40·2 2 2 9·9 1 57 37·9	1.50 1.58 1.65	2 5 1.1		2 12 27·3 2 7 50·8 2 3 12·3 1 58 31·6 1 53 48·2			1·97 2·07 2·19	2 8 41·9 2 3 54·1 1 59 3·4 1 54 9·3 1 49 11·6	2.39	2 6 33.9 2 I 39.5 I 56 4I.7 I 5I 39.6 I 46 33.2	2·34 2·47 2·60
		V.	ARIATIO	ON TO	ı' OF	LAT	ITUDE .	AND	ALTITU	DE.		
Alt.	L. 18	° A.	L. 19	° A.	L. 20	° A.	L. 21	° A.	L. 22	° A.	L. 23	° A.
0 4 8 12 16	1·29 1·27 1·27 1·27	S. -4.22 4.21 4.21 4.20 4.20	s. +1·38 1·36 1·35 1·35	s. -4·24 4·24 4·23 4·23 4·23	s. +1·46 1·44 1·43 1·43	s. -4·26 4·26 4·26 4·26 4·26	s. +1·54 1·52 1·51 1·51	s. -4·29 4·29 4·28 4·28 4·29	s. +1.62 1.60 1.59 1.59 1.60	s. -4·32 4·31 4·31 4·32	s. +1·71. 1·69 1·67 1·67 1·68	s. -4·36 4·35 4·35 4·34 4·35
20 22 24 26 28	+1·28 1·29 1·30 1·31 1·32	4·21 4·21 4·21 4·22 4·22	+1·36 1·37 1·38 1·40 1·41	4·23 4·24 4·24 4·25	+1·45 1·46 1·47 1·48 1·50	4·26 4·26 4·27 4·27 4·28	+1·53 1·54 1·56 1·57 1·59	4·29 4·30 4·31 4·32	+1·62 1·63 1·65 1·67 1·69	4·32 4·33 4·34 4·35	+1.70 1.72 1.74 1.76 1.78	4·35 4·36 4·37 4·38 4·39
36 32 34 36 38	+1·34 1·36 1·38 1·41 1·44	4·23 4·23 4·24 4·25 4·26	+1·43 1·45 1·48 1·51 1·54	4·25 4·26 4·27 4·28 4·30	+1·52 1·55 1·58 1·61 1·65	4·29 4·30 4·31 4·32 4·33	+1.62 1.65 1.68 1.71 1.76	4·32 4·33 4·34 4·36 4·38	+1.71 1.74 1.78 1.82 1.87	4·36 4·37 4·39 4·40 4·42	+ 1.81 1.84 1.88 1.93 1.98	4·40 4·41 4·43 4·45 4·47
40 42 44 46 48	+1·48 1·52 1·56 1·61 1·67	4·27 4·29 4·30 4·32 4·35	+1.58 1.63 1.68 1.74 1.80	4·31 4·33 4·35 4·37 4·40	+1.69 1.74 1.80 1.86 1.94	4·35 4·37 4·39 4·42 4·45	+1.80 1.86 1.92 1.99 2.07	4·40 4·42 4·45 4·48 4·51	+1.92 1.98 2.05 2.12 2.22	4·44 4·47 4·50 4·54 4·58	+2·03 2·10 2·18 2·26 2·36	4·49 4·52 4·56 4·60 4·65
50 52 54 56 58	+1.74 1.82 1.91 2.02 2.15	4·37 4·40 4·44 4·49 4·55	+ 1.88 1.97 2.07 2.20 2.34	4·43 4·47 4·51 4·57 4·64	+2.02 2.12 2.24 2.38 2.54	4.49 4.54 4.59 4.66 4.75	+2·17 2·28 2·41 2·57 2·76	4·56 4·61 4·68 4·76 4·87	+2·32 2·45 2·59 2·77 2·98	4.63 4.70 4.77 4.87 5.00	+2.48 2.62 2.78 2.98 3.23	4·72 4·79 4·88 5·00 5·15

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 5°.

			DECER		N—SAM		AME AS		TITUDE.			
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 50.7 5 11 48.9 5 3 46.9 4 55 45.0	s. + ·35 ·36 ·36 ·36 ·36	H. M. S. 6 0 21·0 5 20 11·7 5 12 9·9 5 4 8·0 4 56 6·2	s. + ·35 ·34 ·34 ·34 ·34	H. M. S. 6 0 42.0 5 20 31.9 5 12 30.0 5 4 28.1 4 56 26.2	s. + ·35 ·33 ·33 ·33 ·32	H. M. S. 6 I 3·I 5 20 5I·4 5 I2 49·2 5 4 47·I 4 56 45·I	s. + ·35 ·32 ·31 ·31 ·30	H. M. S. 6 I 24·I 5 2I I0·2 5 I3 7·7 5 5 5·2 4 57 2·8	s. + '35 '31 '30 '29 '28	H. M. S. 6 I 45.2 5 2I 28.3 5 I3 25.2 5 5 22.2 4 57 I9.3	s. + ·35 ·29 ·28 ·27 ·26
18 20 22 24 26	4 47 42.9 4 39 40.9 4 31 38.8 4 23 36.6 4 15 34.4	+ ·37 ·37 ·38 ·38 ·39	4 48 4·3 4 40 2·5 4 32 0·6 4 23 58·7 4 15 56·7	+ ·34 ·35 ·35 ·35 ·35 ·35	4 48 24·4 4 40 22·5 4 32 20·7 4 24 18·9 4 16 17·0	+ ·32 ·32 ·32 ·32 ·32	4 48 43.0 4 40 41.1 4 32 39.1 4 24 37.2 4 16 35.3	+ ·30 ·30 ·29 ·29 ·29	4 49 0.4 4 40 58.1 4 32 55.8 4 24 53.6 4 16 51.5	+ ·28 ·27 ·26 ·26 ·25	4 49 16·4 4 41 13·6 4 33 11·0 4 25 8·3 4 17 5·7	+ ·25 ·25 ·24 ·23 ·22
28 30 31 32 33	4 7 32·I 3 59 29·7 3 55 28·4 3 5I 27·I 3 47 25·9	+ ·39 ·40 ·41 ·41 ·42	4 7 54·7 3 59 52·7 3 55 51·7 3 51 50·6 3 47 49·6	+ ·36 ·36 ·37 ·37 ·37	4 8 15·2 4 0 13·3 3 56 12·4 3 52 11·5 3 48 10·5	+ ·32 ·32 ·32 ·32 ·33	4 8 33·4 4 0 31·5 3 56 30·6 3 52 29·7 3 48 28·7	+ ·28 ·28 ·28 ·28 ·28	4 8 49.4 4 0 47.3 3 56 46.3 3 52 45.3 3 48 44.3	+ ·25 ·24 ·24 ·24 ·23	4 9 3·2 4 I 0·7 3 56 59·5 3 52 58·3 3 48 57·I	+ ·21 ·20 ·20 ·19 ·19
34 35 36 37 38	3 43 24·5 3 39 23·2 3 35 21·8 3 31 20·4 3 27 18·9	°43 °43 °44 °44	3 39 47.4 2 35 46.3 3 31 45.1 3 27 44.0	+ ·37 ·38 ·38 ·38 ·39	3 44 9.6 3 40 8.6 3 36 7.7 3 32 6.7 3 28 5.7	+ ·33 ·33 ·33 ·33 ·33	3 44 27·8 3 40 26·9 3 36 26·0 3 32 25·1 3 28 24·2	+ ·28 ·28 ·28 ·28 ·28 ·28	3 44 43.3 3 40 42.3 3 36 41.3 3 32 40.3 3 28 39.3	+ ·23 ·23 ·23 ·23 ·22	3 44 55.9 3 40 54.7 3 36 53.6 3 32 52.4 3 28 51.3	+ ·19 ·18 ·18 ·17 ·17
39 40 41 42 43	3 23 17·4 3 19 15·9 3 15 14·3 3 11 12·6 3 7 10·9	•47 •48	3 23 42·8 3 19 41·6 3 15 40·3 3 11 39·0 3 7 37·7	+ ·39 ·40 ·40 ·41 ·41	3 20 3.7 3 16 2.7 3 12 1.7 3 8 0.6	+ '34 '34 '34 '34 '35	3 24 23·2 3 20 22·3 3 16 21·4 3 12 20·5 3 8 19·6	+ ·28 ·28 ·28 ·28 ·28	3 24 38·4 3 20 37·4 3 16 36·5 3 12 35·5 3 8 34·6	+ ·22 ·22 ·22 ·22 ·22	3 24 50·1 3 20 49·0 3 16 47·9 3 12 46·8 3 8 45·7	+ ·17 ·16 ·16 ·16 ·15
44 45 46 47 48	3 3 9·2 2 59 7·4 2 55 5·5 2 51 3·5 2 47 1·5	•53	2 51 32·2 2 47 30·7	+ ·42 ·43 ·43 ·44 ·45	3 3 59·5 2 59 58·5 2 55 57·4 2 51 56·3 2 47 55·1	+ ·35 ·36 ·36 ·36 ·37	3 4 18·6 3 0 17·7 2 56 16·7 2 52 15·8 2 48 14·9	+ ·28 ·28 ·29 ·29 ·29	3 4 33.7 3 0 32.7 2 56 31.8 2 52 30.8 2 48 29.9	·2I	3 4 44.6 3 0 43.5 2 56 42.5 2 52 41.4 2 48 40.4	+ ·15 ·14 ·14 ·13
49 50 51 52 53	2 42 59·4 2 38 57·3 2 34 54·9 2 30 52·6 2 26 50·I	·57 ·59	2 43 29·I 2 39 27·5 2 35 25·9 2 3I 24·I 2 27 22·3	+ ·45 ·46 ·47 ·48 ·49	2 43 53.9 2 39 52.7 2 35 51.5 2 31 50.2 2 27 48.9	+ ·37 ·38 ·38 ·39 ·40	2 44 13·9 2 40 12·9 2 36 11·9 2 32 10·9 2 28 9·9	+ ·29 ·29 ·30 ·30 ·30	2 44 29·0 2 40 28·1 2 36 27·2 2 32 26·2 2 28 25·3	+ ·21 ·21 ·21 ·21 ·21	2 44 39·3 2 40 38·3 2 36 37·2 2 32 36·2 2 28 35·2	+ ·13 ·12 ·12 ·12
54 55 56 57 58	2 22 47·4 2 18 44·7 2 14 41·8 2 10 38·8 2 6 35·5	·62 ·63	2 23 20·5 2 19 18·5 2 15 16·5 2 11 14·3 2 7 12·1	·51 ·52 ·54	2 23 47·6 2 19 46·2 2 15 44·8 2 11 43·3 2 7 41·8	•43	2 24 8·9 2 20 7·9 2 16 6·8 2 12 5·7 2 8 4·6		2 24 24·4 2 20 23·5 2 16 22·6 2 12 21·7 2 8 20·8	+ ·2I ·2I ·2I ·2I ·2I ·2I	2 24 34°I 2 20 33°2 2 16 32°I 2 12 31°I 2 8 30°I	.10 .11 .11 + .11
		VA	RIATIO	и то	ı' OF	LATI'	TUDE A	ND A	ALTITUI	E.		
Alt.	L. 0°	Α.	L. 1°	A.	L. 2°	A.	L. 3°	A.	L. 4°	A.	L. 5°	Α.
0 4 8 12 16	s. :02 :05 -07 -10	S. -4·01 4·01 4·01 4·01 4·01	s. + ·07 - ·04 ·02 ·00 - ·03	s. -4.01 4.01 4.01 4.01 4.01	s. + ·14 - ·12 ·09 ·07 ·04	S. -4.02 4.02 4.02 4.02 4.01	s. + ·21 - ·19 ·16 ·14 ·12	s. -4·02 4·02 4·02 4·02 4·02	s. + ·28 - ·26 ·23 ·21 ·19	s. -4·02 4·02 4·02 4·02 4·02	s. + '35 - '33 '31 '28 '26	s. -4.03 4.03 4.03 4.02 4.02
20 22 24 26 28	- ·13 ·14 ·15 ·17 ·19	4.02 4.02 4.02 4.02 4.02	- ·05 ·06 ·08 ·09 ·11	4.01 4.01 4.01 4.01 4.02	+ ·02 ·01 ·00 - ·01 ·03	4.01 4.01 4.01 4.01	+ ·10 ·08 ·07 ·06 ·05	4.01 4.01 4.01 4.01	+ ·17 ·16 ·15 ·14 ·13	4·02 4·02 4·02 4·02 4·02	+ ·25 ·24 ·23 ·22 ·21	4·02 4·02 4·02 4·02 4·02
30 32 34 36 38	- ·20 ·22 ·24 ·25 ·27	4·02 4·02 4·02 4·02	- ·12 ·14 ·15 ·17 ·18	4·02 4·02 4·02 4·02	- ·04 ·05 ·07 ·08 ·09	4.01 4.01 4.01 4.01	+ ·04 ·03 ·02 ·00 - ·01	4.01 4.01 4.01 4.01	+ ·12 ·11 ·10 ·09 ·08	4·02 4·02 4·01 4·01	+ ·20 ·19 ·19 ·18 ·17	4·02 4·02 4·02 4·02
40 42 44 46 48	- ·29 ·32 ·34 ·37 ·39	4·03 4·03 4·03 4·03	- ·20 ·22 ·24 ·26 ·29	4·02 4·02 4·02 4·03	- ·11 ·13 ·14 ·16 ·18	4.01 4.01 4.02 4.02 4.02	- ·02 ·03 ·05 ·06 ·07	4.01 4.01 4.02 4.02	+ ·07 ·06 ·05 ·04 ·03	4.01 4.01 4.02 4.02 4.02	+ ·16 ·16 ·15 ·14 ·13	4·02 4·02 4·02 4·02 4·02
50 52 54 56 58	- ·42 ·45 ·49 ·53 ·57	4.04 4.04 4.05 4.05	- ·31 ·34 ·37 ·40 ·43	4·03 4·03 4·03 4·04	- ·20 ·22 ·24 ·27 ·30	4·02 4·02 4·02 4·03	- ·09 ·11 ·12 ·14 ·16	4·02 4·02 4·02 4·02 4·02	+ ·02 ·01 ·00 - ·02 ·03	4.02 4.02 4.02 4.02 4.02	+ ·13 ·12 ·11 ·11	4·02 4·02 4·02 4·02 4·02

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 23 LATITUDE 5°.

m 1		n 1	DECEM		N—SAM				TITUDE	Deal		D1
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 2 6.5 5 21 45.7 5 13 41.9 5 5 38.2 4 57 34.6	s. + ·35 ·28 ·27 ·26 ·24	H. M. S. 6 2 27.7 5 22 2.4 5 13 57.7 5 5 53.2 4 57 48.8	s. + ·35 ·27 ·26 ·24 ·23	H. M. S. 6 2 49·I 5 22 18·4 5 14 12·7 5 6 7·2 4 58 1·8	s. + ·36 ·26 ·24 ·22 ·21	H. M. S. 6 3 10·5 5 22 33·7 5 14 26·9 5 6 20·2 4 58 13·6	s. + ·36 ·25 ·23 ·21 ·19	H. M. S. 6 3 32·3 5 22 48·4 5 14 40·3 5 6 32·2 4 58 24·4	s. + ·36 ·24 ·21 ·19 ·17	H. M. S. 6 3 53·8 5 23 2·4 5 14 52·8 5 6 43·2 4 5 ⁸ 33·9	s. + ·36 ·23 ·20 ·17 ·15
18 20 22 24 26	4 49 31·1 4 41 27·7 4 33 24·3 4 25 21·1 4 17 17·9	+ ·23 ·22 ·21 ·20 ·18	4 49 44·4 4 41 40·2 4 33 36·1 4 25 32·0 4 17 28·0	+ ·21 ·20 ·18 ·17 ·15	4 49 56·5 4 41 51·3 4 33 46·2 4 25 41·1 4 17 36·2	+ ·19 ·17 ·15 ·14 ·12	4 25 48·4 4 17 42·3	+ ·17 ·15 ·12 ·10 ·08	4 50 16.6 4 42 8.9 4 34 1.3 4 25 53.8 4 17 46.4	+ ·14 ·12 ·10 ·07 ·05	4 50 24.6 4 42 15.5 4 34 6.4 4 25 57.4 4 17 48.3	+ ·12 ·10 ·07 ·04 + ·01
28 30 31 32 33	4 9 14·8 4 1 11·7 3 57 10·2 3 53 8·7 3 49 7·2	+ ·17 ·16 ·16 ·15 ·14	4 9 24·I 4 I 20·2 3 57 I8·4 3 53 I6·4 3 49 I4·6	+ ·14 ·12 ·11 ·11	3 53 21·6 3 49 19·3	+ ·10 ·08 ·07 ·06 ·05	4 9 36·2 4 I 30·2 3 57 27·2 3 53 24·2 3 49 2I·2	+ ·06 ·04 ·03 ·02 + ·01	4 9 38 9 4 I 31 5 3 57 27 8 3 53 24 I 3 49 20 4	+ ·03 ·00 - ·01 ·02 ·04	4 9 39.4 4 I 30.4 3 57 25.8 3 53 21.3 3 49 16.8	- ·01 ·04 ·05 ·07 ·08
34 35 36 37 38	3 45 5.7 3 41 4.2 3 37 2.8 3 33 1.4 3 28 59.9	·12	3 45 12·7 3 41 10·8 3 37 9·0 3 33 7·1 3 29 5·3	+ ·09 ·08 ·08 ·07 ·06	3 45 16·9 3 41 14·5 3 37 12·1 3 33 9·8 3 29 7·4	+ ·04 ·04 ·03 ·02 + ·01	3 45 18·2 3 41 15·2 3 37 12·2 3 33 9·2 3 29 6·2	- ·01 ·02 ·03 ·05	3 45 16·7 3 41 12·9 3 37 9·2 3 33 5·5 3 29 1·7	- ·05 ·06 ·07 ·09 ·10	3 45 12·2 3 41 7·7 3 37 3·1 3 32 58·5 3 28 53·8	.19
39 40 41 42 43	3 24 58·5 3 20 57·1 3 16 55·7 3 12 54·3 3 8 52·9	+ ·II ·IO ·IO ·O9	3 25 3.5 3 21 1.7 3 16 59.8 3 12 58.0 3 8 56.2	+ ·05 ·05 ·04 ·03 ·02	3 25 5.0 3 21 2.7 3 17 0.3 3 12 58.0 3 8 55.6	- ·01 ·02 ·03 ·04	3 25 3·2 3 21 0·2 3 16 57·1 3 12 54·1 3 8 51·0	- ·06 ·07 ·08 ·10 ·11	3 24 57·9 3 20 54·1 3 16 50·2 3 12 46·4 3 8 42·5	- ·12 ·13 ·15 ·16 ·18	3 24 49·1 3 20 44·3 3 16 39·5 3 12 34·7 3 8 29·8	- ·17 ·19 ·21 ·23 ·24 - ·26
44 45 46 47 48	3 4 51·6 3 0 50·2 2 56 48·8 2 52 47·5 2 48 46·1	+ ·08 ·07 ·06 ·06		+ ·01 ·00 ·00 - ·01 ·02	3 4 53·2 3 0 50·8 2 56 48·4 2 52 46·0 2 48 43·6	- ·05 ·06 ·08 ·09 ·10	3 4 47.9 3 0 44.8 2 56 41.7 2 52 38.5 2 48 35.3	- ·12 ·14 ·15 ·16 ·18	3 4 38·5 3 0 34·5 2 56 30·5 2 52 26·4 2 48 22·2	- ·19 ·21 ·22 ·24 ·26	2 52 9·5 2 48 4·2	·28 ·30 ·32 ·34
49 50 51 52 53	2 44 44·8 2 40 43·4 2 36 42·1 2 32 40·8 2 28 39·4	+ ·05 ·04 ·04 ·03 ·02	2 36 41·8 2 32 39·9 2 28 38·1	- ·03 ·04 ·05 ·06 ·07	2 44 41·2 2 40 38·7 2 36 36·2 2 32 33·7 2 28 31·2	- ·11 ·12 ·14 ·15 ·16	2 44 32·0 2 40 28·7 2 36 25·4 2 32 22·0 2 28 18·6	- ·19 ·21 ·22 ·24 ·26	2 32 4·8 2 28 0·2	- ·28 ·29 ·31 ·33 ·35	2 43 58·7 2 39 53·3 2 35 47·7 2 31 41·9 2 27 36·0	·38 ·40 ·43 ·45
54 55 56 57 58	2 24 38·1 2 20 36·8 2 16 35·5 2 12 34·1 2 8 32·9	+ ·02 ·01 ·00 ·00 - ·01	2 20 34·4 2 16 32·5 2 12 30·7	- ·08 ·09 ·10 ·11 ·12	2 24 28·6 2 20 26·0 2 16 23·3 2 12 20·7 2 8 17·9	- ·18 ·19 ·21 ·22 ·24	2 24 15·1 2 20 11·5 2 16 7·8 2 12 4·0 2 8 0·2		2 II 40·7	- ·38 ·40 ·42 ·45 ·47	2 23 29·9 2 19 23·7 2 15 17·2 2 11 10·5 2 7 3·6	.56
		V	ARIATIO	ON TO	o i' OF	LAT	ITUDE	AND	ALTITU	DE.		
Alt.	L. 6°	Α.	L. 7°	A.	L. 8°	Α.	L. 9°	Α.	L. 10	A.	L. 11	A.
0 4 8 12 16	·40 ·38 ·36 ·34	s. -4·04 4·03 4·03 4·03 4·03	*47 *45 *43 *41	s. -4.04 4.04 4.04 4.04 4.04	*54 *52 *50 *49	s. -4.05 4.05 4.05 4.05 4.04	·61 ·59 ·57 ·56	s. -4.06 4.06 4.06 4.06 4.05	·69 ·67 ·65 ·63	s. -4.08 4.07 4.07 4.07 4.06	s. + ·78 ·76 ·74 ·72 ·71	s. -4.09 4.09 4.08 4.08 4.08
20 22 24 26 28	+ ·32 ·31 ·30 ·30 ·29	4.03 4.03 4.03 4.03	+ ·40 ·39 ·38 ·38 ·37	4.03 4.03 4.03 4.03 4.03	+ ·47 ·46 ·46 ·45 ·45	4:04 4:04 4:04 4:04	+ ·55 ·54 ·54 ·53 ·53	4.05 4.05 4.05 4.05 4.05	+ ·62 ·62 ·62 ·61 ·61	4.06 4.06 4.06 4.06	+ ·70 ·70 ·69 ·69	4.07 4.07 4.07 4.07 4.07
30 32 34 36 38	+ ·28 ·28 ·27 ·27 ·26	4·03 4·02 4·02 4·02	+ ·36 ·36 ·36 ·35 ·35	4.03 4.03 4.03 4.03 4.03	+ ·45 ·44 ·44 ·44 ·44	4.04 4.04 4.04 4.04	+ ·53 ·53 ·53 ·53 ·53	4.05 4.05 4.05 4.05 4.05	+ ·61 ·61 ·62 ·62	4.06 4.06 4.06 4.06	+ ·69 ·70 ·70 ·70 ·71	4.07 4.07 4.08 4.08 4.08
40 42 44 46 48	+ ·25 ·25 ·25 ·24 ·24	4·02 4·02 4·02 4·02	+ ·35 ·34 ·34 ·34 ·34	4.03 4.03 4.03 4.03	+ ·44 ·44 ·45 ·45	4.04 4.04 4.04 4.04	+ ·53 ·54 ·54 ·55 ·56	4.05 4.05 4.05 4.05 4.05	+ ·63 ·63 ·64 ·65 ·66	4.06 4.06 4.07 4.07 4.07	+ ·72 ·73 ·74 ·76 ·77	4.08 4.08 4.09 4.09
50 52 54 56 58	+ ·24 ·23 ·23 ·23 ·23 ·23	4.02 4.02 4.02 4.02 4.02	+ ·35 ·35 ·35 ·36 ·37	4·03 4·03 4·03 4·03	+ ·46 ·46 ·47 ·49 ·50	4.04 4.04 4.04 4.04 4.04	+ ·57 ·58 ·60 ·61 ·63	4.05 4.06 4.06 4.06 4.06	+ ·68 ·70 ·72 ·74 ·77	4.07 4.08 4.08 4.09	+ ·79 ·82 ·84 ·87 ·91	4·10 4·11 4·11 4·12

24 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 5°.

True Alt.		Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 4 15·8 5 23 15·8 5 15 4·5 5 6 53·3 4 58 42·3	s. - '37 -22 -19 -16 -13	H. M. S. 6 4 37.8 5 23 28.5 5 15 15.3 5 7 2.3 4 58 49.5	s. + ·37 ·20 ·17 ·14 ·11	H. M. S. 6 5 0.0 5 23 40.5 5 15 25.4 5 7 10.3 4 58 55.5	s. + ·37 ·19 ·16 ·12 ·09	H. M. S. 6 5 22·4 5 23 51·9 5 15 34·6 5 7 17·4 4 59 0·3	s. + ·37 ·18 ·14 ·11 ·07	H. M. S. 6 5 45.0 5 24 2.6 5 15 42.9 5 7 23.4 4 59 3.9	s. + ·38 ·17 ·13 ·09 ·05	H. M. S. 6 6 8·0 5 24 12·6 5 15 50·4 5 7 28·3 4 59 6·4	s. + ·38 ·16 ·12 ·07 + ·03
18 20 22 24 26	4 50 31·4 4 42 20·5 4 34 9·8 4 25 59·0 4 17 48·3	- ·10 ·07 ·04	4 50 36·7 4 42 24·0 4 34 11·4 4 25 58·7 4 17 46·1	+ ·08 ·04 + ·01 - ·02 ·05	4 50 40·7 4 42 26·0 4 34 II·3 4 25 56·6 4 I7 4I·8	+ ·05 + ·02 - ·02 ·05 ·09	4 50 43.4 4 42 26.4 4 34 9.5 4 25 52.5 4 17 35.4	+ ·03 ·00 - ·04 ·08 ·12	4 50 44·6 4 42 25·2 4 34 5·9 4 25 46·4 4 17 26·7	+ ·01 - ·03 ·07 ·12 ·16	4 50 44.4 4 42 22.5 4 34 0.4 4 25 38.3 4 17 15.9	- ·01 ·06 ·10 ·15 ·20
28 30 31 32 33	4 9 37.6 4 1 26.7 3 57 21.3 3 53 15.9 3 49 10.4	- ·05 ·08 ·10 ·11 ·13	4 9 33.4 4 I 20.6 3 57 I4.2 3 53 7.7 3 49 I.2	- ·09 ·12 ·14 ·16 ·18	4 9 27.0 4 1 11.9 3 57 4.4 3 52 56.7 3 48 49.1	- ·13 ·16 ·18 ·20 ·23	4 9 18·2 4 1 0·7 3 56 51·9 3 52 43·0 3 48 34·0	- ·17 ·21 ·23 ·25 ·27	4 9 6.9 4 0 46.8 3 56 36.6 3 52 26.3 3 48 16.0	- ·21 ·25 ·28 ·30 ·32	4 8 53·2 4 0 30·2 3 56 18·6 3 52 6·8 3 47 54·9	- ·25 ·30 ·32 ·35 ·38
34 35 36 37 38	3 45 4.9 - 3 40 59.4 3 36 53.8 3 32 48.2 3 28 42.5	.22	3 44 54.6 3 40 48.0 3 36 41.3 3 32 34.6 3 28 27.7	- ·20 ·21 ·23 ·25 ·27	3 28 9.5	.33	3 44 24·9 3 40 15·8 3 36 6·5 3 31 57·1 3 27 47·6	.39	3 44 5·5 3 39 54·8 3 35 44·1 3 31 33·2 3 27 22·1	- ·35 ·38 ·40 ·43 ·45	3 43 42·8 3 39 30·6 3 35 18·2 3 31 5·6 3 26 52·8	- ·40 ·43 ·46 ·49 ·52
39 40 41 42 43	3 24 36·8 3 20 30·9 3 16 25·1 3 12 19·1 3 8 13·1	·23 ·25 ·27 ·29 ·31	3 24 20·8 3 20 13·8 3 16 6·7 3 11 59·5 3 7 52·2	- ·30 ·32 ·34 ·36 ·38	3 24 1·2 3 19 52·9 3 15 44·4 3 11 35·8 3 7 27·1	- ·36 ·38 ·40 ·43 ·45	3 23 37·9 3 19 28·1 3 15 18·1 3 11 7·9 3 6 57·6	- ·42 ·44 ·47 ·50 ·53	3 23 10·8 3 18 59·4 3 14 47·7 3 10 35·8 3 6 23·7	- ·48 ·51 ·54 ·57 ·60	3 22 39·8 3 18 26·6 3 14 13·1 3 9 59·3 3 5 45·2	- ·55 ·58 ·61 ·65 ·68
44 45 46 47 48	3 4 6·9 — 3 0 0·7 2 55 54·4 2 51 47·9 2 47 41·4	·33 ·36 ·38 ·40 ·42	2 51 21·5 2 47 13·4	- ·41 ·43 ·46 ·48 ·51	2 50 50·2 2 46 40·4	- ·48 ·51 ·54 ·56 ·59	3 2 47·0 2 58 36·2 2 54 25·1 2 50 13·7 2 46 2·1	- ·56 ·59 ·62 ·65 ·68	3 2 11·2 2 57 58·5 2 53 45·5 2 49 32·1 2 45 18·4	- ·64 ·67 ·70 ·74 ·77	3 I 30·7 2 57 I6·0 2 53 0·8 2 48 45·2 2 44 29·1	- ·71 ·75 ·79 ·83 ·87
49 50 51 52 53	2 43 34·6 2 39 27·7 2 35 20·6 2 31 13·3 2 27 5·8		2 43 5·I 2 38 56·6 2 34 47·9 2 30 38·9 2 26 29·6	·62 ·66	2 34 9.4 2 29 58.4 2 25 47.1	- ·62 ·66 ·69 ·73 ·76	2 41 50·I 2 37 37·7 2 33 25·0 2 29 II·8 2 24 58·2	- ·72 ·75 ·79 ·83 ·87	2 41 4·2 2 36 49·6 2 32 34·5 2 28 18·8 2 24 2·6	- ·81 ·85 ·89 ·94 ·98	2 40 12·5 2 35 55·4 2 31 37·7 2 27 19·2 2 23 0·1	- ·91 ·95 ·00 ·05 ·10
54 55 56 57 58	2 22 58·1 2 18 50·1 2 14 41·9 2 10 33·4 2 6 24·5	- ·58 ·61 ·65 ·68 ·71	2 22 20·0 2 18 10·0 2 13 59·7 2 9 49·0 2 5 37·8	- ·69 ·72 ·76 ·80 ·84		- ·80 ·84 ·88 ·93 ·97		1.01 1.00 1.01	2 19 45.7 2 15 28.1 2 11 9.8 2 6 50.5 2 2 30.4	1.03 1.08 1.13 1.19 1.25	2 5 34.9	1·15 1·21 1·27 1·33 1·40
	(V			ı' OF						1	
Alt.		Α.	L. 13°		L. 14°		L. 15°		L. 16°		L. 17°	
0 4 8 12 16	+ ·86 -4 ·83 4 ·81 4 ·80 4	s. 4·11 4·10 4·10 4·09 4·09	s. + ·93 - ·91 ·89 ·87 ·86	S. -4·12 4·12 4·11 4·11 4·11	s. +1.00 - .98 .96 .95	S. -4·14 4·13 4·13 4·12 4·12	s. +1.08 - 1.05 1.04 1.02 1.01	s. -4·16 4·15 4·15 4·14	s. +1·15 - 1·13 1·11 1·10 1·09	s. -4·18 4·17 4·17 4·16 4·16	s. +1·23 · 1·21 1·19 1·18 1·17	s. -4·20 4·19 4·18 4·18
20 22 24 26 28	·77 4 ·77 4 ·77 4 ·77 4	4·09 4·09 4·09 4·09	+ ·85 ·85 ·86 ·86	4.10 4.10 4.10 4.10	+ ·93 ·93 ·93 ·94 ·94	4·12 4·12 4·12 4·12 4·12	+1.01 1.01 1.02 1.02 1.03	4·14 4·14 4·14 4·14	1.11 1.10 1.00 1.00 +1.00	4·16 4·16 4·16 4·16 4·16	+1·17 1·18 1·18 1·19 1·20	4·18 4·18 4·19 4·19
30 32 34 36 38	·78 4 ·79 4 ·79 4 ·80 4	4·09 4·09 4·09	+ ·86 ·87 ·88 ·89 ·90	4·II 4·II 4·II 4·II	+ *95 *96 *96 *98 *99	4·13 4·13 4·13 4·13	+1.03 1.04 1.06 1.07 1.09	4·14 4·15 4·15 4·16	+1·12 1·13 1·15 1·16 1·18	4·17 4·17 4·18 4·18	+1·21 1·22 1·24 1·26 1·28	4·19 4·20 4·21 4·21
40 42 44 46 48	·83 4 ·84 4 ·86 4 ·88 4	1.11 1.11 1.10 1.10 1.10	+ ·91 ·93 ·95 ·97 ·99	4·12 4·13 4·13 4·14	+1.01 1.03 1.05 1.08 1.11	4·14 4·15 4·16 4·16	+1·11 1·13 1·16 1·19 1·22	4·16 4·17 4·18 4·19 4·20	+1·21 1·23 1·26 1·30 1·34	4·19 4·20 4·21 4·22 4·23	+1·31 1·34 1·37 1·41 1·46	4·22 4·23 4·24 4·26 4·27
50 52 54 56 58	*94 4 *97 4 1.01 4	·12 ·12 ·13 ·14 ·15	+1.02 1.06 1.10 1.14 1.20	4·14 4·15 4·16 4·17 4·19	+1·14 1·18 1·23 1·28 1·35	4·17 4·19 4·20 4·22 4·23	+1·26 1·31 1·36 1·43 1·50	4·21 4·22 4·24 4·26 4·28	+1·39 1·44 1·50 1·58 1·66	4·25 4·27 4·29 4·31 4·34	+1·51 1·57 1·64 1·73 1·83	4·29 4·31 4·34 4·37 4·41

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 25 LATITUDE 5°.

			DECLIN	AIIO	N—SAM	E NA	IME AS	—LA.	III UDE.			
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 6 31·0 5 24 22·0 5 15 57·1 5 7 32·3 4 59 7·5	s. + ·38 ·15 ·10 ·05 + ·01	H. M. S. 6 6 54·3 5 24 30·7 5 16 2·8 5 7 35·1 4 59 7·5	s. + ·39 ·14 ·09 + ·04 - ·01	H. M. S. 6 7 18·0 5 24 38·7 5 16 7·7 5 7 36·9 4 59 6·1	s. + ·40 ·13 ·07 + ·02 - ·03	H. M. S. 6 7 41.9 5 24 46.0 5 16 11.7 5 7 37.6 4 59 3.4	s. + ·40 ·11 + ·06 ·00 - ·05	H. M. S. 6 8 6·2 5 24 52·6 5 16 14·9 5 7 37·1 4 58 59·4	s. + ·41 ·10 + ·04 - ·02 ·08	5 24 58·5 5 16 17·0	s. + ·41 ·09 + ·03 - ·03 ·10
18 20 22 24 26	4 50 42·8 4 42 18·1 4 33 53·2 4 25 28·1 4 17 2·7	·19 ·24	4 50 39·8 4 42 12·0 4 33 44·1 4 25 15·9 4 16 47·3	- ·06 ·11 ·17 ·22 ·28	4 50 35·2 4 42 4·2 4 33 33·0 4 25 1·4 4 16 29·5	- ·09 ·14 ·20 ·26 ·32	4 50 29·I 4 4I 54·7 4 33 20·0 4 24 44·8 4 I6 9·2	- ·11 ·17 ·23 ·29 ·36	4 50 21·6 4 41 43·4 4 33 5·0 4 24 26·0 4 15 46·5	·33 ·40	4 50 12·3 4 41 30·3 4 32 47·9 4 24 4·9 4 15 21·1	- ·17 ·23 ·30 ·37 ·44
28 30 31 32 33	4 8 37·0 4 0 10·9 3 55 57·6 3 51 44·2 3 47 30·6 3 43 16·9	.40	4 8 18·3 3 59 48·8 3 55 33·8 3 51 18·6 3 47 3·2 3 42 47·6	·42 ·45 ·48	4 7 57.0 3 59 23.8 3 55 6.9 3 50 49.8 3 46 32.5 3 42 14.9	- ·38 ·44 ·47 ·51 ·54 - ·57	4 7 32.9 3 58 55.8 3 54 37.0 3 50 17.8 3 45 58.4 3 41 38.7		3 54 3·8 3 49 42·5	·62 ·65	4 6 36·4 3 57 50·7 3 53 27·4 3 49 3·7 3 44 39·7 3 40 15·2	- ·52 ·59 ·63 ·67 ·72 - ·76
35 36 37 38	3 39 2·9 3 34 48·8 3 30 34·5 3 26 19·7 3 22 4·8	•49	3 38 31·8 3 34 15·7 3 29 59·3 3 25 42·7	·55 ·58 ·62 ·65	3 37 57·I 3 33 38·9 3 29 20·4 3 25 I·6 3 20 42·4	.61	3 37 18·7 3 32 58·3 3 28 37·5 3 24 16·3 3 19 54·7		3 36 36.5	.73 .78 .82 .86	3 35 50·3 3 31 24·9 3 26 59·0 3 22 32·6	·80 ·85
40 41 42 43	3 17 49·6 3 13 34·1 3 9 18·2 3 5 2·0 3 0 45·4	·65 ·69 ·72 ·76 — ·80	3 17 8.4 3 12 50.7 3 8 32.6 3 4 14.0 2 59 54.9	·72 ·76 ·80 ·84 — ·88	3 16 22·7 3 12 2·7 3 7 42·1 3 3 21·0 2 58 59·3	·80 ·84 ·88 ·93 — ·97	3 15 32·5 3 11 9·9 3 6 46·7 3 2 22·8 2 57 58·3	·88 ·92 ·97 I·01 — I·06	3 14 37.6 3 10 12.2 3 5 46.1 3 1 19.2 2 56 51.6	·95 1·05 1·11 —1·16	3 13 37·8 3 9 9·3 3 4 40·1 3 0 10·1 2 55 39·1	1·04 1·09 1·14 1·20 -1·26
45 46 47 48 49	2 56 28·3 2 52 10·8 2 47 52·7 2 43 34·1 2 39 14·8	·92 ·97 — 1·01	2 51 15·2 2 46 54·5 2 42 33·1 2 38 10·9	93 97 1.02 1.07	2 50 14·1 2 45 50·4 2 41 25·8 2 37 0·5	1·07 1·12 1·17	2 53 33·0 2 49 7·0 2 44 40·1 2 40 12·2 2 35 43·4	1·17 1·22 1·28	2 38 51.9	1·27 1·33 1·40	2 46 34·I 2 4I 59·9 2 37 24·4 2 32 47·5	1·38 1·45 1·52 -1·59
50 51 52 53 54	2 34 54.9 2 30 34.3 2 26 12.8 2 21 50.5 2 17 27.3	1·11 1·17 1·22	2 33 47·9 2 29 24·1 2 24 59·3 2 20 33·4 2 16 6·4	1·29 1·35 -1·42	2 28 6·8 2 23 38·3 2 19 8·6 2 14 37·4	1·35 1·41 1·48 —1·56	2 17 35·4 2 12 59·6	1·55 1·62	2 25 9.6 2 20 32.5 2 15 53.6 2 11 12.7	1.61 1.69 1.77	2 9 16.0	1.75 1.84 1.93
55 56 57 58	2 13 2·9 2 8 37·4 2 4 10·5 1 59 42·3	1·41 1·48 1·56	2 2 37.1	1·56 1·64 1·72	2 0 53·9 1 56 15·4	1.90	1 59 0·4 1 54 15·8	1.88 1.98 2.09	2 I 44·2 I 56 55·9 I 52 4·5	2·06 2·17 2·29	I 59 34.9 I 54 39.5	2.25
Alt.	L. 18		L. 19		L. 20		L. 21		L. 22		L. 23	° A.
0 4 8 12 16	s. +1·31 1·28 1·27 1·25 1·25	S. -4.22 4.22 4.21 4.21 4.20	s. +1·39 1·36 1·35 1·33	s. -4·25 4·24 4·23 4·23 4·23	S. +1·47 1·44 1·42 1·41	s. -4·27 4·26 4·26 4·26 4·26	s. +1·55 1·52 1·50 1·50	s. -4·30 4·29 4·29 4·28 4·28	s. +1.63 1.60 1.59 1.58	s. -4·33 4·32 4·32 4·31 4·31	1.69 1.67 1.66 1.66	s. -4·36 4·35 4·35 4·34 4·34
20 22 24 26 28	+1·25 1·26 1·26 1·27 1·28	4·20 4·21 4·21 4·21 4·21	+1·34 1·34 1·35 1·36 1·37	4·23 4·23 4·24 4·24	+1·42 1·43 1·44 1·45 1·46	4·26 4·26 4·27 4·27	+1·50 1·51 1·52 1·54 1·55	4·29 4·29 4·30 4·30	+1·59 1·60 1·61 1·63 1·65	4·32 4·33 4·33 4·34	+1.68 1.69 1.70 1.72 1.74	4·35 4·35 4·36 4·37 4·37
30 32 34 36 38 40	+1·30 1·31 1·33 1·35 1·38 +1·41	4·22 4·23 4·24 4·25 4 25	+1·39 1·41 1·43 1·45 1·48 +1·52	4·25 4·25 4·26 4·27 4·28	+1·48 1·50 1·52 1·55 1·58 +1·62	4·28 4·29 4·29 4·30 4·32 4·33	+1·57 1·60 1·62 1·65 1·69 +1·73	4·31 4·32 4·33 4·34 4·36	+1.67 1.69 1.72 1.76 1.80 +1.84	4·34 4·36 4·37 4·38 4·40	+1·76 1·79 1·83 1·86 1·91 +1·96	4·38 4·40 4·41 4·43 4·44
42 44 46 48 50	1·44 1·48 1·53 1·58	4·26 4·28 4·30 4·32 4·34	1.55 1.60 1.65 1.71	4·30 4·32 4·34 4·36 4·39	1.66 1.72 1.77 1.84	4·34 4·37 4·39 4·41	1.78 1.84 1.90 1.97	4·39 4·41 4·44 4·47	1.90 1.96 2.03 2.11 +2.20	4·44 4·47 4·50 4·53 4·58	2·02 2·08 2·16 2·25 +2·36	4·49 4·52 4·56 4·60
52 54 56 58	1·71 1·79 1·89 2·00	4·36 4·40 4·44 4·48	1.85 1.94 2.05 2.18	4·42 4·46 4·51 4·57	2·00 2·10 2·22 2·37	4·48 4·53 4·59 4·66	2·15 2·27 2·41 2·57	4·56 4·61 4·68 4·77	2·3I 2·44 2·60 2·78	4.63 4.70 4.78 4.89	2·48 2·62 2·80 3·01	4·72 4·80 4·89 5·02

26 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 6° .

			DECLIN	ATIO	N—SAM	E N E	IME AS	—LA	ITTUDE.			
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 46.6 5 11 43.9 5 3 41.1 4 55 38.3	s. + ·42 ·43 ·43 ·43 ·44	H. M. S. 6 0 25·2 5 20 11·9 5 12 9·2 5 4 6·6 4 56 3·9	s. + ·42 ·41 ·41 ·41 ·42	H. M. S. 6 0 50·5 5 20 36·4 5 12 33·7 5 4 31·0 4 56 28·4	s. + ·42 ·40 ·40 ·40 ·40	H. M. S. 6 I 15.7 5 2I 0.2 5 I2 57.3 5 4 54.5 4 56 51.6	s. + ·42 ·39 ·38 ·38 ·38	H. M. S. 6 I 41.0 5 2I 23.3 5 I3 20.0 5 5 I6.8 4 57 I3.7	•36	H. M. S. 6 2 6.5 5 21 45.7 5 13 41.9 5 5 38.2 4 57 34.6	s. + ·42 ·37 ·36 ·35 ·34
18 20 22 24 26	4 47 35.4 4 39 32.4 4 31 29.4 4 23 26.3 4 15 23.0	+ ·44 ·45 ·45 ·46 ·47	4 48 1·2 4 39 58·5 4 31 55·8 4 23 53·0 4 15 50·1	+ ·42 ·42 ·42 ·43 ·43	4 48 25.7 4 40 23.1 4 32 20.4 4 24 17.8 4 16 15.1	·40	4 48 48·9 4 40 46·1 4 32 43·4 4 24 40·7 4 16 38·1	+ ·37 ·37 ·37 ·37 ·36	4 49 10·6 4 41 7·6 4 33 4·7 4 25 1·8 4 16 59·0	+ ·35 ·35 ·34 ·34 ·33	4 49 31·1 4 41 27·7 4 33 24·3 4 25 21·1 4 17 17·9	+ ·33 ·32 ·31 ·30 ·30
28 30 31 32 33	4 7 19·7 3 59 16·2 3 55 14·4 3 51 12·6 3 47 10·8 3 43 8·8	·49	4 7 47·2 3 59 44·2 3 55 42·6 3 51 41·1 3 47 39·5 3 43 37·9	•45	4 8 12·4 4 0 9·7 3 56 8·3 3 52 6·9 3 48 5·5 3 44 4·1	.41	4 8 35·4 4 0 32·8 3 56 31·4 3 52 30·1 3 48 28·8 3 44 27·5	+ ·36 ·36 ·36 ·36 ·36 + ·36	4 8 56·2 4 0 53·4 3 56 52·0 3 52 50·7 3 48 49·4 3 44 48·0	+ ·33 ·32 ·32 ·32 ·32 + ·32	3 53 8.7	+ ·29 ·28 ·28 ·28 ·27 + ·27
35 36 37 38 39	3 39 6·9 3 35 4·9 3 31 2·8 3 27 0·7	·51 ·52 ·53	3 43 37 9 3 39 36·3 3 35 34·6 3 31 32·9 3 27 31·2 3 23 29·4	·46 ·47 ·47 ·48 + ·48	3 40 2·7 3 36 1·2 3 31 59·8 3 27 58·3 3 23 56·8	·41 ·42 ·42 ·42 ·42 + ·43	3 40 26·I 3 36 24·8 3 32 23·4 3 28 22·I 3 24 20·7	·37 ·37 ·37 ·37 ·37 + ·37	3 40 46·7 3 36 45·3 3 32 44·0 3 28 42·6 3 24 41·3	·32 ·32 ·31 ·31 + ·31	3 41 4·2 3 37 2·8 3 33 1·4 3 28 59·9 3 24 58·5	·27 ·27 ·26 ·26 + ·26
40 41 42 43	3 18 56·3 3 14 54·0 3 10 51·7 3 6 49·2 3 2 46·7	·55 ·56 ·57 ·58 + ·59	3 19 27.6 3 15 25.7 3 11 23.8 3 7 21.8 3 3 19.8	·49 ·50 ·50 ·51 + ·52	3 19 55·3 3 15 53·7 3 11 52·1 3 7 50·5 3 3 48·9	•43	3 20 19·4 3 16 18·0 3 12 16·6 3 8 15·2 3 4 13·8	·37 ·37 ·38 ·38 + ·38	3 20 40·0 3 16 38·7 3 12 37·4 3 8 36·0 3 4 34·7	+ ·31 ·31 ·31 ·31	3 20 57·I 3 16 55·7 3 12 54·3 3 8 52·9 3 4 5I·5	·25 ·25 ·25 ·25 + ·25
45 46 47 48 49	2 58 43.9 2 54 41.3 2 50 38.5 2 46 35.7 2 42 32.5	·60 ·61 ·62 ·63 + ·65	2 59 17·8 2 55 15·6 2 51 13·4 2 47 11·2 2 43 8·8	*53 *53 *54 *55 + *56	2 59 47·2 2 55 45·5 2 51 43·7 2 47 41·9 2 43 40·1	·45 ·46 ·47 ·47 + ·48	3 0 12·4 2 56 10·9 2 52 9·5 2 48 8·0 2 44 6·5	·39 ·39 ·39 + ·40	3 0 33.4 2 56 32.1 2 52 30.7 2 48 29.4 2 44 28.0	·32 ·32 + ·32	2 56 48·8 2 52 47·5 2 48 46·1 2 44 44·8	·24 ·24 ·24 ·24 + ·24
50 51 52 53 54	2 38 29·4 2 34 26·1 2 30 22·6 2 26 18·9 2 22 15·2	·67 ·69 ·71 + ·72	2 39 6·4 2 35 3·8 2 31 1·2 2 26 58·4 2 22 55·6	·60 ·61 + ·62	2 39 38·2 2 35 36·2 2 31 34·2 2 27 32·1 2 23 29·9	·50 ·51 + ·52	2 36 3.4 2 32 1.8 2 28 0.2 2 23 58.5	+ .43	2 36 25·3 2 32 24·0 2 28 22·6 2 24 21·2	·32 ·33 ·33 + ·33		·24 ·24 ·23 ·23 + ·23
55 56 57 58	2 18 11·2 2 14 7·0 2 10 2·6 2 5 57·9	·76 ·78 ·80)	·67 ·69		·55 ·56 ·57		°45 •46	2 16 18·4 2 12 16·9 2 8 15·5	33 34 34 35	2 16 35·5 2 12 34·1	·23 ·23 ·23 ·23
Alt.	L. 0°	A.	ARIATIC	A.	L. 2°	A.	TUDE A	A.	ALTITUI		L. 5°	Α.
° 0 4 8 12 16	- ·03 ·06 ·09 ·12	S. -4·02 4·02 4·02 4·02 4·02	+ ·01 - ·02 ·05	S. -4.02 4.02 4.02 4.02 4.02	·11 ·08 ·05 + ·02	S. -4·02 4·02 4·02 4·02 4·02	·18 ·15 ·12 ·10	s. -4·03 4·03 4·02 4·02 4·02	·25 ·22 ·20 ·17	s. -4.03 4.03 4.03 4.03 4.02	·32 ·30 ·27 ·24	s. -4.04 4.03 4.03 4.03 4.03
20 22 24 26 28	- ·15 ·17 ·19 ·21 ·22	4·02 4·03 4·03 4·03	- ·08 ·09 ·11 ·13 ·14	4·02 4·02 4·02 4·02	- ·00 - ·02 ·03 ·05 ·06 - ·08	4·02 4·02 4·02 4·02	+ ·07 ·06 ·04 ·03 ·01	4·02 4·02 4·02 4·02 4·02	+ ·15 ·13 ·12 ·11 ·09 + ·08	4·02 4·02 4·02 4·02 4·02	+ ·22 21 ·20 ·18 ·17 + ·16	4.03 4.03 4.03 4.03 4.03
30 32 34 36 38 40	- ·24 ·26 ·28 ·31 ·33 - ·36	4·03 4·03 4·03 4·03 4·04	- ·16 ·18 ·20 ·22 ·24 - ·26	4.02 4.02 4.03 4.03 4.03	- ·06 ·10 ·11 ·13 ·15	4·02 4·02 4·02 4·02 4·02	- ·00 - ·01 ·03 ·04 ·06 - ·08	4·02 4·02 4·02 4·02 4·02	·07 ·05 ·04 ·03 + ·01	4·02 4·02 4·02 4·02 4·02	·15 ·14 ·13 ·12 + ·10	4·02 4·02 4·02 4·02 4·02
42 44 46 48	- 30 -38 -41 -44 -47 51	4·04 4·04 4·04 4·05	·29 ·31 ·34 ·37	4.03 4.03 4.04 4.04	·19 ·21 ·23 ·26 — ·28	4·02 4·03 4·03 4·03	·09 ·11 ·13 ·15	4·02 4·02 4·02 4·02 4·03	·00 - ·02 ·03 ·05 - ·06	4·02 4·02 4·02 4·02 4·02	·09 ·08 ·07 ·06 + ·04	4·02 4·02 4·02 4·02 4·02
50 52 54 56 58	- ·51 ·55 ·59 ·63 ·69	4.05 4.06 4.06 4.07 4.08	- ·40 ·43 ·47 ·51 ·55	4.04 4.05 4.05 4.06	- ·26 ·31 ·34 ·38 ·41	4.03 4.04 4.04 4.04	·20 ·22 ·25 ·28	4·03 4·03 4·03 4·03	•08 •10 •12 •14	4·02 4·02 4·02 4·02	·03 ·02 ·00 — ·01	4·02 4·02 4·02 4·02

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 27 LATITUDE 6° .

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 2 31·9 5 22 7·3 5 14 2·9 5 5 58·5 4 57 54·4	s. + ·42 ·35 ·34 ·33 ·32	H. M. S. 6 2 57·5 5 22 28·4 5 14 23·1 5 6 18·0 4 58 13·0	s. + ·43 ·34 ·33 ·31 ·30	H. M. S. 6 3 23·1 5 22 48·8 5 14 42·5 5 6 36·4 4 58 30·4	s. + :43 :33 :31 :30 :28	H. M. S. 6 3 48.9 5 23 8.5 5 15 1.0 5 6 53.8 4 58 46.7	s. + ·43 ·32 ·30 ·28 ·26	H. M. S. 6 4 14·9 5 23 27·6 5 15 18·8 5 7 10·3 4 59 1·9	s. + ·43 ·31 ·29 ·27 ·24	H. M. S. 6 4 40·9 5 23 46·0 5 15 35·8 5 7 25·7 4 59 16·0	s. + '43 '30 '27 '25
18 20 22 24 26	4 49 50·2 4 41 46·2 4 33 42·3 4 25 38·5 4 17 34·8	+ ·31 ·30 ·28 ·27 ·26	4 50 8·1 4 42 3·3 4 33 58·6 4 25 54·1 4 17 49·7	+ ·28 ·27 ·26 ·24 ·23	4 50 24·6 4 42 18·9 4 34 13·3 4 26 7·9 4 18 2·5	+ ·26 ·25 ·23 ·21 ·20	4 50 39.8 4 42 33.0 4 34 26.3 4 26 19.8 4 18 13.4	+ ·24 ·22 ·20 ·18 ·16	4 50 53.7 4 42 45.7 4 34 37.7 4 26 29.9 4 18 22.2	+ ·22 ·20 ·17 ·15 ·13	4 51 , 6·3 4 42 56·8 4 34 47·4	+ ·20 ·17 ·15 ·12 ·10
28 30 31 32 33	4 9 31·1 4 1 27·5 3 57 25·8 3 53 24·1 3 49 22·3	+ ·25 ·24 ·24 ·23 ·23	4 9 45·3 4 1 41·0 3 57 38·9 3 53 36·8 3 49 34·7	·19	4 9 57·3 4 I 52·I 3 57 49·5 3 53 47·0 3 49 44·5	+ ·18 ·16 ·16 ·15 ·14	4 10 7.0 4 2 0.8 3 57 57.6 3 53 54.6 3 49 51.5	+ ·14 ·12 ·11 ·10 ·09	4 10 14·6 4 2 7·1 3 58 3·3 3 53 59·6 3 49 55·8	+ ·11 ·08 ·07 ·06 ·05	4 10 19·9 4 2 10·9 3 58 6·4 3 54 1·9 3 49 57·4	+ ·07 ·04 ·03 + ·02 ·00
34 35 36 37 38	3 41 19·0 3 37 17·2 3 35 15·6 3 29 14·0	+ ·22 ·22 ·21 ·21 ·21	3 41 30·7 3 37 28·7 3 33 26·7 3 29 24·7	+ ·18 ·17 ·16 ·16 ·15	3 45 42·0 3 41 39·5 3 37 37·0 3 33 34·6 3 29 32·2	+ ·13 ·12 ·11 ·10	3 45 48·5 3 41 45·4 3 37 42·4 3 33 39·4 3 29 36·4	+ ·08 ·07 ·06 ·05 ·04	3 45 52·I 3 4I 48·4 3 37 44·7 3 33 4I·0 3 29 37·3	+ ·04 ·02 + ·01 ·00 - ·01	3 45 52·9 3 41 48·4 3 37 43·9 3 33 39·4 3 29 34·9	- ·01 ·02 ·04 ·05 ·07
39 40 41 42 43	3 21 10·7 3 17 9·1 3 13 7·5 3 9 5·9	+ ·20 ·20 ·19 ·19 ·18	3 25 22·7 3 21 20·8 3 17 18·8 3 13 16·9 3 9 15·0	+ ·14 ·14 ·13 ·12 ·12	3 25 29.7 3 21 27.4 3 17 25.0 3 13 22.5 3 9 20.2	+ ·09 ·08 ·07 ·06 ·05	3 25 33.4 3 21 30.4 3 17 27.4 3 13 24.4 3 9 21.4	+ ·03 ·02 + ·01 ·00 - ·01	3 25 33.6 3 21 29.9 3 17 26.2 3 13 22.4 3 9 18.7	- ·02 ·04 ·05 ·06 ·08	3 25 30·3 3 21 25·8 3 17 21·2 3 13 16·6 3 9 12·0	- ·08 ·10 ·11 ·13 ·15
44 45 46 47 48	3 5 4·3 3 I 2·8 2 57 I·2 2 52 59·7 2 48 58·2	+ ·18 ·17 ·17 ·16 ·16	3 5 13·1 3 1 11·2 2 57 9·3 2 53 7·5 2 49 5·5	+ ·11 ·10 ·09 ·08	3 5 17·8 3 1 15·4 2 57 13·1 2 53 10·7 2 49 8·4	+ ·04 ·03 ·03 ·02 + ·01	3 5 18·4 3 1 15·4 2 57 12·4 2 53 9·4 2 49 6·4	- ·02 ·03 ·05 ·06 ·07	3 5 15·0 3 1 11·2 2 57 7·4 2 53 3·6 2 48 59·7	- ·09 ·11 ·12 ·14 ·15	3 5 7·3 3 1 2·6 2 56 57·9 2 52 53·1 2 48 48·2	- ·16 ·18 ·20 ·21 ·23
49 50 51 52 53	2 44 56·7 2 40 55·2 2 36 53·7 2 32 52·2 2 28 50·7	+ ·16 ·15 ·15 ·14 ·14	2 45 3.7 2 41 1.9 2 37 0.1 2 32 58.2 2 28 56.4	+ ·08 ·07 ·06 ·06 ·05	2 45 6·0 2 41 3·6 2 37 1·3 2 32 58·9 2 28 56·5	- ·01 ·02 ·03 ·04	2 45 3.4 2 41 0.3 2 36 57.2 2 32 54.1 2 28 51.0	- ·08 ·10 ·11 ·12 ·14	2 44 55.8 2 40 51.9 2 36 47.9 2 32 43.9 2 28 39.8	- ·17 ·18 ·20 ·22 ·23	2 44 43.3 2 40 38.3 2 36 33.3 2 32 28.1 2 28 22.8	- ·25 ·27 ·29 ·31 ·33
54 55 56 57 58	2 24 49·2 2 20 47·8 2 16 46·3 2 12 44·8 2 8 43·5	+ ·14 ·13 ·13 ·13 ·12	2 24 54·6 2 20 52·8 2 16 51·0 2 12 49·2 2 8 47·4	+ ·04 ·03 ·03 ·02 ·01	2 24 54·2 2 20 51·8 2 16 49·4 2 12 47·0 2 8 44·5	- ·06 ·07 ·08 ·09 ·10	2 24 47.9 2 20 44.7 2 16 41.5 2 12 38.2 2 8 34.8	- ·15 ·17 ·18 ·20 ·22	2 24 35.7 2 20 31.5 2 16 27.2 2 12 22.8 2 8 18.3	- ·25 ·27 ·29 ·31 ·33	2 24 17·5 2 20 12·0 2 16 6·4 2 12 0·7 2 7 54·8	- ·35 ·38 ·40 ·43 ·45
			ARIATIO				1		ALTITUI		1 - 440	
Alt.	L. 6°	A.	L. 7°	A.	L. 8°	A.	L. 9°	A. s.	L. 10°		L. 11°	A.
0 4 8 12 16	s. + ·42 - ·40 ·37 ·34 ·32	s. -4·04 4·04 4·04 4·04 4·03	s. + ·50 - ·47 ·44 ·42 ·39	s. -4·05 4·05 4·04 4·04	s. + ·57 - ·54 ·51 ·49 ·47	s. -4·06 4·06 4·05 4·05 4·05	s. + .64 - .61 .58 .56	4.07 4.07 4.06 4.06 4.06	s. + ·71 - ·68 ·66 ·63 ·62	s. -4.08 4.08 4.07 4.07 4.07	s. + ·79 - ·76 ·73 ·71 ·69	s. -4·10 4·09 4·09 4·08
20 22 24 26 28	+ ·30 ·28 ·27 ·26 ·25	4·03 4·03 4·03 4·03	+ ·37 ·36 ·35 ·34 ·33	4.04 4.04 4.04 4.04	+ ·45 ·44 ·43 ·42 ·41	4·05 4·04 4·04 4·04	+ ·52 ·51 ·51 ·50 ·49	4.06 4.05 4.05 4.05 4.05	+ ·60 ·59 ·59 ·58 ·58	4.07 4.06 4.06 4.06	+ ·68 ·67 ·66 ·66 ·66	4·08 4·08 4·08 4·08 4·07
30 32 34 36 38	+ ·24 ·23 ·22 ·21 ·21	4·03 4·03 4·03 4·03	+ ·33 ·32 ·31 ·30 ·29	4·03 4·03 4·03 4·03 4·03	+ ·41 ·40 ·39 ·39 ·38	4·04 4·04 4·04 4·04	+ ·49 ·48 ·48 ·48 ·47	4.05 4.05 4.05 4.05 4.05	+ ·57 ·57 ·57 ·57 ·57	4.06 4.06 4.06 4.06 4.06	+ ·65 ·65 ·65 ·66	4·07 4·07 4·07 4·07 4·07
40 42 44 46 48	+ ·20 ·19 ·18 ·17 ·16	4·03 4·03 4·03 4·03 4·03	+ ·29 ·28 ·28 ·27 ·27	4·03 4·03 4·03 4·03	+ ·38 ·38 ·38 ·37 ·37	4·04 4·04 4·04 4·04	+ ·47 ·47 ·47 ·48 ·48	4·05 4·05 4·05 4·05 4·05	+ ·57 ·57 ·57 ·58 ·59	4·06 4·06 4·06 4·06 4·06	+ ·66 ·67 ·67 ·68 ·69	4.07 4.08 4.08 4.08 4.08 4.08
50 52 54 56 58	+ ·15 ·14 ·14 ·13 ·12	4·02 4·02 4·02 4·02 4·02	+ ·26 ·26 ·26 ·26 ·25	4·03 4·03 4·03 4·03	+ ·37 ·37 ·38 ·38 ·39	4·04 4·04 4·04 4·04	+ ·48 ·49 ·50 ·51 ·52	4·05 4·05 4·05 4·06	+ ·59 ·61 ·62 ·64 ·66	4·07 4·07 4·07 4·07	+ ·71 ·72 ·74 ·77 ·79	4·08 4·09 4·09 4·10

28 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 6°.

			DECLIN	ATIO	N—SAM	E NA	AME AS	-LA	TITUDE.			
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14° ·	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 5 7.2 5 24 3.7 5 15 52.0 5 7 40.3 4 59 28.8	s. + ·44 ·29 ·26 ·23 ·20	H. M. S. 6 5 33.7 5 24 20.9 5 16 7.3 5 7 53.8 4 59 40.6	s. + '44 ·28 ·25 ·22 ·18	H. M. S. 6 6 0·4 5 24 37·5 5 16 21·8 5 8 6·4 4 59 51·2	s. + ·45 ·27 ·23 ·20 ·17	5 8 18.0	s. + ·45 ·26 ·22 ·18 ·15	H. M. S. 6 6 54.5 5 25 8.6 5 16 48.5 5 8 28.7 5 0 9.0	s. + '45 '25 '21 '17 '13	H. M. S. 6 7 22·0 5 25 23·3 5 17 0·7 5 8 38·3 5 0 16·1	s. + ·46 ·24 ·19 ·15
18 20 22 24 26	4 51 17.6 4 43 6.5 4 34 55.5 4 26 44.6 4 18 33.8	·06		+ ·15 ·12 ·09 ·06 + ·03	4 51 36·2 4 43 21·3 4 35 6·5 4 26 51·8 4 18 37·1	+ ·13 ·06 + ·03 - ·01	4 51 43.5 4 43 26.5 4 35 9.5 4 26 52.6 4 18 35.6	+ ·11 ·07 + ·03 ·00 - ·04	4 51 49.5 4 43 30.1 4 35 10.7 4 26 51.4 4 18 32.0	+ ·09 + ·05 ·00 - ·03 ·08	4 51 54·1 4 43 32·1 4 35 10·2 4 26 48·2 4 18 26·2	+ ·06 ·02 - ·02 ·07 ·11
28 30 31 32 33	4 10 23.0 4 2 12.3 3 58 7.0 3 54 1.6 3 49 56.2 3 45 50.8	+ ·03 - ·01 ·03 ·04 - ·06	4 10 23.8 4 2 11.2 3 58 4.9 3 53 58.5 3 49 52.2 3 45 45.8	- ·04 ·06 ·07 ·09	4 10 22·4 4 2 7·7 3 58 0·2 3 53 52·8 3 49 45·3 3 45 37·8	- ·04 ·08 ·10 ·12 ·14	4 10 18·6 4 2 1·5 3 57 52·9 3 53 44·3 3 49 35·6 3 45 26·8	- ·08 ·12 ·14 ·16 ·19	4 10 12·5 4 1 52·8 3 57 42·9 3 53 33·0 3 49 22·9 3 45 12·8	- ·12 ·17 ·19 ·21 ·23 - ·26	4 10 4.0 4 1 41.5 3 57 30.2 3 53 18.8 3 49 7.3 3 44 55.7	- ·16 ·21 ·23 ·26 ·29
35 36 37 38	3 41 45·4 3 37 40·0 3 33 34·6 3 29 29·1 3 25 23·6	·07 ·09 ·11 ·12	3 41 39·4 3 37 33·0 3 33 26·6 3 29 20·0 3 25 13·3	·13 ·14 ·16 ·18	3 41 30·3 3 37 22·7 3 33 15·0 3 29 7·3 3 24 59·4	·18 ·20 ·22 ·24 — ·26	3 41 18·0 3 37 9·1 3 33 0·2 3 28 51·1 3 24 42·0	·23 ·25 ·27 ·30	3 41 2.6 3 36 52.3 3 32 41.9 3 28 31.4 3 24 20.7	·28 ·31 ·33 ·36 — ·38	3 40 44·0 3 36 32·1 3 32 20·1 3 28 8·0 3 23 55·7	·34 ·36 ·39 ·42
40 41 42 43 44	3 21 18·1 3 17 12·5 3 13 6·9 3 9 1·2 3 4 55·5	·16 ·18 ·19 ·21 - ·23	3 21 6·7 3 17 0·0 3 12 53·2 3 8 46·4 3 4 39·4	·22 ·24 ·26 ·28 — ·30	3 20 51·6 3 16 43·6 3 12 35·5 3 8 27·3 3 4 19·1	- ·35 - ·38	3 20 32·7 3 16 23·3 3 12 13·7 3 8 4·0 3 3 54·2	·35 ·37 ·40 ·42 - ·45	3 20 9·9 3 15 58·9 3 11 47·7 3 7 36·4 3 3 24·9	·41 ·44 ·47 ·50	3 19 43·1 3 15 30·4 3 11 17·5 3 7 4·3 3 2 50·9	·48 ·51 ·54 ·57 — ·61
45 46 47 48 49	3 0 49.7 2 56 43.9 2 52 37.9 2 48 31.9 2 44 25.8	·29 ·31 — ·33	2 56 25·3 2 52 18·0 2 48 10·6 2 44 3·1	·33 ·35 ·37 ·40	3 0 10·6 2 56 2·0 2 51 53·2 2 47 44·3 2 43 35·2	·43 ·45 ·48 — ·51	2 59 44.2 2 55 33.9 2 51 23.5 2 47 12.9 2 43 1.9	·48 ·51 ·54 ·57 — ·60	2 50 48·7 2 46 36·1 2 42 23·2	·59 ·62 ·66 — ·69	2 50 8·7 2 45 53·9 2 41 38·8	·64 ·67 ·71 ·75
50 51 52 53	2 40 19·4 2 36 13·2 2 32 6·7 2 28 0·0 2 23 53·2	·38 ·40 ·43 — ·46	2 39 55·4 2 35 47·5 2 31 39·5 2 27 31·2 2 23 22·8	·45 ·47 ·50 ·53 — ·56	2 39 25·9 2 35 16·3 2 31 6·5 2 26 56·4 2 22 45·9	·54 ·57 ·60 ·63	2 38 50·6 2 34 39·2 2 30 27·4 2 26 15·2 2 22 2·6		2 38 9.9 2 33 56.2 2 29 42.1 2 25 27.5 2 21 12.5	·73 ·77 ·81 ·85 - ·89	2 24 33·3 2 20 15·4	-1.0
55 56 57 58	2 19 46·3 2 15 39·1 2 11 31·7 2 7 24·1	·51 ·54 ·57	2 19 14·0 2 15 5·0 2 10 55·7 2 6 46·1	·66 ·70	2 18 35·2 2 14 24·1 2 10 12·6 2 6 0·5	·78 ·82		.82 .86 .91 .95	2 16 56.8 2 12 40.6 2 8 23.7 2 4 5.9 ALTITUI	1.04 1.09		1·06 1·12 1·12
Alt.	L. 12°		L. 13°		L. 14°		L. 15		L. 16		L. 17°	A.
° 0 4 8 12 16	·83 ·80 ·78 ·77	S. -4·II 4·IO 4·IO 4·IO 4·O9	·90 ·88 ·86 ·84	S. -4·13 4·12 4·12 4·11 4·11	·98 ·95 ·93 ·92	S. -4·15 4·14 4·13 4·13 4·12	1.05 1.03 1.01 1.00	s. -4·17 4·16 4·15 4·15 4·14	1·13 1·10 1·09 1·07	s. -4·18 4·18 4·17 4·17 4·16	1·21 1·18 1·16 1·15	s. -4·21 4·20 4·19 4·18
20 22 24 26 28	+ ·75 ·75 ·74 ·74 ·74	4·09 4·09 4·09 4·09	+ ·83 ·83 ·82 ·82 ·82	4·II 4·I0 4·I0 4·I0	+ ·91 ·90 ·90 ·90	4·12 4·12 4·12 4·12 4·12	+ ·99 ·99 ·98 ·99 ·99	4·14 4·14 4·14 4·14	+1.07 1.07 1.07 1.07 1.07	4·16 4·16 4·16 4·16	+1·15 1·15 1·15 1·16	4·18 4·18 4·18 4·18
30 32 34 36 38	+ ·74 ·74 ·74 ·74 ·75	4·09 4·09 4·09 4·09	+ ·82 ·82 ·83 ·83 ·84	4·10 4·11 4·11 4·11	+ ·91 ·91 ·92 ·92 ·93	4·12 4·12 4·13 4·13	1·00 1·01 1·02 1·03	4·14 4·14 4·15 4·15	+1.08 1.09 1.10 1.11 1.12	4·16 4·16 4·17 4·17 4·18	+1·17 1·18 1·19 1·20 1·22	4·19 4·19 4·19 4·20 4·20
40 42 44 46 48	+ ·75 ·76 ·77 ·79 ·80 + ·82	4·09 4·10 4·10 4·10	+ ·85 ·86 ·88 ·89 ·91 + ·94	4·II 4·II 4·I2 4·I2 4·I2	+ ·95 ·96 ·98 I·00 I·02	4·13 4·14 4·14 4·15	+1.05 1.06 1.08 1.11 1.14	4·15 4·16 4·16 4·17 4·18	+1·14 1·16 1·19 1·22 1·25	4·18 4·19 4·19 4·20 4·21	+1·24 1·27 1·30 1·33 1·37 +1·42	4·21 4·21 4·23 4·24 4·25
50 52 54 56 58	**82 *84 *87 *90 *93	4·10 4·11 4·12 4·13	+ ·94 ·96 ·99 1·03 1·08	4·13 4·14 4·15 4·16	+ 1.05 1.09 1.12 1.17 1.22	4·16 4·17 4·18 4·19 4·20	+1·17 1·21 1·26 1·31 1·37	4·19 4·20 4·21 4·23 4·25	+1·29 1·34 1·39 1·45 1·53	4·22 4·24 4·26 4·28 4·30	1.47 1.53 1.60 1.69	4·28 4·30 4·33 4·36

True	18°	Decl.	19°	Decl.	20°	Decl.	21°	Decl.	22°	Decl.	23°	Decl.
Alt.		Var.		Var.		Var.		Var.		Var.		Var.
0 10 12 14 16	H. M. S. 6 7 49.7 5 25 37.4 5 17 12.0 5 8 47.0 5 0 22.1	s. + ·46 ·23 ·18 ·13 ·09	H. M. S. 6 8 17·8 5 25 50·7 5 17 22·6 5 8 54·6 5 0 26·8	s. + ·47 ·22 ·17 ·12 ·07	H. M. S. 6 8 46·2 5 26 3·5 5 17 32·3 5 9 1·2 5 0 30·3	s. + ·48 ·21 ·15 ·10 + ·05	H. M. S. 6 9 15.0 5 26 15.7 5 17 41.1 5 9 6.8 5 0 32.6	s. + ·48 ·20 ·14 ·08 + ·03	H. M. S. 6 9 44 I 5 26 27 2 5 17 49 I 5 9 11 3 5 0 33 6	s. + ·49 ·19 ·13 + ·07 ·00	H. M. S. 6 10 13.7 5 26 38.1 5 17 56.3 5 9 14.8 5 0 33.3	**************************************
18 20 22 24 26	4 51 57·3 4 43 32·6 4 35 7·9 4 26 43·1 4 18 18·2	+ ·04 - ·05 - ·10 ·15	4 51 59·1 4 43 31·5 4 35 3·8 4 26 35·9 4 18 7·9	+ ·02 - ·03 ·08 ·14 ·19	4 51 59·5 4 43 28·7 4 34 57·8 4 26 26·7 4 17 55·3	- ·01 ·06 ·11 ·17 ·23	4 51 58·4 4 43 24·2 4 34 49·9 4 26 15·3 4 17 40·4	- ·03 ·09 ·15 ·21 ·27	4 51 55.9 4 43 18.1 4 34 40.1 4 26 1.8 4 17 23.0	- ·05 ·12 ·18 ·24 ·31	4 25 46·0 4 17 3·2	·08 ·15 ·21 ·28 ·35
28 30 31 32 33	4 9 53·0 4 1 27·5 3 57 14·7 3 53 1·7 3 48 48·6	·20 ·25 ·28 ·31 ·34	4 9 39·5 4 I 10·9 3 56 56·3 3 52 41·6 3 48 26·8	- ·24 ·30 ·33 ·36 ·39	4 9 23.6 4 0 51.3 3 56 35.0 3 52 18.5 3 48 1.8	- ·29 ·35 ·38 ·41 ·44	4 9 5.0 4 0 28.9 3 56 10.6 3 51 52.2 3 47 33.5	- ·33 ·40 ·43 ·46 ·50	4 8 43.7 4 0 3.6 3 55 43.2 3 51 22.6 3 47 1.8	- ·38 ·45 ·48 ·52 ·56	4 8 19·6 3 59 35·2 3 55 12·7 3 50 49·8 3 46 26·7	- ·42 ·50 ·54 ·57 ·61
34 35 36 37 38	3 44 35·4 3 40 22·0 3 36 8·5 3 31 54·7 3 27 40·8	·42 ·45 ·48	3 31 25·7 3 27 9·8	- ·42 ·45 ·48 ·52 ·55	3 30 52·8 3 26 34·9	·54 ·58 ·61	3 30 16·0 3 25 55·8	- ·53 ·57 ·61 ·65 ·68	3 42 40·7 3 38 19·2 3 33 57·4 3 29 35·2 3 25 12·7	- ·59 ·63 ·67 ·71 ·75	3 28 50·3 3 24 25·1	- ·66 ·70 ·74 ·78 ·83
39 40 41 42 43	3 23 26·7 3 19 12·3 3 14 57·7 3 10 42·8 3 6 27·7	- ·52 ·58 ·61 ·65	3 22 53.7 3 18 37.3 3 14 20.7 3 10 3.7 3 5 46.3	- ·58 ·62 ·65 ·69 ·73	3 22 16·7 3 17 58·1 3 13 39·2 3 9 19·8 3 5 0·1	- ·65 ·69 ·73 ·77 ·81	3 21 35·3 3 17 14·4 3 12 53·0 3 8 31·2 3 4 8·8	- ·72 ·76 ·81 ·85 ·90	3 20 49·6 3 16 26·1 3 12 2·1 3 7 37·5 3 3 12·4	·94 ·99	3 19 59.4 3 15 33.1 3 11 6.3 3 6 38.8 3 2 10.5	·88 ·92 ·97 I·02 I·08
44 45 46 47 48	3 2 12·1 2 57 56·3 2 53 40·0 2 49 23·3 2 45 6·2	- ·69 ·72 ·76 ·80 ·84	3 I 28·5 2 57 I0·3 2 52 5I·6 2 48 32·4 2 44 I2·7	- ·77 ·81 ·85 ·90 ·94	3 0 39·8 2 56 19·0 2 51 57·7 2 47 35·8 2 43 13·2	- ·85 ·90 ·95 ·99 I·04	2 59 45.9 2 55 22.3 2 50 58.1 2 46 33.2 2 42 7.4	- ·94 ·99 I·04 I·09 I·15	2 58 46·5 2 54 19·9 2 49 52·6 2 45 24·4 2 40 55·2	-1.04 1.09 1.14 1.20 1.26	2 48 40·9 2 44 9·I	-1·13 1·19 1·25 1·31 1·38
49 50 51 52 53	2 40 48·6 2 36 30·4 2 32 11·6 2 27 52·2 2 23 32·1		2 26 47·0 2 22 23·7	- ·99 1·04 1·09 1·15 1·20	2 38 49·8 2 34 25·7 2 30 0·7 2 25 34·7 2 21 7·8	-1·10 1·15 1·21 1·27 1·33		1·21 1·27 1·33 1·39 1·47	2 36 25.0 2 31 53.7 2 27 21.2 2 22 47.3 2 18 11.9	1.23	2 25 49·8 2 21 11·4 2 16 31·1	-1.44 1.52 1.67 1.76
54 55 56 57 58	2 19 11·1 2 14 49·3 2 10 26·6 2 6 2·7 2 1 37·7	- 1·13 1·19 1·25 1·32 1·38	2 17 59·3 2 13 33·9 2 9 7·3 2 4 39·3 2 0 10·0	-1·26 1·33 1·39 1·47 1·54	2 16 39·6 2 12 10·1 2 7 39·2 2 3 6·7 1 58 32·5	-1·40 1·47 1·54 1·62 1·71	2 15 11·6 2 10 37·6 2 6 2·0 2 1 24·4 1 56 44·7	-1.54 1.62 1.70 1.79 1.89	2 13 34·8 2 8 55·9 2 4 15·0 1 59 31·7 1 54 45·8	-1.69 1.78 1.87 1.97 2.08	2 7 4·5 2 2 17·6 1 57 27·9	-1.85 1.94 2.05 2.16 2.28
		V	ARIATIC	N TO	ı' OF	LATI	TUDE A	AND .	ALTITUI	ÞΕ		
Alt.	L. 18°	A.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α.	L. 22°	Α.	L. 23°	Α.
0 4 8 12 16	s. +1·31 - 1·28 1·26 1·24 1·23	s. -4·23 4·22 4·21 4·21 4·21	s. +1·39 1·36 1·34 1·32 1·31	s. -4·26 4·24 4·24 4·23 4·23	s. +1.47 1.44 1.42 1.40 1.39	s. -4·28 4·27 4·26 4·26 4·26	s. +1.55 1.52 1.50 1.48 1.48	s. -4·31 4·30 4·29 4·29 4·28	s. +1.63 - 1.60 1.58 1.56 1.56	s. -4·34 4·33 4·32 4·31 4·31	s. +1.72 - 1.68 1.66 1.65 1.64	s. -4·37 4·36 4·35 4·35 4·34
20 22 24 26 28	+1·23 1·23 1·23 1·24 1·25	4·20 4·21 4·21 4·21	+1·31 1·31 1·32 1·33	4·23 4·23 4·23 4·24	+ 1·39 1·40 1·40 1·41 1·42	4·26 4·26 4·26 4·26 4·26	+1.48 1.48 1.49 1.50 1.51	4·28 4·28 4·29 4·29 4·30	+1.56 1.57 1.58 1.59 1.60	4·31 4·32 4·32 4·33	+1.65 1.66 1.67 1.68 1.70	4·35 4·35 4·36 4·36
30 32 34 36 38	+1·25 1·27 1·28 1·30 1·32	4·21 4·22 4·23 4·23	+1·34 1·36 1·38 1·40 1·42	4·24 4·24 4·25 4·26 4·27	+1.44 1.45 1.47 1.50 1.52	4·27 4·28 4·28 4·29 4·30	+1·53 1·55 1·57 1·60 1·63	4·30 4·31 4·32 4·33 4·34	+1.62 1.64 1.67 1.70 1.73	4·34 4·34 4·35 4·37 4·38	+1.72 1.74 1.77 1.80 1.84	4·37 4·38 4·39 4·41 4·42
40 42 44 46 48	+1·35 1·37 1·41 1·45 1·49	4·24 4·25 4·26 4·27 4·29	+1.45 1.48 1.52 1.56 1.61	4·27 4·28 4·30 4·32 4·33	+1.55 1.59 1.63 1.68 1.74	4·31 4·32 4·36 4·38	+1.66 1.70 1.75 1.81 1.87	4·35 4·37 4·39 4·41 4·44	+1.77 1.82 1.87 1.93 2.01	4·39 4·41 4·46 4·49	+1.89 1.94 2.00 2.06 2.14	4.44 4.46 4.49 4.52 4.56
50 52 54 56 58	+1.54 1.60 1.67 1.75 1.85	4·31 4·36 4·39 4·43	+1.67 1.74 1.82 1.91 2.03	4·36 4·38 4·41 4·45 4·50	+1.81 1.88 1.97 2.03 2.21	4·41 4·48 4·53 4·59	+1.95 2.03 2.13 2.25 2.40	4.47 4.51 4.55 4.61 4.68	+2.09 2.18 2.30 2.43 2.60	4·53 4·58 4·63 4·70 4·79	+2·24 2·35 2·47 2·63 2·82	4·60 4·66 4·72 4·80 4·91

30 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 7°.

			DECLIN	AIIO	N—SAM	E NA	IME AS	—LA.	TITUDE.	,		
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0·0 5 19 41·8 5 11 38·0 5 3 34·2 4 55 30·4	s. + ·49 ·50 ·50 ·50 ·51	H. M. S. 6 0 29.4 5 20 11.3 5 12 7.7 5 4 4.1 4 56 0.4	s. + ·49 ·49 ·49 ·49	H. M. S. 6 0 59.0 5 20 40.2 5 12 36.5 5 4 32.9 4 56 29.3	s. + ·49 ·47 ·47 ·47 ·47	H. M. S. 6 I 28·5 5 2I 8·3 5 I3 4·4 5 5 0·7 4 56 57·0	s. + *49 *46 *46 *45 *45	H. M. S. 6 I 58·0 5 2I 35·6 5 I3 3I·5 5 5 27·4 4 57 23·4	s. + ·49 ·45 ·44 ·44 ·43	H. M. S. 6 2 27.7 5 22 2.4 5 13 57.7 5 5 53.2 4 57 48.8	s. + ·49 ·44 ·43 ·42 ·41
18 20 22 24 26	4 47 26·5 4 39 22·4 4 31 18·3 4 23 14·0 4 15 9·6	+ ·52 ·52 ·53 ·54 ·55	4 47 56·8 4 39 53·0 4 31 49·2 4 23 45·3 4 15 41·4	+ ·49 ·50 ·50 ·51 ·51	4 48 25.7 4 40 22.1 4 32 18.5 4 24 14.8 4 16 11.1	+ ·47 ·47 ·47 ·47 ·48	4 48 53·3 4 40 49·6 4 32 46·0 4 24 42·4 4 16 38·8	+ ·45 ·45 ·44 ·44 ·44	4 49 19.5 4 41 15.7 4 33 11.9 4 25 8.1 4 17 4.4	+ ·43 ·42 ·42 ·41 ·41	4 49 44.4 4 41 40.2 4 33 36.1 4 25 32.0 4 17 28.0	+ ·40 ·40 ·39 ·38 ·38
28 30 31 32 33	4 7 5.0 3 59 0.3 3 54 57.9 3 50 55.4 3 46 52.8	+ ·56 ·57 ·57 ·58 ·59	4 7 37·3 3 59 33·2 3 55 31·0 3 51 28·9 3 47 26·7	+ ·52 ·53 ·53 ·53 ·54	4 8 7.4 4 0 3.6 3 56 1.7 3 51 59.7 3 47 57.7	+ ·48 ·49 ·49 ·49 ·49	4 8 35·2 4 0 31·6 3 56 29·7 3 52 27·9 3 48 26·1	+ ·44 ·44 ·45 ·45 ·45	4 9 0.7 4 0 57.1 3 56 55.3 3 52 53.5 3 48 51.7	+ ·41 ·40 ·40 ·40 ·40	4 9 24·1 4 1 20·2 3 57 18·4 3 53 16·4 3 49 14·6	+ ·37 ·36 ·36 ·36 ·36
34 35 36 37 38	3 42 50·2 3 38 47·5 3 34 44·8 3 30 42·0 3 26 39·1	+ ·59 ·60 ·61 ·62 ·62	3 43 24·4 3 39 22·1 3 35 19·8 3 31 17·4 3 27 15·0	+ ·55 ·56 ·56 ·57	3 27 47.5		3 44 24·2 3 40 22·4 3 36 20·5 3 32 18·6 3 28 16·7	+ ·45 ·45 ·45 ·46 ·46	3 36 46·3 3 32 44·4 3 28 42·7	+ ·40 ·40 ·40 ·40 ·40	3 45 12·7 3 41 10·8 3 37 9·0 3 33 7·1 3 29 5·3	+ ·36 ·35 ·35 ·35 ·35
39 40 41 42 43	3 22 36·1 3 18 33·1 3 14 30·0 3 10 26·7 3 6 23·4	+ ·63 ·64 ·65 ·66 ·68	3 23 12·5 3 19 10·0 3 15 7·3 3 11 4·5 3 7 1·9	+ ·58 ·58 ·59 ·60 ·61	3 23 45.4 3 19 43.2 3 15 41.0 3 11 38.7 3 7 36.4	+ ·52 ·52 ·53 ·54 ·54	3 24 14·8 3 20 12·9 3 16 11·0 3 12 9·0 3 8 6·9	+ ·46 ·46 ·47 ·47 ·48	3 24 40·8 3 20 39·0 3 16 37·2 3 12 35·4 3 8 33·6	+ ·40 ·41 ·41 ·41 ·41	3 12 58·0 3 8 56·2	+ ·35 ·35 ·35 ·34 ·34
44 45 46 47 48	2 58 16·4 2 54 12·6 2 50 8·8 2 46 4·8	+ ·69 ·70 ·71 ·73 ·74	3 2 59·I 2 58 56·I 2 54 53·I 2 50 50·0 2 46 46·8	+ ·62 ·63 ·64 ·65 ·66	2 47 24.0	·57 •·58	3 4 4.9 3 0 2.9 2 56 0.8 2 51 58.6 2 47 56.4	+ ·48 ·48 ·49 ·50 ·50	2 52 26·1 2 48 24·2	+ '41 '41 '42 '42 '42	2 56 50·8 2 52 49·0 2 48 47·2	+ ·34 ·34 ·34 ·34 ·34
49 50 51 52 53	2 42 0.6 2 37 56.3 2 33 51.7 2 29 47.0 2 25 42.1	+ ·76 ·77 ·79 ·81 ·83	2 42 43.5 2 38 40.0 2 34 36.4 2 30 32.6 2 26 28.7	+ ·67 ·68 ·70 ·71 ·73	2 43 21·3 2 39 18·5 2 35 15·7 2 31 12·7 2 27 9·6	·60 ·61 ·62 ·63	2 43 54·2 2 39 51·9 2 35 49·6 2 31 47·2 2 27 44·8	+ ·51 ·52 ·53 ·54	2 44 22·3 2 40 20·3 2 36 18·3 2 32 16·3 2 28 14·3	+ ·43 ·43 ·43 ·44 ·44	2 44 45.4 2 40 43.6 2 36 41.8 2 32 39.9 2 28 38.1	+ ·34 ·35 ·35 ·35 ·35
54 55 56 57 58	2 21 36·8 2 17 31·4 2 13 25·6 2 9 19·6 2 5 13·1	·87 ·89	2 22 24·6 2 18 20·4 2 14 15·9 2 10 11·2 2 6 6·2	+ ·75 ·76 ·78 ·80 ·83	2 19 3·1 2 14 59·6 2 10 56·0	·66 ·67 ·69	2 23 42·2 2 19 39·6 2 15 36·9 2 11 34·3 2 7 31·2	+ ·55 ·56 ·57 ·58 ·59	2 24 12·2 2 20 10·0 2 16 7·9 2 12 5·7 2 8 3·4	+ ·45 ·46 ·46 ·47 ·48	2 12 30.7	+ ·35 ·36 ·36 ·36 ·37
	,	VA	RIATIO	N TO	ı' OF	LATI	TUDE A	ND A	ALTITUI	E.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	Α.	L. 3°	A	L. 4°	Α.	L. 5°	Α.
0 4 8 12 16	- ·03 ·07 ·10 ·14	s. -4·03 4·03 4·03 4·03 4·03	s. + ·07 - ·04 ·00 - ·03 ·07	s. -4·03 4·03 4·03 4·03 4·03	s. + ·14 - ·11 ·07 ·04 ·00	s. -4·03 4·03 4·03 4·03 4·03	s. + ·21 - ·18 ·14 ·11 ·08	s. -4.03 4.03 4.03 4.03 4.03	s. + ·28 - ·25 ·22 ·18 ·15	s. -4·04 4·04 4·03 4·03 4·03	s. + ·35 - ·32 ·29 ·26 ·23	S. -4.04 4.04 4.04 4.04 4.04
20 22 24 26 28	- ·18 ·20 ·22 ·24 ·26	4·03 4·03 4·04 4·04	- ·10 ·12 ·14 ·16 ·18	4.03 4.03 4.03 4.03 4.03	- ·03 ·05 ·06 ·08 ·10	4·03 4·03 4·03 4·03	+ ·04 ·03 + ·01 ·00 - ·02	4.03 4.03 4.03 4.03	+ ·12 ·10 ·09 ·07 ·06	4.03 4.03 4.03 4.03 4.03	+ ·20 ·18 ·17 ·15 ·14	4.03 4.03 4.03 4.03
30 32 34 36 38	- ·28 ·31 ·33 ·36 ·39	4·04 4·04 4·04 4·05	- ·20 ·22 ·25 ·27 ·30	4.03 4.03 4.04 4.04 4.04	- ·12 ·14 ·16 ·18 ·21	4·03 4·03 4·03 4·03	- ·04 ·06 ·08 ·10 .	4.03 4.03 4.03 4.03	+ ·04 ·02 ·01 - ·01 ·03	4·03 4·03 4·03 4·03	+ ·12 ·11 ·09 ·08 ·06	4·03 4·03 4·03 4·03
40 42 44 46 48	- ·42 ·45 ·48 ·52 ·56	4.05 4.05 4.06 4.06 4.07	- ·32 ·35 ·38 ·41 ·45	4.04 4.05 4.05 4.05 4.05	- ·23 ·25 ·28 ·31 ·34	4.03 4.04 4.04 4.04 4.04	- ·14 ·16 ·18 ·21 ·23	4.03 4.03 4.04 4.04	- ·04 ·06 ·08 ·10 ·13	4·03 4·03 4·03 4·03	+ ·05 ·03 ·01 ·00 - ·02	4·03 4·03 4·03 4·03
50 52 54 56 58	- ·60 ·64 ·69 ·75 ·81	4.09 4.10 4.11	- ·48 ·52 ·57 ·61 ·67	4.06 4.06 4.07 4.08 4.08	- ·37 ·40 ·44 ·48 ·53	4·05 4·05 4·06 4·06	- ·26 ·29 · ·32 ·35 ·39	4.04 4.04 4.04 4.05	- ·15 ·17 ·20 ·23 ·26	4.03 4.03 4.04 4.04	- ·04 ·06 ·08 ·10 ·12	4·03 4·03 4·03 4·03

			DECLIN	IATIO	N—SAM	$E N_{\perp}$	AME AS	LA	TITUDE.			
True Alt.		ecl. ar.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 2 57·5 + 5 22 28·4 5 14 23·1 5 6 17·9 4 58 12·9	·50 ·43 ·42 ·40	H. M. S. 6 3 27·3 5 22 53·7 5 14 47·7 5 6 41·7 4 58 35·9	s. + ·50 ·42 ·40 ·39 ·37	H. M. S. 6 3 57·3 5 23 18·5 5 15 11·4 5 7 4·5 4 58 57·9	s. + ·50 ·41 ·39 ·37 ·35	H. M. S. 6 4 27·4 5 23 42·6 5 15 34·4 5 7 26·4 4 59 18·6	s. + ·50 ·39 ·37 ·36 ·34	H. M. S. 6 4 57.7 5 24 6.0 5 15 56.5 5 7 47.3 4 59 38.4	s. + ·51 ·38 ·36 ·34 ·32	5 24 28·9 5 16 17·9 5 8 7·3	s. + ·51 ·37 ·35 ·32 ·30
18 20 22 24 26	4 50 8·I + 4 42 3·3 4 33 58·6 4 25 54·I 4 17 49·7	·37 ·36 ·35	4 50 30·3 4 42 24·8 4 34 19·5 4 26 14·3 4 18 9·2	+ ·36 ·35 ·33 ·32 ·31	4 50 51·4 4 42 45·0 4 34 38·8 4 26 32·8 4 18 26·9	+ ·34 ·32 ·31 ·29 ·28	4 51 11·1 4 43 3·7 4 34 56·4 4 26 49·4 4 18 42·5	+ ·32 ·30 ·28 ·26 ·24	4 51 29·5 4 43 20·9 4 35 12·5 4 27 4·2 4 18 56·1	+ ·30 ·27 ·25 ·23 ·21	4 51 46·7 4 43 36·7 4 35 26·8 4 27 17·1 4 19 7·7	+ ·27 ·25 ·22 ·20 ·18
28 30 31 32 33	4 9 45·3 4 1 41·0 3 57 38·9 3 53 36·8 3 49 34·7	·33 ·32 ·32	4 10 4·2 4 1 59·4 3 57 57·0 3 53 54·6 3 49 52·3	+ ·30 ·29 ·28 ·27 ·27	4 10 21·0 4 2 15·4 3 58 12·6 3 54 9·8 3 50 7·0	+ ·26 ·25 ·24 ·23 ·22	4 10 35.7 4 2 29.0 3 58 25.7 3 54 22.4 3 50 19.2	+ ·22 ·21 ·20 ·19 ·18	4 10 48·1 4 2 40·2 3 58 36·3 3 54 32·5 3 50 28·6	+ ·19 ·17 ·15 ·14 ·13	3 54 39·8 3 50 35·3	+ ·15 ·11 ·10 ·09
34 35 36 37 38	3 45 32·7 + 3 41 30·7 3 37 28·7 3 33 26·7 3 29 24·7	·30 ·30	3 45 49.9 3 41 47.6 3 37 45.3 3 33 43.0 3 29 40.8	+ ·26 ·26 ·25 ·25 ·25	3 46 4·3 3 42 1·6 3 37 59·0 3 33 56·3 3 29 53·7	+ ·22 ·21 ·20 ·19 ·19	3 46 16·0 3 42 12·8 3 38 9·6 3 34 6·4 3 30 3·3	+ ·17 ·16 ·15 ·14 ·13	3 46 24·8 3 42 21·0 3 38 17·2 3 34 13·4 3 30 9·7	+ ·12 ·11 ·10 ·09 ·08	3 46 30·7 3 42 26·2 3 38 21·7 3 34 17·2 3 30 12·7	+ ·07 ·06 ·05 ·04 ·02
39 40 41 42 43	3 25 22·7 3 21 20·8 3 17 18·8 3 13 16·9 3 9 15·0	·29 ·29 ·28	3 25 38·6 3 21 36·4 3 17 34·2 3 13 32·0 3 9 29·9	+ ·24 ·23 ·22 ·22 ·21	3 25 51·1 3 21 48·5 3 17 45·9 3 13 43·4 3 9 40·8	+ ·18 ·17 ·16 ·16 ·15	3 26 0·2 3 21 57·1 3 17 54·0 3 13 51·0 3 9 47·9	+ ·12 ·11 ·10 ·09 ·09	3 26 5.9 3 22 2.2 3 17 58.5 3 13 54.7 3 9 51.1	+ ·07 ·05 ·04 ·03 ·02	3 26 8·2 3 22 3·7 3 17 59·2 3 13 54·7 3 9 50·2	+ ·01 - ·02 - ·03 ·05
44 45 46 47 48	3 5 13·1 + 3 1 11·2 2 57 9·3 2 53 7·5 2 49 5·5	.27	3 5 27·7 3 1 25·6 2 57 23·5 2 53 21·4 2 49 19·3	+ ·21 ·20 ·20 ·19 ·19	3 5 38·3 3 1 35·8 2 57 33·3 2 53 30·9 2 49 28·4	+ ·14 ·13 ·13 ·12 ·11	3 5 44.9 3 1 41.8 2 57 38.8 2 53 35.8 2 49 32.8	+ ·07 ·06 ·05 ·04 ·03	3 5 47.4 3 I 43.6 2 57 39.9 2 53 36.2 2 49 32.5	+ ·01 - ·02 ·03 ·04	3 5 45·7 3 1 41·2 2 57 36·6 2 53 32·1 2 49 27·5	- ·06 ·08 ·09 ·11 ·12
49 50 51 52 53	2 45 3.7 2 41 1.9 2 37 0.1 2 32 58.2 2 28 56.4	·26 ·26 ·26	2 45 17·3 2 41 15·2 2 37 13·2 2 33 11·1 2 29 9·1	+ ·18 ·18 ·17 ·17 ·17	2 45 25·9 2 41 23·5 2 37 21·1 2 33 18·7 2 29 16·3	+ ·10 ·10 ·09 ·08 ·07	2 45 29·8 2 41 26·8 2 37 23·8 2 33 20·8 2 29 17·8	+ ·02 + ·01 ·00 - ·01 ·02	2 45 28·8 2 41 25·1 2 37 21·3 2 33 17·6 2 29 13·8	- ·06 ·07 ·09 ·10 ·11	2 45 22·9 2 41 18·2 2 37 13·5 2 33 8·8 2 29 4·0	- ·14 ·16 ·17 ·19 ·21
54 55 56 57 58	2 24 54·6 2 20 52·8 2 16 51·0 2 12 49·2 2 8 47·4	·26 ·26	2 25 7·I 2 2I 5·I 2 17 3·2 2 13 1·2 2 8 59·2	+ ·16 ·15 ·15 ·14	2 25 13·9 2 21 11·5 2 17 9·1 2 13 6·8 2 9 4·4	+ ·06 ·06 ·05 ·04 ·03	2 25 14·8 2 21 11·9 2 17 8·8 2 13 5·8 2 9 2·8	- ·03 ·04 ·06 ·07 ·08	2 25 9·9 2 21 6·1 2 17 2·2 2 12 58·3 2 8 54·4	- ·13 ·15 ·16 ·18 ·20	_ ' '	- ·23 ·25 ·27 ·29 ·31
		V	ARIATIO)N TO) 1' OF	LATI	TUDE A	AND .	ALTITU	DE.		
Alt.	L. 6°	Α.	L. 7°	A.	L. 8°	A.	L. 9°	Α.	L. 10	° A.	L. 11°	A.
0 4 8 12 16	+ ·43 -4 ·39 4 ·36 4 ·33 4	s. -05 -05 -05 -04 -04	s. + ·50 ·46 ·43 ·40 ·37	s. -4.06 4.06 4.05 4.05 4.05	s. + ·57 ·54 ·50 ·47 ·45	s. -4·07 4·06 4·06 4·06 4·05	s. + ·64 ·61 ·58 ·55 ·52	s. -4.08 4.08 4.07 4.07 4.06	s. + ·71 ·68 ·65 ·62 ·60	s. -4·09 4·08 4·08 4·07	•75 •72 •70 •67	s. -4·10 4·10 4·09 4·09 4·08
20 22 24 26 28	·26 4 ·24 4 ·23 4 ·22 4	• 04 • 04 • 04 • 04 • 04	+ ·35 ·33 ·32 ·31 ·30	4.04 4.04 4.04 4.04 4.04	+ ·42 ·41 ·40 ·39 ·38	4.05 4.05 4.05 4.05 4.05	+ ·50 ·49 ·48 ·47 ·46	4.06 4.06 4.06 4.06 4.06	+ ·57 ·56 ·56 ·55 ·55	4.07 4.07 4.07 4.07 4.07	+ ·65 ·64 ·63 ·63 ·62	4.08 4.08 4.08 4.08 4.08
30 32 34 36 38	•19 4 •18 4 •16 4 •15 4	1·03 4·03 4·03 4·03	+ ·29 ·27 ·26 ·25 ·24	4·04 4·04 4·04 4·04 4·04	+ ·37 ·36 ·35 ·34 ·33	4·05 4·04 4·04 4·04 4·04	+ ·45 ·44 ·43 ·43 ·42	4·05 4·05 4·05 4·05 4·05	+ ·53 ·53 ·52 ·52 ·51	4·06 4·06 4·06 4·06 4·06	+ ·61 ·61 ·60 ·60	4·08 4·07 4·07 4·07 4·07
40 42 44 46 48	•12 4 •11 4 •10 4 •08 4	4·03 4·03 4·03 4·03	+ ·23 ·22 ·21 ·20 ·19	4·04 4·04 4·03 4·03	+ ·32 ·31 ·31 ·30 ·29	4·04 4·04 4·04 4·04 4·04	+ ·41 ·41 ·40 ·40	4.05 4.05 4.05 4.05 4.05	+ ·51 ·51 ·51 ·51 ·51	4.06 4.06 4.06 4.06 4.06	+ ·60 ·61 ·61	4.07 4.07 4.07 4.08 4.08
50 52 54 56 58	·06 4 ·04 4 ·03 4	4·03 4·03 4·03 4·03	+ ·18 ·17 ·16 ·15 ·14	4·03 4·03 4·03 4·03	+ ·29 ·28 ·28 ·28 ·27	4·04 4·04 4·04 4·04	+ ·40 ·40 ·40 ·40 ·41	4.05 4.05 4.05 4.05 4.05	+ ·51 ·52 ·52 ·53 ·54	4.06 4.06 4.06 4.06 4.07	+ ·62 ·63 ·64 ·66 ·68	4.08 4.08 4.08 4.08 4.09

32 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 7° .

	1		DECLIN		N—SAM		IME AS		III UDE.			
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 5 58.9 5 24 51.1 5 16 38.6 5 8 26.3 5 0 14.3	•36		s. + ·52 ·35 ·32 ·29 ·26	H. M. S. 6 7 1.0 5 25 33.8 5 17 17.5 5 9 1.6 5 0 45.9	s. + ·52 ·34 ·31 ·28 ·24	H. M. S. 6 7 32·5 5 25 54·2 5 17 35·8 5 9 17·8 5 1 0·0	s. + ·53 ·33 ·30 ·26 ·22	5 26 14·1 5 17 53·4	+ .53	5 26 33·4 5 18 10·2 5 9 47·3	s. + ·54 ·32 ·27 ·23 ·19
18 20 22 24 26	4 52 2·5 4 43 51·0 4 35 39·6 4 27 28·4 4 19 17·3	·22 ·20 ·17 ·14	4 52 17·1 4 44 3·8 4 35 50·7 4 27 37·7 4 19 24·8	.11	4 52 30·4 4 44 15·2 4 36 0·1 4 27 45·2 4 19 30·3	+ ·21 ·18 ·14 ·11	4 52 42.4 4 44 25.0 4 36 7.8 4 27 50.8 4 19 33.8		4 52 53·I 4 44 33·5 4 36 I3·9 4 27 54·5 4 I9 35·2	+ .04	4 27 56·3 4 19 34·4	03
28 30 31 32 33	4 II 6·3 4 2 55·5 3 58 50·0 3 54 44·6 3 50 39·3	•09 •07 •06 •04	3 58 53·1 3 54 46·7 3 50 40·4	+ ·08 ·04 ·03 + ·01 ·00		+ ·04 -00 - ·01 ·03 ·05	4 II 16.9 4 2 59.9 3 58 51.4 3 54 42.9 3 50 34.4	•06 •08 •10		- ·04 ·08 ·10 ·12 ·14	4 II 12·5 4 2 50·3 3 58 39·3 3 54 28·1 3 50 16·9	- ·08 ·12 ·15 ·17 ·19
34 35 36 37 38	3 46 33.9 3 42 28.5 3 38 23.2 3 34 17.8 3 30 12.4	+ ·01 - ·02 - ·03	3 46 34·I 3 42 27·8 3 38 2I·5 3 34 I5·2 3 30 8·8	·07	3 38 16·7 3 34 9·2 3 30 1·7	- ·07 ·09 ·11 ·13 ·15	3 46 25.9 3 42 17.3 3 38 8.7 3 34 0.0 3 29 51.2	.30	3 37 57·4 3 33 47·3 3 29 37·2	- ·17 ·19 ·21 ·24 ·26	3 37 42·8 3 33 31·3 3 29 19·6	- ·22 ·24 ·27 ·30 ·32
39 40 41 42 43	3 26 7·1 3 22 1·7 3 17 56·3 3 13 50·8 3 9 45·4 3 5 39·9	- ·05 ·06 ·08 ·10 ·11 - ·13	3 26 2.4 3 21 56.0 3 17 49.5 3 13 43.1 3 9 36.5 3 5 29.9	- ·11 ·12 ·14 ·16 ·18	3 9 23.6	- ·17 ·18 ·21 ·23 ·25 - ·27		·25 ·27 ·30 ·32	3 25 27·0 3 21 16·7 3 17 6·2 3 12 55·7 3 8 45·0 3 4 34·1	·31 ·34 ·36	3 25 7.8 3 20 55.9 3 16 43.8 3 12 31.6 3 8 19.2 3 4 6.6	- ·35 ·38 ·41 ·44 ·47 - ·50
44 45 46 47 48 49	3 5 39.9 3 1 34.4 2 57 28.9 2 53 23.3 2 49 17.7 2 45 12.0	·15 ·17 ·19 ·20	3 I 23·3	·22 ·24 ·26 ·29	3 I 7·8 2 56 59·7 2 52 51·6 2 48 43·3	•30	3 0 47.7 2 56 38.2 2 52 28.5 2 48 18.6	·37 ·40 ·43 ·45	3 0 23·I 2 56 II·9	.45 .48 .51	2 59 53.7 2 55 40.6 2 51 27.3 2 47 13.6 2 42 59.7	·53 ·56 ·60 ·63
50 51 52 53	2 41 6·2 2 37 0·4 2 32 54·5 2 28 48·4 2 24 42·3	·24 ·26 ·29 ·31	2 40 48·9 2 36 41·8 2 32 34·5 2 28 27·0 2 24 19·4	·33 ·36 ·38	2 40 26·4 2 36 17·6 2 32 8·7 2 27 59·6	·42 ·45 ·48 ·51	2 39 58.3	·51 ·54 ·58 ·61	2 39 24.7 2 35 12.3 2 30 59.4 2 26 46.2	·61 ·64 ·68 ·72	2 38 45·3 2 34 30·6 2 30 15·5	·70 ·74 ·78 ·83
55 56 57 58	2 20 36·1 2 16 29·8 2 12 23·3 2 8 16·7	.35	2 20 11·7 2 16 3·7	·46 ·49	2 19 40·7 2 15 30·8 2 11 20·7	·57 ·60 ·64	2 19 3·1 2 14 51·1 2 10 38·7	·68 ·72 ·76	2 18 18·7 2 14 4·2 2 9 49·2	·80 ·84 ·89	2 17 27·2 2 13 10·1 2 8 52·0	·92 ·97 I·02
_			ARIATIO								1 - 4-	
Alt.	L. 12°	A.	L. 13	° A.	L. 14		L. 15		L. 16		L. 17	
0 4 8 12 16	s. + ·86 ·83 ·80 ·77 ·75	S. -4·12 4·11 4·11 4·10 4·10	s. + ·94 ·90 ·87 ·85 ·82	S. -4·14 4·13 4·12 4·11	·98 ·95 ·92 ·90	s. -4·15 4·14 4·13 4·13	s. +1.09 1.05 1.02 1.00	s. -4·17 4·17 4·16 4·15	S. +1·16 1·13 1·10 1·07 1·06	s. -4·19 4·18 4·18 4·17 4·16	1·21 1·18 1·15 1·13	S. -4·21 4·21 4·20 4·19 4·19
20 22 24 26 28	+ ·73 ·72 ·71 ·71 ·70	4·09 4·09 4·09 4·09	+ ·81 ·80 ·79 ·79 ·78	4·II 4·II 4·II 4·II	+ ·89 ·88 ·87 ·87 ·87	4·I3 4·I2 4·I2 4·I2	+ ·96 ·96 ·95 ·95 ·95	4·14 4·14 4·14 4·14	+1.04 1.04 1.04 1.04	4·16 4·16 4·16 4·16	+1·12 1·12 1·12 1·12 1·12	4·18 4·18 4·18 4·18 4·18
30 32 34 36 38	+ ·70 ·70 ·69 ·69 ·69 + ·70	4·09 4·09 4·09 4·09 4·09	+ ·78 ·78 ·78 ·78 ·78 ·79 + ·79	4·10 4·10 4·10 4·10	+ ·87 ·87 ·87 ·87 ·88 + ·89	4·12 4·12 4·12 4·12 4·12	+ ·95 ·95 ·96 ·96 ·97 + ·98	4·14 4·14 4·14 4·15 4·15	+1.04 1.04 1.05 1.06 1.07 +1.08	4·16 4·16 4·16 4·17 4·17	+1·13 1·13 1·14 1·15 1·16 +1·18	4·19 4·19 4·19 4·19 4·20
40 42 44 46 48	·70 ·71 ·71 ·72	4·09 4·09 4·09	·80 ·81 ·82 ·83	4·II 4·II 4·II 4·II	·90 ·91 ·92 ·94	4·13 4·13 4·14	1.00 1.01 1.03 1.05	4·15 4·16 4·16 4·17	I·10 I·12 I·14 I·17	4·18 4·19 4·20	1·20 1·22 1·25 1·28	4·20 4·21 4·22 4·23
50 52 54 56 58	+ ·74 ·75 ·77 ·79 ·82	4·10 4·10 4·10 4·11	+ ·85 ·87 ·89 ·92 ·96	4·12 4·13 4·13 4·14	+ ·96 ·99 I·02 I·06 I·10	4·14 4·15 4·16 4·17 4·17	+1.08 1.11 1.15 1.19 1.25	4·17 4·18 4·19 4·20 4·22	+1·20 1·24 1·28 1·34 1·40	4·21 4·22 4·23 4·25 4·27	1·32 1·37 1·42 1·48 1·55	4·24 4·26 4·27 4·29 4·32

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 33 LATITUDE 7°.

True	18°	Decl.	19°	Decl.	20°	Decl.	21°	Decl.	22°	Decl.	23°	Decl.
Alt.		Var.	10	Var.		Var.		Var.		Var.	20	Var.
0 10 12 14 16	H. M. S. 6 9 8·8 5 26 52·1 5 18 26·2 5 10 0·7 5 1 35·5	s. + ·54 ·31 ·26 ·21 ·17	H. M. S. 6 9 41·6 5 27 10·2 5 18 41·5 5 10 13·1 5 1 45·0	s. + ·55 ·30 ·25 ·20 ·15	H. M. S. 6 10 14·7 5 27 27·8 5 18 56·0 5 10 24·6 5 1 53·5	s. + ·55 ·29 ·23 ·18 ·13	H. M. S. 6 10 48·3 5 27 44·8 5 19 9·8 5 10 35·1 5 2 0·6	s. + ·56 ·28 ·22 ·17 ·11	H. M. S. 6 II 22·4 5 28 I·2 5 I9 22·7 5 I0 44·6 5 2 6·7	s. + ·57 ·27 ·21 ·15 ·09	H. M. S. 6 II 57.0 5 28 I7.1 5 I9 34.9 5 I0 53.1 5 2 II.5	s. + ·58 ·26 ·20 ·13 + ·07
18 20 22 24 26	4 53 10·5 4 44 45·7 4 36 20·9 4 27 56·2 4 19 31·5	+ ·12 ·08 + ·03 - ·02 ·07	4 53 17·2 4 44 49·4 4 36 21·8 4 27 54·1 4 19 26·4	+ ·10 + ·05 ·00 - ·05 ·10	4 53 22·5 4 44 51·7 4 36 20·9 4 27 50·0 4 19 19·0	+ ·08 + ·02 - ·03 ·08 ·14	4 53 26·4 4 44 52·2 4 36 18·1 4 27 43·8 4 19 9·3	+ ·05 ·00 - ·06 ·12 ·18	4 53 28.9 4 44 51.2 4 36 13.5 4 27 35.5 4 18 57.3	+ ·03 - ·03 ·09 ·15 ·22	4 53 30·0 4 44 48·5 4 36 6·9 4 27 25·1 4 18 43·0	- ·00 - ·06 ·12 ·19 ·26
28 30 31 32 33	4 II 6.6 4 2 4I.7 3 58 29.1 3 54 I6.4 3 50 3.7	- ·12 ·17 ·19 ·22 ·24	4 10 58·4 4 2 30·3 3 58 16·1 3 54 1·8 3 49 47·4	- ·16 ·21 ·24 27 ·30	4 10 47·8 4 2 16·3 3 58 0·3 3 53 44·3 3 49 28·1	- ·20 ·26 ·29 ·32 ·35	4 10 34·6 4 1 59·4 3 57 41·6 3 53 23·6 3 49 5·5	- ·24 ·30 ·34 ·37 ·40	4 10 18·8 4 1 39·7 3 57 19·9 3 52 59·9 3 48 39·7	- ·28 ·35 ·39 ·42 ·46	4 IO 0.4 4 I 17.0 3 56 55.1 3 52 32.9 3 48 IO.5	- ·33 ·40 ·44 ·48 ·51
34 35 36 37 38	3 45 50·9 3 41 37·9 3 37 24·9 5 33 11·7 3 28 58·3	- ·27 ·30 ·33 ·36 ·38	3 45 32·9 3 41 18·3 3 37 3·5 3 32 48·5 3 28 33·3	·39 ·42 ·45	3 45 11·7 3 40 55·2 3 36 38·5 3 32 21·6 3 28 4·5	- ·38 ·41 ·44 ·48 ·51	3 44 47.2 3 40 28.7 3 36 10.0 3 31 50.9 3 27 31.7	- ·44 ·47 ·51 ·54 ·58	3 44 19·3 3·39 58·6 3 35 37·6 3 31 16·4 3 26 54·7	•65	3 43 47·8 3 39 24·8 3 35 1·5 3 30 37·8 3 26 13·7	- ·55 ·59 ·63 ·68 ·72
39 40 41 42 43	3 24 44.9 3 20 31.2 3 16 17.3 3 12 3.3 3 7 48.9	- ·41 ·44 ·48 ·51 ·54	3 24 18·0 3 20 2·4 3 15 46·6 3 11 30·5 3 7 14·1	·51 ·55 ·58 ·62	3 23 47·I 3 19 29·4 3 15 11·5 3 10 53·2 3 6 34·6	- ·55 ·58 ·62 ·66 ·70	3 23 12·1 3 18 52·2 3 14 31·9 3 10 11·2 3 5 50·2	- ·62 ·66 ·70 ·74 ·78	3 22 32·8 3 18 10·5 3 13 47·7 3 9 24·6 3 5 0·7	- ·69 ·73 ·78 ·82 ·87	3 21 49·2 3 17 24·2 3 12 58·7 3 8 32·7 3 4 6·1	- ·76 ·81 ·86 ·91 ·96
44 45 46 47 48	3 3 34.4 2 59 19.5 2 55 4.4 2 50 48.9 2 46 33.1	- ·58 ·61 ·65 ·68 72	3 2 57·4 2 58 40·4 2 54 22·9 2 50 5·1 2 45 46·8	·73 ·78 ·82	3 2 15·5 2 57 56·1 2 53 36·2 2 49 15·8 2 44 54·8	- ·74 ·78 ·82 ·87 ·92	3 I 28.6 2 57 6.6 2 52 43.9 2 48 20.7 2 43 56.8	- ·83 ·87 ·92 ·97 I·02	3 0 36·4 2 56 11·5 2 51 45·9 2 47 19·6 2 42 52·6	·96 1·02 1·07	2 59 38·8 2 55 10·8 2 50 42·0 2 46 12·3 2 41 41·7	1.01 1.06 1.12 1.18 1.24
49 50 51 52 53	2 42 16·8 2 38 0·1 2 33 42·9 2 29 25·2 2 25 6·9	·89 ·94	2 28 28·3 2 24 7·0	·91	2 40 33·3 2 36 11·1 2 31 48·1 2 27 24·4 2 22 59·8	·96 1·02 1·07 1·12 1·18	2 39 32·2 2 35 6·8 2 30 40·6 2 26 13·3 2 21 45·0	1·19 1·25 1·31	2 38 24·6 2 33 55·7 2 29 25·8 2 24 54·7 2 20 22·4	1·31 1·38 1·45	2 37 10·2 2 32 37·4 2 28 3·5 2 23 28·2 2 18 51·4	- 1·30 1·37 1·44 1·51 1·59
54 55 56 57 58	2 20 48·0 2 16 28·4 2 12 8·0 2 7 46·8 2 3 24·6	- ·99 1·04 1·10 1·16 1·22	2 19 44·9 2 15 22·0 2 10 58·1 2 6 33·1 2 2 7·0	-1·11 1·17 1·23 1·30 1·37	2 18 34·2 2 14 7·6 2 9 39·8 2 5 10·7 2 0 40·2	-1·24 1·31 1·38 1·45 1·53	2 17 15·6 2 12 44·9 2 8 12·8 2 3 39·0 1 59 3·5	- 1·38 1·45 1·53 1·61 1·70	2 15 48·7 2 11 13·4 2 6 36·4 2 1 57·5 1 57 16·5	1.60 1.69 1.78	2 4 50.3	- 1.67 1.76 1.86 1.96 2.07
		V.	ARIATIC	N TO	ı' OF	LAT	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	A.	L. 21°	A.	L. 22°	Α.	L. 23°	A.
° 0 4 8 12 16	1·28 1·25 1·23 1·21	s. -4·24 4·23 4·22 4·21 4·21	1·36 1·33 1·31 1·29	s. -4·26 4·25 4·24 4·24 4·23	1·44 1·41 1·39 1·38	s. -4·29 4·28 4·27 4·26 4·26	1·52 1·49 1·47 1·46	s. -4·32 4·31 4·30 4·29 4·28	1.60 1.57 1.55 1.54	s. -4·35 4·34 4·33 4·32 4·31	1.68 1.66 1.64 1.63	s. -4·38 4·37 4·36 4·35 4·35
20 22 24 26 28	+1·20 1·20 1·20 1·20 1·21	4·21 4·20 4·21 4·21	1·29 1·29 1·29 1·29	4·23 4·23 4·23 4·23	+ 1·37 1·37 1·37 1·38 1·38	4·26 4·26 4·26 4·26 4·26	+ 1·45 1·46 1·46 1·46 1·47	4·28 4·28 4·29 4·29 4·29	+ 1.54 1.54 1.55 1.55 1.56	4·31 4·32 4·32 4·32	+1.63 1.63 1.64 1.64 1.66	4·34 4·35 4·35 4·36
30 32 34 36 38	+1·21 1·22 1·23 1·25 1·26	4·21 4·21 4·21 4·22 4·22	+1·30 1·31 1·33 1·34 1·36	4·23 4·24 4·24 4·25 4·25	+1·39 1·41 1·42 1·44 1·46	4·26 4·27 4·27 4·28 4·29	+ 1.49 1.50 1.52 1.54 1.57	4·29 4·30 4·31 4·32	+1.58 1.60 1.62 1.64 1.67	4·33 4·34 4·35 4·36	+1.67 1.69 1.72 1.74 1.78	4·36 4·37 4·38 4·39 4·40
40 42 44 46 48	+1.28 1.31 1.33 1.37 1.40	4·23 4·24 4·25 4·27	+1·38 1·41 1·44 1·48 1·52	4·26 4·27 4·28 4·29 4·31	+1.49 1.52 1.56 1.60 1.65	4·30 4·31 4·32 4·34 4·35	+1.60 1.63 1.67 1.72 1.78	4·33 4·35 4·36 4·38 4·40	+1.70 1.74 1.79 1.84 1.91	4·37 4·39 4·41 4·43 4·46	+1.82 1.86 1.91 1.97 2.04	4·42 4·44 4·46 4·49 4·52
50 52 54 56 58	+1.45 1.50 1.56 1.63 1.71	4·28 4·30 4·32 4·35 4·35	+1.57 1.63 1.70 1.78 1.88	4·33 4·35 4·37 4·41 4·45	+1.71 1.77 1.85 1.94 2.05	4·38 4·40 4·43 4·47 4·52	+1.84 1.92 2.00 2.11 2.24	4·43 4·46 4·50 4·55 4·61	+1.98 2.06 2.16 2.28 2.43	4·49 4·53 4·57 4·63 4·70	+2·12 2·22 2·33 2·47 2·63	4.56 4.60 4.66 4.73 4.81

34 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 8°.

True Alt,	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 10	H. M. S. 6 0 0.0 5 19 36.2 5 11 31.3 5 3 26.3 4 55 21.2	s. + ·56 ·57 ·57 ·58 ·58	H. M. S. 6 0 33.7 5 20 10.0 5 12 5.3 5 4 0.5 4 55 55.7	s. + ·56 ·56 ·56 ·56 ·56	H. M. S. 6 I 7.5 5 20 43.2 5 I2 38.5 5 4 33.7 4 56 29.0	s. + ·56 ·55 ·54 ·54 ·54	H. M. S. 6 I 41·3 5 2I I5·6 5 I3 I0·8 5 5 5·9 4 57 I·I	s. + ·56 ·53 ·53 ·53 ·53	H. M. S. 6 2 15.0 5 21 47.3 5 13 42.1 5 5 37.0 4 57 32.0	s. + ·56 ·52 ·51 ·51 ·50	H. M. S. 6 2 49·1 5 22 18·4 5 14 12·7 5 6 7·2 4 58 1·8	s. + ·57 ·51 ·50 ·49 ·49
18 20 22 24 26	4 47 16·1 4 39 10·8 4 31 5·4 4 22 59·8 4 14 54·0	+ ·59 ·60 ·61 ·62 ·63	4 47 50·9 4 39 45·9 4 31 40·9 4 23 35·8 4 15 30·6	+ ·57 ·57 ·58 ·58 ·59	4 48 24·3 4 40 19·6 4 32 14·8 4 24 10·0 4 16 5·0	+ ·54 ·55 ·55 ·55 ·56	4 48 56·4 4 40 51·6 4 32 46·9 4 24 42·2 4 16 37·5	+ ·52 ·52 ·52 ·52 ·52	4 49 27·I 4 4I 22·2 4 33 I7·4 4 25 I2·6 4 I7 7·8	+ ·50 ·50 ·49 ·49 ·49	4 49 56·5 4 41 51·3 4 33 46·2 4 25 41·1 4 17 36·2	+ ·48 ·47 ·46 ·46 ·45
28 30 31 32 33	4 6 48.0 3 58 41.9 3 54 38.6 3 50 35.4 3 46 32.1	+ ·64 ·65 ·66 ·66 ·67	4 7 25.2 3 59 19.6 3 55 16.8 3 51 14.0 3 47 11.0	+ ·60 ·61 ·61 ·62 ·62	4 8 0·1 3 59 55·0 3 55 52·4 3 51 49·8 3 47 47·2	+ ·56 ·57 ·57 ·57 ·58	4 8 32.7 4 0 27.9 3 56 25.5 3 52 23.0 3 48 20.6	+ ·52 ·53 ·53 ·53 ·53	3 52 53·6 3 48 51·2	+ ·49 ·49 ·49 ·49 ·49	4 9 31·3 4 1 26·4 3 57 24·0 3 53 21·6 3 49 19·3	+ ·45 ·45 ·44 ·44 ·44
34 35 36 37 38	3 42 28.6 3 38 25.1 3 34 21.5 3 30 17.9 3 26 14.1	+ ·68 ·69 ·70 ·71 ·72	3 43 8·0 3 39 5·0 3 35 I·9 3 30 58·7 3 26 55·5	+ ·63 ·64 ·65 ·65 ·66	3 43 44·5 3 39 41·8 3 35 39·1 3 31 36·3 3 27 33·4	+ ·58 ·59 ·59 ·60 ·60	3 44 18·1 3 40 15·7 3 36 13·2 3 32 10·6 3 28 8·1	+ ·54 ·54 ·54 ·54 ·55	3 40 46·5 3 36 44·I	+ ·49 ·49 ·49 ·49 ·49	3 45 16·9 3 41 14·5 3 37 12·1 3 33 9·8 3 29 7·4	+ ·44 ·44 ·44 ·44 ·44
39 40 41 42 43	3 22 10·2 3 18 6·2 3 14 2·1 3 9 57·8 3 5 53·4	·74 ·75 ·76 ·78	3 22 52·1 3 18 48·7 3 14 45·2 3 10 41·6 3 6 37·9	·68 ·69 ·70 ·71	3 19 27·5 3 15 24·5 3 11 21·5 3 7 18·3	+ ·61 ·62 ·62 ·63 ·64	3 7 54.7	·56 ·56 ·57 ·57	3 16 32·0 3 12 29·6 3 8 27·1	·50 ·50 ·51		'44 '44 '44
44 45 46 47 48	3 r 48·9 2 57 44·2 2 53 39·3 2 49 34·3 2 45 29·0	+ ·79 ·80 ·82 ·83 ·85	3 2 34·I 2 58 30·2 2 54 26·I 2 50 2I·9 2 46 I7·6	+ ·72 ·73 ·74 ·75 ·77	3 3 15·1 2 59 11·8 2 55 8·4 2 51 4·9 2 47 1·2	+ ·65 ·66 ·67 ·68 ·69	3 3 51·9 2 59 49·1 2 55 46·1 2 51 43·1 2 47 40·1	+ ·58 ·59 ·59 ·60 ·61	3 0 22·1 2 56 19·5 2 52 16·9 2 48 14·2	·51 ·52 ·52	3 4 53.2 3 0 50.8 2 56 48.4 2 52 46.0 2 48 43.6	·44 ·45 ·45
49 50 51 52 53	2 41 23·5 2 37 17·8 2 33 11·8 2 29 5·6 2 24 59·1	•95	2 42 13.0 2 38 8.4 2 34 3.5 2 29 58.4 2 25 53.1	·80 ·82 ·83 ·85	2 30 45·6 2 26 41·3	·71 ·72 ·74 ·75	2 43 36·9 2 39 33·8 2 35 30·5 2 31 27·1 2 27 23·6	·63 ·64 ·65 ·66	2 40 8·8 2 36 6·0 2 32 3·1	.54 .55 .55	2 44 4I·2 2 40 38·7 2 36 36·2 2 32 33·7 2 28 3I·2	•46 •46 •47
54 55 56 57 58	2 20 52·2 2 16 45·0 2 12 37·4 2 8 29·4 2 4 20·9	I·00 I·02 I·05	2 21 47·6 2 17 41·8 2 13 35·7 2 9 29·3 2 5 22·5	+ ·87 ·89 ·92 ·94 ·97	2 22 36·8 2 18 32·2 2 14 27·3 2 10 22·3 2 6 16·9	+ ·77 ·79 ·81 ·83 ·85	2 23 20·0 2 19 16·3 2 15 12·4 2 11 8·4 2 7 4·2	·68 ·70 ·71	2 15 51 1 2 11 47 8	·58 ·59 ·60		·48 ·49 ·49
		V.	ARIATIO	N TO	ı' OF	LATI	TUDE A	AND .	ALTITUI	DE.		
Alt.	L. 0°		L. 1°	A.	L. 2°		L. 3°		L. 4°	A.	L. 5°	Α.
0 4 8 12 16	s. 00 04 .08 .12 .16	s. -4·04 4·04 4·04 4·04	s. + ·07 ·03 - ·01 ·05 ·09	s. -4·04 4·04 4·04 4·04	s. + ·14 ·10 ·06 + ·02 - ·01	s. -4.04 4.04 4.04 4.04 4.04	s. + ·21 ·17 ·14 ·10 ·06	s. -4·04 4·04 4·04 4·04	s. + ·28 ·24 ·21 ·17 ·13	s. -4·05 4·05 4·04 4·04	s. + ·36 ·32 ·28 ·24 ·21	s. -4.05 4.05 4.05 4.05 4.04
20 22 24 26 28	- ·21 ·23 ·25 ·28 ·30	4.04 4.04 4.05 4.05 4.05	- ·13 ·15 ·17 ·20 ·22	4.04 4.04 4.04 4.04 4.04	- ·05 ·07 ·10 ·12 ·14	4.04 4.04 4.04 4.04 4.04	+ ·02 ·00 - ·02 ·04 ·06	4.04 4.04 4.04 4.04 4.04	+ ·09 ·08 ·06 ·04 + ·02	4·04 4·04 4·04 4·04	+ ·17 ·15 ·14 ·12 ·10	4.04 4.04 4.04 4.04 4.04
30 32 34 36 38	- ·33 ·36 ·38 ·41 ·45	4.05 4.05 4.06 4.06 4.06	- ·24 ·27 ·30 ·32 ·35	4.05 4.05 4.05 4.05 4.05	- ·16 ·19 ·21 ·24 ·26	4.04 4.04 4.04 4.04 4.05	- ·08 ·10 ·12 ·15 ·17	4·04 4·04 4·04 4·04	- ·00 - ·02 ·04 ·06 ·08	4.04 4.04 4.04 4.04 4.04	+ ·08 ·06 ·04 ·03 + ·01	4.04 4.04 4.04 4.04 4.04
40 12 44 46 48	- ·48 ·51 ·55 ·59 ·64	4.07 4.08 4.08 4.08	- ·38 ·42 ·45 ·49 ·53	4.06 4.06 4.07 4.07	- ·29 ·32 ·35 ·38 ·42	4.05 4.05 4.05 4.06 4.06	- ·20 ·22 ·25 ·28 ·31	4·04 4·05 4·05 4·05 4·05	- ·10 ·13 ·15 ·18 ·20	4·04 4·04 4·04 4·04	- ·01 ·03 ·05 ·08 ·10	4.04 4.04 4.04 4.04 4.04
50 52 54 56 58	- ·69 ·74 ·80 ·86 ·93	4·10 4·11 4·12 4·13 4·15	- ·57 ·62 ·67 ·73 ·79	4·08 4·09 4·10 4·12	- ·46 ·50 ·54 ·59 ·65	4.06 4.07 4.08 4.08 4.09	- ·35 ·38 ·42 ·46 ·51	4.05 4.06 4.06 4.07 4.07	- ·23 ·26 ·30 ·33 ·37	4.04 4.05 4.05 4.05 4.06	- ·12 ·15 ·18 ·21 ·24	4.04 4.04 4.04 4.04

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 35 LATITUDE 8°.

			DECLIN	AIIO	N—SAM	E NA	AME AS	—LA	TITUDE	1 .		
True Alt.		Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 3 23.0 5 22 48.8 5 14 42.5 5 6 36.4 4 58 30.4	s. - 57 - 50 - 49 - 48 - 47	H. M. S. 6 3 57·3 5 23 18·5 5 15 11·4 5 7 4·5 4 58 57·9	s. + ·57 ·49 ·47 ·46 ·45	5 23 47·6 5 15 39·6	s. + ·57 ·48 ·46 ·45 ·43	H. M. S. 6 5 6·1 5 24 16·0 5 16 7·0 5 7 58·1 4 59 49·5	s. + ·58 ·47 ·45 ·43 ·41	H. M. s. 6 5 40.8 5 24 43.9 5 16 33.5 5 8 23.5 5 0 13.7	s. + ·58 ·46 ·44 ·41 ·39	H. M. S. 6 6 15.7 5 25 11.2 5 16 59.4 5 8 47.9 5 0 36.7	s. + ·58 ·45 ·42 ·40 ·37
18 20 22 24 26	4 50 24·6 4 42 18·9 4 34 13·3 4 26 7·9 4 18 2·5	·45 ·44	4 50 51·4 4 42 45·0 4 34 38·8 4 26 32·8 4 18 26·9	+ ·43 ·42 ·41 ·40 ·39	4 35 2.7	+ ·41 ·40 ·38 ·37 ·35	4 51 41·1 4 43 33·0 4 35 25·0 4 27 17·2 4 19 9·6	+ ·39 ·37 ·36 ·34 ·32	4 52 4·I 4 43 54·8 4 35 45·6 4 27 36·7 4 19 28·0	+ ·37 ·35 ·33 ·31 ·29	4 52 25.8 4 44 15.1 4 36 4.7 4 27 54.4 4 19 44.4	+ ·35 ·33 ·30 ·28 ·26
28 30 31 32 33	4 9 57·3 + 4 1 52·1 3 57 49·5 3 53 47·0 3 49 44·5	·41 ·40 ·40 ·40	4 10 21·0 4 2 15·4 3 58 12·6 3 54 9·8 3 50 7·0		4 2 36·3 3 58 33·2 3 54 30·0 3 50 27·0	+ ·34 ·33 ·32 ·31 ·31	4 II 2·I 4 2 54·8 3 58 5I·2 3 54 47·7 3 50 44·2	+ ·30 ·29 ·28 ·27 ·26	4 II 19.4 4 3 II.0 3 59 6.9 3 55 2.8 3 50 58.7	1	4 II 34·5 4 3 24·8 3 59 20·0 3 55 15·2 3 51 10·5	+ ·23 ·21 ·20 ·19 ·17
34 35 36 37 38	3 45 42·0 3 41 39·5 3 37 37·0 3 33 34·6 3 29 32·2	·39 ·39 ·38	3 46 4·3 3 42 1·6 3 37 59·0 3 33 56·3 3 29 53·7	*33	3 42 20·9 3 38 17·9 3 34 14·9 3 30 12·0	·29 ·29 ·28 ·28	3 46 40·7 3 42 37·2 3 38 33·8 3 34 30·4 3 30 27·0	·25 ·24 ·23 ·22	3 38 46·6 3 34 42·7 3 30 38·8	·20 ·19 ·18 ·17	3 47 5.8 3 43 1.1 3 38 56.5 3 34 51.8 3 30 47.3	·15 ·14 ·13 ·11
39 40 41 42 43	3 25 29.7 3 21 27.4 3 17 25.0 3 13 22.5 3 9 20.2	·38 ·38 ·38 ·38	3 25 51·1 3 21 48·5 3 17 45·9 3 13 43·4 3 9 40·8	.31	3 22 6·1 3 18 3·3 3 14 0·4 3 9 57·6	+ ·27 ·26 ·26 ·25 ·25	3 26 23.6 3 22 20.3 3 18 17.0 3 14 13.8 3 10 10.5	+ ·21 ·20 ·19 ·18	3 14 23·3 3 10 19·5	+ ·16 ·15 ·14 ·13 ·12	3 26 42·7 3 22 38·1 3 18 33·6 3 14 29·0 3 10 24·5	+ ·10 ·09 ·08 ·06 ·05
44 45 46 47 48	3 5 17·8 4 3 1 15·4 2 57 13·1 2 53 10·7 2 49 8·4	·37 ·37 ·37 ·37	3 5 38·3 3 1 35·8 2 57 33·3 2 53 30·9 2 49 28·4		3 I 52·0 2 57 49·3 2 53 46·5 2 49 43·8	+ ·24 ·24 ·23 ·22 ·22	3 6 7·3 3 2 4·1 2 58 0·9 2 53 57·7 2 49 54·6	+ ·17 ·17 ·16 ·15 ·14	3 6 15·7 3 2 11·9 2 58 8·2 2 54 4·4 2 50 0·7	+ ·II ·10 ·08 ·07 ·06	3 6 20·0 3 2 15·5 2 58 11·1 2 54 6·6 2 50 2·1	·02 ·01 ·00 - ·02
49 50 51 52 53	2 45 6·0 2 41 3·6 2 37 1·2 2 32 58·9 2 28 56·5	·37 ·37 ·37 ·37	2 45 25.9 2 41 23.5 2 37 21.1 2 33 18.7 2 29 16.3		2 4I 38·4 2 37 35·7 2 33 33·I 2 29 30·5	+ ·21 ·21 ·20 ·20 ·19	2 45 51·4 2 41 48·4 2 37 45·2 2 33 42·2 2 29 39·1	+ ·13 ·12 ·11 ·10	2 45 57.0 2 41 53.3 2 37 49.5 2 33 45.8 2 29 42.1	+ ·05 ·04 ·03 + ·01 ·00	2 45 57.6 2 41 53.1 2 37 48.5 2 33 44.0 2 29 39.5	- ·03 ·04 ·06 ·08 ·09
54 55 56 57 58	2 24 54·2 + 2 20 51·8 2 16 49·4 2 12 47·0 2 8 44·5	·38 ·38	2 21 11·5 2 17 9·1 2 13 6·8	+ ·28 ·28 ·28 ·28 ·27	2 25 27·8 2 21 25·2 2 17 22·6 2 13 20·1 2 9 17·5	+ ·18 ·18 ·17 ·17 ·16	2 17 30·0 2 13 27·0	+ ·09 ·08 ·07 ·06 ·05	2 25 38·4 2 21 34·7 2 17 31·0 2 13 27·3 2 9 23·6	- ·01 ·02 ·04 ·05 ·06	2 13 21.1	- ·11 ·12 ·14 ·16 ·18
		VA	RIATIO	N TC	ı' OF	LAT	TUDE A	AND	ALTITU	DE.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	Α.	L. 9°	Α.	L. 10°	A.	L. 11°	A.
0 4 8 12 16	·39 ·35 ·31 ·28	s. 4.06 4.06 4.05 4.05 4.05	s. + ·50 - ·46 ·42 ·39 ·35	s. -4.07 4.06 4.06 4.06 4.05	s. + ·57 - ·53 ·50 ·46 ·43	s. -4·08 4·07 4·07 4·06 4·06	s. + .65 .61 .57 .54 .50	s. -4·09 4·08 4·08 4·07 4·07	s. + ·72 ·68 ·64 ·61 ·58	s. -4·10 4·09 4·09 4·08 4·08	·75 ·72 ·68 ·65	S. -4·II 4·I0 4·I0 4·09
20 22 24 26 28	·23 ·21 ·20 ·18	4·05 4·05 4·04 4·04 4·04	+ ·32 ·31 ·29 ·28 ·26	4.05 4.05 4.05 4.05 4.05	+ ·40 ·38 ·37 ·35 ·34	4.06 4.05 4.05 4.05 4.05	+ '47 '46 '45 '43 '42	4.07 4.06 4.06 4.06 4.06	+ ·55 ·54 ·53 ·51 ·50	4·08 4·07 4·07 4·07 4·07	+ ·63 ·62 ·60 ·59 ·58	4.09 4.09 4.08 4.08 4.08
30 32 34 36 38	·15 ·13 ·11 ·10	4·04 4·04 4·04 4·04 4·04	+ ·25 ·23 ·22 ·20 ·19	4.04 4.04 4.04 4.04	+ ·33 ·31 ·30 ·29 ·28	4.05 4.05 4.05 4.05 4.05	+ ·41 ·40 ·39 ·38 ·37	4.06 4.06 4.06 4.06 4.05	+ ·49 ·48 ·47 ·46 ·46	4.07 4.07 4.07 4.07 4.06	+ ·58 ·57 ·56 ·55 ·55	4.08 4.08 4.08 4.08 4.08
40 42 44 46 48	·06 ·04 ·03 +·01	4·04 4·04 4·04 4·04 4·04	+ ·17 ·16 ·14 ·13 ·11	4.04 4.04 4.04 4.04	+ ·26 ·25 ·24 ·23 ·22	4.05 4.05 4.05 4.05 4.04	+ ·36 ·35 ·34 ·33 ·32	4.05 4.05 4.05 4.05 4.05	+ ·45 ·44 ·44 ·43 ·43	4.06 4.06 4.06 4.06	+ ·54 ·54 ·54 ·54 ·54	4.07 4.07 4.07 4.07 4.07
50 52 54 56 58	·03 ·06 ·08	4.04 4.04 4.04 4.04 4.04	+ ·10 •08 •06 •05 ·03	4.04 4.04 4.04 4.04	+ ·21 ·20 ·18 ·17 ·16	4.04 4.04 4.04 4.04	+ ·32 ·31 ·30 ·30 ·30	4.05 4.05 4.05 4.05 4.05	+ ·43 ·43 ·43 ·43 ·43 ·43	4.06 4.06 4.06 4.06 4.06	+ ·54 ·54 ·54 ·56 ·57	4.08 4.08 4.08 4.08 4.08

36 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 8°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 6 50·8 5 25 37·9 5 17 24·5 5 9 11·5 5 0 58·7	s. + '59 '44 '41 '38 '36	H. M. S. 6 7 26·2 5 26 4·0 5 17 48·9 5 9 34·1 5 1 19·6	s. + ·59 ·43 ·40 ·37 ·34	5 26 29.5	s. + ·60 ·42 ·39 ·35 ·32	H. M. S. 6 8 37·9 5 26 54·6 5 18 35·4 5 10 16·6 5 1 58·2	s. + ·60 ·41 ·37 ·34 ·30	H. M. S. 6 9 14·3 5 27 19·0 5 18 57·6 5 10 36·5 5 2 15·8	s. + ·61 ·40 ·36 ·32 ·28	H. M. S. 6 9 51.0 5 27 43.0 5 19 19.1 5 10 55.5 5 2 32.4	s. + ·61 ·39 ·35 ·31 ·27
18 20 22 24 26	4 52 46·3 4 44 34·1 4 36 22·1 4 28 10·4 4 19 58·8	+ ·33 ·30 ·28 ·25 ·22	4 44 51·5 4 36 37·9 4 28 24·5 4 20 11·2	+ ·31 ·28 ·25 ·22 ·19	4 45 7·6 4 36 52·I	+ ·29 ·26 ·22 ·19 ·15	4 53 40·I 4 45 22·3 4 37 04·6 4 28 47·3 4 20 30·0	+ ·27 ·23 ·19 ·16 ·12	4 28 55.8	+ ·24 ·21 ·17 ·13 ·09	4 45 47·I 4 37 24·8	+ ·22 ·18 ·14 ·10 ·05
28 30 31 32 33	4 II 47.4 4 3 36.2 3 59 30.7 3 55 25.1 3 51 19.6	+ ·20 ·17 ·16 ·14 ·13	4 II 58·2 4 3 45·2 3 59 38·8 3 55 32·4 3 51 26·0	.10		+ ·12 ·09 ·07 ·05 ·04	4 12 12·9 4 3 55·9 3 59 47·5 3 55 39·0 3 51 30·5	+ ·08 ·05 ·03 + ·01 – ·01	4 12 17·0 4 3 57·6 3 59 47·9 3 55 38·3 3 51 28·6	+ ·05 + ·01 - ·01 ·03 ·06	4 12 18·6 4 3 56·7 3 59 45·8 3 55 34·7 3 51 23·7	+ ·01 - ·03 ·06 ·08 ·10
34 35 36 37 38	3 47 14·1 3 43 8·7 3 39 3·3 3 34 57·9 3 30 52·5		3 35 0·7 3 30 54·4	+ ·07 ·05 ·03 + ·02 ·00	3 43 15·0 3 39 7·6 3 35 0·3 3 30 52·9	02	ł .	- ·03 ·05 ·07 ·09 ·11	3 43 9·1 3 38 59·3 3 34 49·6 3 30 39·7	- ·08 ·10 ·12 ·14 ·17	3 30 27.8	- ·13 ·15 ·18 ·20 ·23
39 40 41 42 43	3 26 47·1 3 22 41·7 3 18 36·4 3 14 31·0 3 10 25·6	01 00 + .01	3 14 29·1 3 10 22·7	•08	3 18 30·7 3 14 23·3 3 10 15·8	.12	3 18 22·2 3 14 13·5 3 10 4·7	.22	3 18 9·8 3 13 59·6 3 9 49·4	- ·19 ·21 ·24 ·26 ·29	3 17 53·4 3 13 41·7 3 9 29·9	- ·25 ·28 ·30 ·33 ·36
44 45 46 47 48	3 6 20·3 3 2 14·9 2 58 9·5 2 54 4·1 2 49 58·7		2 53 57·I 2 49 50·5	- ·10 ·12 ·14 ·16 ·18	3 6 8·3 3 2 0·6 2 57 53·0 2 53 45·3 2 49 37·5	1	3 5 55.8 3 1 46.9 2 57 37.9 2 53 28.8 2 49 19.5	- ·24 ·27 ·29 ·32 ·34	3 I 28·6 2 57 I7·9 2 53 7·4 2 48 56·5	l _i	3 5 17.9 3 1 5.8 2 56 53.4 2 52 41.0 2 48 28.2	- ·39 ·42 ·45 ·48 ·51
49 50 51 52 53	2 45 53·3 2 41 47·8 2 37 42·3 2 33 36·7 2 29 31·1	·15 ·17 ·19	2 45 44·0 2 41 37·4 2 37 30·7 2 33 23·9 2 29 17·0	- ·20 ·22 ·24 ·26 ·28	2 45 29.6 2 41 21.7 2 37 13.6 2 33 5.4 2 28 57.0	·33	2 45 10·1 2 41 0·6 2 36 50·8 2 32 41·0 2 28 31·0	·45 ·48	2 36 22·6 2 32 10·9 2 27 58·8	·55 ·59	2 35 48·4 2 31 34·6 2 27 20·4	- ·55 ·58 ·62 ·66 ·69
54 55 56 57 58	2 25 25·5 2 21 19·8 2 17 14·0 2 13 8·2 2 9 2·2		2 16 55·8 2 12 48·5	- ·31 ·33 ·36 ·38 ·41		•44		.62	2 19 33·9 2 15 20·9 2 11 7·5	.74	2 18 50·7 2 14 35·2 2 10 19·2	- ·74 ·78 ·82 ·87 ·92
		\mathbf{V}_{I}	ARIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 12°	A.	L. 13	A.	L. 14	A.	L. 15	° A.	L. 16	A.	L. 17	° А.
0 4 8 12 16	s. + ·87 ·83 ·79 ·76 ·73	S. -4·13 4·12 4·11 4·11	s. + '94 '90 '86 '83 '81	S. -4·15 4·14 4·13 4·12 4·12	s. +1.02 •98 •94 •91 •88	S. -4·16 4·15 4·15 4·14 4·13	s. +1.09 1.05. 1.02 .99	s. -4·18 4·17 4·16 4·16 4·15	S. +1·17 1·13 1·09 1·06 1·04	S. -4·20 4·19 4·18 4·17 4·17	S. + I·25 I·21 I·17 I·14 I·12	s. -4·23 4·21 4·20 4·20 4·19
20 22 24 26 28	+ ·71 ·69 ·68 ·67 ·67	4·10 4·10 4·09 4·09	+ ·78 ·77 ·76 ·76 ·75	4.11 4.11 4.11 4.11	+ ·86 ·85 ·84 ·84 ·83	4·13 4·13 4·12 4·12	+ ·94 ·93 ·93 ·92 ·92	4·I5 4·I4 4·I4 4·I4	+1.02 1.01 1.01 1.00 1.00	4·17 4·16 4·16 4·16 4·16	+1·10 1·09 1·09 1·08	4·19 4·18 4·18 4·18 4·18
30 32 34 36 38	+ .66 .65 .65 .64 .64	4.09 4.09 4.09 4.09	+ ·74 ·74 ·74 ·73 ·73	4·II 4·IO 4·IO 4·II	+ ·83 ·82 ·82 ·82 ·82	4·12 4·12 4·12 4·12 4·12	+ ·91 ·91 ·91 ·91 ·92	4·I4 4·I4 4·I4 4·I4	1.01 1.00 1.00 1.00	4·16 4·16 4·16 4·16 4·16	+1.09 1.09 1.10 1.11	4·18 4·18 4·18 4·18 4·19
40 42 44 46 48	+ ·64 ·64 ·64 ·64 ·64	4·09 4·09 4·09 4·09	+ ·73 ·73 ·74 ·75 ·75	4·10 4·11 4·11 4·11	+ ·83 ·83 ·84 ·85 ·86	4·12 4·13 4·13 4·13	+ ·92 ·93 ·94 ·96 ·97	4·14 4·14 4·15 4·16	+1.02 1.03 1.05 1.07 1.09	4·17 4·17 4·18 4·18	+1·12 1·14 1·15 1·18 1·20	4·19 4·19 4·20 4·21 4·21
50 52 54 56 58	+ ·65 ·66 ·67 ·68 ·70	4·09 4·09 4·10 4·10	+ ·76 ·78 ·79 ·82 ·84	4·II 4·II 4·I2 4·I2 4·I2	+ ·88 ·90 ·92 ·95 ·98	4·13 4·14 4·15 4·15	+ ·99 1·02 1·05 1·08 1·13	4·16 4·16 4·17 4·18 4·19	+1·11 1·14 1·18 1·22 1·27	4·19 4·20 4·21 4·22 4·23	+1·23 1·27 1·31 1·36 1·42	4·22 4·23 4·25 4·26 4·28

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 37

LATITUDE 8°. DECLINATION—SAME NAME AS—LATITUDE.

T		D. 1							TITUDE	1 1	<u> </u>	Dest
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 10 28-1 5 28 6-4 5 19 39-7 5 11 13-7 5 2 47-9	s. + ·62 ·38 ·34 ·29 ·25	5 11 30.9	s. + ·63 ·38 ·33 ·28 ·23	H. M. S. 6 II 43.7 5 28 51.6 5 20 19.1 5 II 47.1 5 3 15.5	s. + ·64 ·37 ·32 ·26 ·21	H. M. S. 6 12 22·2 5 29 13·4 5 20 37·7 5 12 2·5 5 3 27·7	s. + ·64 ·36 ·30 ·25 ·19	H. M. S. 6 13 1 2 5 29 34 8 5 20 55 6 5 12 17 0 5 3 38 7	s. + ·65 ·35 ·29 ·23 ·17		s. + ·66 ·34 ·28 ·22 ·15
18 20 22 24 26	4 54 22·5 4 45 57·3 4 37 32·3 4 29 7·5 4 20 42·8	.11	4 54 34.0 4 46 6.0 4 37 38.2 4 29 10.5 4 20 42.8	+ ·18 ·13 ·08 + ·03 - ·02	4 54 44.2 4 46 13.2 4 37 42.3 4 29 11.5 4 20 40.6	+ ·16 ·11 + ·05 ·00 - ·05	4 54 53·1 4 46 18·8 4 37 44·7 4 29 10·5 4 20 36·3	+ ·14 ·08 + ·02 - ·03 ·09	4 55 0·7 4 46 22·9 4 37 45·2 4 29 7·5 4 20 29·6	+ ·II + ·05 - ·01 ·07 ·I3		+ ·09 + ·03 - ·03 ·10 ·17
28 30 31 32 33	4 12 18·1 4 3 53·3 3 59 40·9 3 55 28·5 3 51 16·0	·08 ·10 ·13 ·15	4 12 15·1 4 3 47·3 3 59 33·3 3 55 19·3 3 51 5·3	- ·07 ·12 ·15 ·18 ·20	4 12 9.7 4 3 38.7 3 59 23.0 3 55 7.3 3 50 51.5		4 12 1.9 4 3 27.3 3 59 9.9 3 54 52.3 3 50 34.6	- ·15 ·21 ·24 ·27 ·31	4 II 51.6 4 3 I3.2 3 58 53.8 3 54 34.3 3 50 I4.6	.36	3 54 13·1 3 49 51·3	- ·23 ·31 ·34 ·38 ·41
34 35 36 37 38	3 47 3.5 3 42 50.8 3 38 38.1 3 34 25.3 3 30 12.5	- ·18 ·20 ·23 ·26 ·29	3 42 36·8 3 38 22·5 3 34 8·0 3 29 53·4	·29 ·32 ·35	3 46 35.6 3 42 19.5 3 38 3.4 3 33 47.0 3 29 30.5	·35 ·38	3 46 16.8 3 41 58.9 3 37 40.7 3 33 22.4 3 29 3.8	·44 ·48	3 45 54·8 3 41 34·8 3 37 14·5 3 32 54·0 3 28 33·2	*47 *51	3 41 7.0 3 36 44.5 3 32 21.7 3 27 58.5	- ·45 ·49 ·53 ·57 ·61
39 40 41 42 43	3 25 59·5 3 21 46·4 3 17 33·1 3 13 19·6 3 9 6·0	·37 ·40 ·44	3 21 23.7 3 17 8.5 3 12 5 2 3 8 37.6	- ·38 ·41 ·44 ·48 ·51	3 25 13.8 3 20 56.9 3 16 39.8 3 12 22.4 3 8 4.7	- ·44 ·48 ·51 ·55 ·59	3 II 47·0 3 7 27·0	- ·51 ·55 ·59 ·63 ·67	3 11 7·0 3 6 44·5	·62 ·66 ·71 ·75	3 19 11·1 3 14 46·8 3 10 22·1 3 5 56·8	·79 ·84
44 45 46 47 48	3 4 52·2 3 0 38·2 2 56 24·0 2 52 9·5 2 47 54·7	·57 ·60	2 55 49.4 2 51 32.7 2 47 15.7		3 3 46·7 2 59 28·4 2 55 9·7 2 50 50·6 2 46 31·1	- ·63 ·67 ·71 ·75 ·79	3 3 6·7 2 58 45·8 2 54 24·6 2 50 2·8 2 45 40·6	- ·71 ·75 ·80 ·84 ·89	2 44 44·I	·84 ·89 ·94 ·99	2 57 4.6 2 52 37.6 2 48 9.8 2 43 41.3	1.04 1.10
49 50 51 52 53	2 43 39·6 2 39 24·2 2 35 8·3 2 30 52·1 2 26 35·4	·68 ·72 ·76 ·81	2 42 58·2 2 38 40·4 2 34 22·0 2 30 3·1 2 25 43·7	·82 ·87 ·92	2 42 II·0 2 37 50·5 2 33 29·3 2 29 7·5 2 24 45·0	- ·84 ·88 ·93 ·98 I·04	2 32 29·9 2 28 4·9 2 23 39·0	- ·94 ·99 1·05 1·10 1·16		1·10 1·16 1·23 1·29	2 34 41·6 2 30 10·2 2 25 37·7 2 21 3·9	1·29 1·36 1·43
54 55 56 57 58	2 22 18·2 2 18 0·5 2 13 42·1 2 9 23·0 2 5 3·2	.90		- ·97 1·02 1·08 1·14 1·20		1·15 1·22 1·28	2 19 12·2 2 14 44·2 2 10 15·2 2 5 44·8 2 1 13·1	1·23 1·36 1·44 1·51	2 13 22·6 2 8 49·1	1.43 1.60		1.58 1.67 1.76
		\mathbf{V}	ARIATIO	N TO	ı' OF	LAT	TUDE A	AND	ALTITU	DE.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	A.	L. 21°	A.	L. 22	° A.	L. 23	° А.
0 4 8 12 16	s. +1·33 - 1·28 1·25 1·22 1·20	s. -4·25 4·24 4·23 4·22 4·21	s. +1·40 - 1·36 1·33 1·30 1·28	s. -4·28 4·26 4·25 4·24 4·24	s. +1·49 1·44 1·41 1·38 1·36	s. -4·30 4·29 4·28 4·27 4·26	s. +1·57 1·52 · 1·49 1·46 1·44	s. -4·33 4·32 4·30 4·29 4·29	s. +1.65 1.61 1.57 1.54 1.52	s. -4·36 4·35 4·33 4·32 4·32	s. +1.73 1.69 1.65 1.63 1.61	s. -4·39 4·36 4·36 4·35 4·35
20 22 24 26 28	+1·18 1·18 1·17 1·17 1·17	4·21 4·21 4·21 4·20 4·20	+1·26 1·26 1·26 1·26 1·26	4·23 4·23 4·23 4·23	+1·35 1·34 1·34 1·35	4·26 4·26 4·26 4·26 4·26	+1·43 1·43 1·43 1·44	4·28 4·28 4·28 4·28 4·29	+1·52 1·51 1·52 1·52 1·53	4·31 4·31 4·31 4·32	+ 1.60 1.60 1.60 1.61 1.62	4·34 4·34 4·35 4·35
30 32 34 36 38	+1·17 1·18 1·18 1·19 1·21	4·2I 4·2I 4·2I 4·2I 4·2I	+1·26 1·27 1·28 1·29 1·30	4·23 4·24 4·24 4·24	+1·35 1·36 1·37 1·39 1·40	4·26 4·26 4·27 4·27 4·27	+1.44 1.45 1.47 1.48 1.51	4·29 4·29 4·30 4·30 4·31	+1·54 1·55 1·57 1·59 1·61	4·32 4·33 4·34 4·35	+1.63 1.65 1.66 1.69 1.71	4·35 4·36 4·37 4·38 4·39
40 42 44 46 48	+1·22 1·24 1·26 1·29 1·32	4·22 4·23 4·24 4·25	+1·32 1·34 1·37 1·40 1·44	4·25 4·26 4·26 4·28 4·29	+1·42 1·45 1·48 1·52 1·56	4·28 4·29 4·30 4·31 4·33	+1.53 1.56 1.60 1.64 1.68	4·32 4·33 4·34 4·36 4·38	+1.64 1.67 1.71 1.76 1.81	4·36 4·37 4·39 4·40 4·43	+1.75 1.79 1.83 1.88 1.94	4·4 ⁰ 4·4 ¹ 4·43 4·46 4·48
50 52 54 56 58	+1·35 1·40 1·45 1·51 1·58	4·26 4·27 4·29 4·31 4·34	+1.48 1.53 1.59 1.66 1.74	4·30 4·32 4·34 4·37 4·40	+1.61 1.67 1.73 1.81 1.91	4·35 4·37 4·40 4·43 4·47	+1.74 1.81 1.88 1.97 2.08	4·40 4·42 4·46 4·49 4·54	+1.88 1.95 2.04 2.14 2.26	4·45 4·48 4·52 4·57 4·63	+2·01 2·10 2·20 2·32 2·46	4·51 4·55 4·60 4·66 4·73

38 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 9°.

True	00	Decl.	1	Decl.	N—SAM	Decl.		Decl.	TITUDE	Decl.	F0.	Decl.
Alt.	0°	Var.	1°	Var.	2°	Var.	3°	Var.	4°	Var.	5°	Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19'29.8 5 11 23.5 5 3 17.2 4 55 10.8	s. + ·63 ·64 ·65 ·65 ·66	H. M. S. 6 0 38·0 5 20 8·0 5 12 2·0 5 3 55·9 4 55 49·8	s. + ·63 ·63 ·63 ·63 ·64	H. M. S. 6 I 16·1 5 20 45·5 5 I2 39·5 5 4 33·5 4 56 27·5	s. + ·63 ·62 ·62 ·62 ·62	H. M. S. 6 I 54·I 5 2I 22·3 5 I3 I6·2 5 5 I0·I 4 57 4·I	s. + ·63 ·60 ·60 ·60	H. M. S. 6 2 32·3 5 21 58·3 5 13 51·9 5 5 45·6 4 57 39·4	s. + ·64 ·59 ·59 ·58 ·58	H. M. S. 6 3 10·5 5 22 33·7 5 14 26·9 5 6 20·2 4 58 13·6	s. + ·64 ·58 ·57 ·57 ·56
18 20 22 24 26	4 47 4·2 4 38 57·6 4 30 50·7 4 22 43·6 4 14 36·3	+ ·67 ·67 ·68 ·69 ·71	4 47 43.6 4 39 37.3 4 31 30.9 4 23 24.3 4 15 17.6	+ ·64 ·65 ·65 ·66 ·67	4 48 21·5 4 40 15·4 4 32 9·3 4 24 3·2 4 15 56·9	+ ·62 ·62 ·63 ·63 ·64	4 24 40·I 4 I6 34·0	+ ·60 ·60 ·60 ·60	4 49 33'3 4 41 27'2 4 33 21'2 4 25 15'2 4 17 9'2	+ ·57 ·57 ·57 ·57 ·57	4 50 7·2 4 42 0·8 4 33 54·6 4 25 48·4 4 17 42·3	+ ·55 ·55 ·54 ·54 ·53
28 30 31 32 33	4 6 28·7 3 58 20·8 3 54 16·8 3 50 12·6 3 46 8·4	+ ·72 ·73 ·74 ·75 ·76	4 7 10·7 3 59 3·7 3 55 0·0 3 50 56·3 3 46 52·5	+ ·68 ·69 ·70 ·70 ·71	4 7 50·5 3 59 44·0 3 55 40·6 3 51 37·3 3 47 33·8	+ ·64 ·65 ·65 ·66 ·66	4 8 28·0 4 0 21·8 3 56 18·7 3 52 15·6 3 48 12·4	+ ·60 ·61 ·61 ·61 ·62	4 9 3·2 4 0 57·2 3 56 54·2 3 52 51·1 3 48 48·1	+ ·57 ·57 ·57 ·57 ·57	4 9 36·2 4 I 30·2 3 57 27·2 3 53 24·2 3 49 2I·2	+ ·53 ·53 ·53 ·53 ·53
34 35 36 `37 38	3 42 4·I 3 37 59·6 3 33 55·0 3 29 50·3 3 25 45·5	+ ·77 ·78 ·79 ·80 ·81	3 3 ⁸ 44.7 3 34 40.7 3 30 36.6 3 26 32.4	+ ·72 ·73 ·73 ·74 ·75	3 43 30·4 3 39 26·9 3 35 23·3 3 31 19·6 3 27 15·9	•69 •69	3 44 9.2 3 40 6.0 3 36 2.7 3 31 59.4 3 27 56.0	+ ·62 ·62 ·63 ·63 ·64	3 44 45·I 3 40 42·0 3 36 38·9 3 32 35·8 3 28 32·7	+ ·57 ·58 ·58 ·58 ·58	3 45 18·2 3 41 15·2 3 37 12·2 3 33 9·2 3 29 6·2	+ ·53 ·53 ·53 ·53 ·53
39 40 41 42 43	3 21 40·6 3 17 35·5 3 13 30·3 3 9 24·9 3 5 19·3	+ ·82 ·83 ·85 ·86 ·88	3 22 28·1 3 18 23·7 3 14 19·2 3 10 14·5 3 6 9·7	+ ·76 ·77 ·78 ·79 ·81	3 23 12·1 3 19 8·2 3 15 4·3 3 11 0·2 3 6 56·1	+ ·70 ·71 ·72 ·73 ·74	3 23 52·6 3 19 49·1 3 15 45·6 3 11 42·0 3 7 38·4	+ ·64 ·65 ·66 ·66 ·67	3 24 29.6 3 20 26.4 3 16 23.2 3 12 19.9 3 8 16.7	·59 ·60 ·60 ·60	3 8 51.0	+ ·53 ·53 ·53 ·54 ·54
44 45 46 47 48	3 I I3·5 2 57 7·5 2 53 I·3 2 48 54·9 2 44 48·2	+ ·89 ·91 ·92 ·94 ·96	3 2 4.8 2 57 59.7 2 53 54.4 2 49 49.0 2 45 43.3	+ ·82 ·83 ·85 ·86 ·88	3 2 51·8 2 58 47·5 2 54 43·0 2 50 38·4 2 46 33·6	+ ·75 •76 ·77 ·78 ·80	3 3 34·7 2 59 30·9 2 55 27·0 2 51 23·0 2 47 18·9	+ ·68 ·69 ·70 ·70 ·72	3 4 13.4 3 0 10.0 2 56 6.5 2 52 3.0 2 47 59.5	·63 ·64	2 48 35.3	+ ·54 ·54 ·55 ·55 ·56
49 50 51 52 53	2 40 41·1 2 36 33·9 2 32 26·3 2 28 18·3 2 24 9·9	+ ·98 1·00 1·03 1·05 1·08	2 41 37·5 2 37 31·4 2 33 25·0 2 29 18·4 2 25 11·5	+ ·90 ·91 ·93 ·95 ·98	2 42 28·6 2 38 23·5 2 34 18·2 2 30 12·8 2 26 7·1	+ ·81 ·82 ·84 ·86 ·88	2 43 14·7 2 39 10·4 2 35 6·0 2 31 1·4 2 26 56·7	+ ·73 ·74 ·75 ·76 ·78	2 43 55·8 2 39 52·1 2 35 48·4 2 31 44·5 2 27 40·5	·66 ·67 ·68	2 44 32·0 2 40 28·7 2 36 25·4 2 32 22·0 2 28 18·6	+ ·56 ·57 ·57 ·58 ·59
54 55 56 57 58	2 20 I·2 2 I5 52·0 2 II 42·3 2 7 32·0 2 3 2I·I	+1·10 1·13 1·16 1·20 1·23	2 21 4·3 2 16 56·7 2 12 48·7 2 8 40·4 2 4 31·5	+1.00 1.02 1.05 1.08 1.11	2 22 1·1 2 17 54·8 2 13 48·4 2 9 41·6 2 5 34·4		2 22 51·7 2 18 46·6 2 14 41·4 2 10 35·8 2 6 30·1	+ ·79 ·81 ·83 ·85 ·87	2 23 36·4 2 19 32·1 2 15 27·8 2 11 23·3 2 7 18·6	·71 ·72 ·73	2 24 15·I 2 20 II·4 2 16 7·8 2 I2 4·0 2 8 0·2	+ ·60 ·60 ·61 ·62 ·63
		V	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUL	E.		
Alt.	L. 0°	Α.	L. 1°	Α	L. 2°	Α.	L. 3°	Α.	L. 4°	Α.	L. 5°	Α.
0 4 8 12 16	- ·04 ·09 ·14 ·18	s. -4.05 4.05 4.05 4.05 4.05	- ·02 ·06 ·11	s. -4·05 4·05 4·05 4·05 4·05	·10 ·05 + ·01 - ·03	s. -4.05 4.05 4.05 4.05 4.05	·17 ·13 ·08 + ·04	s. -4.05 4.05 4.05 4.05 4.05	s. + ·29 ·24 ·20 ·16 ·11	s. -4.06 4.06 4.05 4.05 4.05	·31 ·27 ·23 ·19	s. -4.06 4.06 4.06 4.06 4.05
20 22 24 26 28	- ·23 ·26 ·29 ·31 ·34	4.06 4.06 4.06 4.06	- ·16 ·18 ·21 ·23 ·26	4.05 4.05 4.06 4.06	- ·08 ·10 ·13 ·15 ·18	4.05 4.05 4.05 4.05 4.05	- ·00 - ·03 ·05 ·07 ·10	4.05 4.05 4.05 4.05 4.05	+ ·07 ·05 ·03 ·00 - ·02	4.05 4.05 4.05 4.05 4.05	+ ·15 ·12 ·10 ·08 ·06	4.05 4.05 4.05 4.05 4.05
30 32 34 36 38	- ·37 ·40 ·43 ·47 ·50	4.06 4.07 4.07 4.08 4.08	- ·29 ·32 ·35 ·38 ·41	4.06 4.06 4.07 4.07	- ·20 ·23 ·26 ·29 ·32	4.05 4.06 4.06 4.06 4.06	- ·12 ·15 ·17 ·20 ·23	4.05 4.05 4.05 4.05 4.06	- ·04 ·06 ·09 ·11 ·14	4.05 4.05 4.05 4.05 4.05	+ ·04 ·02 ·00 - ·02 ·05	4.05 4.05 4.05 4.05 4.05
40 42 44 46 48	- ·54 ·58 ·63 ·67 ·72	4·08 4·09 4·10 4·10	- :45 •48 •52 •57 •61	4.07 4.08 4.08 4.09 4.10	- ·35 ·39 ·42 ·46 ·50	4·06 4·07 4·08 4·08	- ·26 ·29 ·32 ·36 ·39	4.06 4.06 4.06 4.07 4.07	- ·16 ·19 ·22 ·25 ·29	4·05 4·06 4·06 4·06	- ·07 ·10 ·12 ·15 ·18	4.05 4.05 4.05 4.05 4.05
50 52 54 56 58	- ·78 ·84 ·91 ·98 I·06	4·12 4·14 4·15 4·17 4·19	- ·66 ·72 ·78 ·84 ·91	4·10 4·11 4·12 4·14 4·15	- ·55 ·60 ·65 ·71 ·77	4·09 4·10 4·11 4·12	- :43 •48 •52 •57 •63	4·07 4·08 4·08 4·09 4·10	- ·32 ·36 ·40 ·44 ·49	4·06 4·07 4·07 4·07 4·08	- ·21 ·24 ·28 ·31 ·35	4·05 4·06 4·06 4·06 4·06

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 39 LATITUDE 9°.

			DECLIN	ATIO	N— <i>SAM</i>	$E N_{\lambda}$	AME AS	LA	TITUDE.			
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 3 48·9 5 23 8·5 5 15 1·0 5 6 53·8 4 58 46·7	s. + ·64 ·57 ·56 ·55 ·55	H. M. S. 6 4 27.4 5 23 42.6 5 15 34.4 5 7 26.4 4 59 18.6	s. + ·64 ·56 ·55 ·53 ·52	H. M. S. 6 5 6·1 5 24 16·0 5 16 7·0 5 7 58·1 4 59 49·5	s. + ·65 ·55 ·54 ·52 ·50	H. M. S. 6 5 45.0 5 24 48.9 5 16 38.8 5 8 28.9 5 0 19.2	s. + ·65 ·54 ·52 ·50 ·49		s. + ·65 ·53 ·51 ·49 ·47	H. M. S. 6 7 3.4 5 25 52.9 5 17 40.1 5 9 27.7 5 1 15.5	s. + ·66 ·52 ·50 ·47 ·45
18 20 22 24 26 28	4 50 39·8 4 42 33·0 4 34 26·3 4 26 19·8 4 18 13·4	.20	4 26 49·4 4 18 42·5	+ ·51 ·50 ·49 ·48 ·47	4 51 41·1 4 43 33·0 4 35 25·0 4 27 17·2 4 19 9·6	+ ·49 ·47 ·46 ·45 ·43	4 52 9.9 4 44 0.8 4 35 51.9 4 27 43.2 4 19 34.7	•43 •42 •40	4 28 7·5 4 19 57·9	+ ·45 ·43 ·41 ·39 ·37	4 28 29·9 4 20 19·1	+ ·43 ·40 ·38 ·36 ·34
30 31 32 33	4 2 0·8 3 57 57·6 3 53 54·6 3 49 51·5	·49 ·49 ·48	4 10 35.7 4 2 29.0 3 58 25.7 3 54 22.4 3 50 19.2 3 46 16.0	+ ·46 ·45 ·44 ·44 ·44 + ·43	4 II 2·I 4 2 54·8 3 58 5I·2 3 54 47·7 3 50 44·2 3 46 40·7		4 II 26·4 4 3 I8·3 3 59 I4·3 3 55 I0·4 3 5I 6·5 3 47 2·6	·37 ·36 ·36	4 II 48.6 4 3 39.5 3 59 35.0 3 55 30.5 3 5I 26.1 3 47 21.7	+ ·35 ·33 ·32 ·31 ·30 + ·29	3 55 48·I	+ ·31 ·29 ·28 ·27 ·26 + ·25
35 36 37 38 39	3 41 45.4 3 37 42.4 3 33 39.4 3 29 36.4	·48 ·48	3 42 12·8 3 38 9·6 3 34 6·4 3 30 3·3 3 26 0·2	•43	3 42 37·2 3 38 33·8 3 34 30·4 3 30 27·0 3 26 23·6	•38	3 42 58·8 3 38 55·0 3 34 51·2 3 30 47·4 3 26 43·7	·33 ·33 ·32	3 43 17·4 3 39 13·1 3 35 8·9 3 31 4·7 3 27 0·5		3 43 33·2 3 39 28·3 3 35 23·4 3 31 18·6 3 27 13·8	·24 ·23 ·22 ·20
40 41 42 43 44		·47 ·47 ·47 ·47 + ·47	3 21 57·1 3 17 54·0 3 13 51·0 3 9 47·9 3 5 44·9	·41 ·41 ·41 ·41 + ·41	3 22 20·3 3 18 17·0 3 14 13·8 3 10 10·5 3 6 7·3	·36 ·35 ·35 ·34 + ·34	3 22 40·I 3 18 36·4 3 14 32·8 3 10 29·3 3 6 25·7	·30 ·29 ·28 ·28 + ·27	3 22 56·3 3 18 52·2 3 14 48·1 3 10 44·1 3 6 40·1	·24 ·23 ·22 ·21 + ·20	3 23 9·I 3 19 4·3 3 14 59·6 3 10 55·0 3 6 50·3	·18 ·17 ·16 ·15 + ·14
45 46 47 48 49 50	3 I 15·4 2 57 12·4 2 53 9·4 2 49 6·4 2 45 3·4 2 41 0·3	48	3 I 41.8 2 57 38.8 2 53 35.8 2 49 32.8 2 45 29.8 2 41 26.8	·41 ·40 ·40 ·40 ·40	3 2 4·I 2 58 0·9 2 53 57·7 2 49 54·6 2 45 5I·4 2 4I 48·4	·33 ·32 + ·32	3 2 22·2 2 58 18·6 2 54 15·2 2 50 11·7 2 46 8·3 2 42 4·9	·27 ·26 ·25 ·25 ·24 ·23	3 2 36·0 2 58 32·1 2 54 28·1 2 50 24·2 2 46 20·3 2 42 16·4	·18 ·17 + ·16	2 58 41·1 2 54 36·5 2 50 32·0 2 46 27·4	
51 52 53 54 55	2 36 57·2 2 32 54·1 2 28 51·0	·49 ·49 ·49	2 37 23.8 2 33 20.8 2 29 17.8 2 25 14.8 2 21 11.9	·40 ·40 ·40 + ·40	2 37 45·2 2 33 42·2 2 29 39·1 2 25 36·0		2 38 1·5 2 33 58·1 2 29 54·7 2 25 51·4	·23 ·22 ·21 + ·21	2 38 12·5 2 34 8·7 2 30 4·9 2 26 1·1		2 34 13·9 2 30 9·4 2 26 4·9	·07 ·05 ·04 ·03 + ·01
56 57 58	2 16 41·5 2 12 38·2 2 8 34·8	·51 ·51 ·52	2 17 8·8 2 13 5·8	·40 ·40 ·41 ·41	2 17 30·0 2 13 27·0 2 9 23·9	·30	2 17 44.8 2 13 41.6 2 9 38.4	•18	2 21 57·3 2 17 53·5 2 13 49·8 2 9 46·0	·10 ·09 ·08 ·07	2 13 51.4	- ·01 ·03 ·04
Alt.	L. 6°	Α.	L. 7°	A.	L. 8°	A.	L. 9°	A.	L. 10°		L. 11°	A.
0 4 8 12 16	·39 ·34 ·30 ·26	s. 4.07 4.07 4.06 4.06 4.06	·46 ·42 ·37 ·34	s. -4.08 4.08 4.07 4.07 4.06	·53 ·49 ·45 ·41	s. -4.09 4.08 4.08 4.07 4.07	·60 ·56 ·52 ·49	s. -4·10 4·09 4·09 4·08 4·08	.68 .64 .60 .56	S. -4·II 4·II 4·09 4·09	·75 ·71 ·67 ·64	S. -4·13 4·12 4·11 4·10 4·10
20 22 24 26 28	·20 ·18 ·16 ·14	4.05 4.05 4.05 4.05 4.05	+ ·30 ·28 ·26 ·24 ·22 + ·21	4.06 4.06 4.06 4.06 4.06	+ ·37 ·36 ·34 ·32 ·30 + ·29	4.07 4.06 4.06 4.06 4.06	+ '45 '43 '42 '40 '39	4.07 4.07 4.07 4.07 4.07	+ ·53 ·50 ·48 ·47	4.08 4.08 4.08 4.08 4.08	+ ·60 ·59 ·58 ·56 ·55	4.09 4.09 4.09 4.09
32 34 36 38 40	·10 ·08 ·06 ·04	4.05 4.05 4.05 4.05 4.05	·19 ·17 ·15	4.05 4.05 4.05 4.05 4.05	+ ·29 ·27 ·26 ·24 ·22 + ·21	4.06 4.06 4.06 4.06 4.05	+ ·37 ·36 ·34 ·33 ·31 + ·30	4·07 4·06 4·06 4·06 4·06	+ ·45 ·44 ·43 ·42 ·40 + ·39	4.07 4.07 4.07 4.07 4.07	+ ·54 ·52 ·51 ·50 ·49 + ·48	4.08 4.08 4.08 4.08 4.08
42 44 46 48 50	- ·00 - ·02 ·05 ·07	4.05 4.05 4.05 4.05 4.05	·09 ·07 ·05 ·03 + ·01	4·05 4·05 4·05 4·05 4·05	·19 ·17 ·16 ·14	4.05 4.05 4.05 4.05 4.05	·28 ·27 ·26 ·25 + ·23	4·06 4·06 4·06 4·06	*39 *38 *37 *36 *35 + *34	4.07 4.07 4.07 4.06 4.06	+ '46 '48 '47 '46 '46 + '46	4.08 4.08 4.08 4.08 4.08
52 54 56 58	·12 ·15 ·18	4·05 4·05 4·05 4·06	- ·oi ·o3 ·o6 ·o8	4·05 4·05 4·05 4·05	·11 ·09 ·07 ·05	4·05 4·05 4·05 4·05	·23 ·22 ·21 ·20 ·18	4·06 4·06 4·06 4·05	*34 *33 *32 *32	4.06 4.06 4.06 4.06	*45 *45 *45 *45 *45	4·07 4·07 4·07 4·07

40 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 9°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 7 43°0 5 26 24°1 5 18 9°7 5 9 55°7 5 1 42°1	s. + ·66 ·51 ·49 ·46 ·43	H. M. S. 6 8 22·9 5 26 54·7 5 18 38·6 5 10 22·9 5 2 7·5	s. + ·67 ·50 ·47 ·44 ·41	H. M. S. 6 9 3·2 5 27 24·8 5 19 6·8 5 10 49·2 5 2 32·0	s. + ·67 ·50 ·46 ·43 ·40	H. M. S. 6 9 43.7 5 27 54.4 5 19 34.3 5 11 14.6 5 2 55.4	s. + ·68 ·49 ·45 ·42 ·38	H. M. S. 6 10 24.7 5 28 23.5 5 20 1.0 5 11 39.2 5 3 17.7	s. + ·69 ·48 ·44 ·40 ·36	H. M. S. 6 II 6·I 5 28 52·I 5 20 27·5 5 I2 2·9 5 3 39·0	s. + ·69 ·47 ·43 ·39 ·35
18 20 22 24 26		+ ·41 ·38 ·35 ·33 ·30	4 53 52·6 4 45 37·9 4 37 23·6	+ ·39 ·36	4 54 15·2 4 45 58·7	+ ·36 ·33 ·30	4 54 36·5 4 46 18·0	+ ·34 ·31 ·27 ·24 ·20	4 54 56·7 4 46 36·0 4 38 15·6 4 29 55·5	+ ·32 ·29 ·25 ·21 ·17	4 55 15.6 4 46 52.5 4 38 29.7 4 30 7.2 4 21 44.9	+ ·30 ·26 ·22 ·18 ·14
28 30 31 32 33	4 12 26·4 4 4 14·7 4 0 8·8 3 56 3·1 3 51 57·4	+ ·28 ·25 ·24 ·23 ·21	4 12 42·1 4 4 28·7 4 0 22·1 3 56 15·5 3 52 8·9	+ ·24 ·21 ·20 ·18 ·17	4 0 32.8	+ ·21 ·17 ·16 ·14 ·12	4 13 6·9 4 4 49·6 4 0 41·0 3 56 32·5 3 52 23·9	+ ·17 ·13 ·11 ·10 ·08	4 13 15·9 4 4 56·4 4 0 46·7 3 56 37·0 3 52 27·3	+ ·13 ·09 ·07 ·05 ·03	4 13 22.8 4 5 0.8 4 0 49.8 3 56 38.8 3 52 27.9	+ ·09 ·05 ·03 + ·01 - ·01
34 35 36 37 38	3 47 51·7 3 43 46·0 3 39 40·4 3 35 34·8 3 31 29·3	·19 ·18	3 48 2·4 3 43 56·0 3 39 49·5 3 35 43·1 3 31 36·7	+ ·15 ·14 ·13 ·11 ·09	3 48 10·4 3 44 2·9 3 39 55·6 3 35 48·2 3 31 40·8	+ ·11 ·09 ·07 ·06 ·04	3 48 15·3 3 44 7·0 3 39 58·5 3 35 50·0 3 31 41·5	+ ·06 ·04 + ·02 ·00 - ·01	3 48 17·6 3 44 7·9 3 39 58·3 3 35 48·6 3 31 38·9	+ ·01 - ·01 ·03 ·05 ·07	3 48 16·9 3 44 5·9 3 39 54·9 3 35 43·9 3 31 32·8	- ·04 ·06 ·08 ·11 ·13
39 40 41 42 43	3 27 23·8 3 23 18·3 3 19 12·8 3 15 7·4 3 11 2·0	•11	3 27 30·3 3 23 24·0 3 19 17·6 3 15 11·3 3 11 5·0	+ ·08 ·06 ·05 ·03 + ·02	3 27 33:5 3 23 26:1 3 19 18:8 3 15 11:4 3 11 4:1	+ ·02 ·00 - ·01 ·03 ·05	3 27 33·1 3 23 24·6 3 19 16·1 3 15 7·6 3 10 59·0	- ·03 ·05 ·08 ·10 ·12	3 27 29·1 3 23 19·4 3 19 9·6 3 14 59·8 3 10 49·9	- ·09 ·12 ·14 ·16 ·19	3 27 21·7 3 23 10·5 3 18 59·3 3 14 48·0 3 10 36·6	- ·15 ·18 ·20 ·23 ·26
44 45 46 47 48	3 2 51·2 2 58 45·8 2 54 40·5	•03	3 6 58·7 3 2 52·4 2 58 46·1 2 54 39·8 2 50 33·4	- ·00 - ·02 ·03 ·05 ·07	2 54 34.4	- ·07 ·09 ·11 ·13 ·15	3 6 50·5 3 2 41·8 2 58 33·1 2 54 24·4 2 50 15·6	- ·14 ·16 ·18 ·21 ·23	3 6 39·9 3 2 29·9 2 58 19·8 2 54 9·6 2 49 59·3	- ·21 ·24 ·26 ·29 ·31	3 6 25·1 3 2 13·5 2 58 1·7 2 53 49·9 2 49 37·8	- ·28 ·31 ·34 ·37 ·40
49 50 51 52 53	2 46 29.7 2 42 24.4 2 38 19.0 2 34 13.6 2 30 8.2	- ·00 - ·02 ·03 ·05 ·07	2 46 27·1 2 42 20·7 2 38 14·3 2 34 7·8 2 30 1·4	- ·09 ·10 ·12 ·14 ·16	2 42 11·7 2 38 4·2 2 33 56·5	- ·17 ·19 ·21 ·24 ·26	2 46 6·7 2 41 57·7 2 37 48·6 2 33 39·4 2 29 30·1	- ·25 ·28 ·31 ·33 ·36	2 45 48·8 2 41 38·2 2 37 27·5 2 33 16·6 2 29 5·5	- ·34 ·37 ·40 ·43 ·46	2 45 25.7 2 41 13.3 2 37 0.7 2 32 47.8 2 28 34.7	- ·43 ·46 ·50 ·53 ·57
54 55 56 57 58	2 26 2·8 2 21 57·4 2 17 51·9 2 13 46·5 2 9 40·9		2 17 41·6 2 13 34·9	- ·18 ·20 ·23 ·25 ·27	2 25 40·8 2 21 32·8 2 17 24·7 2 13 16·5 2 9 8·1	- ·28 ·31 ·34 ·36 ·39	2 25 20·6 2 21 11·0 2 17 1·2 2 12 51·1 2 8 40·9	- ·39 ·42 ·45 ·48 ·51	2 24 54·2 2 20 42·7 2 16 30·8 2 12 18·7 2 8 6·3		2 24 21·3 2 20 7·6 2 15 53·5 2 11 39·1 2 7 24·1	- ·60 ·64 ·68 ·72 ·77
		v	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 12°	Α.	L. 13°	Α.	L. 14°	Α.	L. 15°	A.	L. 16°	Α.	L. 17°	A.
0 4 8 12 16	s. + ·87 - ·83 ·78 ·75 ·71	S. -4·14 4·13 4·12 4·12 4·11	s. + '95 - '90 '86 '82 '79	s. -4·16 4·15 4·14 4·13 4·12	s. +1.02 - .98 .93 .90 .87	S. -4·17 4·17 4·15 4·15 4·14	s. +1·10 - 1·05 1·01 ·97 ·94	s. -4·19 4·18 4·17 4·16 4·16	s. +1·18 - 1·13 1·09 1·05 1·02	s. -4·22 4·20 4·19 4·18 4·18	5. +1·25 - 1·21 1·17 1·13 1·10	S. -4·24 4·22 4·21 4·20 4·20
20 22 ·24 · 26 28	+ ·68 ·67 ·66 ·64 ·63	4·II 4·IO 4·IO 4·IO	+ ·76 ·75 ·73 ·72 ·71	4·12 4·11 4·11 4·11	+ ·84 ·83 ·82 ·81 ·80	4·I3 4·I3 4·I3 4·I3	+ ·92 ·91 ·90 ·89 ·88	4·15 4·15 4·15 4·14	+1.00 .99 .98 .97 .96	4·17 4·17 4·16 4·16	+1.08 1.07 1.06 1.05 1.05	4·19 4·19 4·18 4·18
30 32 34 36 38	+ ·62 ·61 ·60 ·59 ·59	4·10 4·09 4·09 4·09	+ ·70 ·70 ·69 ·68 ·68	4·11 4·11 4·11 4·11	+ ·79 ·78 ·78 ·77 ·77	4·12 4·12 4·12 4·12 4·12	+ ·87 ·87 ·87 ·86 ·86	4·14 4·14 4·14 4·14	+ ·96 ·96 ·95 ·96 ·96	4·16 4·16 4·16 4·16 4·16	+1.05 1.04 1.05 1.05 1.05	4·18 4·18 4·18 4·18 4·18
40 42 44 46 48	+ ·58 ·57 ·57 ·57 ·57	4.09 4.09 4.09 4.09	+ ·67 ·67 ·67 ·67 ·68	4·10 4·10 4·10 4·10	+ ·77 ·77 ·77 ·78 ·78	4·12 4·12 4·12 4·12 4·12	+ ·87 ·87 ·88 ·88 ·89	4·14 4·14 4·14 4·15	+ ·96 ·97 ·98 ·99	4·16 4·17 4·17 4·17	+1.06 1.07 1.08 1.10 1.12	4·19 4·19 4·20 4·20
50 52 54 56 58	+ ·57 ·57 ·57 ·58 ·59	4·09 4·09 4·09 4·09	+ ·68 ·69 ·70 ·71 ·73	4.11 4.11 4.11 4.11	+ ·79 ·81 ·82 ·84 ·86	4·13 4·13 4·14 4·14	+ ·91 ·93 ·95 ·97 1·01	4·15 4·16 4·17 4·17	+1·02 1·05 1·08 1·11 1·15	4·18 4·19 4·20 4·21	+1·14 1·17 1·21 1·25 1·30	4·21 4·22 4·23 4·24 4·25

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 41 LATITUDE 9°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	.22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 11 48·0 5 29 20·2 5 20 52·7 5 12 25·7 5 3 59·3	s. + ·70 ·46 ·42 ·37 ·33	H. M. S. 6 12 30·3 5 29 47·8 5 21 17·5 5 12 47·7 5 4 18·5	s. + ·71 ·46 ·41 ·36 ·31	5 I3 8·9	s. + ·72 ·45 ·40 ·34 ·29	H. M. S. 6 13 56.6 5 30 41.6 5 22 5.1 5 13 29.1 5 4 53.7	s. + ·73 ·44 ·39 ·33 ·27		s. + ·74 ·43 ·37 ·31 ·26	H. M. S. 6 15 25·2 5 31 33·7 5 22 50·1 5 14 7·1 5 5 24·6	s. + ·75 ·43 ·36 ·30 ·24
18 20 22 24 26	4 55 33.2 4 47 7.6 4 38 42.2 4 30 17.0 4 21 5.1	+ ·28 ·24 ·19 ·15 ·10	4 55 49.6 4 47 21.2 4 38 53.0 4 30 25.1 4 21 57.3	+ ·26 ·21 ·17 ·12 ·07	4 56 4·8 4 47 33·3 4 39 2·2 4 30 3I·2 4 22 0·3	+ ·24 ·19 ·14 ·08 + ·03	4 56 18·7 4 47 44·0 4 39 9·6 4 30 35·4 4 22 1·2	+ ·22 ·16 ·11 + ·05 ·00	4 56 31·3 4 47 53·2 4 39 15·3 4 30 37·6 4 21 59·9	+ ·20 ·14 ·08 + ·02 - ·04	4 56 42.6 4 48 0.8 4 39 19.3 4 30 37.8 4 21 56.4	+ ·18 - ·01 - ·01 ·08
28 30 31 32 33	4 13 27·3 4 5 2·6 4 0 50·3 3 56 37·9 3 52 25·5	+ ·06 + ·01 - ·01 ·04 ·06	4 13 29.6 4 5 1.9 4 0 48.1 3 56 34.2 3 52 20.3	+ ·02 - ·03 ·06 ·08 ·11	4 13 29·5 4 4 58·6 4 0 43·2 3 56 27·7 3 52 12·1	- ·02 ·08 ·10 ·13 ·16	4 13 27·0 4 4 52·7 4 0 35·5 3 56 18·3 3 52 0·9	- ·06 ·12 ·15 ·18 ·21	4 13 22·1 4 4 44·2 4 0 25·1 3 56 5·9 3 51 46·6	- ·10 ·16 ·20 ·23 ·26	4 13 14.7 4 4 32.8 4 0 11.7 3 55 50.5 3 51 29.1	- ·14 ·21 ·25 ·28 ·32
34 35 36 37 38	3 48 13·2 3 44 0·7 3 39 48·3 3 35 35·7 3 31 23·2	- ·09 ·11 ·14 ·16 ·19	3 39 38.3	- ·14 ·16 ·19 ·22 ·25	3 39 25.0 3 35 9.1 3 30 53.1	- ·19 ·22 ·25 ·28 ·31	3 47 43.5 3 43 25.9 3 39 8.3 3 34 50.5 3 30 32.5	- ·24 ·27 ·31 ·34 ·37	3 47 27.2 3 43 7.7 3 38 48.0 3 34 28.1 3 30 8.0	- ·30 ·33 ·37 ·40 ·44	3 47 7.6 3 42 46.0 3 38 24.1 3 34 2.0 3 29 39.6	- ·35 ·39 ·43 ·47 ·51
39 40 41 42 43	3 27 10·5 3 22 57·8 3 18 45·0 3 14 32·0 3 10 19·0	- ·22 ·24 ·27 ·30 ·33	3 26 55·6 3 22 41·2 3 18 26·6 3 14 11·9 3 9 57·0	- ·28 ·31 ·34 ·37 ·40	3 26 36·9 3 22 20·6 3 18 4·1 3 13 47·4 3 9 30·6	- ·34 ·38 ·41 ·44 ·48	3 26 14·3 3 21 56·0 3 17 37·4 3 13 18·6 3 8 59·5	- ·41 ·44 ·48 ·52 ·56	3 21 27·1 3 17 6·3 3 12 45·2	- ·48 ·52 ·55 ·59 ·64	3 25 17·0 3 20 54·0 3 16 30·7 3 12 7·1 3 7 43·0	- ·55 ·59 ·63 ·67 ·72
44 45 46 47 48	3 6 5.8 3 I 52.4 2 57 38.9 2 53 25.2 2 49 II.3	- ·36 ·39 ·42 ·45 ·49	3 5 41·9 3 1 26·6 2 57 11·2 2 52 55·4 2 48 39·3	- ·44 ·47 ·50 ·54 ·58	3 5 13.4 3 0 56.0 2 56 38.3 2 52 20.3 2 48 2.0	- ·51 ·55 ·59 ·63 ·67	3 4 40·I 3 0 20·4 2 56 0·3 2 5I 39·8 2 47 I8·9	- ·60 ·64 ·68 ·72 ·77	3 4 1·9 2 59 39·6 2 55 16·9 2 50 53·7 2 46 30·1	- ·68 ·72 ·77 ·82 ·86	3 3 18·5 2 58 53·5 2 54 28·0 2 50 1·8 2 45 35·0	- ·77 ·81 ·86 ·91 ·97
49 50 51 52 53	2 44 57·I 2 40 42·7 2 36 28·0 2 32 I3·0 2 27 57·6	- ·52 ·56 ·59 ·63 ·67	2 44 23·0 2 40 6·4 2 35 49·3 2 31 31·9 2 27 14·0	- ·62 ·65 ·70 ·74 ·78	2 39 24·I 2 35 4·4 2 30 44·3 2 26 23·5	- ·71 ·76 ·80 ·85 ·90	2 42 57·5 2 38 35·6 2 34 13·1 2 29 50·0 2 25 26·1	- ·81 ·86 ·91 ·96 1·02	2 28 48·7 2 24 21·4	- ·92 ·97 I·02 I·08 I·14	2 41 7.6 2 36 39.3 2 32 10.2 2 27 40.1 2 23 9.0	-1.02 1.08 1.14 1.21 1.27
54 55 56 57 58	2 23 41·9 2 19 25·7 2 15 9·0 2 10 51·8 2 6 34·1	- ·71 ·76 ·80 ·85 ·90	2 22 55.6 2 18 36.6 2 14 17.0 2 9 56.8 2 5 35.8	- ·83 ·88 ·93 ·98 I·04	2 17 40·2 2 13 17·3 2 8 53·7	- ·95 1·00 1·06 1·12 1·19	2 7 42.1	1.14	2 10 53·4 2 6 21·6	- 1·21 1·27 1·34 1·42 1·50	2 4 51.7	1.50
		V	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α.	L. 22°	Α.	L. 23°	A.
0 4 8 12 16	s. +1·33 - 1·28 1·24 1·21 1·18	s. -4·26 4·25 4·23 4·23 4·22	s. +1·41 - 1·36 1·32 1·29 1·26	s. -4·29 4·27 4·26 4·25 4·24	s. +1·49 - 1·44 1·40 1·37 1·34	s. -4·31 4·30 4·29 4·27 4·27	s. +1.58 - 1.53 1.48 1.45 1.42	s. -4·35 4·33 4·31 4·30 4·29	s. +1.66 - 1.61 1.57 1.53 1.51	s. -4·38 4·36 4·34 4·33 4·32	s. +1·74 1·69 1·65 1·62 1·59	s. -4·41 4·39 4·37 4·36 4·35
20 22 24 26 28	+1·16 1·15 1·14 1·14 1·14	4.21 4.21 4.21 4.21 4.20	+1·24 1·23 1·23 1·22 1·22	4·23 4·23 4·23 4·23 4·23	+1·32 1·32 1·31 1·31 1·31	4·26 4·26 4·26 4·26 4·26	+1·41 1·40 1·40 1·40	4·29 4·28 4·28 4·28	+1·49 1·49 1·49 1·49	4·32 4·31 4·31 4·31	+1.58 1.58 1.57 1.58 1.58	4·35 4·34 4·34 4·35
30 32 34 36 38	+1·13 1·13 1·14 1·14 1·15	4·20 4·21 4·21 4·21	+1·22 1·22 1·23 1·24 1·25	4·23 4·23 4·23 4·24	+1'31 1'32 1'32 1'33 1'35	4·26 4·26 4·26 4·27	+1·40 1·41 1·42 1·43 1·45	4·29 4·29 4·29 4·30	+1.49 1.50 1.52 1.53 1.55	4·32 4·32 4·33 4·34	+1.59 1.60 1.61 1.63 1.65	4·35 4·35 4·36 4·37 4·37
40 42 44 46 48	+1·16 1·17 1·19 1·21 1·23	4·21 4·21 4·23 4·23	+1·26 1·28 1·30 1·32 1·35	4·24 4·24 4·25 4·26 4·27	+1·36 1·38 1·41 1·44 1·47	4·27 4·28 4·29 4·30 4·31	+1·47 1·49 1·52 1·55 1·59	4·31 4·33 4·34 4·35	+1·57 1·60 1·63 1·67 1·72	4·34 4·35 4·37 4·38 4·40	+1.68 1.71 1.75 1.80 1.85	4·38 4·40 4·41 4·43 4·45
50 52 54 56 58	+1·26 1·30 1·34 1·39 1·45	4·24 4·25 4·27 4·28 4·30	+1·39 1·43 1·48 1·54 1·61	4·28 4·29 4·31 4·33 4·35	+1·51 1·56 1·62 1·69 1·77	4·32 4·34 4·36 4·39 4·42	+ 1.64 1.70 1.76 1.84 1.93	4·37 4·39 4·42 4·45 4·49	+1.77 1.84 1.91 2.00 2.11	4·42 4·45 4·48 4·52 4·57	+1.91 1.98 2.07 2.17 2.30	4·48 4·51 4·55 4·60 4·65

42 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 10°.

			DECLIN	A110	N—SAM	E NA	IME AS	—LAT	TTUDE.			
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 22.6 5 11 14.9 5 3 7.1 4 54 59.2	s. + ·70 ·72 ·72 ·73 ·73	H. M. S. 6 0 42·3 5 20 5·2 5 11 57·7 5 3 50·2 4 55 42·6	•70	H. M. S. 6 I 24.7 5 20 47.I 5 I2 39.7 5 4 32.3 4 56 24.8	s. + ·71 ·69 ·69 ·69	H. M. S. 6 2 7·I 5 2I 28·2 5 I3 20·7 5 5 I3·3 4 57 5·8	s. + ·71 ·68 ·68 ·67 ·67	H. M. S. 6 2 49.5 5 22 8.6 5 14 0.9 5 5 53.2 4 57 45.6	s. + ·71 ·67 ·66 ·66 ·65	H. M. S. 6 3 32·2 5 22 48·4 5 14 40·3 5 6 32·2 4 58 24·4	s. + ·71 ·66 ·65 ·64 ·63
18 20 22 24 26	4 46 51·0 4 38 42·7 4 30 34·2 4 22 25·4 4 14 16·4	+ ·74 ·75 ·76 ·77 ·79	4 47 34.9 4 39 27.1 4 31 19.1 4 23 10.9 4 15 2.5	+ ·72 ·72 ·73 ·74 ·75	4 48 17·3 4 40 9·8 4 32 2·2 4 23 54·4 4 15 46·6	+ ·70 ·70 ·70 ·71 ·72	4 48 58·5 4 40 51·0 4 32 43·6 4 24 36·1 4 16 28·6	∙68	4 49 38·2 4 41 30·7 4 33 23·3 4 25 15·9 4 17 8·5	+ ·65 ·65 ·65 ·65 ·65	4 50 16.6 4 42 8.9 4 34 1.3 4 25 53.8 4 17 46.4	+ ·63 ·62 ·62 ·62 ·61
28 30 31 32 33	4 6 7·0 3 57 57·2 3 53 52·2 3 49 47·0 3 45 41·8	+ ·80 ·82 ·83 ·84 ·85	4 6 53.9 3 58 45.0 3 54 40.5 3 50 35.9 3 46 31.1	•80	4 7 38·6 3 59 30·4 3 55 26·2 3 51 22·0 3 47 17·6		4 8 20·9 4 0 13·2 3 56 9·3 3 52 5·3 3 48 1·3	•69 •70 •70 •70	4 9 1.0 4 0 53.6 3 56 49.8 3 52 46.0 3 48 42.2	+ ·65 ·65 ·66 ·66	4 9 38·9 4 I 3I·5 3 57 27·8 3 53 24·I 3 49 20·4	·61 ·61 ·61 ·61
34 35 36 37 38	3 41 36·4 3 37 30·9 3 33 25·2 3 29 19·4 3 25 13·5	+ ·86 ·87 ·88 ·89 ·90	3 42 26·3 3 38 21·4 3 34 16·4 3 30 11·2 3 26 5·9	·83 ·84	3 43 13·3 3 39 8·8 3 35 4·3 3 30 59·7 3 26 55·0	+ ·76 ·76 ·77 ·78 ·79	3 43 57·3 3 39 53·2 3 35 49·0 3 31 44·8 3 27 40·6	+ ·71 ·72 ·72 ·73	3 44 38·4 3 40 34·6 3 36 30·6 3 32 26·7 3 28 22·8	+ ·66 ·67 ·67 ·67	3 45 16·7 3 41 13·0 3 37 9·2 3 33 5·5 3 29 1·7	+ ·61 ·62 ·62 ·62
39 40 41 42 43	3 21 7·3 3 17 1·0 3 12 54·5 3 8 47·8 3 4 40·8	+ ·91 ·93 ·94 ·96 ·98	3 22 0·5 3 17 55·0 3 13 49·3 3 9 43·4 3 5 37·4	.91		·81 ·82 ·83 ·84		+ ·74 ·74 ·75 ·76 ·77	3 24 18·8 3 20 14·7 3 16 10·6 3 12 6·4 3 8 2·2	+ ·68 ·69 ·70 ·70	3 24 57·9 3 20 54·1 3 16 50·2 3 12 46·4 3 8 42·5	+ ·62 ·63 ·63 ·64
44 45 46 47 48	3 0 33.7 2 56 26.2 2 52 18.5 2 48 10.5 2 44 2.1	1.01 1.03 1.05 1.08	3 I 3I·I 2 57 24·7 2 53 I8·I 2 49 II·2 2 45 4·I	·97 ·99	2 54 13·0 2 50 7·1 2 46 0·9	•91	2 55 3·3 2 50 58·2 2 46 52·9	·81 ·82	3 3 57.9 2 59 53.6 2 55 49.1 2 51 44.6 2 47 39.9	+ ·71 ·72 ·73 ·73 ·74	3 4 38·5 3 0 34·5 2 56 30·5 2 52 26·4 2 48 22·2	+ ·64 ·65 ·65 ·66 ·66
49 50 51 52 53	2 39 53·4 2 35 44·4 2 31 34·9 2 27 25·0 2 23 14·5	+1·10 1·12 1·15 1·18 1·21		1.03 1.05 1.08	2 41 54·6 2 37 48·0 2 33 41·2 2 29 34·1 2 25 26·8		2 38 41·8 2 34 36·0 2 30 30·0 2 26 23·8	·85 ·87 ·88 ·90		+ ·75 ·76 ·78 ·79 ·80	2 44 17·9 2 40 13·7 2 36 9·3 2 32 4·8 2 28 0·2	+ ·67 ·68 ·69 ·70 ·71
54 55 56 57 58	2 19 3.6 2 14 52·1 2 10 40·0 2 6 27·1 2 2 13·5	1·24 1·27 1·31 1·34 1·38	2 7 44·I	+1·13 1·16 1·19 1·22 1·26	2 13 2·6 2 8 53·8	1.05		·94 ·96	2 23 9.4 2 19 3.8 2 14 57.9 2 10 51.9 2 6 45.6		2 23 55·5 2 19 50·8 2 15 45·8 2 11 40·7 2 7 35·4	+ ·72 ·73 ·74 ·76 ·77
	,	V	ARIATI	ON TO	o r' OF	LATI		ND A	LTITUD	E.	,	
Alt.	L. 0°	A.	L. 1°	A.	L. 2°	A.	L. 3°	A.	L. 4°	A.	L. 5°	A.
0 4 8 12 16	- ·05 ·10 ·15 ·20	s. -4·06 4·06 4·06 4·06 4·07	- ·02 - ·03 ·08 ·13	s. -4.06 4.06 4.06 4.06 4.06	s. + ·14 - ·09 + ·04 ·00 - ·05	s. -4·06 4·06 4·06 4·06 4·06	S. + ·22 - ·17 ·12 ·07 + ·02	s. -4.07 4.06 4.06 4.06 4.06	s. + ·29 - ·24 ·19 ·14 ·09	s. -4.07 4.07 4.07 4.06 4.06	·31 ·26 ·21 ·17	s. -4·08 4·07 4·07 4·07 4·06
20 22 24 26 28	- ·26 ·29 ·32 ·35 ·38	4.07 4.07 4.08 4.08	- ·18 ·21 ·24 ·27 ·30	4.06 4.07 4.07 4.07 4.07	- ·11 ·14 ·16 ·19 ·22	4.06 4.06 4.07 4.07	- ·03 ·06 ·08 ·11 ·14	4.06 4.06 4.06 4.06 4.06	+ ·04 ·02 ·00 - ·03 ·05	4.06 4.06 4.06 4.06	+ ·12 ·10 ·07 ·05 ·03	4.06 4.06 4.06 4.06
30 32 34 36 38	- ·42 ·45 ·49 ·52 ·57 - ·61	4·09 4·09 4·09 4·10	- ·33 ·36 ·40 ·43 ·47	4.08 4.08 4.08 4.08 4.09	- ·25 ·28 ·31 ·34 ·38	4.07 4.07 4.07 4.07 4.08	- ·17 ·19 ·22 ·25 ·29	4·07 4·07 4·07 4·07	- ·08 ·11 ·14 ·16 ·20	4.06 4.06 4.06 4.06 4.06	- ·00 - ·02 ·05 ·07 ·10	4.06 4.06 4.06 4.06 4.06
40 42 44 46 48	·65 ·70 ·75 ·81	4·11 4·12 4·13 4·14	- ·51 ·55 ·60 ·65 ·70	4·10 4·11 4·11 4·12	- ·41 ·45 ·49 ·54 ·59	4.08 4.08 4.09 4.10 4.10	- ·32 ·35 ·39 ·43 ·48	4.08 4.08 4.08 4.09	- ·23 ·26 ·29 ·33 ·37	4.07 4.07 4.07 4.07 4.08	- ·13 ·16 ·19 ·22 ·26	4.06 4.06 4.07 4.07 4.07
50 52 54 56 58	- ·87 ·94 ··02 ··10 ··19	4·15 4·17 4·19 4·21 4·23	- ·75 ·82 ·88 ·96 I·04	4·13 4·14 4·16 4·17 4·19	- ·64 ·69 ·75 ·82 ·90	4·II 4·I2 4·I3 4·I4 4·I6	- ·52 ·57 ·63 ·69 ·75	4·10 4·11 4·12 4·13	- ·41 ·45 ·50 ·55 ·61	4.08 4.09 4.10 4.10	- ·29 ·33 ·38 ·42 ·47	4.07 4.07 4.08 4.08 4.09

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 43 LATITUDE 10°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.		Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 4 14.9 5 23 27.6 5 15 18.8 5 7 10.3 4 59 1.9	s. - ·71 ·65 ·63 ·63 ·62	H. M. S. 6 4 57.7 5 24 6.0 5 15 56.5 5 7 47.3 4 59 38.4	s. + ·71 ·63 ·62 ·61 ·60	5 24 43·9 5 16 33·5	s. + ·72 ·63 ·61 ·59 ·58	H. M. S. 6 6 24·1 5 25 21·2 5 17 9·8 5 8 58·7 5 0 48·0	s. + ·72 ·62 ·60 ·58 ·56	H. M. S. 6 7 7.6 5 25 58.0 5 17 45.4 5 9 33.1 5 1 21.1	s. + ·73 ·61 ·59 ·56 ·54	H. M. S. 6 7 51·4 5 26 34·2 5 18 20·2 5 10 6·5 5 1 53·3	s. + ·73 ·60 ·57 ·55 ·53
18 20 22 24 26	4 50 53.7 + 4 42 45.7 4 34 37.7 4 26 29.9 4 18 22.2	·60 ·59 ·59 ·58	4 51 29·5 4 43 20·9 4 35 12·5 4 27 4·2 4 18 56·1		4 52 4·I 4 43 54·8 4 35 45·6 4 27 36·7 4 19 28·0	+ ·57 ·55 ·54 ·53 ·51	4 52 37·4 4 44 27·2 4 36 17·2 4 28 7·5 4 19 58·0	+ ·54 ·53 ·51 ·50 ·48	4 53 9.6 4 44 58.3 4 36 47.2 4 28 36.5 4 20 25.9	+ ·52 ·50 ·49 ·47 ·45	4 53 40.4 4 45 27.8 4 37 15.6 4 29 3.6 4 20 52.0	+ ·50 ·48 ·46 ·44 ·42
28 30 31 32 33	4 10 14·6 4 2 7·1 3 58 3·3 3 53 59·6 3 49 55·8	- ·58 ·57 ·57 ·57 ·57	4 10 48·1 4 2 40·2 3 58 36·3 3 54 32·5 3 50 28·6	+ ·54 ·53 ·53 ·53 ·52	4 11 19·4 4 3 11·0 3 59 6·9 3 55 2·8 3 50 58·7	+ ·50 ·49 ·49 ·48 ·48	4 II 48.6 4 3 39.5 3 59 35.0 3 55 30.5 3 51 26.1	+ ·47 ·45 ·45 ·44 ·43	4 12 15.7 4 4 5.6 4 0 0.7 3 55 55.7 3 51 50.9	+ '43 '41 '40 '39	4 12 40·5 4 4 29·4 4 0 23·8 3 56 18·4 3 52 13·0	+ ·40 ·38 ·36 ·36 ·35
34 35 36 37 38	3 45 52·I 3 4I 48·4 3 37 44·7 3 33 4I·0 3 29 37·3	- ·57 ·57 ·57 ·56 ·57	3 46 24·8 3 42 21·0 3 38 17·2 3 34 13·4 3 30 9·7	+ ·52 ·52 ·52 ·51 ·51	3 46 54·6 3 42 50·6 3 38 46·6 3 34 42·7 3 30 38·8	+ ·47 ·47 ·46 ·46 ·46	3 47 21·7 3 43 17·4 3 39 13·1 3 35 8·9 3 31 4·7	+ ·43 ·42 ·42 ·41 ·40	3 47 46·I 3 43 4I·3 3 39 36·6 3 35 3I·9 3 3I 27·3	+ ·38 ·37 ·37 ·36 ·35	3 48 7.6 3 44 2.3 3 39 57.1 3 35 51.9 3 31 46.7	+ ·34 ·32 ·31 ·31 ·30
39 40 41 42 43	3 25 33.6 3 21 29.9 3 17 26.2 3 13 22.4 3 9 18.7	- ·57 ·57 ·57 ·57 ·57	3 26 5.9 3 22 2.2 3 17 58.5 3 13 54.7 3 9 51.1	+ ·51 ·51 ·51 ·51 ·51	3 26 34·9 3 22 31·0 3 18 27·1 3 14 23·3 3 10 19·5	+ ·45 ·45 ·45 ·44 ·44	3 27 0·5 3 22 56·3 3 18 52·2 3 14 48·1 3 10 44·1	+ ·40 ·39 ·39 ·38 ·38	3 27 22·7 3 23 18·2 3 19 13·7 3 15 9·2 3 11 4·8	+ ·34 ·33 ·33 ·32 ·31	3 27 41.6 3 23 36.5 3 19 31.5 3 15 26.5 3 11 21.5	+ ·29 ·28 ·27 ·26 ·25
44 45 46 47 48	3 5 15.0 3 1 11.2 2 57 7.4 2 53 3.6 2 48 59.7	- ·57 ·58 ·58 ·58 ·58	3 5 47.4 3 1 43.6 2 57 39.9 2 53 36.2 2 49 32.5	+ ·51 ·51 ·51 ·51	3 6 15·7 3 2 11·9 2 58 8·2 2 54 4·4 2 50 0·7	+ '44 '44 '43 '43 '43	3 6 40·I 3 2 36·0 2 58 32·I 2 54 28·I 2 50 24·2	+ ·37 ·36 ·36 ·36	3 7 0.4 3 2 56.0 2 58 51.6 2 54 47.3 2 50 43.1	+ ·30 ·30 ·29 ·28 ·27	3 7 16·7 3 3 11·7 2 59 6·9 2 55 2·0 2 50 57·2	+ ·24 ·23 ·22 ·21 ·20
49 50 51 52 53	2 44 55·8 2 40 51·9 2 36 47·9 2 32 43·9 2 28 39·8	- ·59 ·59 ·60 ·61 ·61	2 45 28·8 2 41 25·1 2 37 21·3 2 33 17·6 2 29 13·8	+ ·51 ·51 ·51 ·52 ·52	2 45 57·0 2 41 53·3 2 37 49·5 2 33 45·8 2 29 42·1	+ ·43 ·43 ·43 ·43 ·43	2 46 20·3 2 42 16·4 2 38 12·5 2 34 8·7 2 30 4·9	+ ·35 ·34 ·34 ·34 ·33	2 46 38·8 2 42 34·6 2 38 30·4 2 34 26·2 2 30 22·1	+ ·27 ·26 ·25 ·25 ·24	2 46 52·5 2 42 47·8 2 38 43·0 2 34 38·4 2 30 33·7	+ ·19 ·18 ·17 ·16 ·15
54 55 56 57 58	2 24 35·7 + 2 20 31·5 2 16 27·2 2 12 22·8 2 8 18·3		2 17 2·2 2 12 58·3	+ ·52 ·53 ·53 ·54 ·54	2 25 38·4 2 21 34·7 2 17 31·0 2 13 27·3 2 9 23·6	+ ·43 ·43 ·43 ·43 ·43	2 13 49.8	+ ·33 ·33 ·32 ·32 ·32	2 26 18·0 2 22 13·8 2 18 9·8 2 14 5·8 2 10 1·8		2 26 29·0 2 22 24·4 2 18 19·8 2 14 15·2 2 10 10·7	+ ·14 ·13 ·11 ·10 ·09
		V	ARIATIO	ON TO	ı' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	Α.	L. 9°	Α.	L. 10°	Α.	L. 11°	Α.
0 4 8 12 16	+ ·43 -4 ·38 4 ·34 4 ·29 4	s. \$.08 \$.08 \$.07 \$.07 \$.07	s. + ·51 - ·46 ·41 ·36 ·32	s. -4·09 4·09 4·08 4·08	s. + ·58 - ·53 ·48 ·44 ·39	s. -4·10 4·09 4·09 4·08 4·08	s. + .65 - .60 .55 .51	s. -4·II 4·IO 4·09 4·09	s. + '73 - '68 '63 '59 '54	S. -4·12 4·11 4·10 4·10	.75 .70 .66 .62	S. -4·14 4·13 4·12 4·11 4·11
20 22 24 26 28	·18 4 ·15 4 ·13 4	4·07 4·06 4·06 4·06	+ ·27 ·25 ·23 ·21 ·19	4.07 4.07 4.07 4.07	+ ·35 ·33 ·31 ·29 ·27	4·08 4·07 4·07 4·07	+ '43 '41 '39 '37 '35	4.08 4.08 4.08 4.08 4.08	+ ·50 ·49 ·47 ·45 ·43	4·09 4·09 4·09 4·08	+ ·58 ·57 ·55 ·53 ·51	4·10 4·10 4·10 4·10
30 32 34 36 38	+ ·01 4	4·06 4·06 4·06 4·06	+ ·17 ·14 ·12 ·10 ·08	4·07 4·06 4·06 4·06 4·06	+ ·25 ·23 ·21 ·19 ·17	4·07 4·07 4·07 4·07	+ ·33 ·31 ·30 ·28 ·26	4·08 4·07 4·07 4·07 4·07	+ ·42 ·40 ·38 ·37 ·34	4.08 4.08 4.08 4.08 4.08	+ ·50 ·48 ·47 ·45 ·44	4.09 4.09 4.09 4.09
40 42 44 46 48	·06 4 ·09 4 ·12 4 ·15 4	4·06 4·06 4·06 4·06 4·06	+ ·05 ·03 ·01 - ·02 ·04	4·06 4·06 4·06 4·06 4·06	+ ·15 ·13 ·11 ·08 ·06	4.06 4.06 4.06 4.06 4.06	+ ·24 ·22 ·20 ·19 ·17	4.07 4.07 4.07 4.07 4.06	+ ·33 ·32 ·30 ·29 ·27	4.07 4.07 4.07 4.07 4.07	+ ·43 ·42 ·40 ·39 ·38	4.08 4.08 4.08 4.08 4.08
50 52 54 56 58	*22 4 *25 4 *29 4	\$·07 \$·07 \$·07 \$·07	- ·07 ·10 ·13 ·16 ·20	4·06 4·06 4·06 4·06 4·06	+ ·04 -01 - ·01 -04 -06	4.06 4.06 4.06 4.06 4.06	+ ·15 ·13 ·11 ·09 ·07	4.06 4.06 4.06 4.06 4.06	+ ·26 ·25 ·23 ·22 ·21	4.07 4.07 4.07 4.07 4.07	+ ·37 ·36 ·35 ·35 ·34	4·08 4·08 4·08 4·08 4·08

44 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 10°.

		DECLINA'	1101	-SAM	E NA	ME AS	-LA	III UDE.			
True Alt.	12° Dec		ecl.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	5 27 9·8 5 18 54·2 5 10 39·1	H. M. S. 74 6 9 19 9 59 5 27 45 0 56 5 19 27 7 54 5 11 10 9 51 5 2 54 5	·74 ·58 ·55	H. M. S. 6 10 4.7 5 28 19.6 5 20 0.4 5 11 41.7 5 3 23.5	s. + ·75 ·57 ·54 ·51 ·47	H. M. S. 6 10 49.9 5 28 53.7 5 20 32.5 5 12 11.8 5 3 51.6	·56 ·53	H. M. S. 6 II 35.6 5 29 27.4 5 2I 4.0 5 I2 4I.0 5 4 I8.6	·56	H. M. S. 6 12 21·7 5 30 0·7 5 21 34·8 5 13 9·4 5 4 44·6	s. + ·77 ·55 ·51 ·47 ·42
18 20 22 24 26	4 45 56·1 ·2 4 37 42·4 ·2 4 29 29·1 ·2 4 21 16·1 ·3	48 4 54 38·5 + 46 4 46 23·0 43 4 38 7·7 41 4 29 52·8 38 4 21 38·2	'44 4 '41 4 '38 4 '35 4	4 55 5·8 4 46 48·4 4 38 31·5 4 30 14·7 4 21 58·4	+ '44 '41 '38 '35 '32	4 55 31·8 4 47 12·5 4 38 53·5 4 30 35·0 4 22 16·7	·35 ·32 ·29	4 47 35.2 4 39 14.1 4 30 53.4 4 22 33.0	·29 ·25	4 56 20·4 4 47 56·6 4 39 33·1 4 31 10·0 4 22 47·2	+ ·38 ·34 ·30 ·26 ·22
28 30 31 32 33	4 4 50·8 4 0 44·6 3 56 38·5 3 52 32·5	36 4 13 23.9 + 34 4 5 9.8 32 4 1 2.9 31 3 56 56.1 30 3 52 49.3	·30 ·28 ·27 ·26	4 13 42·4 4 5 26·6 4 1 18·8 3 57 11·0 3 53 3·3	.21	_	+ 25 •22 •20 •18 •17	4 5 52-9 4 I 43-0 3 57 33-2 3 53 23-4	·18 ·16 ·14 ·12	3 57 40·3 3 53 29·3	·14 ·12 ·10 ·07
34 35 36 37 38	3 44 20·5 3 40 14·6 3 36 8·7 3 32 2·9	29 3 48 42·5 + 28 3 44 35·7 27 3 40 29·1 25 3 36 22·4 24 3 32 15·8	·23 ·21 ·20 ·19	3 48 55.7 3 44 48.1 3 40 40.5 3 36 33.0 3 32 25.5	·13	3 49 6·1 3 44 57·5 3 40 48·9 3 36 40·3 3 32 31·8	+ ·15 ·13 ·11 ·09 ·08	3 40 54·I 3 36 44·5 3 32 34·8	·08 ·06 ·04 + ·02	3 40 56·3 3 36 45·4 3 32 34·4	+ ·01 - ·01 - ·03
39 40 41 42 43	3 23 51·4 3 19 45·7 3 15 40·1 3 11 34·4	23 3 28 9·3 + 22 3 24 2·8 21 3 19 56·3 19 3 15 49·8 18 3 11 43·4	·16 ·14 ·13 ·12	3 28 18·0 3 24 10·6 3 20 3·2 3 15 55·8 3 11 48·4	·08 ·07 ·05	3 28 23·3 3 24 14·8 3 20 6·4 3 15 57·9 3 11 49·4	+ ·06 ·04 + ·02 ·00 - ·02	3 15 56·1 3 11 46·4	- ·02 ·04 ·06 ·08	3 24 12·4 3 20 1·4 3 15 50·3 3 11 39·2	- ·06 ·08 ·10 ·13 ·15 - ·18
44 45 46 47 48	3 3 23·3 2 59 17·8 2 55 12·3 2 51 6·8	17 3 7 37 0 + 16 3 3 30 6 14 2 59 24 3 13 2 55 17 9 12 2 51 11 6	·09 ·07 ·06 ·04	3 7 41·1 3 3 33·7 2 59 26·2 2 55 19·0 2 51 11·7	- ·02 ·04	3 7 40·9 3 3 32·5 2 59 24·0 2 55 15·5 2 51 6·9	- ·04 ·06 ·08 ·10 ·12	2 50 57.2	- ·11 ·13 ·15 ·18 ·20	2 54 54·I 2 50 42·6	·21 ·23 ·26 ·29
49 50 51 52 53	2 42 55.9 2 38 50.4 2 34 45.1 2 30 39.7	III 2 47 5:3 + 09 2 42 58:9 + 08 2 38 52:6 - 07 2 34 46:3 05 2 30 40:0 04 2 26 33:7 -	·01 2	2 47 4·3 2 42 56·9 2 38 49·5 2 34 42·1 2 30 34·6 2 26 27·1	·08 ·10 ·12 ·14	2 46 58·3 2 42 49·7 2 38 41·0 2 34 32·2 2 30 23·4 2 26 14·5	- ·14 ·16 ·19 ·21 ·24 - ·26	2 38 27·0 2 34 16·7 2 30 6·3	- ·23 ·25 ·28 ·31 ·34 - ·36	2 42 19·3 2 38 7·4	- ·31 ·34 ·37 ·41 ·44
54 55 56 57 58	2 22 28·9 2 18 23·6 2 14 18·2	04 2 26 33·7 — 02 2 22 27·3 01 2 18 21·0 00 2 14 14·6 02 2 10 8·1	·08 2	2 22 19·5 2 18 11·9	·18	2 22 5·5 2 17 56·3 2 13 47·1	·29 ·31	2 21 45·0 2 17 34·1 2 13 23·0	- 130 -40 -43 -46 -49	2 21 18·0 2 17 5·1 2 12 51·9	- ·47 ·51 ·54 ·58 ·62
	T	VARIATION	1					1		1	
Alt.	L. 12° A.		A. 	L. 14°		L. 15°		L. 16°		L. 17°	
0 4 8 12 16	s. s. + .88 -4.1 .82 4.1 .78 4.1 .74 4.1 .70 4.1	5 + ·95 -4 4 ·90 4 3 ·85 4 3 ·81 4	s. •17 •16 •15 •14 •13	s. +1.03 - .98 .93 .89	s. -4·19 4·18 4·17 4·16 4·15	s. +1·11 - 1·05 1·01 ·96	s. -4·21 4·19 4·18 4·17 4·17	S. +1·18 1·13 1·08 1·04 1·01	s. -4·23 4·22 4·20 4·19 4·18	S. +1·26 - 1·21 1·16 1·12 1·09	s. -4·25 4·24 4·22 4·21 4·20
20 22 24 26 28	+ ·66 4·1 ·64 4·1 ·63 4·1 ·61 4·1 ·59 4·1	1 ·72 4 1 ·71 4 1 ·69 4	·13 ·13 ·12 ·12 ·12	+ ·82 ·80 ·79 ·78 ·76	4·I4 4·I4 4·I4 4·I4 4·I4	+ ·90 ·88 ·87 ·86 ·84	4·16 4·15 4·15 4·15	+ ·97 ·96 ·95 ·94 ·93	4·18 4·17 4·17 4·17	+1.06 1.05 1.03 1.02 1.01	4·20 4·19 4·19 4·19
30 32 34 36 38	+ ·58 4·1 ·57 4·1 ·56 4·1 ·54 4·1 ·53 4·1	0 ·65 4 0 ·64 4 0 ·63 4 0 ·63 4	·12 ·11 ·11 ·11	+ ·75 ·74 ·73 ·72 ·72	4·13 4·13 4·12 4·13	+ ·84 ·83 ·82 ·81 ·81	4·15 4·14 4·14 4·14	+ ·92 ·91 ·91 ·91	4·17 4·16 4·16 4·16 4·16	1.00 1.00 1.00 1.00 1.00	4·19 4·18 4·18 4·18 4·19
40 42 44 46 48	+ ·52 4·0 ·51 4·0 ·50 4·0 ·50 4·0 ·49 4·0	9 ·61 4 9 ·60 4 9 ·60 4 9 ·60 4	.11 .11 .11	+ ·7I ·7I ·7I ·70 ·7I	4·12 4·12 4·12 4·12 4·12	+ ·81 ·81 ·81 ·82	4·14 4·14 4·14 4·14	+ ·90 ·91 ·91 ·92 ·93	4·16 4·16 4·16 4·16 4·17	+1.00 1.01 1.01 1.02 1.04	4·18 4·19 4·19 4·19
50 52 54 56 58	+ ·48 4·0 ·48 4·0 ·48 4·0 ·48 4·0 ·48 4·0	9 ·60 4 9 ·60 4 9 ·60 4	.11 .11 .11 .11	+ ·71 ·72 ·73 ·75	4·12 4·13 4·13 4·13	+ ·82 ·83 ·85 ·87 ·89	4·14 4·15 4·15 4·16	+ ·94 ·95 ·97 I·00 I·03	4·17 4·17 4·18 4·18 4·19	+1.06 1.08 1.11 1.14 1.18	4·20 4·21 4·22 4·23

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 45 LATITUDE 10°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 13 8·3 5 30 33·5 5 22 5·0 5 13 37·1 5 5 9·7	s. + ·78 ·54 ·50 ·45 ·41	H. M. S. 6 13 55·4 5 31 5·9 5 22 34·5 5 14 3·8 5 5 33·8	s. + ·79 ·54 ·49 ·44 ·39	H. M. S. 6 14 43·1 5 31 37·8 5 23 3·5 5 14 29·8 5 5 56·7	s. + ·80 ·53 ·48 ·43 ·37	H. M. S. 6 15 31·5 5 32 9·5 5 23 31·8 5 14 55·0 5 6 18·7	s. + ·81 ·52 ·47 ·41 ·36	H. M. S. 6 16 20·6 5 32 40·7 5 23 59·7 5 15 19·5 5 6 39·8	s. + ·82 ·52 ·46 ·40 ·34	H. M. S. 6 17 10·2 5 33 11·5 5 24 26·9 5 15 43·0 5 6 59·8	s. + ·83 ·51 ·45 ·38 ·32
18 20 22 24 26	4 56 42·9 4 48 16·5 4 39 50·5 4 31 24·9 4 22 59·6	+ ·36 ·32 ·28 ·23 ·19	4 57 4·2 4 48 35·0 4 40 6·3 4 31 37·9 4 23 9·8	+ ·34 ·30 ·25 ·20 ·15	4 57 24·2 4 48 52·1 4 40 20·5 4 31 49·1 4 23 18·0	+ ·32 ·27 ·22 ·17 ·12	4 57 43·I 4 49 7·9 4 40 33·0 4 3I 58·5 4 23 24·2	+ ·30 ·25 ·19 ·14 ·08	4 58 0.8 4 49 22.1 4 40 43.9 4 32 6.0 4 23 28.2	+ ·28 ·22 ·17 ·11 + ·05	4 58 17·2 4 49 35·0 4 40 53·1 4 32 11·4 4 23 30·0	+ ·26 ·20 ·14 ·07 + ·01
28 30 31 32 33	4 14 34·5 4 6 9·6 4 1 57·1 3 57 44·8 3 53 32·4	+ ·14 ·10 ·07 ·05 + ·03	4 14 41.9 4 6 14.2 4 2 0.3 3 57 46.5 3 53 32.6	+ ·10 ·05 + ·03 ·00 - ·02	4 14 47·1 4 6 16·2 4 2 0·8 3 57 45·5 3 53 30·0	+ ·07 + ·01 - ·01 ·04 ·07	4 14 50·0 4 6 15·8 4 - 1 58·7 3 57 41·6 3 53 24·5	+ ·03 - ·03 ·06 ·09 ·12	4 14 50·5 4 6 12·7 4 1 53·8 3 57 34·9 3 53 15·9	- ·01 ·07 ·10 ·14 ·17	4 I4 48.5 4 6 7.0 4 I 46.I 3 57 25.2 3 53 4.I	- ·05 ·12 ·15 ·18 ·22
34 35 36 37 38	3 49 20·0 3 45, 7·7 3 40 55·3 3 36 43·0 3 32 30·5	- ·00 - ·02 ·04 ·07 ·09	3 49 18·8 3 45 5·0 3 40 51·1 3 36 37·1 3 32 23·2	'04 '07 '10 '12 '15	3 49 14·6 3 44 59·1 3 40 43·5 3 36 27·9 3 32 12·2	- ·10 ·12 ·15 ·18 ·21	3 49 7·2 3 44 50·0 3 40 32·6 3 36 15·2 3 31 57·7	- ·15 ·18 ·21 ·24 ·27	3 48 56·8 3 44 37·6 3 40 18·3 3 35 58·9 3 31 39·3	- ·20 ·23 ·27 ·30 ·34	3 48 43·I 3 44 2I·8 3 40 0·4 3 35 38·9 3 3I I7·I	- ·25 ·29 ·33 ·36 ·40
39 40 41 42 43	3 28 18·1 3 24 5·6 3 19 53·1 3 15 40·5 3 11 27·9	- ·12 ·14 ·17 ·20 ·22	3 28 9·2 3 23 55·1 3 19 40·9 3 15 26·6 3 11 12·2	- ·18 ·21 ·24 ·27 ·30	3 27 56·5 3 23 40·6 3 19 24·6 3 15 8·5 3 10 52·2	- ·24 ·27 ·30 ·34 ·37	3 27 40·0 3 23 22·2 3 19 4·2 3 14 46·1 3 10 27·7	- ·31 ·34 ·37 ·41 ·45	3 27 19·6 3 22 59·7 3 18 39·5 3 14 19·2 3 9 58·6		3 26 55·2 3 22 33·0 3 18 10·5 3 13 47·8 3 9 24·7	- ·44 ·48 ·52 ·56 ·60
44 45 46 47 48	3 7 15·1 3 3 2·2 2 58 49·3 2 54 36·2 2 50 22·9	- ·25 ·28 ·31 ·34 ·37	3 6 57·7 3 2 43·1 2 58 28·2 2 54 13·2 2 49 58·0	- ·33 ·36 ·39 ·43 ·46	3 6 35·8 3 2 19·1 2 58 2·2 2 53 45·1 2 49 27·7	- ·40 ·44 ·47 ·51 ·55	3 6 9·1 3 1 50·3 2 57 31·2 2 53 11·8 2 48 52·0	- ·48 ·52 ·56 ·60 ·64	3 5 37·7 3 1 16·5 2 56 54·9 2 52 33·0 2 48 10·6	·69 ·74	3 5 1·3 3 0 37·5 2 56 13·2 2 51 48·5 2 47 23·2	- ·65 ·69 ·74 ·79 ·84
49 50 51 52 -	2 46 9·5 2 41 55·9 2 37 42·1 2 33 28·0 2 29 13·8	- ·40 ·44 ·47 ·51 ·54	2 45 42.6 2 41 26.9 2 37 10.9 2 32 54.6 2 28 38.0	- ·49 ·53 ·57 ·61 ·65	2 45 10·1 2 40 52·1 2 36 33·7 2 32 15·0 2 27 55·7	- ·59 ·63 ·67 ·72 ·76	2 44 31·8 2 40 11·3 2 35 50·2 2 31 28·7 2 27 6·6	- ·69 ·73 ·78 ·83 ·88	2 43 47·7 2 39 24·3 2 35 0·3 2 30 35·8 2 26 10·5	- ·79 ·84 ·89 ·94 I·00	2 42 57·4 2 38 30·9 2 34 3·8 2 29 35·8 2 25 7·0	- ·89 ·94 ·•00 ·•06 ·•12
54 55 56 57 58	2 24 59·2 2 20 44·3 2 16 29·0 2 12 13·4 2 7 57·3	- ·58 ·62 ·66 ·70 ·75	2 11 27.3	- ·69 ·74 ·78 ·83 ·88	2 23 36·0 2 19 15·8 2 14 54·9 2 10 33·4 2 6 11·1	- ·81 ·86 ·91 ·97 I·02	2 22 43·9 2 18 20·5 2 13 56·3 2 9 31·3 2 5 5·3	- ·93 ·99 I·04 I·11 I·17	2 21 44·4 2 17 17·5 2 12 49·6 2 8 20·7 2 3 50·6	-1.05 1.12 1.18 1.25 1.32	2 16 6·4 2 11 34·5 2 7 1·2	-1·19 1·25 1·33 1·40 1·48
		V	ARIATI	ON T	O I' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 18°	A.	L. 19°	A.	L. 20°	Α.	L. 21°	A.	L. 22°	A.	L. 23°	Α.
0 4 8 12 16	1·29 1·24 1·20 1·16	s. -4·28 4·26 4·25 4·23 4·22	1·37 1·32 1·28 1·24	s. -4·30 4·28 4·27 4·26 4·25	s. +1·50 - 1·45 1·40 1·36 1·33	s. -4·33 4·31 4·30 4·28 4·27	s. +1·59 - 1·53 1·48 1·44 1·41	s. -4·36 4·34 4·32 4·31 4·30	s. +1.67 1.61 1.56 1.52 1.49	s. -4·39 4·37 4·35 4·34 4·33	s. +1.76 - 1.70 1.65 1.61 1.58	s. -4·42 4·40 4·38 4·37 4·36
20 22 24 26 28	+1·14 1·13 1·12 1·11 1·10	4·22 4·21 4·21 4·21	+1·22 1·21 1·20 1·19 1·19	4·24 4·24 4·24 4·23	+1·30 1·29 1·28 1·28 1·27	4·26 4·26 4·26 4·26 4·26	+1·39 1·38 1·37 1·37 1·36	4·29 4·29 4·29 4·28	+1.47 1.47 1.46 1.46 1.45	4·32 4·31 4·31 4·31	+1.56 1.55 1.55 1.55 1.54	4·35 4·35 4·35 4·34
30 32 34 36 38	1.09 1.09 1.09	4·21 4·20 4·21 4·20 4·21	1.19 1.19 1.19 1.19	4·23 4·23 4·23 4·23	+1·27 1·27 1·28 1·28 1·29	4·26 4·26 4·26 4·26 4·26	+1·37 1·37 1·37 1·38 1·39	4·29 4·29 4·29 4·29	+ 1.46 1.46 1.47 1.48 1.49	4·32 4·31 4·32 4·33	+1.55 1.56 1.57 1.58 1.60	4·35 4·35 4·36 4·36
40 42 44 46 48	+1·10 1·11 1·12 1·13 1·15	4.21 4.21 4.22 4.22	+1·20 1·21 1·23 1·25 1·27	4·23 4·24 4·25 4·25	+1·30 1·32 1·34 1·36 1·39	4·26 4·27 4·28 4·28 4·29	+ 1·40 1·42 1·45 1·47 1·51	4·30 4·31 4·32 4·33	+1·51 1·53 1·56 1·59 1·63	4·33 4·34 4·35 4·36 4·38	+1.62 1.64 1.68 1.71 1.76	4·37 4·38 4·39 4·41 4·43
50 52 54 56 58	+1·18 1·20 1·24 1·28 1·32	4·23 4·24 4·25 4·26 4·27	+1·30 1·33 1·37 1·42 1·48	4·26 4·27 4·29 4·30 4·32	+1·42 1·46 1·51 1·57 1·63	4·30 4·32 4·33 4·35 4·38	+1.55 1.59 1.65 1.72 1.80	4·35 4·36 4·38 4·41 4·44	+1.68 1.73 1.80 1.87 1.97	4·39 4·41 4·44 4·51	+1.81 1.87 1.95 2.04 2.14	4.45 4.47 4.50 4.54 4.59

46 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 11°.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 0 0·0 5 19 14·6 5 11 5·2 5 2 55·8 4 54 46·1	s. + ·78 ·79 ·79 ·80 ·81	H. M. S. 6 0 46·6 5 20 1·6 5 11 52·5 5 3 43·4 4 55 34·1	s.	H. M. S. 6 I 33·3 5 20 47·9 5 I2 38·9 5 4 29·9 4 56 20·9	s. + ·78 ·76 ·76 ·77	H. M. S. 6 2 20·1 5 21 33·4 5 13 24·4 5 5 15·4 4 57 6·4	s. + ·78 ·75 ·75 ·75 ·75	H. M. S. 6 3 6·9 5 22 18·2 5 14 9·0 5 5 59·8 4 57 50·6	s. + ·78 ·74 ·74 ·73 ·73	H. M. S. 6 3 53.8 5 23 2.4 5 14 52.8 5 6 43.2 4 58 33.9	s. + ·78 ·73 ·72 ·72 ·71
18 20 22 24 26	4 46 36·3 4 38 26·2 4 30 15·8 4 22 5·2 4 13 54·2	+ ·82 ·83 ·84 ·85 ·87	4 47 24·7 4 39 15·1 4 31 5·4	+ ·79 ·80 ·81 ·82 ·83	4 48 11·7 4 40 2·5 4 31 53·2 4 23 43·8 4 15 34·2	+ ·77 ·78 ·78 ·79 ·80	4 48 57.4 4 40 48.4 4 32 39.3 4 24 30.1 4 16 20.9	+ ·75 ·75 ·75 ·76 ·76	4 49 41·7 4 41 32·7 4 33 25·7 4 25 14·7 4 17 5·7	+ ·73 ·72 ·72 ·73 ·73	4 50 24·6 4 42 15·5 4 34 6·4 4 25 57·4 4 17 48·3	+ ·70 ·70 ·70 ·69 ·69
28 30 31 32 33	4 5 42·8 3 57 30·9 3 53 24·8 3 49 18·6 3 45 12·2	•93	4 6 34·7 3 58 23·8 3 54 18·3 3 50 12·6 3 46 6·8		4 7 24·3 3 59 14·2 3 55 9·0 3 51 3·8 3 46 58·5	+ ·81 ·82 ·82 ·83 ·84	4 8 II·6 4 0 2·I 3 55 57·2 3 5I 52·3 3 47 47·4	+ ·77 ·78 ·78 ·79 ·79	4 8 56.6 4 0 47.4 3 56 42.8 3 52 38.1 3 48 33.5	+ ·73 ·73 ·74 ·74 ·74	4 9 39.4 4 1 30.4 3 57 25.8 3 55 21.3 3 49 16.8	+ ·69 ·69 ·70 ·70 ·70
34 35 36 37 38	3 41 5.6 3 36 58.9 3 32 52.1 3 28 45.0 3 24 37.7	+ ·94 ·96 ·97 ·98 I·00	3 37 54·8 3 33 48·7 3 29 42·3 3 25 35·8	•94	3 42 53·I 3 38 47·6 3 34 42·0 3 30 36·3 3 26 30·5	+ ·84 ·85 ·86 ·87 ·88 + ·89	3 43 42·4 3 39 37·3 3 35 32·2 3 31 27·0 3 27 21·6	+ ·80 ·80 ·81 ·82 ·82	3 44 28·7 3 40 24·0 3 36 19·2 3 32 14·3 3 28 9·4	+ ·75 ·75 ·76 ·76 ·77	3 41 7.7 3 37 3.1 3 32 58.5 3 28 53.8	十 ·70 ·70 ·70 ·71 ·71
39 40 41 42 43 44	3 20 30·3 3 16 22·6 3 12 14·6 3 8 6·4 3 3 57·9 2 59 49·2	+1.01 1.03 1.04 1.06 1.08 +1.10	3 21 29·2 3 17 22·4 3 13 15·4 3 9 8·1 3 5 0·7 3 0 53·0	+ ·95 ·96 ·98 ·99 ·1·01 + ·1·03	3 22 24·5 3 18 18·4 3 14 12·1 3 10 5·7 3 5 59·2 3 1 52·4	.90	3 23 16·2 3 19 10·7 3 15 5·1 3 10 59·3 3 6 53·5 3 2 47·5	+ ·83 ·84 ·85 ·86 ·87 + ·88	3 24 4·4 3 19 59·3 3 15 54·2 3 11 49·0 3 7 43·6 3 3 38·2	+ ·77 ·78 ·79 ·79 ·80 + ·81	3 20 44·3 3 16 39·5 3 12 34·7 3 8 29·8	+ ·72 ·72 ·72 ·73 ·74
45 46 47 48 49	2 55 40·1 2 51 30·7 2 47 20·9 2 43 10·8 2 39 0·1	1.12	2 56 45·1 2 52 36·9 2 48 28·4 2 44 19·5	1.04 1.06 1.08 1.10	2 57 45·4 2 53 38·3 2 49 30·9 2 45 23·2 2 41 15·2	93 -97 -98 1-00 1-02 +1-04	2 58 41·3 2 54 34·9 2 50 28·5 2 46 21·8 2 42 14·9	·89 ·91 ·92 ·93 + ·95	3 3 38·2 2 59 32·7 2 55 27·1 2 51 21·3 2 47 15·4 2 43 9·4	+ ·81 ·82 ·83 ·84 ·85 + ·86	3 0 19·8 2 56 14·7 2 52 9·5 2 48 4·2	+ ·74 ·75 ·76 ·76 ·77 + ·78
50 51 52 53	2 34 49·1 2 30 37·5 2 26 25·3 2 22 12·6 2 17 59·2	1·24 1·27 1·30 1·34	2 36 0.8 2 31 50.9 2 27 40.5 2 23 29.6	1·15 1·17 1·20 1·23	2 37 7·0 2 32 58·4 2 28 49·6 2 24 40·3	1.06 1.08 1.10 1.13	2 38 7.7 2 34 0.4 2 29 52.7 2 25 44.9 2 21 36.6	·97 ·99 ••00	2 39 3·2 2 34 56·8 2 30 50·2 2 26 43·4	·88 ·89 •91	2 39 53·3 2 35 47·7 2 31 41·9 2 27 36·0	·79 ·80 ·82 ·83 + ·84
55 56 57	2 13 45·1 2 9 30·2 2 5 14·4 2 0 57·7	1·41 1·45 1·49 1·54	2 15 6·2 2 10 53·6 2 6 40·3 2 2 26·2	1·29 1·33 1·37 1·41	2 16 20·4 2 12 9·8 2 7 58·7 2 3 46·8	1·18 1·21 1·24 1·28	2 17 28·0 2 13 19·0 2 9 9·6 2 4 59·8	1·07 1·10 1·12 1·15	2 18 29.0 2 14 21.4 2 10 13.5 2 6 5.3	·96 ·98 1·01 1·03	2 19 23·7 2 15 17·2 2 11 10·5	·86 ·87 ·89 ·91
Alt.	L. 0°	A.	L. 1°	A.	L. 2°	LATI'	L. 3°	ND A	LTITUD	E. A.	L. 5°	Α.
0 4 8 12 16 20 22 24 26	- ·05 ·11 ·17 ·23 - ·29 ·32 ·35 ·39	s. -4.07 4.07 4.08 4.08 4.08 4.08 4.09 4.09 4.09 4.09	S. + ·07 ÷ + ·02 - ·04 ·09 ·15 - ·21 ·24 ·27 ·31	s. -4.07 4.07 4.07 4.08 4.08 4.08 4.08 4.08 4.09	S. + ·14 - ·09 + ·03 - ·02 ·07 - ·13 ·17 ·19 ·23	s. -4.08 4.07 4.07 4.07 4.07 4.08 4.08 4.08 4.08	s. + ·222 - ·16 ·11 ·05 ·00 - ·06 ·09 ·11 ·15	s. -4.08 4.08 4.08 4.07 4.07 4.07 4.07 4.08 4.07 4.08	s. + ·29 - ·23 ·18 ·13 ·07 + ·02 - ·01 ·03 ·07	s. -4.08 4.08 4.08 4.07 4.07 4.07 4.08 4.07 4.08	s. + '36 - '31 '25 '20 '15 + '10 '07 '04 + '02	s. 4.09 4.09 4.08 4.08 4.08 4.07 4.08 4.07 4.08
30 32 34 36 38	- ·42 - ·46 ·50 ·54 ·58 ·63	4·10 4·10 4·11 4·11 4·12	*34 - *38 *41 *45 *49 *53	4·09 4·09 4·10 4·10 4·11	·26 ·29 ·32 ·36 ·40 ·44	4.09 4.09 4.09 4.09 4.10	-17 21 -24 -27 -31 -35	4.08 4.08 4.08 4.08 4.08 4.09	·09 ·12 ·15 ·19 ·22 ·25	4.07 4.08 4.08 4.08 4.08 4.08	- ·01 - ·04 ·07 ·10 ·13 ·16	4.07 4.08 4.07 4.08 4.08 4.08
40 42 44 46 48	- ·67 ·72 ·78 ·84 ·90	4·13 4·14 4·15 4·16 4·17	- ·57 ·62 ·67 ·73 ·79	4·II 4·I2 4·I3 4·I4 4·I5	- ·48 ·52 ·57 ·62 ·67	4·10 4·11 4·12 4·13	- ·38 ·42 ·47 ·51 ·56	4·09 4·10 4·11 4·11	- ·29 ·32 ·36 ·41 ·45	4·08 4·08 4·09 4·10	*34	4·08 4·08 4·08 4·09 4·09
50 52 54 56 58	- ·97 I·05 I·13 I·23 I·33	4·19 4·21 4·26 4·29	- ·85 ·92 I·00 I·08 I·18	4·16 4·18 4·19 4·22 4·24	- ·73 ·79 ·86 ·94 I·03	4·14 4·15 4·17 4·18 4·20	- ·61 ·67 ·73 ·80 ·88	4·12 4·13 4·14 4·15 4·17	- ·50 ·55 ·60 ·66 ·73	4·I0 4·I1 4·I2 4·I4	·48 ·53	4·09 4·10 4·11 4·12

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 47 LATITUDE 11°.

Tours		Decl.		Decl.	N—SAM	Decl.		Decl.	TITUDE.	Decl.	1	Dool
True Alt.	6°	Var.	7°	Var.	8°	Var.	9°	Var.	10°	Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 4 40.9 5 23 46.0 5 15 35.8 5 7 25.7 4 59 16.0	s. + ·79 ·72 ·71 ·70 ·69	H. M. S. 6 5 28·2 5 24 28·9 5 16 18·0 5 8 7·3 4 59 56·8	s. + ·79 ·71 ·70 ·68 ·67	H. M. S. 6 6 15.7 5 25 11.2 5 16 59.4 5 8 47.9 5 0 36.7	s. + ·79 ·70 ·68 ·67 ·65	H. M. S. 6 7 3.4 5 25 53.0 5 17 40.1 5 9 27.7 5 1 15.5	s. + ·80 ·69 ·67 ·65 ·64	H. M. S. 6 7 51.4 5 26 34.2 5 18 20.2 5 10 6.5 5 1 53.3	s. + ·80 ·68 ·66 ·64 ·62	H. M. S. 6 8 39.7 5 27 14.8 5 18 59.4 5 10 44.5 5 2 30.0	s. + ·81 ·67 ·65 ·63 ·60
18 20 22 24 26	4 51 6·3 4 42 56·8 4 34 47·4 4 26 38·1 4 18 29·0	+ ·68 ·68 ·67 ·66 ·66	4 51 46·7 4 43 36·7 4 35 26·8 4 27 17·1 4 19 7·7	+ ·66 ·65 ·64 ·63 ·63	4 52 25·8 4 44 15·1 4 36 4·7 4 27 54·4 4 19 44·4	+ ·64 ·63 ·62 ·60 ·59	4 53 3.7 4 44 52.2 4 36 40.9 4 28 29.9 4 20 19.1	+ ·62 ·60 ·59 ·58 ·56	4 53 40·4 4 45 27·8 4 37 15·6 4 29 3·6 4 20 52·0	+ ·60 ·58 ·56 ·55 ·53	4 54 15.8 4 46 2.1 4 37 48.7 4 29 35.6 4 21 22.8	+ ·58 ·56 ·54 ·52 ·50
28 30 31 32 33	4 10 19·9 4 2 10·9 3 58 6·4 3 54 1·9 3 49 57·4	+ ·66 ·65 ·65 ·65 ·65	4 10 58·3 4 2 49·0 3 58 44·4 3 54 39·8 3 50 35·3	1	3 55 15·2 3 51 10·5	+ ·58 ·58 ·57 ·57 ·56	4 12 8.6 4 3 58.2 3 59 53.1 3 55 48.1 3 51 43.1	+ ·55 ·54 ·53 ·52 ·52	4 12 40·5 4 4 29·4 4 0 23·8 3 56 18·4 3 52 13·0		4 13 10·3 4 4 58·1 4 0 52·1 3 56 46·1 3 52 40·2	+ ·48 ·46 ·45 ·44 ·43
34 35 36 37 38	3 45 52·9 3 41 48·4 3 37 43·9 3 33 39·4 3 29 34·9	+ ·65 ·65 ·65 ·65 ·66	3 46 30·7 3 42 26·2 3 38 21·7 3 34 17·2 3 30 12·7	•60	3 43 1·1 3 38 56·5 3 34 51·8 3 30 47·3	+ ·56 ·56 ·55 ·55 ·55	3 47 38·1 3 43 33·2 3 39 28·3 3 35 23·4 3 31 18·6	+ ·51 ·50 ·50 ·49	3 48 7.6 3 44 2.3 3 39 57.1 3 35 51.9 3 31 46.7	·45 ·44	3 48 34·4 3 44 28·6 3 40 22·9 3 36 17·2 3 32 11·6	+ ·42 ·41 ·40 ·40
39 40 41 42 43	3 25 30·3 3 21 25·8 3 17 21·2 3 13 16·6 3 9 12·0	+ ·66 ·66 ·67 ·67	3 26 8·2 3 22 3·7 3 17 59·2 3 13 54·7 3 9 50·2	·60	3 18 33·6 3 14 29·0 3 10 24·5	+ ·55 ·54 ·54 ·54 ·54	3 27 13.8 3 23 9.1 3 19 4.3 3 14 59.6 3 10 55.0	+ '49 '48 '48 '48 '47	3 27 41 6 3 23 36 5 3 19 31 5 3 15 26 5 3 11 21 5	+ '43 '43 '42 '42 '41	3 28 6·0 3 24 0·5 3 19 55·0 3 15 49·6 3 11 44·2	+ ·38 ·37 ·36 ·35 ·35
44 45 46 47 48	3 5 7·3 3 I 2·6 2 56 57·9 2 52 53·I 2 48 48·2	·68 ·69 ·69	3 5 45.7 3 1 41.2 2 57 36.6 2 53 32.1 2 49 27.5	+ ·61 ·61 ·61	3 2 15·5 2 58 11·1 2 54 6·6 2 50 2·1	*54 *54 *54 *54	3 6 50·3 3 2 45·7 2 58 41·1 2 54 36·5 2 50 32·0	+ ·47 ·47 ·46 ·46 ·46		+ ·40 ·40 ·39 ·39 ·38	3 7 38·9 3 3 33·6 2 59 28·3 2 55 23·0 2 51 17·9	+ ·34 ·33 ·32 ·31 ·30
49 50 51 52 53	2 44 43·3 2 40 38·3 2 36 33·3 2 32 28·1 2 28 22·8	+ ·70 ·71 ·71 ·72 ·73	2 45 22.9 2 41 18.2 2 37 13.5 2 33 8.8 2 29 4.0	·63 ·64	2 4I 53·I 2 37 48·5 2 33 44·0 2 29 39·5	+ ·54 ·54 ·54 ·54 ·54	2 38 18·4 2 34 13·9 2 30 9·4	+ ·46 ·46 ·45 ·45 ·45	2 46 52·5 2 42 47·8 2 38 43·0 2 34 38·4 2 30 33·7	+ ·38 ·37 ·36 ·36		+ ·30 ·29 ·28 ·27 ·27
54 55 56 57 58	2 24 17·5 2 20 12·0 2 16 6·4 2 12 0·7 2 7 54·8	·77	2 24 59·I 2 20 54·2 2 16 49·2 2 12 44·2 2 8 39·0	+ ·64 ·65 ·66 ·67 ·68	2 21 30·3 2 17 25·7 2 13 21·1	+ ·55 ·55 ·56 ·56 ·57		+ ·45 ·45 ·45 ·45 ·45	2 26 29·0 2 22 24·4 2 18 19·8 2 14 15·2 2 10 10·7	+ ·35 ·35 ·35 ·34 ·34	2 26 47·4 2 22 42·5 2 18 37·5 2 14 32·6 2 10 27·7	+ ·26 ·25 ·24 ·23 ·23
		7	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	Α.	L. 9°	Α.	L. 10°	A.	L. 11°	A.
0 4 8 12 16	s. + '43 '38 '33 '27 '22	s. -4·10 4·09 4·09 4·08 4·08	*45 *40 *35 *30	s. -4·10 4·10 4·09 4·09 4·08	·53 ·47 ·42 ·37	s. -4·II 4·IO 4·IO 4·O9	·60 ·55 ·50 ·45	s. -4·13 4·12 4·11 4·10 4·10	·68 ·62 ·57 ·53	S. -4·14 4·13 4·12 4·11 4·11	s. + ·81 · ·75 ·70 ·65 ·60	S. -4·I5 4·I4 4·I3 4·I2 4·I2
20 22 24 26 28	+ ·17 ·15 ·12 ·10 ·07	4.08 4.08 4.08 4.08 4.07	+ ·25 ·23 ·20 ·18 ·15	4.08 4.08 4.08 4.08 4.08	+ ·33 ·30 ·28 ·26 ·23	4.09 4.09 4.08 4.08 4.08	+ ·40 ·38 ·36 ·34 ·31	4·09 4·09 4·09 4·09	+ ·48 ·46 ·44 ·42 ·40	4·10 4·10 4·10 4·10	+ ·56 ·54 ·52 ·50 ·48	4·II 4·II 4·II 4·IO
30 32 34 36 38	+ ·04 . ·02 . ·01 . ·04 . ·07 ·120	4·07 4·07 4·07 4·07	+ ·13 ·10 ·08 ·05 ·02	4·07 4·07 4·07 4·07	+ ·21 ·19 ·16 ·14 ·12	4.08 4.08 4.08 4.08 4.08	+ ·29 ·27 ·25 ·23 ·21	4.08 4.08 4.08 4.08 4.08	+ ·38 ·36 ·34 ·31 ·30	4.09 4.09 4.09 4.08	+ ·46 ·44 ·42 ·40 ·39	4·10 4·10 4·09 4·09
40 42 44 46 48	- ·10 ·13 ·16 ·20 ·23	4.07 4.08 4.08 4.08 4.08	- ·00 - ·03 ·06 ·09 ·12	4.07 4.07 4.08 4.08	+ ·09 ·06 ·04 + ·01 - ·02	4·07 4·07 4·07 4·07	+ ·18 ·16 ·14 ·11 ·09	4.08 4.08 4.08 4.08 4.08	+ ·28 ·26 ·24 ·22 ·20	4.08 4.08 4.08 4.08 4.08	+ ·37 ·35 ·34 ·32 ·30	4·09 4·09 4·09 4·09
50 52 54 56 58	- ·27 ·31 ·35 ·40 ·45	4·08 4·09 4·09 4·10	- ·16 ·19 ·23 ·27 ·31	4.08 4.08 4.08 4.08 4.09	- ·04 ·08 ·11 ·14 ·18	4.07 4.07 4.08 4.08 4.08	+ ·07 ·04 + ·01 - ·01 ·04	4.07 4.07 4.07 4.07 4.07	+ ·18 ·16 ·14 ·11 ·09	4.08 4.08 4.08 4.08 4.08	+ ·29 ·27 ·26 ·24 ·23	4.08 4.08 4.08 4.08 4.08

48 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 11°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Far.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 9 28·3 5 27 55·0 5 19 38·1 5 11 21·7 5 3 5·7	s. + ·81 ·66 ·64 ·61 ·59	H. M. S. 6 10 17·3 5 28 34·6 5 20 16·0 5 11 58·0 5 3 40·4	s. + ·82 ·66 ·63 ·60 ·57	H. M. S. 6 II 6·7 5 29 I3·9 5 20 53·4 5 I2 33·5 5 4 I4·I	s. + ·83 ·65 ·62 ·58 ·55	H. M. S. 6 II 56·5 5 29 52·6 5 2I 30·I 5 I3 8·I 5 4 46·7	s. + ·83 ·64 ·61 ·57 ·54	5 30 31.0	s. + ·84 ·63 ·60 ·56 ·52	H. M. S. 6 13 37.7 5 31 8.9 5 22 41.7 5 14 15.2 5 5 49.3	s. + ·85 ·63 ·59 ·55 ·50
18 20 22 24 26	4 54 50·I 4 46 35·0 4 38 20·2 4 30 5·9 4 2I 5I·8	+ ·56 ·54 ·51 ·49 ·47	4 55 23·2 4 47 6·6 4 38 50·3 4 30 34·4 4 22 18·8	+ ·54 ·51 ·49 ·46 ·43	4 55 55·2 4 47 36·7 4 39 18·8 4 31 1·2 4 22 44·0	+ ·52 ·49 ·46 ·43 ·40	4 56 26·0 4 48 5·6 4 39 45·7 4 31 26·2 4 23 7·1	+ ·50 ·47 ·43 ·40 ·37	4 56 55.6 4 48 33.1 4 40 11.1 4 31 49.5 4 23 28.4	+ ·48 ·45 ·41 ·37 ·34	4 57 24·I 4 48 59·3 4 40 35·0 4 32 II·2 4 23 47·7	+ ·46 ·42 ·38 ·34 ·30
28 30 31 32 33	4 13 38·0 4 5 24·6 4 1 17·9 3 57 11·4 3 53 4·9	+ ·44 ·42 ·41 ·40 ·39	4 14 3.6 4 5 48.7 4 1 41.3 3 57 34.1 3 53 26.9	+ ·41 ·38 ·37 ·36 ·34	4 14 27·1 4 6 10·5 4 2 2·3 3 57 54·2 3 53 46·2	+ ·37 ·34 ·33 ·31 ·30	4 14 48·4 4 6 30·0 4 2 20·8 3 58 11·8 3 54 2·8	+ ·34 ·30 ·29 ·27 ·25		+ ·30 ·26 ·25 ·23 ·21	4 15 24.6 4 7 1.8 4 2 50.5 3 58 39.3 3 54 28.1	+ ·27 ·22 ·20 ·18 ·16
34 35 36 37 38	3 48 58·5 3 44 52·1 3 40 45·7 3 36 39·5 3 32 33·3	+ ·38 ·36 ·35 ·34 ·33	3 49 19·7 3 45 12·6 3 41 5·6 3 36 58·6 3 32 51·7	+ ·33 ·32 ·30 ·29 ·28		+ ·28 ·27 ·25 ·24 ·23	3 49 54·0 3 45 45·1 3 41 36·3 3 37 27·5 3 33 18·8		3 50 6.8 3 45 56.9 3 41 47.1 3 37 37.2 3 33 27.5	+ ·19 ·17 ·15 ·13 ·11	3 50 16·9 3 46 5·8 3 41 54·8 3 37 43·8 3 33 32·8	+ ·14 ·12 ·10 ·08 ·06
39 40 41 42 43	3 28 27·I 3 24 2I·O 3 20 I5·O 3 I6 9·O 3 I2 3·O		3 28 44·8 3 24 38·1 3 20 31·3 3 16 24·5 3 12 17·9	+ ·27 ·25 ·24 ·23 ·22	3 28 59·2 3 24 51·6 3 20 44·0 3 16 36·4 3 12 28·9	+ ·21 ·19 ·18 ·17 ·15	3 29 10·2 3 25 1·5 3 20 53·0 3 16 44·4 3 12 35·9	.10	3 29 17·7 3 25 8·0 3 20 58·3 3 16 48·6 3 12 38·9	+ ·10 ·08 ·06 ·04 + ·02	3 29 21·8 3 25 10·8 3 20 59·8 3 16 48·8 3 12 37·9	+ ·04 + ·01 - ·00 - ·03 ·05
44 45 46 47 48	3 7 57·1 3 3 51·2 2 59 45·4 2 55 39·6 2 51 33·8	+ ·27 ·26 ·25 ·24 ·23	3 8 11·3 3 4 4·7 2 59 58·1 2 55 51·6 2 51 45·1	+ ·20 ·19 ·18 ·16 ·15	3 8 21·4 3 4 13·9 3 0 6·5 2 55 59·0 2 51 51·8	+ ·13 ·12 ·10 ·09 ·07	3 8 27·4 3 4 18·9 3 0 10·4 2 56 2·0 2 51 53·5	+ ·06 ·05 ·03 + ·01 - ·01	3 8 29·2 3 4 19·6 3 0 9·9 2 56 0·2 2 51 50·5	- ·00 - ·02 ·05 ·07 ·09	3 8 26·9 3 4 15·9 3 0 4·8 2 55 53·7 2 51 42·6	- ·07 ·10 ·12 ·15 ·17
49 50 51 52 53	2 47 28·1 2 43 22·4 2 39 16·7 2 35 11·1 2 31 5·6	+ ·22 ·20 ·19 ·18 ·17	2 47 38·6 2 43 32·2 2 39 25·8 2 35 19·4 2 31 13·1	+ ·I3 ·I2 ·II ·09 ·08	2 43 37·0 2 39 29·5 2 35 22·2	+ ·05 ·04 + ·02 ·00 - ·02	2 47 45·0 2 43 36·5 2 39 28·0 2 35 19·5 2 31 11·0	- ·03 ·05 ·07 ·09 ·11	2 43 30·9 2 39 21·1	- ·11 ·14 ·16 ·18 ·21	2 47 31·4 2 43 20·1 2 39 8·7 2 34 57·3 2 30 45·6	- ·20 ·23 ·25 ·28 ·31
54 55 56 57 58	2 27 0·0 2 22 54·4 2 18 49·0 2 14 43·4 2 10 38·0	+ ·16 ·15 ·14 ·13 ·11	2 27 6·7 2 23 0·4 2 18 54·0 2 14 47·7 2 10 41·4	.02	2 27 7.5 2 23 0.2 2 18 52.8 2 14 45.4 2 10 38.0	- ·04 ·05 ·07 ·09 ·11	2 27 2·4 2 22 53·8 2 18 45·1 2 14 36·4 2 10 27·6	•18	2 26 51·2 2 22 41·1 2 18 30·8 2 14 20·5 2 10 10·0		2 18 10·0 2 13 57·7	- ·34 ·37 ·40 ·44 ·47
		V	ARIATIO	ON TO	O 1' OF	LATI'	TUDE A	ND A	LTITUD	E.		
Alt.	L. 12°	Α.	L. 13°	A.	L. 14°	Α.	L. 15°	Α.	L. 16°	A.	L. 17°	A.
°0 4 8 12 16	s. + ·88 - ·83 ·77 ·72 ·68	S. -4·17 4·16 4·15 4·14 4·13	s. + ·96 - ·90 ·85 ·80 ·76	s. -4·19 4·17 4·16 4·15	s. +1.04 - .98 .92 .88 .83	s. -4·20 4·19 4·18 4·17 4·16	s. +1·11 - 1·05 1·00 ·95 ·91	S. -4·22 4·21 4·19 4·18 4·17	s. +1·19 · 1·13 1·08 1·03 ·99	s. -4:24 4:23 4:21 4:20 4:19	S. +1·27 - 1·21 1·16 1·11 1·07	s. -4·27 4·25 4·24 4·22 4·21
20 22 24 26 28	+ ·64 ·62 ·60 ·58 ·56	4·12 4·12 4·12 4·11	+ ·71 ·70 ·68 ·66 ·64	4·14 4·13 4·13 4·12	+ •79 •78 •76 •74 •73	4·I5 4·I4 4·I4 4·I4	+ ·87 ·86 ·84 ·83 ·81	4·17 4·16 4·16 4·15	+ ·95 ·94 ·92 ·91 ·89	4·18 4·18 4·18 4·18 4·17	+1.03 1.02 1.00 .99	4·20 4·20 4·19 4·19
30 32 34 36 38	+ ·55 ·53 ·51 ·49 ·48	4·10 4·11 4·11	+ ·63 ·61 ·60 ·58 ·57	4·12 4·12 4·12 4·12 4·11	+ ·71 ·70 ·69 ·67 ·67	4·14 4·13 4·13 4·13	+ ·80 ·79 ·78 ·76 ·76	4·15 4·15 4·15 4·15	+ ·89 ·87 ·87 ·86 ·85	4·17 4·16 4·16 4·16	+ ·97 ·96 ·96 ·95 ·95	4·19 4·18 4·18 4·18
40 42 44 46 48	+ ·46 ·45 ·44 ·42 ·41	4·10 4·10 4·10	+ ·56 ·55 ·54 ·53 ·52	4·II 4·II 4·II 4·II	+ ·65 ·65 ·64 ·63 ·63	4·I3 4·I2 4·I2 4·I2 4·I2	+ ·75 ·74 ·74 ·74 ·74	4·I4 4·I4 4·I4 4·I4	+ ·85 ·84 ·84 ·84 ·85	4·16 4·16 4·16 4·16	+ ·94 ·94 ·95 ·95 ·96	4·18 4·18 4·18 4·18 4·19
50 52 54 56 58	+ ·40 ·39 ·38 ·37 ·36	4·09 4·09 4·09 4·09	+ ·51 ·50 ·50 ·50	4·II 4·II 4·II 4·II	+ ·63 ·62 ·63 ·63 ·63	4·12 4·12 4·12 4·12	+ ·74 ·74 ·75 ·76 ·77	4·I4 4·I4 4·I4 4·I5	+ ·85 ·86 ·88 ·89 ·91	4·16 4·17 4·17 4·17	+ ·97 ·99 I·00 I·03 I·06	4·19 4·19 4·20 4·20 4·21

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 49 LATITUDE 11°.

			DECLIN	AIIO	N—SAM	E IV	IME AS	—LA	III ODE.			
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23° -	Decl. Var.
0 ,10 12 14 16	H. M. S. 6 14 29·1 5 31 46·5 5 23 16·7 5 14 47·6 5 6 19·1	s. + ·86 ·62 ·58 ·53 ·49	H. M. S. 6 15 21·0 5 32 23·6 5 23 51·0 5 15 19·2 5 6 48·0	s. + ·87 ·62 ·57 ·52 ·47	5 33 0·5 5 24 24·8 5 15 50·0 5 7 16·0	s. + ·88 ·61 ·56 ·51 ·46	5 33 36·9 5 24 58·1 5 16 20·2 5 7 43·0	s. + ·89 ·60 ·55 ·50 ·44	H. M. S. 6 18 1·0 5 34 13·1 5 25 30·8 5 16 49·5 5 8 9·0	-54	5 34 48·9 5 26 3·1 5 17 18·2	s. + ·92 ·59 ·53 ·47 ·41
18 20 22 24 26	4 57 51·4 4 49 24·1 4 40 57·3 4 32 31·0 4 24 5·1	+ ·44 ·40 ·36 ·31 ·27	4 58 17·5 4 49 47·6 4 41 18·1 4 32 49·1 4 24 20·4		4 58 42·5 4 50 9·7 4 41 37·3 4 33 5·4 4 24 33·8	+ ·41 ·36 ·31 ·26 ·21	4 59 6·4 4 50 30·4 4 41 55·0 4 33 19·9 4 24 45·2	+ ·39 ·33 ·28 ·23 ·17	4 24 54.5	·31	4 59 50·6 4 51 7·7 4 42 25·4 4 33 43·4 4 25 1·7	+ ·35 ·29 ·23 ·16
28 30 31 32 33	4 15 39·5 4 7 14·1 4 3 1·6 3 58 49·0 3 54 36·6		4 15 52·1 4 7 24·1 4 3 10·1 3 58 56·2 3 54 42·3	+ ·19 ·14 ·12 ·10 ·07	4 7 31·5 4 3 16·0 3 59 0·6	+ ·15 ·10 ·08 ·05 + ·02	4 16 10·7 4 7 36·4 4 3 19·4 3 59 2·3 3 54 45·2	+ ·12 ·06 + ·03 ·00 - ·02	4 16 16·6 4 7 38·9 4 3 20·0 3 59 1·2 3 54 42·3	+ ·08 + ·02 - ·01 ·04 ·07	4 16 20·1 4 7 38·7 4 3 18·0 3 58 57·3 3 54 36·4	+ ·04 - ·02 ·06 ·09 ·12
34 35 36 37 38	3 50 24·I 3 46 II·7 3 4I 59·4 3 37 47·0 3 33 34·7	•05	3 50 28·5 3 46 14·6 3 42 0·8 3 37 47·0 3 33 33·1	+ ·05 + ·02 - ·00 - ·03 ·05	3 50 29.8 3 46 14.4 3 41 59.0 3 37 43.5 3 33 28.1	- ·00 ·06 ·08 ·11	3 50 28·I 3 46 II·0 3 4I 53·9 3 37 36·7 3 33 I9·4	- ·05 ·08 ·11 ·14 ·17	3 50 23.4 3 46 4.4 3 41 45.4 3 37 26.3 3 33 7.2	- ·10 ·14 ·17 ·20 ·23		- ·15 ·19 ·22 ·26 ·30
39 40 41 42 43	3 29 22·3 3 25 9·9 3 20 57·6 3 16 45·2 3 12 32·7	- ·02 ·04 ·07 ·09 ·12	3 29 19·2 3 25 5·3 3 20 51·4 3 16 37·4 3 12 23·4	- ·08 ·11 ·16 ·19	3 29 12·5 3 24 57·0 3 20 41·3 3 16 25·6 3 12 9·7	- ·14 ·17 ·20 ·23 ·26	3 29 2·I 3 24 44·7 3 20 27·2 3 16 9·5 3 11 51·7	- ·20 ·24 ·27 ·30 ·34	3 28 47.9 3 24 28.4 3 20 8.9 3 15 49.2 3 11 29.2	- ·27 ·30 ·34 ·37 ·41	3 28 29·7 3 24 8·1 3 19 46·3 3 15 24·3 3 11 2·1	- ·33 ·37 ·41 ·45 ·49
44 45 46 47 48	3 8 20·3 3 4 7·8 2 59 55·1 2 55 42·5 2 51 29·7	- ·15 ·17 ·20 ·23 ·26	3 8 9·3 3 3 55·0 2 59 40·7 2 55 26·3 2 51 11·7	- ·22 ·25 ·28 ·31 ·34	3 7 53·8 3 3 37·7 2 59 21·5 2 55 5·1 2 50 48·5	·36	3 7 33·8 3 3 15·6 2 58 57·3 2 54 38·7 2 50 19·9	- ·37 ·41 ·44 ·48 ·52	2 54 7·I 2 49 45·8	·57 ·62	3 6 39·6 3 2 16·7 2 57 53·5 2 53 30·0 2 49 6·0	- ·53 ·58 ·62 ·67 ·71
49 50 51 52 53	2 47 16·8 2 43 3·8 2 38 50·5 2 34 37·4 2 30 23·9	- ·29 ·32 ·35 ·38 ·41	2 46 56·9 2 42 42·0 2 38 26·9 2 34 11·6 2 29 55·9	- ·38 ·41 ·44 ·48 ·52	2 46 31·6 2 42 14·5 2 37 57·2 2 33 39·6 2 29 21·6	- '47 '51 '54 '59 '63	2 28 40.7	- ·56 ·60 ·65 ·69 ·74	2 36 39·6 2 32 16·5 2 27 52·9	- ·66 ·71 ·75 ·80 ·85	2 44 41·5 2 40 16·6 2 35 51·1 2 31 25·0 2 26 58·1	- ·76 ·81 ·86 ·92 ·97
54 55 56 57 58	2 26 10·2 2 21 56·3 2 17 42·2 2 13 27·8 2 9 13·0	•52	2 25 40·1 2 21 23·9 2 17 7·4 2 12 50·5 2 8 33·1	- ·56 ·60 ·64 ·68 ·73	2 25 3·3 2 20 44·5 2 16 25·3 2 12 5·6 2 7 45·2		2 24 19·6 2 19 57·9 2 15 35·7 2 11 12·8 2 6 49·1	- ·79 ·84 ·89 ·95 I·01		- ·91 ·96 1·02 1·09 1·15		-1.04 1.10 1.16 1.24 1.31
		V	ARIATIO	ON TO	o i' OF	LATI	TUDE A	ND A	LTITUD	E.		•
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α.	L. 22°	Α.	L. 23	° A.
0 4 8 12 16	s. +1·35 - 1·29 1·24 1·19 1·15	s. -4·29 4·27 4·26 4·24 4·23	s. +1·43 - 1·37 1·32 1·25 1·23	s. -4·32 4·30 4·28 4·27 4·26	1.45 1.40 1.35 1.31	s. -4·35 4·33 4·31 4·29 4·28	s. +1.60 - 1.53 1.48 1.43 1.39	s. -4·37 4·35 4·33 4·32 4·31	s. +1.68 - 1.62 1.56 1.52 1.48	s. -4·41 4·38 4·36 4·35 4·33	s. +1.77 · 1.70 1.65 1.60 1.56	s. -4·44 4·41 4·39 4·38 4·36
20 22 24 26 28	+1·12 1·10 1·09 1·08 1·07	4·22 4·22 4·22 4·21	+1·20 1·19 1·17 1·16 1·15	4·25 4·25 4·24 4·24 4·23	+ 1·28 1·27 1·26 1·25 1·24	4·27 4·27 4·26 4·26 4·26	+1·36 1·36 1·34 1·34 1·33	4·30 4·29 4·29 4·28	+1.45 1.44 1.43 1.42 1.42	4·32 4·32 4·32 4·31	+1.54 1.53 1.52 1.51 1.51	4·35 4·35 4·35 4·34
30 32 34 36 38	+ 1.06 1.05 1.05 1.04 1.04	4·21 4·21 4·21 4·21	+1·15 1·14 1·14 1·14	4·23 4·23 4·23 4·23	+1·24 1·23 1·23 1·24	4·26 4·26 4·26 4·26	+1·33 1·32 1·33 1·34	4·28 4·28 4·28 4·29	+ 1·42 1·42 1·43 1·44	4·32 4·31 4·32 4·32	+ 1·51 1·51 1·52 1·53 1·54	4·34 4·35 4·35 4·36
40 42 44 46 48	+1.04 1.04 1.05 1.06 1.07	4·20 4·21 4·21 4·21	+1·14 1·15 1·16 1·17 1·19	4·23 4·24 4·24 4·24	+1·24 1·25 1·27 1·28 1·30	4·26 4·26 4·27 4·27 4·28	+1·34 1·36 1·38 1·40 1·42	4·29 4·30 4·31 4·32	+ 1.45 1.47 1.49 1.51 1.54	4·32 4·33 4·34 4·35 4·36	+ 1·55 1·57 1·60 1·63 1·67	4·36 4·37 4·38 4·39 4·40
50 52 54 56 58	+1.09 1.11 1.13 1.16 1.20	4·22 4·22 4·23 4·24 4·25	+1·21 .1·23 1·27 1·31 1·35	4·25 4·26 4·27 4·28 4·29	+1·33 1·36 1·40 1·45 1·51	4·29 4·30 4·31 4·32 4·34	+1.45 1.49 1.54 1.60 1.67	4·33 4·34 4·36 4·38 4·40	+1.58 1.63 1.68 1.75 1.83	4·37 4·39 4·41 4·43 4·47	+1.71 1.77 1.83 1.91 2.00	4·42 4·44 4·47 4·50 4·54

50 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 12°.

True Alt.		Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 .10 .12 .14 .16	H. M. S. 6 0 0 0 0 5 19 5 8 5 10 54 7 5 2 43 4 4 54 31 8	s.	H. M. S. 6 o 51·0 5 19 57·3 5 11 46·4 5 3 35·5 4 55 24·4	s. + ·85 ·85 ·85 ·86 ·86	5 20 48·0 5 12 37·2	s. + ·85 ·84 ·84 ·84 ·84	H. M. S. 6 2 33·2 5 21 38·0 5 13 27·2 5 5 16·4 4 57 5·7	**************************************	5 22 27·2 5 14 16·2	s. + ·85 ·81 ·81 ·80	H. M. S. 6 4 15.8 5 23 15.8 5 15 4.5 5 6 53.3 4 58 42.3	s. + ·86 ·80 ·80 ·79 ·78
18 20 22 24 26	4 46 20·I 4 38 8·0 4 29 55·6 4 2I 42·9 4 I3 29·8	·91 ·92 ·93	4 47 13·1 4 39 1·7 4 30 50·0	+ ·87 ·88 ·89 ·90 ·91	4 48 4·7 4 39 53·7 4 31 42·5 4 23 31·1 4 15 19·5	+ ·85 ·85 ·86 ·87 ·88	4 48 55.0 4 40 44.2 4 32 33.3 4 24 22.3 4 16 11.2	·83 ·84		+ ·80 ·80 ·80	4 50 31.4 4 42 20.5 4 34 9.8 4 25 59.0 4 17 48.3	+ ·78 ·78 ·77 ·77 ·77
28 30 31 32 33	3 48 47.2	1.00 1.00	4 6 13·1 3 58 0·0 3 53 53·3 3 49 46·5 3 45 39·5	+ ·93 ·94 ·95 ·96 ·97	4 7 7.6 3 58 55.4 3 54 49.2 3 50 42.9 3 46 36.5	+ ·89 ·90 ·91 ·92 ·92	4 7 59·9 3 59 48·4 3 55 42·5 3 51 36·6 3 47 30·6	+ ·85 ·86 ·87 ·87 ·88	3 56 33·3 3 52 27·6	+ ·81 ·82 ·82 ·83 ·83	4 9 37.6 4 I 26.7 3 57 21.3 3 53 I5.9 3 49 I0.4	+ ·77 ·78 ·78 ·78 ·78
34 35 36 37 38	3 36 23·7 3 32 15·5 3 28 7·0	I.02 I.06	3 33 17·6 3 29 10·0	+ ·98 1·00 1·01 1·02 1·03	3 38 23·3 3 34 16·5 3 30 9·5	+ ·93 ·94 ·95 ·96 ·97	3 43 24·5 3 39 18·4 3 35 12·1 3 31 5·7 3 26 59·2	+ ·88 ·89 ·90 ·91 ·92	3 40 10·4 3 36 4·5 3 31 58·6	.85	3 45 4.9 3 40 59.4 3 36 53.8 3 32 48.2 3 28 42.5	+ ·79 ·79 ·79 ·80 ·80
39 40 41 42 43	3 15 40·1 3 11 30·6 3 7 20·8 3 3 10·7	1·13 1·15 1·17	3 12 37·4 3 8 28·6 3 4 19·6	1.11 1.03	3 5 24.3	+ ·99 1·00 1·01 1·03 1·04	3 22 52·6 3 18 45·8 3 14 39·0 3 10 31·9 3 6 24·7	·95 ·96 ·97	3 19 40·2 3 15 33·9 3 11 27·5 3 7 20·9	·88 ·89 ·90	3 24 36·8 3 20 31·0 3 16 25·1 3 12 19·1 3 8 13·1	+ ·81 ·81 ·82 ·83 ·84
44 45 46 47 48	2 54 49·3 2 50 37·9 2 46 26·2 2 42 13·9	1·28 1·31	2 51 50·8 2 47 40·5 2 43 29·7	+1·13 1·15 1·17 1·19 1·22	2 57 7·5 2 52 58·7 2 48 49·6 2 44 40·2	+1.06 1.07 1.09 1.11 1.13	3 2 17·3 2 58 9·7 2 54 1·9 2 49 53·9 2 45 45·6	1.01 1.03	2 50 53·3 2 46 45·9	+ ·91 ·92 ·94 ·95 ·96	3 4 6·9 3 0 0·7 2 55 54·4 2 51 47·9 2 47 41·4	·85 ·86 ·87 ·88
49 50 51 52 53	2 33 47.9 2 29 33.9 2 25 19.3 2 21 3.9	I·37 I·40 I·44 I·47	2 22 28.9	1.39	2 40 30·5 2 36 20·4 2 32 9·8 2 27 58·9 2 23 47·5	+1·15 1·18 1·20 1·23 1·26	2 41 37·1 2 37 28·2 2 33 19·1 2 29 9·6 2 24 59·7	1·13 1·13	2 26 5.8	I·03	2 35 20·6 2 31 13·3 2 27 5·8	+ ·89 ·91 ·92 ·94 ·95
54 55 56 57 58	2 12 30·7 2 8 12·7 2 3 53·6	1·51 1·59 1·63 1·68	2 I4 0·4 2 9 45·0 2 5 28·7			+1·29 1·32 1·35 1·39 1·43	2 20 49·4 2 16 38·7 2 12 27·4 2 8 15·7 2 4 3·3	+1·18 1·21 1·24 1·27 1·30	2 17 47·7 2 13 38·1 2 9 28·1	I·09	2 22 58·I 2 18 50·I 2 14 4I·9 2 10 33·4 2 6 24·5	+ ·97 ·99 I·01 I·03 I·05
		V	ARIATI	ON T		LATI	TUDE A	ND A	1	E.	1	
Alt.		Α.	L. 1°	Α.	L. 2°	A.	L. 3°	Α.	L. 4°	Α.	L. 5°	
0 4 8 12 16	- ·00 -4 ·06 4 ·12 4 ·18 4	s. 4·09 4·09 4·09 4·10	s. + ·07 - + ·01 - ·05 ·11 ·17	s. -4·09 4·09 4·09 4·09	s. + ·15 - ·08 + ·02 - ·03 ·10	s. -4·09 4·09 4·09 4·09	s. + ·22 · ·16 ·10 + ·04 - ·02	s. -4·09 4·09 4·09 4·09	s. + ·29 - ·23 ·17 ·11 + ·05	s. -4·10 4·09 4·09 4·09	s. + ·37 · ·30 ·24 ·19 ·13	s. -4·11 4·10 4·10 4·09
20 22 24 26 28	·35 4 ·39 4 ·43 4 ·46 4	h.II h.II h.IO h.IO	- ·24 ·27 ·31 ·35 ·38	4.11 4.11 4.10 4.10	- ·16 ·20 ·23 ·26 ·30	4·09 4·09 4·10 4·10	- ·08 ·12 ·15 ·18 ·21	4·09 4·09 4·09 4·09	- ·00 ·04 ·07 ·10 ·13	4·09 4·09 4·09 4·09	+ ·07 ·04 + ·01 - ·02 ·05	4.09 4.09 4.09 4.09
30 32 34 36 38	·55 4 ·59 4 ·64 4 ·69 4	1·12 1·13 1·14 1·15	- ·42 ·46 ·50 ·55 ·59	4·II 4·II 4·I2 4·I2 4·I3	- '34 '37 '41 '45 '50	4·I0 4·II 4·II 4·II	- ·25 ·29 ·32 ·36 ·40	4·10 4·10 4·10	- ·17 ·20 ·24 ·27 ·31	4·09 4·10 4·10 4·10	- ·08 ·11 ·15 ·18 ·22	4.09 4.09 4.09 4.10
40 42 44 46 48	·80 4 ·86 4 ·92 4 ·99 4	1·15 1·16 1·18 1·19	- ·64 ·69 ·75 ·81 ·88	4·14 4·15 4·16 4·17 4·18	- '54 '59 '64 '70 '76	4·12 4·13 4·14 4·15 4·16	- ·45 ·49 ·54 ·59 ·65	4·II 4·I2 4·I3 4·I4	- ·35 ·39 ·44 ·48 ·53	4·I0 4·II 4·I2 4·I2	- ·25 ·29 ·33 ·38 ·42	4·10 4·10 4·10
50 52 54 56 58	1·16 4 1·25 4 1·36 4	1·23 4·25 4·28 4·31 4·35	- ·95 1·03 1·11 1·21 1·32	4·20 4·24 4·26 4·30	- ·83 ·90 ·98 ·•06 ·•16	4·17 4·19 4·20 4·23 4·25	- ·71 ·77 ·84 ·92 I·01	4·15 4·16 4·17 4·19 4·21	- ·59 ·65 ·71 ·78 ·86	4·13 4·14 4·15 4·16 4·18	- ·47 ·52 ·58 ·65 ·71	4·12 4·13 4·14 4·15

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 51 LATITUDE 12°.

True		Decl.	i	Decl.	N—SAM	Decl.	·····	Decl.	TITUDE.	Decl.		Decl.
Alt.	6°	Var.	7°	Var.	8°	Var.	9°	Var.	10°	Var.	11°	Var.
0 10 12 14 16	H. M. S. 6 5 7.2 5 24 3.7 5 15 52.0 5 7 40.3 4 59 28.8	s. + ·86 ·79 ·78 ·77 ·77	H. M. S. 6 5 58.9 5 24 51.1 5 16 38.6 5 8 26.3 5 0 14.3	s. + ·86 ·78 ·77 ·76 ·75	H. M. S. 6 6 50·8 5 25 37·9 5 17 24·5 5 9 11·5 5 0 58·7	s. + ·87 ·77 ·76 ·74 ·73	H. M. S. 6 7 43.0 5 26 24.1 5 18 9.7 5 9 55.7 5 1 42.1	s. + ·87 ·76 ·75 ·73 ·71	H. M. S. 6 8 35·5 5 27 9·8 5 18 54·2 5 10 39·1 5 2 24·4	s. + ·88 ·76 ·74 ·71 ·70	H. M. s. 6 9 28·3 5 27 55·0 5 19 38·1 5 11 21·7 5 3 5·7	s. + ·88 ·75 ·72 ·70 ·68
18 20 22 24 26	4 51 17.6 4 43 6.5 4 34 55.5 4 26 44.6 4 18 33.8	+ ·76 ·75 ·75 ·74 ·74	4 52 2·5 4 43 51·0 4 35 39·6 4 27 28·4 4 19 17·3	+ ·74 ·73 ·72 ·71 ·71	4 52 46·3 4 44 34·1 4 36 22·1 4 28 10·4 4 19 58·8	+ ·72 ·71 ·69 ·68 ·67	4 20 38.4	+ ·70 ·68 ·67 ·66 ·64		+ ·68 ·66 ·64 ·63 ·61	4 30 5.9 4 21 51.8	+ ·66 ·64 ·62 ·60 ·58
28 30 31 32 33	4 10 23.0 4 2 12.3 3 58 7.0 3 54 1.6 3 49 56.2	+ ·74 ·74 ·74 ·74 ·74	4 II 6·3 4 2 55·5 3 58 50·0 3 54 44·6 3 50 39·3		4 II 47·4 4 3 36·2 3 59 30·7 3 55 25·1 3 51 19·6	-65	4 12 26·4 4 4 14·7 4 0 8·8 3 56 3·1 3 51 57·4	+ ·63 ·62 ·61 ·61	3 52 32.5	·57 ·56	4 13 38·0 4 5 24·6 4 1 17·9 3 57 11·4 3 53 4·9	+ ·56 ·54 ·53 ·53 ·52
34 35 36 37 38	3 4I 45·4 3 37 40·0 3 33 34·6 3 29 29·I	+ ·74 ·74 ·74 ·75 ·75	3 42 28·5 3 38 23·2 3 34 17·8 3 30 12·4	·69	3 43 8·7 3 39 3·3 3 34 57·9 3 30 52·5	·64 ·64	3 47 51.7 3 43 46.0 3 39 40.4 3 35 34.8 3 31 29.3	+ ·60 ·60 ·59 ·59	3 36 8·7 3 32 2·9	·55 ·54 ·54 ·53	3 48 58·5 3 44 52·1 3 40 45·7 3 36 39·5 3 32 33·3	+ ·51 ·50 ·49 ·49 ·48
39 40 41 42 43	3 21 18·1 3 17 12·5 3 13 6·9 3 9 1·2	+ ·75 ·75 ·76 ·76 ·77	3 26 7·1 3 22 1·7 3 17 56·3 3 13 50·8 3 9 45·4	·70 ·70 ·70	3 26 47·1 3 22 41·7 3 18 36·4 3 14 31·0 3 10 25·6	+ ·64 ·64 ·64 ·64 ·64	3 27 23.8 3 23 18.3 3 19 12.8 3 15 7.4 3 11 2.0	·57 ·57	3 11 34.4	·51	3 28 27·I 3 24 2I·0 3 20 15·0 3 16 9·0 3 12 3·0	+ '47 '46 '46 '45' '44
44 45 46 47 48	3 4 55.5 3 0 49.7 2 56 43.9 2 52 37.9 2 48 31.9	+ ·77 ·78 ·79 ·79 ·80	3 5 39.9 3 1 34.4 2 57 28.9 2 53 23.3 2 49 17.7	+ ·71 ·71 ·72 ·72	3 2 14·9 2 58 9·5 2 54 4·1 2 49 58·7	+ ·64 ·64 ·64 ·64	3 6 56.6 3 2 51.2 2 58 45.8 2 54 40.5 2 50 35.1	+ ·57 ·57 ·57 ·57 ·57		+ ·50 ·50 ·50 ·49 ·49	2 51 33.8	+ ·44 ·43 ·42 ·42 ·41
49 50 51 52 53	2 44 25.8 2 40 19.4 2 36 13.2 2 32 6.7 2 28 0.0	+ ·81 ·82 ·83 ·84 ·85	2 45 12·0 2 41 6·2 2 37 0·4 2 32 54·5 2 28 48·4	·75 ·76	2 45 53·3 2 41 47·8 2 37 42·3 2 33 36·7 2 29 31·1	·66	2 46 29·7 2 42 24·4 2 38 19·0 2 34 13·6 2 30 8·2	· ·57 ·57	2 47 1·3 2 42 55·9 2 38 50·4 2 34 45·1 2 30 39·7	·48 ·48	2 39 16·7 2 35 11·1 2 31 5·6	+ ·41 ·40 ·40 ·39 ·38
54 55 56 57 58	2 23 53·2 2 19 46·3 2 15 39·1 2 11 31·7 2 7 24·1	+ ·87 ·88 ·90 ·92 ·93	2 24 42·3 2 20 36·1 2 16 29·8 2 12 23·3 2 8 16·7		2 25 25·5 2 21 19·8 2 17 14·0 2 13 8·2 2 9 2·2	+ ·67 ·68 ·68 ·69 ·70	2 26 2.8 2 21 57.4 2 17 51.9 2 13 46.5 2 9 40.9	.58	2 26 34·3 2 22 28·9 2 18 23·6 2 14 18·2 2 10 12·9	.47	2 27 0·0 2 22 54·4 2 18 49·0 2 14 43·4 2 10 38·0	+ ·38 ·37 ·37 ·37 ·36
ļ		. V	ARIATIO	ON TO	o i' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 6°	A.	L. 7°	Α	L. 8°	Α.	L. 9°	A.	L. 10°	A.	L. 11°	Α.
°0 4 8 12 16	s. + ·44 - ·38 ·32 ·26 ·20	\$. -4·11 4·10 4·10 4·10 4·09	s. + ·51 - ·45 ·39 ·34 ·28	S. -4·12 4·11 4·11 4·10 4·10	s. + ·59 - ·53 ·47 ·41 ·36	S. -4·13 4·12 4·11 4·11 4·10	·6o ·54 ·49 ·43	S. -4·14 4·13 4·12 4·12 4·11	·68 ·62 ·56 ·51	S. -4·15 4·14 4·13 4·13 4·12	s. + ·81 - ·75 ·69 ·64 ·59	s. -4·17 4·16 4·15 4·14 4·13
20 22 24 26 28	+ ·15 ·12 ·09 ·06 + ·03	4.09 4.09 4.09 4.09	+ ·22 ·20 ·17 ·14 ·11	4.09 4.09 4.09 4.09	+ ·30 ·28 ·25 ·23 ·20	4·10 4·10 4·10	+ ·38 ·36 ·33 ·31 ·28	4·II 4·I0 4·I0 4·I0	+ ·46 ·44 ·41 ·39 ·36	4·II 4·II 4·II 4·II	+ ·54 ·5x ·49 ·47 ·44	4·12 4·12 4·12 4·12
30 32 34 36 38	- ·00 - ·03 ·06 ·09 ·13	4.09 4.09 4.09 4.09	+ ·09 ·06 ·03 ·00 - ·03	4·09 4·09 4·09	+ ·17 ·14 ·12 ·09 ·06	4.09 4.09 4.09 4.09	+ ·26 ·23 ·20 ·18 ·15	4·10 4·09 4·09 4·09	+ ·34 ·31 ·29 ·27 ·24	4·10 4·10 4·10 4·10	+ ·42 ·40 ·38 ·35 ·34	4·10 4·11 4·11
40 42 44 46 48	- ·16 ·19 ·23 ·27 ·31	4.09 4.10 4.10 4.10	- ·06 ·10 ·13 ·17 ·20	4·09 4·09 4·09 4·09	+ ·03 ·00 - ·03 ·06 ·10	4·09 4·09 4·09 4·09	+ ·12 ·10 ·07 ·04 + ·01	4·09 4·09 4·09 4·09	+ ·22 ·19 ·17 ·14 ·12	4·09 4·09 4·09 4·09	+ ·31 ·29 ·27 ·25 ·23	4·10 4·10 4·10
50 52 54 56 58	- ·36 ·40 ·46 ·51 ·57	4·I0 4·II 4·I2 4·I3	- 24 29 :33 :38 :43	4.11 4.11 4.10 4.10	- ·13 ·17 ·21 ·25 ·29	4·09 4·09 4·10 4·10	- ·02 ·05 ·08 ·12 ·16	4·09 4·09 4·09 4·09	+ ·09 ·07 ·04 + ·01 - ·02	4·09 4·09 4·09 4·09	+ ·20 ·18 ·16 ·14 ·11	4·09 4·09 4·09 4·09

52 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 12°.

			DECLIN		N-SAM		AME AS		IIIUDE.			
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 10 21·5 5 28 39·7 5 20 21·3 5 12 3·4 5 3 46·0	·74 ·71	H. M. S. 6 II 15·I 5 29 24·0 5 21 3·9 5 I2 44·3 5 4 25·3	s. + ·90 ·73 ·70 ·67 ·65	H. M. S. 6 12 9·1 5 30 7·8 5 21 45·8 5 13 24·5 5 5 3·7	s. + ·90 ·73 ·69 ·66 ·63	H. M. S. 6 13 3.6 5 30 51.2 5 22 27.1 5 14 3.8 5 5 41.1	s. + ·91 ·72 ·68 ·65 ·61	H. M. S. 6 13 58.6 5 31 34.2 5 23 7.9 5 14 42.4 5 6 17.5	s. + ·92 ·71 ·67 ·64 ·60	H. M. S. 6 14 54·3 5 32 16·8 5 23 48·2 5 15 20·3 5 6 53·2	s. + ·93 ·71 ·66 ·62 ·58
18 20 22 24 26	4 55 29·1 4 47 12·6 4 38 56·6 4 30 40·9 4 22 25·6	+ ·64 ·61 ·59 ·57 ·55	4 56 6·9 4 47 48·9 4 39 31·3 4 31 14·2 4 22 57·6	+ ·62 ·59 ·57 ·54 ·51	4 56 43·5 4 48 23·8 4 40 4·6 4 31 45·9 4 23 27·6	·54	4 57 19·0 4 48 57·4 4 40 36·4 4 32 15·8 4 23 55·7	+ ·58 ·55 ·52 ·48 ·45	4 57 53.4 4 49 29.8 4 41 6.7 4 32 44.1 4 24 22.0	+ ·56 ·53 ·49 ·46 ·42	4 58 26.7 4 50 0.8 4 41 35.5 4 33 10.7 4 24 46.3	+ ·54 ·50 ·47 ·43 ·39
28 30 31 32 33	4 14 10·7 4 5 56·1 4 1 48·9 3 57 41·8 3 53 34·7	+ ·53 ·50 ·49 ·48 ·47	4 14 41·2 4 6 25·3 4 2 17·4 3 58 9·6 3 54 1·9	+ ·49 ·47 ·45 ·44 ·43	4 15 9.7 4 6 52.2 4 2 43.5 3 58 34.9 3 54 26.5	.39	4 15 36·0 4 7 16·7 4 3 7·2 3 58 57·8 3 54 48·4	+ ·42 ·39 ·37 ·36 ·34	4 16 0·3 4 7 39·0 4 3 28·4 3 59 18·0 3 55 7·7	+ ·39 ·35 ·31 ·30	4 16 22·4 4 7 58·9 4 3 47·3 3 59 35·7 3 55 24·3	+ ·35 ·31 ·29 ·27 ·25
34 35 36 37 38	3 49 27·7 3 45 20·8 3 41 14·0 3 37 7·2 3 33 0·5	+ ·46 ·45 ·44 ·43 ·42	3 37 31·8 3 33 24·4	.37	3 50 18·1 3 46 9·7 3 42 1·5 3 37 53·3 3 33 45·2	•36 •34 •33	3 50 39·1 3 46 29·9 3 42 20·8 3 38 11·7 3 34 2·7	+ ·33 ·31 ·29 ·28 ·26	3 50 57·4 3 46 47·2 3 42 37·0 3 38 27·0 3 34 16·9	+ ·28 ·26 ·24 ·23 ·21	3 34 27.9	+ ·23 ·21 ·19 ·17 ·15
39 40 41 42 43	3 28 53·8 3 24 47·2 3 20 40·7 3 16 34·2 3 12 27·7	+ ·42 ·41 ·40 ·39 ·38	3 16 55·6 3 12 48·6	+ ·36 ·35 ·34 ·33 ·31	3 29 37·I 3 25 29·I 3 21 21·2 3 17 13·3 3 13 5·5	+ ·30 ·29 ·28 ·26 ·25	3 25 44·9 3 21 36·0 3 17 27·3 3 13 18·5	+ ·25 ·23 ·22 ·20 ·18	3 30 7·0 3 25 57·1 3 21 47·2 3 17 37·4 3 13 27·6	+ ·19 ·17 ·15 ·14 ·12	3 17 43.6 3 13 32.7	+ ·13 ·11 ·09 ·07 ·05
44 45 46 47 48	3 8 21·4 3 4 15·0 3 0 8·7 2 56 2·4 2 51 56·3	'34 '33	•	+ ·30 ·29 ·28 ·27 ·26	2 52 27.1	+ ·23 ·22 ·21 ·19 ·18	2 56 44·0 2 52 35·5	·15 ·13 ·12 ·10	3 5 8·1 3 0 58·4 2 56 48·7 2 52 39·1	+ ·10 ·08 ·06 ·04 + ·02	2 56 48·8 2 52 37·8	+ ·03 + ·01 - ·01 - ·04 ·06
49 50 51 52 53	2 47 50·1 2 43 44·0 2 39 37·9 2 35 31·8 2 31 25·8	·32 ·31 ·30 ·29	2 48 7·2 2 44 0·5 2 39 53·8 2 35 47·2 2 31 40·6	.20		·15 ·13 ·12 ·10	2 44 18·4 2 40 9·9 2 36 1·4 2 31 53·0	+ .01	2 40 10·0 2 36 0·3 2 31 50·6	.09	2 40 4·7 2 35 53·6 2 31 42·4	- ·08 ·11 ·16 ·19
54 55 56 57 58	2 27 19·9 2 23 13·9 2 19 8·1 2 15 2·2 2 10 56·4	·27 ·27 ·26		•15	2 27 42·2 2 23 34·8 2 19 27·4 2 15 20·1 2 11 12·7	•07 •06 •04	2 27 44.5 2 23 36.1 2 19 27.6 2 15 19.1 2 11 10.5	- ·01 ·03 ·05 ·07 ·09	2 27 40·9 2 23 31·1 2 19 21·3 2 15 11·4 2 11 1·4		2 27 31·2 2 23 19·8 2 19 8·4 2 14 56·9 2 10 45·2	- ·2I ·24 ·27 ·30 ·33
		V			o r' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 12°	Α.	L. 13°	A.	L. 14°	Α.	L. 15°	A.	L. 16°	A.	L. 17°	Α.
0 4 8 12 16	s. + ·89 - ·83 ·77 ·71 ·66	s. -4·18 4·17 4·16 4·15 4·14	s. + ·97 - ·90 ·84 ·79 ·74	s. -4·20 4·19 4·17 4·16 4·15	s. + 1.04 - .98 .92 .87 .82	s. -4·22 4·20 4·19 4·18 4·17	s. +1·12 - 1·06 1·00 ·94 ·90	S. -4·24 4·22 4·21 4·20 4·19	S. + I·20 I·14 I·08 I·02 ·97	S. -4·26 4·24 4·23 4·21 4·20	S. +1·28 1·21 1·15 1·10 1·05	s. -4·28 4·26 4·25 4·23 4·22
20 22 24 26 28	+ ·6r ·59 ·57 ·55 ·53	4·13 4·13 4·13 4·12	+ ·69 ·67 ·65 ·63 ·61	4·15 4·14 4·14 4·13	+ ·77 ·75 ·73 ·71 ·69	4·16 4·15 4·15 4·15	+ ·85 ·83 ·81 ·80 ·78	4·18 4·17 4·17 4·17 4·16	+ ·93 ·92 ·89 ·88 ·86	4·19 4·18 4·18 4·18	+1.01 1.00 .98 .96	4·2I 4·2I 4·20 4·20 4·20
30 32 34 36 38	+ ·51 ·48 ·47 ·44 ·43	4·12 4·12 4·11 4·11 4·11	+ ·59 ·57 ·55 ·53 ·52	4·13 4·13 4·12 4·12	+ ·68 ·66 ·64 ·62 ·61	4·15 4·14 4·14 4·14 4·19	+ ·76 •74 •73 •72 •71	4·16 4·16 4·15 4·15 4·15	+ ·85 ·83 ·82 ·81 ·80	4·18 4·17 4·17 4·17	+ ·93 ·92 ·91 ·90 ·89	4·20 4·19 4·19 4·19
40 42 44 46 48	+ ·41 ·39 ·37 ·35 ·33	4·11 4·11 4·10 4·10	+ ·50 ·49 ·47 ·46 ·44	4·12 4·11 4·11 4·11	+ ·60 ·58 ·57 ·56 ·55	4·13 4·13 4·13 4·13	+ ·69 ·68 ·67 ·67 ·66	4·15 4·14 4·14 4·14	+ ·79 ·78 ·78 ·77 ·77	4·16 4·16 4·16 4·16	+ ·89 ·88 ·88 ·88 ·88	4·18 4·18 4·18 4·18
50 52 54 56 58	+ ·32 ·30 ·28 ·27 ·25	4·10 4·10 4·10 4·10	+ '43 '42 '41 '40 '39	4·11 4·11 4·11 4·11	+ ·54 ·53 ·53 ·52 ·52	4·12 4·12 4·12 4·12 4·12	+ ·66 ·65 ·65 ·65 ·66	4·14 4·14 4·14 4·14	+ ·77 ·77 ·78 ·79 ·80	4·16 4·16 4·16 4·16 4·16	+ ·89 ·89 ·90 ·92 ·94	4·19 4·19 4·19 4·19

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 15 50·5 5 32 59·1 5 24 27·9 5 15 57·5 5 7 27·8	s. + ·94 ·70 ·66 ·61 ·57	H. M. S. 6 16 47·3 5 33 41·1 5 25 7·1 5 16 33·9 5 8 1·5	s. + ·95 ·70 ·65 ·60 ·55	H. M. S. 6 17 44.9 5 34 22.8 5 25 45.7 5 17 9.6 5 8 34.4	s. + '97 '69 '64 '59	H. M. S. 6 18 43·2 5 35 4·2 5 26 23·9 5 17 44·7 5 9 6·3	s. + ·98 ·69 ·63 ·58 ·52	H. M. S. 6 19 42·4 5 35 45·3 5 27 1·7 5 18 19·1 5 9 37·3	s. + ·99 ·68 ·62 ·57 ·51	H. M. S. 6 20 42·4 5 36 26·2 5 27 39·0 5 18 52·8 5 10 7·5	s. +1.00 .68 .62 .55 .49
18 20 22 24 26	4 58 58·8 4 50 30·5 4 42 2·7 4 33 35·5 4 25 8·7	+ ·53 ·48 ·44 ·40 ·36	4 59 29·9 4 50 58·9 4 42 28·5 4 33 58·7 4 25 29·2	+ ·51 ·46 ·42 ·37 ·32	4 59 59·8 4 51 26·0 4 42 52·7 4 34 20·0 4 25 47·8	+ ·49 ·44 ·39 ·34 ·29	5 0 28.6 4 51 51.8 4 43 15.5 4 34 39.7 4 26 4.4	+ ·47 ·42 ·36 ·31 ·26	5 0 56.4 4 52 16.2 4 43 36.6 4 34 57.6 4 26 19.0	+ ·45 ·40 ·34 ·28 ·23	5 I 23·I 4 52 39·3 4 43 56·3 4 35 I3·7 4 26 3I·6	+ ·43 ·37 ·31 ·25 ·19
28 30 31 32 33	4 16 42·4 4 8 16·5 4 4 3·7 3 59 50·9 3 55 38·2	+ ·31 ·27 ·25 ·23 ·21	4 17 0·3 4 8 31·7 4 4 17·4 4 0 3·4 3 55 49·4	+ ·28 ·23 ·21 ·19 ·16	4 17 16·0 4 8 44·5 4 4 28·8 4 0 13·3 3 55 57·8	+ ·24 ·19 ·17 ·14 ·12	4 17 29·5 4 8 54·8 4 4 37·7 4 0 20·5 3 56 3·4	+ ·21 ·15 ·12 ·10 ·07	4 17 40.7 4 9 2.7 4 4 43.8 4 0 25.0 3 56 6.1	+ ·17 ·11 ·08 ·05 + ·02	4 17 49.7 4 9 8.1 4 4 47.4 4 0 26.7 3 56 5.9	+ ·13 ·07 + ·04 ·00 - ·02
34 35 36 37 38	3 51 25.6 3 47 13.0 3 43 0.4 3 38 48.0 3 34 35.5	+ ·19 ·16 ·14 ·12 ·10	3 51 35.4 3 47 21.4 3 43 7.5 3 38 53.6 3 34 39.8	+ ·14 ·11 ·09 ·07 ·04	3 51 42·3 3 47 26·8 3 43 11·4 3 38 56·0 3 34 40·6	+ ·00 ·04 + ·01 - ·01	3 51 46·3 3 47 29·2 3 43 12·1 3 38 55·0 3 34 37·9	+ ·04 + ·01 - ·01 ·04 ·07		- ·01 ·04 ·07 ·10 ·13	3 51 45.2 3 47 24.4 3 43 3.6 3 38 42.7 3 34 21.8	- ·06 ·09 ·13 ·16 ·19
39 40 41 42 43	3 30 23·1 3 26 10·7 3 21 58·4 3 17 46·0 3 13 33·7	+ ·08 ·05 ·03 + ·01 - ·02	3 30 25.9 3 26 12.1 3 21 58.3 3 17 44.5 3 13 30.6	+ ·02 - ·01 ·03 ·06 ·09	3 30 25·2 3 26 9·8 3 21 54·3 3 17 38·8 3 13 23·3	- ·04 ·07 ·10 ·13 ·16	3 30 20·8 3 26 3·7 3 21 46·4 3 17 29·1 3 13 11·7	- ·10 ·13 ·16 ·20 ·23	3 12 55.7	- ·17 ·20 ·23 ·27 ·30	3 30 0.8 3 25 39.6 3 21 18.3 3 16 56.9 3 12 35.3	- ·23 ·27 ·30 ·34 ·38
44 45 46 47 48	3 9 21·4 3 5 9·0 3 0 56·6 2 56 44·1 2 52 31·7	- ·04 ·07 ·09 ·12 ·14	3 9 16·7 3 5 2·7 3 0 48·7 2 56 34·7 2 52 20·5	- ·11 ·14 ·17 ·20 ·23	3 9 7·7 3 4 52·0 3 0 36·2 2 56 20·3 2 52 4·3	- ·19 ·22 ·25 ·28 ·31	3 8 54·2 3 4 36·6 3 0 18·8 2 56 0·9 2 51 42·8	- ·26 ·30 ·33 ·37 ·40	2 55 36·4 2 51 15·9	- ·34 ·38 ·41 ·45 ·49	3 8 13.4 3 3 51.4 2 59 29.1 2 55 6.5 2 50 43.5	- ·42 ·46 ·50 ·54 ·59
49 50 51 52 53	2 48 19·2 2 44 6·6 2 39 53·9 2 35 41·1 2 31 28·2	- ·17 ·20 ·23 ·26 ·29	2 48 6·3 2 43 51·9 2 39 37·4 2 35 22·8 2 31 8·0	- ·26 ·29 ·32 ·35 ·39	2 47 48·I 2 43 3I·7 2 39 I5·2 2 34 58·5 2 30 4I·5	- ·35 ·38 ·42 ·46 ·49	2 47 24·5 2 43 5·9 2 38 47·1 2 34 28·0 2 30 8·6	- '44 '48 '52 '56 '60	2 33 51·2 2 29 29·1	- ·53 ·58 ·62 ·67 ·72	2 46 20·3 2 41 56·6 2 37 32·8 2 33 7·9 2 28 42·7	.83
54 55 56 57 58	2 27 15·2 2 23 2·1 2 18 48·8 2 14 35·3 2 10 21·6		2 26 53·0 2 22 37·8 2 18 22·3 2 14 6·6 2 9 50·6	- ·42 ·46 ·50 ·54 ·58	2 26 24·2 2 22 6·6 2 17 48·8 2 13 30·5 2 9 11·8	.67	2 25 48·8 2 21 28·6 2 17 7·9 2 12 46·7 2 8 25·0	- ·65 ·69 ·74 ·79 ·85	2 25 6.4 2 20 43.3 2 16 19.4 2 11 55.1 2 7 29.9	- ·77 ·82 ·87 ·93 ·99	2 24 16·9 2 19 50·5 2 15 23·3 2 10 55·2 2 6 26·2	·95 1·01 1·07
		V	ARIATI	ON TO	o i' OF	LATI'	TUDE A	ND A	LTITUD	E.		
Alt.	L. 18°	A.	L. 19°	Α.	L. 20°	Α.	L. 21°	A.	L. 22°	Α.	L. 23°	A.
0 4 8 12 16	s. +1·36 - 1·29 1·23 1·18 1·13	s. -4·31 4·29 4·27 4·26 4·24	s. +1.44 - 1.37 1.31 1.26 1.22	s. -4·34 4·31 4·30 4·28 4·27	s. +1.53 - 1.46 1.40 1.34 1.30	s. -4·36 4·34 4·32 4·30 4·29	s. +1.61 1.54 1.48 1.43 1.38	s. -4·39 4·37 4·35 4·33 4·32	s. +1.69 1.62 1.56 1.51 1.47	s. -4:43 4:40 4:38 4:36 4:34	s. +1.78 1.71 1.65 1.59 1.55	s. -4:46 4:43 4:41 4:39 4:37
20 22 24 26 28	+ 1.09 1.08 1.06 1.05 1.03	4·23 4·23 4·22 4·22	+1·18 1·16 1·14 1·13 1·12	4·25 4·25 4·24 4·24	+1·26 1·25 1·23 1·22 1·21	4·28 4·28 4·27 4·27 4·26	+1·34 1·33 1·32 1·31 1·29	4·30 4·30 4·29 4·29	+1.43 1.42 1.40 1.39 1.38	4·33 4·32 4·32 4·32	+ 1·52 1·50 1·49 1·48 1·47	4·36 4·35 4·35 4·35
30 32 34 36 38	+1.02 1.01 1.00 .99	4·21 4·21 4·21 4·21 4·21	+1.11 +1.10 +1.11	4·24 4·23 4·23 4·23 4·23	+1·20 1·19 1·18 1·18	4·26 4·26 4·26 4·26	+1·29 1·28 1·28 1·28 1·28	4·29 4·28 4·28 4·28 4·29	+ 1·38 1·37 1·38 1·38 1·38	4·32 4·31 4·31 4·32	+ 1·47 1·47 1·47 1·47 1·48	4·35 4·34 4·35 4·35
40 42 44 46 48	+ ·98 ·98 ·98 ·99	4·20 4·21 4·21 4·21	+1.08 1.09 1.10 1.11	4·23 4·23 4·23 4·24	+1·18 1·19 1·20 1·21 1·22	4·26 4·26 4·26 4·27	+ 1·28 1·29 1·31 1·32 1·34	4·29 4·29 4·30 4·30	+1·39 1·40 1·42 1·43 1·46	4·32 4·33 4·33 4·34	+1.49 1.51 1.53 1.55 1.58	4·35 4·36 4·36 4·37 4·38
50 52 54 56 58	+1.00 1.02 1.03 1.06 1.08	4·21 4·22 4·22 4·23	+1·12 1·14 1·16 1·19 1·23	4·24 4·24 4·25 4·26 4·27	+ 1·24 1·27 1·30 1·33 1·38	4·27 4·28 4·29 4·30 4·31	+ 1·37 1·40 1·43 1·48 1·53	4·31 4·32 4·33 4·35 4·37	+ 1·49 1·53 1·57 1·63 1·69	4·35 4·36 4·38 4·40 4·42	+ 1.62 1.66 1.72 1.78 1.86	4·40 4·42 4·43 4·46 4·49

54 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 13°.

True	1	Deal		1	N—SAM		AME AS	1	TITUDE		1	- ·
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 18 56.2 5 10 43.1 5 2 29.7 4 54 16.2	s. + ·92 ·94 ·94 ·95 ·96	H. M. s. 6 0 55.5 5 19 52.1 5 11 39.3 5 3 26.4 4 55 13.3	s. + ·92 ·92 ·93 ·93 ·94	H. M. S. 6 I 50·9 5 20 47·3 5 I2 34·6 5 4 2I·9 4 56 9·I	s. + ·92 ·91 ·91 ·92 ·92	H. M. S. 6 2 46·4 5 21 41·7 5 13 29·0 5 5 16·4 4 57 3·8	s. + ·92 ·90 ·90 ·90	H. M. S. 6 3 42·0 5 22 35·4 5 14 22·5 5 6 9·8 4 57 57·2	s. + ·93 ·89 ·88 ·88	H. M. S. 6 4 37.8 5 23 28.5 5 15 15.3 5 7 2.3 4 58 49.5	s. + ·93 ·88 ·87 ·87 ·86
18 20 22 24 26	4 46 2·3 4 37 48·1 4 29 33·5 4 21 18·5 4 13 3·0		4 47 0.0 4 38 46.5 4 30 32.6 4 22 18.5 4 14 3.9	1.00	4 47 56·3 4 39 43·2 4 31 30·0 4 23 16·5 4 15 2·7	.95	4 48 51·1 4 40 38·3 4 32 25·5 4 24 12·5 4 15 59·3	+ ·90 ·91 ·91 ·92 ·92		+ ·88 ·88 ·88 ·88 ·89	4 25 58.7	+ ·86 ·85 ·85 ·85 ·86
28 30 31 32 33	4 4 46·9 3 56 30·3 3 52 21·6 3 48 12·8 3 44 3·8	+1.05 1.07 1.09 1.10 1.11	4 5 49·0 3 57 33·4 3 53 25·5 3 49 17·4 3 45 9·1	1.06	3 54 26·6 3 50 19·1 3 46 11·4	+ ·97 ·99 ·•00 ·•00 ·•01	4 7 45·8 3 59 32·1 3 55 25·1 3 51 18·0 3 47 10·9	1	4 0 27.5 3 56 20.9 3 52 14.2 3 48 7.4	+ ·90 ·91 ·91 ·92	4 9 33.4 4 I 20.6 3 57 I4.2 3 53 7.7 3 49 I.2	+ ·86 ·87 ·87 ·87
34 35 36 37 38	3 39 54·5 3 35 45·1 3 31 35·3 3 27 25·3 3 23 15·1	1.19	3 4I 0.6 3 36 52.0 3 32 43.I 3 28 34.0 3 24 24.7		3 33 47·5 3 29 39·2 3 25 30·7	1.05 1.05	3 43 3·6 3 38 56·2 3 34 48·7 3 30 41·0 3 26 33·2	.98 .99 1.00	3 3I 39·4 3 27 32·2	·95	3 44 54·6 3 40 48·0 3 36 41·3 3 32 34·6 3 28 27·7	+ ·88 ·89 ·89 ·90
39 40 41 42 43	3 19 4.5 3 14 53.6 3 10 42.3 3 6 30.7 3 2 18.7 2 58 6.3	1·25 1·27 1·29	3 20 15·I 3 16 5·3 3 II 55·2 3 7 44·8 3 3 34·I	1·18 1·20 1·22	3 8 54·6 3 4 44·9	1·15 1·13	3 5 51 6	1.07	3 19 17·3 3 15 9·7 3 11 1·9 3 6 53·7	+ ·96 ·97 ·98 ·99 I·00	3 II 59·5 3 7 52·2	+ ·90 ·91 ·92 ·93 ·94
44 45 46 47 48	2 53 53.4 2 49 39.9 2 45 26.0 2 41 11.5	+1·32 1·34 1·37 1·40 1·43	2 50 59·6 2 46 47·2 2 42 34·4	1·28 1·31 1·34	2 56 24·8 2 52 14·2 2 48 3·3 2 43 51·9	+ 1·16 1·18 1·20 1·22 1·25	3 I 42·6 2 57 33·4 2 53 24·0 2 49 I4·2 2 45 4·2	+ 1.09 1.11 1.12 1.14 1.16	2 58 37.5 2 54 29.0 2 50 20.3 2 46 11.3	1·03 1·04 1·06 1·08	2 55 29·4 2 51 21·5 2 47 13·4	·96 ·97 ·98 ·99
49 50 51 52 53	2 32 40·5 2 28 23·9 2 24 6·5 2 19 48·2	1.22 1.61	2 29 52·6 2 25 37·4 2 21 21·5	1.43 1.46 1.50	2 22 48.1	1.39 1.39	2 40 53·8 2 36 43·0 2 32 31·8 2 28 20·2 2 24 8·2	+ 1·18 1·20 1·23 1·25 1·28	2 33 42·7 2 29 32·5 2 25 21·9	1·13 1·16 1·11	2 34 47·9 2 30 38·9 2 26 29·6	+ 1.01 1.02 1.04 1.06 1.08
54 55 56 57 58	2 15 28·9 2 11 8·6 2 6 47·1 2 2 24·3 1 58 0·0	I·74 I·79	2 12 47·2 2 8 28·6		2 14 18·3 2 10 2·1 2 5 45·2			+ 1·31 1·34 1·38 1·42 1·46	2 16 59·6 2 12 47·6 2 8 35·2	1·23 1·26 1·29	2 18 10·0 2 13 59·7 2 9 49·0	I·I2 I·I4 I·I7
		7		ON T	O 1' OF	LAT	TUDE A	ND A	LTITUI	E.	,	
Alt.	L. 0°	Α.	L. 1°	A.	L. 2°	Α.	L. 3°	A.	L. 4°	Α.	L. 5°	Α.
0 4 8 12 16	s. - ·00 - ·07 ·13 ·20 ·27	S. -4·10 4·11 4·11 4·11	s. + ·07 + ·01 - ·06 ·12 ·19	S. -4·II 4·IO 4·II 4·II	s. + ·15 - ·08 + ·01 - ·05 ·12	S. -4·II 4·IO 4·IO 4·IO 4·IO	s. + ·22 · ·15 ·09 + ·02 - ·04	S. -4·II 4·II 4·II 4·I0 4·I0	s. + ·29 ·23 ·16 ·10 + ·03	S. -4·II 4·II 4·II 4·II	s. + ·37 ·30 ·24 ·17 ·11	S. -4·12 4·12 4·11 4·11 4·11
20 22 24 26 28	- ·34 ·39 ·42 ·47 ·51	4·12 4·13 4·13 4·13	- ·27 ·31 ·34 ·38 ·42	4·II 4·II 4·I2 4·I2 4·I3	- ·19 ·23 ·26 ·30 ·34	4·II 4·II 4·II 4·II 4·I2	- ·11 ·15 ·18 ·22 ·25	4·10 4·11 4·11 4·14	- ·03 ·07 ·10 ·14 ·17	4·10 4·11 4·10 4·11	+ ·04 + ·01 - ·02 ·06 ·09	4·10 4·11 4·10 4·14
30 32 34 36 38	- ·55 ·60 ·65 ·70 ·75 - ·81	4·14 4·15 4·16 4·16 4·17	- ·47 ·51 •56 ·60 ·66	4·14 4·14 4·15 4·16	- ·38 ·42 ·47 ·51 ·56	4·12 4·13 4·14 4·14	- ·29 ·33 ·38 ·42 ·47	4·12 4·12 4·13 4·13	- ·21 ·25 ·29 ·33 ·37	4·II 4·II 4·I2 4·I2 4·I2	- ·12 ·16 ·20 ·23 ·28	4·II 4·II 4·II 4·II
40 42 44 46 48	·87 ·94 I·01 I·09	4·18 4·19 4·21 4·23 4·25	- ·71 ·77 ·83 ·90 ·97	4·16 4·17 4·19 4·20 4·22	- ·61 ·66 ·72 ·78 ·85	4·15 4·16 4·17 4·18 4·19	- ·51 ·56 ·62 ·67 ·73	4·14 4·15 4·16 4·17	- ·41 ·46 ·51 ·56 ·62	4·13 4·13 4·14 4·15	- ·32 ·36 ·41 ·46 ·51	4·12 4·13 4·13 4·14
50 52 54 56 58	1·17 1·27 1·38 1·50 1·63	4·27 4·30 4·33 4·37 4·42	1·13 1·23 1·34 1·46	4·24 4·26 4·29 4·32 4·36	1.30 1.00 1.09 1.19	4·21 4·23 4·25 4·28 4·31	- ·80 ·87 ·95 ·1·04 ·1·14	4·18 4·20 4·21 4·24 4·26	- ·68 ·75 ·82 ·90 ·99	4·16 4·17 4·19 4·20 4·22	- ·56 ·62 ·69 ·76 ·84	4·14 4·15 4·16 4·17 4·19

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 5 33.7 5 24 20.9 5 16 7.3 5 7 53.8 4 59 40.6	s. + '93 '87 '86 '85 '84	H. M. S. 6 6 29.9 5 25 12.7 5 16 58.4 5 8 44.4 5 0 30.6	s. + '94 '86 '85 '83 '82	H. M. S. 6 7 26·2 5 26 4·0 5 17 48·9 5 9 34·1 5 1 19·6	s. + ·94 ·85 ·83 ·82 ·81	5 18 38·6 5 10 22·9	s. + ·95 ·84 ·82 ·81 ·79	H. M. S. 6 9 19·9 5 27 45·0 5 19 27·7 5 11 10·9 5 2 54·5	s. + ·95 ·83 ·81 ·79 ·77	H. M. S. 6 10 17·3 5 28 34·6 5 20 16·0 5 11 57·9 5 3 40·4	s. + ·96 ·82 ·80 ·78 ·76
18 20 22 24 26	4 51 27.6 4 43 14.7 4 35 1.8 4 26 49.1 4 18 36.5	+ ·84 ·83 ·83 ·82 ·82	4 52 17·1 4 44 3·8 4 35 50·7 4 27 37·7 4 19 24·8	+ ·81 ·80 ·79 ·79	4 53 5:4 4 44 51:5 4 36 37:9 4 28 24:5 4 20 11:2	+ ·79 ·78 ·77 ·76 ·76	4 53 52·6 4 45 37·9 4 37 23·6 4 29 9·5 4 20 55·7	+ ·77 ·76 ·75 ·73 ·72	4 54 38·5 4 46 23·0 4 38 7·7 4 29 52·8 4 21 38·2	+ ·75 ·74 ·72 ·71 ·69	4 55 23.2 4 47 6.6 4 38 50.3 4 30 34.4 4 22 18.8	+ ·74 ·71 ·70 ·68 ·66
28 30 31 32 33	4 10 23.8 4 2 11.2 3 58 4.9 3 53 58.5 3 49 52.2	+ ·82 ·82 ·82 ·82 ·83	4 II I2·I 4 2 59·4 3 58 53·I 3 54 46·7 3 50 40·4	+ ·78 ·78 ·78 ·78 ·78	4 II 58·2 4 3 45·2 3 59 38·8 3 55 32·4 3 51 26·0	+ ·75 ·74 ·74 ·74 ·74	4 12 42·I 4 4 28·7 4 0 22·I 3 56 15·5 3 52 9·0	+ ·71 ·70 ·70 ·70 ·69	4 13 23.9 4 5 9.8 4 1 2.9 3 56 56.1 3 52 49.3	+ ·68 ·67 ·66 ·65 ·65	4 14 3.6 4 5 48.7 4 1 41.3 3 57 34.1 3 53 26.9	+ ·64 ·63 ·62 ·61 ·60
34 35 36 37 38	3 45 45·8 3 41 39·4 3 37 33·0 3 33 26·6 3 29 20·0	+ ·83 ·83 ·83 ·84 ·84	3 46 34·1 3 42 27·8 3 38 21·5 3 34 15·2 3 30 8·8	+ ·78 ·78 ·78 ·78 ·78 ·79	3 47 19·7 3 43 13·3 3 39 7·0 3 35 0·7 3 30 54·4	+ ·74 ·73 ·73 ·73 ·73	3 48 2·4 3 43 56·0 3 39 49·5 3 35 43·1 3 31 36·7	+ ·69 ·69 ·68 ·68	3 48 42·5 3 44 35·7 3 40 29·1 3 36 22·4 3 32 15·8	+ ·64 ·64 ·63 ·63 ·62	3 49 19·7 3 45 12·6 3 41 5·6 3 36 58·6 3 32 51·7	
39 40 41 42 43	3 25 13·3 3 21 6·7 3 17 0·0 3 12 53·2 3 8 46·4	·85 ·86 ·86	3 26 2·4 3 2I 56·0 3 I7 49·5 3 I3 43·I 3 9 36·5	+ ·79 ·79 ·79 ·80 ·80	3 26 48·I 3 22 4I·8 3 I8 35·4 3 I4 29·I 3 I0 22·7	+ ·73 ·73 ·73 ·73 ·74	3 27 30·3 3 23 24·0 3 19 17·6 3 15 11·3 3 11 5·0	·67	3 24 2·8 3 19 56·3 3 15 49·8	·62 ·61 ·61	3 28 44.8 3 24 38.1 3 20 31.3 3 16 24.5 3 12 17.9	+ ·56 ·56 ·55 ·55 ·54
44 45 46 47 48	3 4 39.4 3 0 32.4 2 56 25.3 2 52 18.0 2 48 10.6	·88 ·89	3 5 29.9 3 1 23.3 2 57 16.6 2 53 9.8 2 49 2.9	·81 ·82 ·83 ·83	3 6 16·4 3 2 10·0 2 58 3·5 2 53 57·1 2 49 50·5	1	3 6 58·7 3 2 52·4 2 58 46·1 2 54 39·8 2 50 33·4	·67 ·67 ·67 ·68	2 59 24·3 2 55 17·9 2 51 11·6	·60 ·60 ·60	2 55 51·6 2 51 45·1	·53 ·53 ·52 ·52
49 50 51 52 53	2 44 3·I 2 39 55·4 2 35 47·5 2 3I 39·5 2 27 3I·2	·94 ·95 ·96		·85 ·86 ·87 ·88	2 45 44.0 2 41 37.4 2 37 30.7 2 33 23.9 2 29 17.0	·76 ·77 ·78	2 38 14·3 2 34 7·8 2 30 1·4	·68 ·68 ·69 ·69	2 42 58·9 2 38 52·6 2 34 46·3	·60 ·60	2 39 25·8 2 35 19·4	·51 ·51
54 55 56 57 58	2 23 22·8 2 19 14·0 2 15 5·0 2 10 55·7 2 6 46·1	1.01 1.03	2 16 3·7 2 11 55·5	·91 ·92 ·94	2 25 10·1 2 21 3·0 2 16 55·8 2 12 48·5 2 8 41·0	·80 ·82 ·83	2 17 41·6 2 13 34·9	·70 ·71 ·72	2 22 27·3 2 18 21·0 2 14 14·6	·60 ·61	2 27 6·7 2 23 0·4 2 18 54·0 2 14 47·7 2 10 41·4	·50 ·50 ·50
		7	ARIATI	ON T	O 1' OF	LAT	TUDE A	ND A	ALTITUI	Œ.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	A.	L. 9°	Α.	L. 10	° A.	L. 11	° A.
0 4 8 12 16	s. + ·44 ·38 ·31 ·25 ·18	S. -4·13 4·12 4·11 4·11	s. + ·52 ·45 ·39 ·32 ·26	S. -4·14 4·13 4·12 4·12 4·11	s. + ·59 ·52 ·46 ·40 ·34	s. -4·15 4·14 4·13 4·12 4·12	s. + .67 .60 .54 .47	s. -4·16 4·15 4·14 4·13 4·12	s. + ·74 ·68 ·61 ·55 ·49	s. -4·17 4·16 4·15 4·14 4·13	•75 •69 •63 •57	s. -4·19 4·17 4·16 4·15 4·14
20 22 24 26 28	+ ·12 ·09 ·06 ·03 ·00	4.10 4.10 4.11	+ ·20 ·17 ·14 ·11 ·08	4.11 4.11 4.11 4.11	+ ·28 ·25 ·22 ·19 ·16	4·II 4·II 4·II 4·II	+ ·36 ·33 ·30 ·27 ·24	4·12 4·12 4·11 4·11	+ ·44 ·41 ·38 ·35 ·32	4·13 4·12 4·12 4·12	+ ·51 ·49 ·46 ·44 ·41	4·14 4·13 4·13 4·12
30 32 34 36 38	- ·04 ·07 ·11 ·14 ·18	4·II 4·II 4·II 4·II	+ ·05 + ·01 - ·02 ·05 ·09	4·I0 4·I0 4·I0 4·I1	+ ·13 ·10 ·07 ·03 + ·01	4·10 4·11 4·11 4·11	+ ·22 ·18 ·16 ·13 ·10	4·II 4·II 4·II 4·II	+ ·30 ·27 ·24 ·21 ·19	4·I2 4·II 4·II 4·II 4·II	+ ·38 ·36 ·33 ·30 ·28	4·12 4·12 4·12 4·12 4·11
40 42 44 46 48	- ·22 ·26 ·30 ·35 ·40	4·II 4·II 4·I2 4·I2 4·I2	- ·12 ·16 ·20 ·24 ·29	4·II 4·II 4·II 4·II	- ·03 ·06 ·10 ·14 ·18	4·10 4·11 4·11 4·10	+ ·06 ·03 ·00 - ·03 ·07	4·10 4·10 4·10 4·10	+ ·16 ·13 ·10 ·07 ·04	4·II 4·II 4·II 4·II	+ ·25 ·23 ·20 ·18 ·15	4·II 4·II 4·II 4·II
50 52 54 56 58	- '45 '50 '56 '62 '70	4·14 4·14 4·15 4·16	- ·33 ·38 ·43 ·49 ·55	4·12 4·13 4·13 4·14	- ·22 ·26 ·31 ·36 ·41	4·11 4·12 4·12 4·12	- ·10 ·14 ·18 ·23 ·27	4·II 4·II 4·II 4·II	+ ·01 - ·02 ·06 ·10 ·14	4·10 4·11 4·11 4·10	+ ·12 ·09 ·06 ·03 ·00	4·10 4·11 4·11

56 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 13°.

True Alt.	12° Dec		14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 11 15·1 + ·9 15 29 24·0 ·7 15 12 44·3 ·7 15 4 25·3 ·7	7 6 12 13·3 + ·97 2 5 30 12·8 ·81 9 5 21 51·0 ·78 6 5 13 29·8 ·75	5 22 37·6 5 14 14·6	s. + ·98 ·80 ·77 ·74 ·71	H. M. S. 6 14 11·1 5 31 49·3 5 23 23·6 5 14 58·7 5 6 34·5	s. + ·99 ·80 ·76 ·73 ·69	H. M. S. 6 15 11.0 5 32 37.0 5 24 9.1 5 15 42.0 5 7 15.7	s. + 1.00 .79 .75 .72 .68	H. M. S. 6 16 11·4 5 33 24·4 5 24 54·1 5 16 24·7 5 7 56·1	s. +1:01 :79 :74 :70 :66
18 20 22 24 26	4 56 6·9 + ·7 4 47 48·9 4 39 31·3 4 31 14·2 4 22 57·6	9 4 48 29·9 ·67 7 4 40 II·0 ·65 5 4 3I 52·4 ·62	4 49 9.6 4 40 49.0 4 32 28.9	+ ·68 ·65 ·62 ·59 ·57	4 58 10·9 4 49 48·0 4 41 25·6 4 33 3·8 4 24 42·5	+ ·66 ·63 ·60 ·57 ·53	4 58 50·1 4 50 25·1 4 42 0·8 4 33 37·0 4 25 13·7	+ ·64 ·61 ·57 ·54 ·50		+ ·62 ·59 ·55 ·51 ·47
28 30 31 32 33	4 14 41·2 + ·6 4 6 25·3 4 2 17·4 3 58 9·6 3 54 1·9 ·5	9 4 6 59·5 ·55 8 4 2 51·0 ·54 7 3 58 42·6 ·53 6 3 54 34·3 ·52	4 7 31·5 4 3 22·3 3 59 13·2	+ ·54 ·51 ·50 ·49 ·47	4 16 21·6 4 8 1·2 4 3 51·2 3 59 41·2 3 55 31·3	+ ·50 ·48 ·46 ·44 ·43	4 16 50·9 4 8 28·6 4 4 17·6 4 0 6·7 3 55 55·9	+ ·47 ·44 ·42 ·40 ·39	4 8 53·8 4 4 4I·7 4 0 29·7	+ ·44 ·40 ·38 ·36 ·34
34 35 36 37 38	3 33 24.4 .5	4 3 46 18·0 ·50 3 3 42 9·9 ·48 3 3 8 1·8 ·47 2 3 33 54·0 ·46	3 46 46·3 3 42 37·6 3 38 28·9 3 34 20·2	+ ·46 ·45 ·44 ·42 ·41	3 51 21.6 3 47 11.9 3 43 2.3 3 38 52.8 3 34 43.4	+ ·42 ·40 ·39 ·37 ·36	3 51 45·2 3 47 34·6 3 43 24·1 3 39 13·6 3 35 3·2	.30	3 47 54.4 3 43 42.8 3 39 31.3 3 35 19.8	·31 ·29 ·27 ·25
39 40 41 42 43	3 21 2·7 ·4 3 16 55·6 ·4 3 12 48·6 ·4	0 3 25 38·3 ·44 9 3 21 30·6 ·43 9 3 17 22·9 ·42 3 13 15·3 ·41	3 26 3·2 3 21 54·8 3 17 46·5 3 13 38·3	+ ·40 ·39 ·37 ·36 ·35	3 30 34·0 3 26 24·7 3 22 15·5 3 18 6·3 3 13 57·3	+ ·34 ·33 ·31 ·30 ·28	3 30 52·9 3 26 42·7 3 22 32·5 3 18 22·4 3 14 12·4	.22	3 26 57·2 3 22 45·9 3 18 34·6 3 14 23·6	+ ·23 ·21 ·19 ·17 ·15
44 45 46 47 48	2 56 20·8 ·4 2 52 I4·0 ·4	6 3 5 0·3 ·39 6 3 0 52·9 ·38 5 2 56 45·5 ·37 4 2 52 38·2 ·36	3 5 21.9 3 1 13.8 2 57 5.8 2 52 57.8	+ ·34 ·32 ·31 ·30 ·29	3 9 48·3 3 5 39·3 3 1 30·4 2 57 21·5 2 53 12·7	+ ·27 ·25 ·24 ·22 ·21	3 10 2.4 3 5 52.5 3 1 42.6 2 57 32.7 2 53 22.9	+ ·20 ·18 ·17 ·15 ·13	3 6 1.4 3 1 50.4 2 57 39.3 2 53 28.3	+ ·13 ·11 ·09 ·07 ·05
49 50 51 52 53	2 35 47·2 ·4 2 31 40·6 ·4	3 2 44 23·8 ·35 2 2 40 16·6 ·34 2 2 36 9·5 ·33 1 2 32 2·4 ·32	2 48 49·9 2 44 42·0 2 40 34·2 2 36 26·4 2 32 18·7	·24 ·22	2 49 3·9 2 44 55·3 2 40 46·5 2 36 37·9 2 32 29·3		2 49 13·1 2 45 3·4 2 40 53·7 2 36 44·0 2 32 34·3	-	2 45 6·4 2 40 55·4 2 36 44·4 2 32 33·5	- ·02 ·04 ·06
54 55 56 57 58		0 2 23 48·4 ·30 0 2 19 41·5 ·29 9 2 15 34·6 ·28	2 28 II·0 2 24 3·3 2 I9 55·8 2 I5 48·2 2 II 40·6	+ ·21 ·20 ·18 ·17 ·16	2 28 20·7 2 24 12·2 2 20 3·7 2 15 55·2 2 11 46·7		2 28 24·6 2 24 14·9 2 20 5·3 2 15 55·6 2 11 45·9	.03	2 24 II·4 2 20 0·4 2 I5 49·I	+ ·09 ·11 ·14 ·16 ·19
	1	VARIATION T								
Alt.	L. 12° A.	L. 13° A.	L. 14°		L. 15°		L. 16		L. 17	
° 0 4 8 12 16	S. S. + ·90 -4·20 ·83 4·19 ·76 4·17 ·70 4·16 ·65 4·15	·90 4·20 ·84 4·19	s. +1.05 .98 .92 .86 .80	s. -4·23 4·22 4·21 4·19 4·18	s. +1·13 - 1·06 ·99 ·94 ·88	s. -4·25 4·24 4·22 4·21 4·20	S. +1·21 1·14 1·07 1·01 •96	s. -4·28 4·26 4·24 4·23 4·22	S. + I·29 I·22 I·15 I·09 I·04	s. -4·30 4·28 4·26 4·25 4·23
20 22 24 26 28	+ ·59 4·15 ·57 4·14 ·54 4·14 ·52 4·14 ·49 4·13	·65 4·16 ·62 4·15 ·60 4·15	+ ·75 ·73 ·70 ·68 ·66	4·17 4·16 4·16 4·16	+ ·83 ·81 ·78 ·76 ·74	4·19 4·18 4·18 4·17	+ ·91 ·89 ·87 ·85 ·83	4·20 4·20 4·19 4·19 4·19	+ ·99 ·97 ·95 ·93 ·91	4·22 4·21 4·21 4·20
30 32 34 36 38	+ ·47 4·13 ·44 4·13 ·42 4·13 ·39 4·12 ·37 4·12	·53 4·14 ·51 4·14 ·48 4·13	+ ·64 ·61 ·60 ·58 ·56	4·16 4·15 4·14 4·14	+ ·72 ·70 ·69 ·67 ·65	4·17 4·16 4·16 4·16 4·16	+ ·81 ·79 ·78 ·76 ·75	4·19 4·18 4·17 4·17	+ ·90 ·88 ·87 ·85 ·84	4·20 4·19 4·19 4·19
40 42 44 46 48	+ ·35 4·12 ·33 4·12 ·30 4·12 ·28 4·11 ·26 4·11	·42 4·12 ·40 4·12 ·38 4·12 ·36 4·12	+ ·54 ·52 ·51 ·49 ·47	4·I4 4·I4 4·I3 4·I3	+ ·63 ·62 ·61 ·59 ·58	4·15 4·15 4·15 4·15	+ ·73 ·72 ·71 ·70 ·69	4·17 4·17 4·16 4·16	+ ·83 ·82 ·81 ·81 ·80	4·19 4·18 4·18 4·18 4·18
50 52 54 56 58	+ ·23 4·11 ·21 4·11 ·16 4·11 ·14 4·11	*33 4·12 *31 4·12 *29 4·11	+ ·46 ·44 ·43 ·42 ·41	4·13 4·13 4·13 4·13	+ ·57 ·56 ·56 ·55 ·55	4·14 4·14 4·14 4·14	+ ·69 ·68 ·68 ·68 ·68	4·16 4·16 4·16 4·16 4·16	+ ·80 ·80 ·81 ·81 ·82	4·18 4·18 4·19 4·19

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 57 LATITUDE 13°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 17 12·5 5 34 11·5 5 25 38·6 5 17 6·6 5 8 35·5	s. +1.02 .78 .74 .69	H. M. S. 6 18 14·3 5 34 58·3 5 26 22·6 5 17 47·9 5 9 14·1	s. + 1.04 •78 •73 •68 •64	H. M. S. 6 19 16·8 5 35 44·8 5 27 6·2 5 18 28·6 5 9 51·9	s. + 1·05 ·77 ·72 ·67 ·62	H. M. S. 6 20 20·2 5 36 31·2 5 27 49·3 5 19 8·6 5 10 28·8	s. +1.06 .77 .71 .66	H. M. S. 6 21 24·5 5 37 17·3 5 28 32·1 5 19 48·0 5 11 4·9	s. + 1.08 .77 .71 .65	H. M. S. 6 22 29.7 5 38 3.2 5 29 14.4 5 20 26.8 5 11 40.2	s. + 1·08 ·76 ·70 ·64 ·58
18 20 22 24 26	5 0 5·2 4 51 35·6 4 43 6·7 4 34 38·4 4 26 10·6	+ ·61 ·57 ·52 ·48 ·44	5 0 41·2 4 52 9·0 4 43 37·4 4 35 6·5 4 26 36·2	+ ·59 ·54 ·50 ·45 ·41	5 I I6·I 4 52 4I·0 4 44 6·7 4 35 33·0 4 27 0·0	+ ·57 ·52 ·48 ·43 ·38	5 I 49.9 4 53 II.9 4 44 34.6 4 35 57.9 4 27 21.7	+ ·55 ·50 ·45 ·40 ·35	5 2 22.8 4 53 41.5 4 45 0.9 4 36 21.0 4 27 41.7	+ ·54 ·48 ·43 ·37 ·31	5 2 54·6 4 54 9·8 4 45 25·8 4 36 42·4 4 27 59·6	+ ·52 ·46 ·40 ·34 ·28
28 30 31 32 33	4 17 43.4 4 9 16.6 4 5 3.4 4 0 50.2 3 56 37.2	+ ·40 ·36 ·34 ·32 ·30	4 18 6·4 4 9 37·1 4 5 22·5 4 1 8·2 3 56 53·8	+ ·37 ·32 ·30 ·28 ·25	4 18 27·4 4 9 55·2 4 5 39·3 4 1 23·5 3 57 7·7	+ ·33 ·28 ·26 ·23 ·21	4 18 46·1 4 10 11·0 4 5 53·5 4 1 36·2 3 57 18·9	+ ·29 ·24 ·22 ·19 ·16	4 19 2.8 4 10 24.4 4 6 5.3 4 1 46.2 3 57 27.3	+ ·26 ·20 ·17 ·14 ·11		+ ·22 ·16 ·13 ·10 ·07
34 35 36 37 38	3 52 24·3 3 48 11·4 3 43 58·6 3 39 45·8 3 35 33·2	+ ·28 ·26 ·24 ·21 ·19	3 39 57·2 3 35 43·2	+ ·23 ·21 ·18 ·16 ·14	3 52 52·0 3 48 36·4 3 44 20·9 3 40 5·4 3 35 49·9	+ ·18 ·16 ·13 ·11 ·08	3 53 1.7 3 48 44.5 3 44 27.3 3 40 10.2 3 35 53.1	+ ·14 ·11 ·08 ·05 + ·02	3 53 8·4 3 48 49·5 3 44 30·6 3 40 11·7 3 35 52·9	03	3 44 30·6 3 40 9·8 3 35 49·I	+ ·04 ·00 - ·02 ·06 ·09
39 40 41 42 43	3 31 20·6 3 27 8·1 3 22 55·6 3 18 43·1 3 14 30·7	+ ·17 ·15 ·13 ·11 ·08	3 31 29·3 3 27 15·4 3 23 1·5 3 18 47·7 3 14 33·8	+ ·II ·09 ·07 ·04 + ·02	3 31 34·5 3 27 19·0 3 23 3·6 3 18 48·2 3 14 32·9	+ ·06 + ·03 ·00 - ·02 ·05	3 31 36·1 3 27 19·0 3 23 1·9 3 18 44·8 3 14 27·6	- ·00 - ·03 ·06 ·09 ·12	3 31 34·0 3 27 15·1 3 22 56·2 3 18 37·2 3 14 18·2	- ·06 ·10 ·13 ·16 ·19	3 22 46·5 3 18 25·4 3 14 4·3	- ·12 ·16 ·19 ·23 ·27
44 45 46 47 48	3 10 18·3 3 6 6·0 3 1 53·6 2 57 41·3 2 53 28·9	+ ·06 ·04 + ·02 - ·01 ·03	3 10 20·0 3 6 6·2 3 1 52·3 2 57 38·5 2 53 24·5	- ·01 ·03 ·06 ·09	3 10 17·4 3 6 1·9 3 1 46·4 2 57 30·9 2 53 15·2	- ·08 ·11 ·14 ·17 ·20	3 10 10·5 3 5 53·1 3 1 35·8 2 57 18·2 2 53 0·8	- ·15 ·18 ·22 ·25 ·28	3 9 59·0 3 5 39·8 3 1 20·3 2 57 0·8 2 52 41·1	- ·23 ·26 ·30 ·33 ·37	2 56 38·1 2 52 16·0	- ·31 ·34 ·38 ·42 ·46
49 50 51 52 53	2 49 16·5 2 45 4·2 2 40 51·6 2 36 39·3 2 32 26·8	- ·06 ·08 ·11 ·13 ·16	2 44 56.7 2 40 42.6 2 36 28.4 2 32 14.2	- ·14 ·17 ·20 ·23 ·26	2 48 59·5 2 44 43·5 2 40 27·6 2 36 11·7 2 31 55·4	- ·23 ·26 ·30 ·33 ·37	2 48 43·I 2 44 25·2 2 40 7·I 2 35 48·9 2 3I 30·3	- ·32 ·35 ·39 ·43 ·47	2 48 21·2 2 44 1·0 2 39 40·6 2 35 20·0 2 30 58·9	- ·41 ·45 ·49 ·54 ·58	2 34 44·6 2 30 20·8	- ·51 ·55 ·60 ·64 ·69
54 55 56 57 58	2 28 14·2 2 24 1·6 2 19 48·9 2 15 36·0 2 11 23·0	- ·19 ·22 ·25 ·28 ·31	2 27 59·8 2 23 45·3 2 19 30·6 2 15 15·8 2 11 0·7		2 27 39.0 2 23 22.3 2 19 5.5 2 14 48.3 2 10 30.9	- ·40 ·44 ·48 ·52 ·56	2 27 11.6 2 22 52.6 2 18 33.3 2 14 13.5 2 9 53.3	- ·51 ·55 ·60 ·64 ·69	2 26 37·6 2 22 15·8 2 17 53·6 2 13 30·9 2 9 7·6	- ·62 ·67 ·72 ·78 ·83	2 21 31·8 2 17 6·4 2 12 40·4	- ·74 ·80 ·85 ·91 ·97
	1		7	-	O 1' OF		_					
Alt.	L. 18°		L. 19°		L. 20°		L. 21°		L. 22°		L. 23	
0 4 8 12 16	s. +1·37 - 1·30 1·23 1·17 1·12	s. -4·33 4·31 4·28 4·27 4·26	s. + 1·45 1·38 1·31 1·25 1·20	s. -4·35 4·33 4·31 4·29 4·28	s. + 1·54 - 1·46 1·40 1·34 1·28	s. -4·38 4·36 4·34 4·32 4·30	S. + 1.62 - 1.55 1.48 1.42 1.37	s. -4·41 4·39 4·36 4·34 4·33	S. + 1.71 1.63 1.56 1.50 1.45	s. -4.44 4.42 4.39 4.37 4.35	S. + 1.80 1.72 1.65 1.59 1.54	s. -4:48 4:45 4:42 4:40 4:38
20 22 24 26 28	+1.07 1.06 1.03 1.02 1.00	4·24 4·24 4·23 4·23	+1.16 1.14 1.12 1.10 1.08	4·26 4·26 4·25 4·25 4·24	+ 1·24 1·22 1·20 1·19 1·17	4·29 4·28 4·28 4·27 4·27	+1·32 1·31 1·29 1·28 1·26	4·31 4·30 4·30 4·29	+1.41 1.39 1.38 1.36 1.35	4·34 4·33 4·33 4·32	+ 1.50 1.48 1.46 1.45 1.44	4·37 4·36 4·36 4·35
30 32 34 36 38	+ ·98 ·97 ·96 ·94 ·94	4·22 4·22 4·21 4·21	+ 1.07 1.06 1.05 1.04 1.03	4·24 4·24 4·23 4·23	+1·16 1·15 1·14 1·13 1·13	4·27 4·26 4·26 4·26 4·26	+ 1·25 1·24 1·24 1·23 1·23	4·29 4·29 4·28 4·29	+1.34 1.33 1.33 1.33	4·32 4·31 4·31 4·31	+ 1·43 1·43 1·43 1·42 1·43	4·35 4·35 4·34 4·34 4·34
40 42 44 46 48	+ ·93 ·92 ·92 ·91 ·91	4·21 4·21 4·21 4·21	+ I·02 I·02 I·02 I·03	4·23 4·23 4·23 4·23	+1·12 1·13 1·13 1·14	4·26 4·25 4·26 4·26 4·26	+ I·23 I·23 I·24 I·25 I·26	4·28 4·29 4·29 4·29	+ 1·33 1·33 1·35 1·36 1·38	4·31 4·32 4·32 4·33	+ 1·43 1·44 1·46 1·47 1·50	4·35 4·35 4·36 4·36 4·37
50 52 54 56 58	+ ·92 ·92 ·93 ·95 ·97	4·21 4·21 4·21 4·21 4·22	+1.04 1.05 1.06 1.08 1.11	4·23 4·24 4·25 4·25	+1·15 1·17 1·19 1·22 1·26	4·27 4·27 4·28 4·28 4·29	+1·28 1·30 1·33 1·36 1·41	4·30 4·31 4·31 4·34	+1·40 1·43 1·47 1·51 1·56	4·34 4·35 4·36 4·37 4·39	+1.53 1.56 1.61 1.66 1.72	4·38 4·39 4·41 4·43 4·45

58 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 14°.

		t	DECLIN	ATIO	N—SAM	E NA	AME AS	—LA	TTTUDE			
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 0 0.0 5 18 45.7 5 10 30.5 5 2 14.9 4 53 59.1	1.03	H. M. S. 6 0 59·8 5 19 46·1 5 11 31·2 5 3 16·2 4 55 0·9	I.01 I.00 I.00	H. M. S. 6 I 59·8 5 20 45·8 5 I2 3I·I 5 4 I6·3 4 56 I·4	s. + 1·00 ·99 ·99 ·99	H. M. S. 6 2 59.7 5 21 44.7 5 13 30.0 5 5 15.3 4 57 0.6	s. +1.00 .98 .97 .97	H. M. S. 6 4 0·0 5 22 43·0 5 14 28·1 5 6 13·3 4 57 58·6	96	H. M. S. 6 5 0.0 5 23 40.5 5 15 25.4 5 7 10.3 4 58 55.5	s. + 1·00 ·95 ·95 ·94 ·94
18 20 22 24 26	4 45 43.0 4 37 26.5 4 29 9.5 4 20 52.0 4 12 33.9	+1.05 1.06 1.08 1.10	4 46 45.4 4 38 29.6 4 30 13.4 4 21 56.9 4 13 39.8	+1.03 1.04 1.05	4 47 46·3 4 39 31·0 4 31 15·5 4 22 59·7 4 14 43·6	+1.00 1.01 1.02 1.03	4 48 45.8 4 40 30.9 4 32 15.9 4 24 0.6 4 15 45.1	+ ·98 ·98 ·99 I·00	4 49 43·9 4 41 29·2	+ ·96 ·96 ·96 ·97 ·97	4 50 40.7 4 42 26.0 4 34 11.3 4 25 56.6 4 17 41.8	+ ·93 ·93 ·93 ·93 ·94
28 30 31 32 33	4 4 15·2 3 55 55·7 3 51 45·6 3 47 35·3 3 43 24·8 3 39 14·0		4 5 22·3 3 57 4·2 3 52 54·9 3 48 45·3 3 44 35·6 3 40 25·6	+ 1·10 1·12 1·13 1·14 1·15 + 1·17	3 49 52·3 3 45 43·3	1.10	4 7 29·3 3 59 13·2 3 55 4·9 3 50 56·6 3 46 48·1 3 42 39·5	1.05	4 0 13·8 3 56 6·0 3 51 58·0 3 47 50·0	·99		+ ·94 ·95 ·95 ·96 ·96 + ·96
34 35 36 37 38	3 35 3.0 3 30 51.6 3 26 39.9 3 22 27.9 3 18 15.6	1.23	3 36 15·5 3 32 5·1 3 27 54·4 3 23 43·5 3 19 32·2	1·18 1·20 1·21 1·23 +1·24	3 41 34·I 3 37 24·7 3 33 15·I 3 29 5·3 3 24 55·3 3 20 45·0	+1·11 1·13 1·14 1·15 1·17 +1·18		1.07	3 39 33.7 3 35 25.3 3 31 16.8 3 27 8.2	1·02 1·03 1·04 1·05	3 40 33·5 3 36 25·6 3 32 17·5 3 28 9·5	+ ·96 ·97 ·98 ·98 ·99 +1·00
40 41 42 43 44	3 14 2·8 3 9 49·7 3 5 36·1 3 1 22·0 2 57 7·4	1·33 1·35 1·38 1·40 +1·43	3 15 20.7 3 11 8.8 3 6 56.5 3 2 43.8 2 58 30.8	1·26 1·28 1·30 1·33 +1·35	3 16 34·5 3 12 23·7 3 8 12·6 3 4 1·2 2 59 49·4	1·20 1·21 1·23 1·25 +1·27	3 17 44·5 3 13 34·6 3 9 24·4 3 5 14·1 3 1 3·4	1·13 1·15 1·16 1·18 +1·20	3 18 50·5 3 14 41·4 3 10 32·2 3 6 22·7 3 2 12·9	1.07 1.08 1.09 1.11 +1.12	3 19 52·9 3 15 44·4 3 11 35·8 3 7 27·1 3 3 18·1	1.01 1.02 1.03 1.04
45 46 47 48 49	2 52 52·3 2 48 36·6 2 44 20·3 2 40 3·2 2 35 45·4 2 31 26·8	1.49 1.52 1.55 +1.59	2 54 17·2 2 50 3·2 2 45 48·6 2 41 33·4 2 37 17·6	1·37 1·40 1·43 1·46	2 47 11·6 2 42 58·1 2 38 44·1		2 52 41·1 2 48 29·5 2 44 17·4 2 40 4·9		2 53 52.8 2 49 42.2 2 45 31.4 2 41 20.3	1·15 1·17 1·19 +1·21		1.08
50 51 52 53 54 55	2 31 20.6 2 27 7.3 2 22 46.8 2 18 25.2 2 14 2.5 2 9 38.5	1.67 1.71 1.76 +1.81	2 33 I·2 2 28 44·0 2 24 26·0 2 20 7·1 2 I5 47·2 2 II 26·2	1.52 1.56 1.60 1.64 +1.68 1.73	2 30 14·3 2 25 58·5	1·42 1·45 1·49 1·52 +1·56	2 18 54.8	1·33 1·35 1·38 1·41 +1·45 1·48	2 32 56·9 2 28 44·5 2 24 31·7 2 20 18·4	1·26 1·28 1·31 +1·34	2 34 9.4 2 29 58.4 2 25 47.1 2 21 35.4	1·16 1·18 1·21
56 57 58	2 5 13·1 2 0 46·1 1 56 17·3	1·91 1·96 2·02	2 7 4·I 2 2 40·6 I 58 I5·8	1.78 1.84 1.90	2 8 47·0 2 4 26·6	1.65 1.70 1.75	2 10 22·2 2 6 4·6 2 1 46·1	1·52 1·57 1·61	2 II 49·9 2 7 34·7 2 3 18·7	1·40 1·44 1·48	2 13 10·5 2 8 57·3	1.32
Alt.	L. 0°		L. 1°		L. 2°	Α.	L. 3°		L. 4°		L. 5°	A.
° 0 4 8 12 16	s. - ·oo ·o7 ·14 ·22 ·29	S. -4·12 4·12 4·13 4·13	s. + ·07 ·00 - ·07 ·14 ·22	S. -4·12 4·12 4·12 4·13	s. + ·15 + ·08 ·00 - ·07 ·14	S. -4·12 4·12 4·12 4·12 4·12	s. + ·22 ·15 ·08 + ·01 - ·06	S. -4·13 4·12 4·12 4·12 4·12	·22 ·15 ·08 + ·01	S. -4·13 4·13 4·12 4·12 4·12	·30 ·23 ·16 ·09	S. -4·14 4·13 4·13 4·12 4·12
20 22 24 26 28	- ·37 ·42 ·46 ·51 ·55	4·14 4·15 4·15 4·16	- ·30 ·34 ·38 ·42 ·46	4·13 4·14 4·14 4·15	- ·22 ·26 ·30 ·34 ·38	4·13 4·13 4·14 4·14	- ·14 ·18 ·21 ·26 ·29	4·12 4·13 4·13 4·13	- ·06 ·10 ·13 ·17 ·21	4·12 4·12 4·13 4·13	+ ·02 - ·02 ·05 ·09 ·13	4·12 4·12 4·12 4·12
30 32 34 36 38 40	- ·60 ·65 ·70 ·76 ·82 - ·88	4·16 4·17 4·18 4·19 4·20	- ·51 ·56 ·61 ·66 ·72 - ·78	4·15 4·16 4·17 4·17 4·19	- ·43 ·47 ·52 ·57 ·62 - ·68	4·15 4·16 4·16 4·17 4·18	- ·34 ·38 ·43 ·47 ·53 - ·58	4·14 4·14 4·15 4·16	- ·25 ·29 ·34 ·38 ·43 - ·48	4·13 4·14 4·14 4·15	- ·17 ·20 ·25 ·29 ·34 - ·38	4·13 4·13 4·14 4·14
42 44 46 48 50	95 1.02 1.10 1.19	4·21 4·23 4·25 4·27 4·29	- · /6 · · · · · · · · · · · · · · · · · · ·	4·21 4·22 4·24 4·26 4·28	- 108 -74 -80 -87 -94 - 1.02	4·19 4·20 4·21 4·23 4·25	- 150 -63 -69 -76 -83	4·17 4·18 4·19 4·20	·53 ·59 ·65 ·71 — ·78	4·15 4·16 4·17 4·18	·43 ·48 ·54 ·59 — ·66	4·14 4·15 4·16 4·16
52 54 56 58	1·39 1·51 1·64 1·80	4·35 4·39 4·44 4·50	1:25 1:36 1:48 1:62	4·31 4·34 4·38 4·43	1.02 1.11 1.21 1.32 1.45	4·27 4·30 4·33 4·37	1.07 1.17 1.28	4·24 4·26 4·29 4·32	.85 .93 1.02 1.13	4·21 4·23 4·25 4·27	·73 ·80 ·88 ·97	4·19 4·20 4·22 4·24

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 6 0.4 5 24 37.5 5 16 21.8 5 8 6.4 4 59 51.2	s. + 1·01 ·94 ·93 ·93 ·92	H. M. S. 6 7 1.0 5 25 33.8 5 17 17.5 5 9 1.6 5 0 45.9	s. +1.01 .93 .92 .91	H. M. S. 6 8 1.9 5 26 29.5 5 18 12.5 5 9 55.8 5 1 39.4	s. +1.02 .92 .91 .90	H. M. S. 6 9 3·2 5 27 24·8 5 19 6·8 5 10 49·2 5 2 32·0	s. + 1.02 .92 .90 .88	H. M. S. 6 10 4.7 5 28 19.6 5 20 0.4 5 11 41.7 5 3 23.5	s. + 1·03 ·91 ·89 ·87 ·85	H. M. S. 6 II 6.7 5 29 I3.9 5 20 53.4 5 I2 33.5 5 4 I4.I	s. +1.04 .90 .88 .85
18 20 22 24 26	4 51 36·2 4 43 21·3 4 35 6·5 4 26 51·8 4 18 37·1	.90 .91 .91	4 52 30·4 4 44 15·2 4 36 0·1 4 27 45·2 4 19 30·3	+ ·89 ·89 ·88 ·87 ·87	4 53 23.4 4 45 7.6 4 36 52.1 4 28 36.8 4 20 21.6	+ ·87 ·86 ·85 ·84 ·84	4 54 15·2 4 45 58·7 4 37 42·5 4 29 26·6 4 21 11·0	·82 ·81	4 55 5.8 4 46 48.4 4 38 31.5 4 30 14.7 4 21 58.4	+ ·83 ·82 ·80 ·79 ·77	4 55 55 ² 4 47 36 ⁷ 4 39 18 ⁸ 4 31 1 ² 4 22 44 ⁰	+ ·81 ·79 ·78 ·76 ·74
28 30 31 32 33	4 10 22·4 4 2 7·7 3 58 0·2 3 53 52·8 3 49 45·3	.91 .91 .91 + .90	4 11 15.6 4 3 0.9 3 58 53.6 3 54 46.2 3 50 38.9	+ ·87 ·87 ·87 ·87 ·87	4 12 6.6 4 3 51.8 3 59 44.4 3 55 37.0 3 51 29.6	+ ·83 ·83 ·83 ·82 ·82	4 12 55.6 4 4 40.4 4 0 32.8 3 56 25.3 3 52 17.8	+ ·80 ·79 ·79 ·78 ·78	4 5 26.6 4 I 18.8 3 57 II.0 3 53 3.3	+ ·76 ·75 ·74 ·74 ·74	4 14 27·1 4 6 10·5 4 2 2·3 3 57 54·2 3 53 46·2	+ ·73 ·71 ·70 ·70 ·69
34 35 36 37 38	3 45 37·8 3 41 30·3 3 37 22·7 3 33 15·0 3 29 7·3	+ ·92 ·92 ·93 ·93	3 46 31·5 3 42 24·1 3 38 16·7 3 34 9·2 3 30 1·7	+ ·87 ·87 ·87 ·88 ·88	3 47 22·3 3 43 15·0 3 39 7·6 3 35 0·3 3 30 52·9	+ ·82 ·82 ·82 ·82 ·82	3 48 10·4 3 44 3·0 3 39 55·6 3 35 48·2 3 31 40·8	+ ·78 ·77 ·77 ·77 ·77	3 44 48·I 3 40 40·5 3 36 33·0 3 32 25·5	+ ·73 ·73 ·72 ·72 ·72 ·72	3 49 38·2 3 45 30·3 3 41 22·4 3 37 14·7 3 33 6·9	+ ·69 ·68 ·67 ·67 ·66
39 40 41 42 43	3 24 59·4 3 20 51·6 3 16 43·6 3 12 35·5 3 8 27·3	+ ·94 ·95 ·95 ·96 ·97	3 25 54·2 3 21 46·6 3 17 39·0 3 13 31·3 3 9 23·6	+ ·88 ·89 ·89 ·90 ·90	3 26 45.5 3 22 38.1 3 18 30.7 3 14 23.3 3 10 15.8	+ ·83 ·83 ·83 ·83 ·84	3 27 33.5 3 23 26.1 3 19 18.8 3 15 11.4 3 11 4.1	+ ·77 ·77 ·77 ·77 ·77	3 28 18·0 3 24 10·6 3 20 3·2 3 15 55·8 3 11 48·4	+ ·71 ·71 ·71 ·71	3 28 59·2 3 24 51·6 3 20 44·0 3 16 36·4 3 12 28·9	+ ·66 ·65 ·65 ·65 ·64
44 45 46 47 48	3 4 19·1 3 0 10·6 2 56 2·0 2 51 53·2 2 47 44·3	+ ·98 ·99 1·00 1·01 1·02	3 5 15.7 3 1 7.8 2 56 59.7 2 52 51.6 2 48 43.3	+ ·91 ·92 ·92 ·93 ·94	3 6 8·3 3 2 0·6 2 57 53·0 2 53 45·3 2 49 37·5	+ ·84 ·85 ·85 ·86 ·86	3 6 56·7 3 2 49·3 2 58 41·9 2 54 34·4 2 50 26·9	+ ·77 ·78 ·78 ·78 ·78	3 7 41·1 3 3 33·7 2 59 26·2 2 55 19·0 2 51 11·7	+ ·71 ·71 ·71 ·71	3 8 21.4 3 4 13.9 3 0 6.5 2 55 59.0 2 51 51.8	+ ·64 ·64 ·63 ·63 ·63
49 50 51 52 53	2 43 35·2 2 39 25·9 2 35 16·3 2 31 6·5 2 26 56·4	+1.04 1.05 1.07 1.09 1.10	2 44 34.9 2 40 26.4 2 36 17.6 2 32 8.7 2 27 59.6	+ ·95 ·96 ·98 ·99	2 45 29·6 2 41 21·7 2 37 13·6 2 33 5·4 2 28 57·0	+ ·87 ·88 ·89 ·90 ·91	2 46 19·4 2 42 11·7 2 38 4·2 2 33 56·5 2 29 48·6	+ ·79 ·80 ·81 ·81	2 34 42·I 2 30 34·6	+ ·71 ·71 ·71 ·71 ·72	2 47 44·3 2 43 36·9 2 39 29·5 2 35 22·2 2 31 14·9	+ ·63 ·63 ·62 ·62 ·62
54 55 56 57 58	2 22 45·9 2 18 35·2 2 14 24·1 2 10 12·6 2 6 0·6	1.17	2 23 50·3 2 19 40·7 2 15 30·8 2 11 20·7 2 7 10·3		2 24 48·5 2 20 39·9 2 16 31·0 2 12 22·0 2 8 12·7	+ ·92 ·93 ·95 ·96 ·98	2 25 40·8 2 21 32·8 2 17 24·7 2 13 16·5 2 9 8·1	+ ·82 ·83 ·84 ·85 ·86	2 22 19·5 2 18 11·9 2 14 4·2	+ ·72 ·73 ·73 ·74 ·75	2 27 7·5 2 23 0·2 2 18 52·8 2 14 45·4 2 10 38·0	+ ·63 ·63 ·63 ·63 ·63

VARIATION	ТОт	'OF	LATITUDE	AND	ALTITUDE

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
0 4 8 12 16	S. S. + '45 -4'15 '37 4'14 '30 4'13 '23 4'13 '17 4'12	s. s. + ·52 -4·15 ·45 4·15 ·38 4·14 ·31 4·13 ·24 4·13	S. S. + .60 -4.16 .52 4.15 .45 4.15 .39 4.14 .32 4.13	S. S. + .67 -4.17 .60 4.17 .53 4.15 .46 4.15 .40 4.14	s. s. + ·75 -4·19 ·68 4·18 ·61 4·17 ·54 4·16 ·47 4·15	s. s. + .83 - 4.20 .75 4.19 .68 4.18 .62 4.17 .55 4.16
20	+ ·10 4·12	+ ·18 4·13	+ ·26 4·13	+ ·33 4·13	+ '41 4'14	+ ·49 4·15
22	·06 4·12	·14 4·12	·22 4·13	·30 4·13	'38 4'14	·46 4·15
24	+ ·03 4·12	·11 4·12	·19 4·13	·27 4·13	'35 4'14	·43 4·14
26	- ·01 4·12	·08 4·12	·16 4·13	·24 4·13	'32 4'14	·40 4·14
28	·04 4·12	·04 4·12	·12 4·12	·21 4·13	'29 4'13	·37 4·14
30	- ·08 4·12	+ ·01 4·12	+ ·09 4·12	+ ·18 4·13	+ ·26 4·13	+ ·35 4·14
32	·12 4·12	- ·03 4·12	·05 4·12	·14 4·12	·23 4·13	·31 4·13
34	·16 4·12	·07 4·12	·02 4·12	·11 4·12	·20 4·13	·29 4·13
36	·20 4·13	·11 4·12	- ·01 4·12	·07 4·12	·16 4·12	·25 4·13
38	·24 4·13	·15 4·13	·05 4·12	+ ·04 4·12	·13 4·13	·23 4·13
40	- ·28 4·13	- ·18 4·12	- ·09 4·12	- ·00 4·12	+ ·10 4·12	+ ·19 4·13
42	·33 4·13	·23 4·13	·13 4·12	·03 4·12	·07 4·12	·17 4·12
44	·38 4·14	·27 4·13	·17 4·13	·07 4·12	·03 4·12	·13 4·12
46	·43 4·14	·32 4·13	·21 4·13	·11 4·12	·00 4·12	·10 4·12
48	·48 4·15	·37 4·14	·26 4·13	·15 4·12	- ·04 4·12	·07 4·12
50	- ·54 4·16	- ·42 4·14	- ·31 4·13	- ·19 4·13	- ·08 4·12	+ ·04 4·12
52	·60 4·17	·48 4·15	·36 4·14	·24 4·13	·12 4·12	·00 4·12
54	·67 4·18	·54 4·16	·41 4·14	·28 4·13	·16 4·13	- ·04 4·12
56	·74 4·19	·60 4·17	·47 4·15	·34 4·14	·21 4·13	·07 4·12
58	·82 4·20	·68 4·18	·53 4·16	·39 4·14	·25 4·13	·11 4·12

60 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 14°.

T		D. 1	DECER		N—SAM		AME AS		ITTUDE.	D .		- ·
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 12 9·1 5 30 7·8 5 21 45·8 5 13 24·5 5 5 3·7	s. +1.04 .89 .87 .84	H. M. S. 6 13 12·0 5 31 1·2 5 22 37·6 5 14 14·6 5 5 52·3	s. + 1·05 ·89 ·86 ·83 ·80	H. M. S. 6 14 15·3 5 31 54·3 5 23 28·8 5 15 4·1 5 6 40·1	s. + 1·06 ·88 ·85 ·82 ·79	H. M. S. 6 15 19·3 5 32 47·1 5 24 19·6 5 15 52·9 5 7 27·0	s. +1.07 .88 .84 .81	H. M. s. 6 16 23.9 5 33 39.5 5 25 9.8 5 16 41.0 5 8 13.0	s. + 1·08 ·87 ·83 ·80 ·76	H. M. S. 6 17 29·2 5 34 31·7 5 25 59·6 5 17 28·5 5 8 58·2	s. +1·09 ·87 ·82 ·78 ·74
18 20 22 24 26	4 56 43.5 4 48 23.8 4 40 4.6 4 31 45.9 4 23 27.6	·73	4 57 30·7 4 49 9·6 4 40 49·0 4 32 29·0 4 24 9·4	+ ·78 ·75 ·73 ·70 ·68	4 33 10·4 4 24 49·3	+ ·76 ·73 ·70 ·67 ·65	4 59 1.8 4 50 37.3 4 42 13.4 4 33 50.1 4 25 27.4	+ ·74 ·71 ·68 ·65 ·62	4 59 45.7 4 51 19.3 4 42 53.4 4 34 28.3 4 26 3.7	+ ·72 ·69 ·65 ·62 ·59	5 0 28.7 4 52 0.0 4 43 32.1 4 35 4.7 4 26 38.1	+ ·71 ·67 ·63 ·59 ·56
28 30 31 32 33	4 15 9.7 4 6 52.2 4 2 43.5 3 58 35.0 3 54 26.5	+ ·69 ·67 ·67 ·66 ·65	4 15 50·2 4 7 31·5 4 3 22·3 3 59 13·2 3 55 4·1	+ ·66 ·64 ·63 ·61 ·61	4 16 28·7 4 8 8·6 4 3 58·7 3 59 48·9 3 55 39·2	+ ·62 ·60 ·59 ·57 ·56	4 17 5·2 4 8 43·4 4 4 32·8 4 0 22·2 3 56 11·7	+ ·59 ·56 ·55 ·53 ·52	4 17 39·6 4 9 16·1 4 5 4·5 4 0 53·0 3 56 41·6	+ ·56 ·52 ·51 ·49 ·48	4 18 12·0 4 9 46·4 4 5 33·8 4 1 21·3 3 57 9·0	+ ·52 ·49 ·47 ·45 ·43
34 35 36 37 38	3 46 9.7 3 42 1.5 3 37 53.3 3 33 45.2	.61	3 42 37·6 3 38 28·9 3 34 20·2	+ ·59 ·59 ·58 ·57 ·56	3 51 29·6 3 47 20·1 3 43 10·7 3 39 1·4 3 34 52·1	+ ·55 ·54 ·53 ·52 ·50	3 52 1.4 3 47 51.1 3 43 40.9 3 39 30.8 3 35 20.8	.45	3 52 30·4 3 48 19·2 3 44 8·2 3 39 57·2 3 35 46·4	+ ·46 ·44 ·43 ·41 ·40	3 52 56·7 3 48 44·5 3 44 32·5 3 40 20·5 3 36 8·7	+ ·41 ·40 ·38 ·36 ·34
39 40 41 42 43	3 29 37·1 3 25 29·1 3 21 21·2 3 17 13·3 3 13 5·5	·58 ·58	3 21 54·8 3 17 46·5 3 13 38·3	·52	3 30 43·0 3 26 33·9 3 22 24·9 3 18 16·0 3 14 7·2	+ '49 '48 '47 '46 '45	3 31 10·9 3 27 1·1 3 22 51·4 3 18 41·8 3 14 32·3	+ '44 '42 '41 '40 '38	1	+ ·38 ·37 ·35 ·33 ·32	3 31 56·9 3 27 45·2 3 23 33·6 3 19 22·1 3 15 10·6	+ ·33 ·31 ·29 ·27 ·25
44 45 46 47 48	3 8 57·7 3 4 50·0 3 0 42·3 2 56 34·7 2 52 27·1	+ ·57 ·57 ·56 ·56 ·55	3 9 30·1 3 5 21·9 3 1 13·8 2 57 5·8 2 52 57·8	+ ·51 ·50 ·49 ·48 ·47	3 9 58·4 3 5 49·7 3 1 41·0 2 57 32·4 2 53 23·9	+ ·44 ·43 ·42 ·41 ·40	3 10 22·7 3 6 13·3 3 2 3·9 2 57 54·6 2 53 45·4	+ ·37 ·36 ·34 ·33 ·32	3 10 43·0 3 6 32·7 3 2 22·5 2 58 12·3 2 54 2·2	+ ·30 ·29 ·27 ·26 ·24	3 10 59·2 3 6 47·9 3 2 36·6 2 58 25·4 2 54 14·2	+ ·24 ·22 ·20 ·18 ·16
49 50 51 52 53	2 48 19·5 2 44 12·0 2 40 4·5 2 35 57·0 2 31 49·6	·53	2 32 18.7	•44 •44		+ ·39 ·38 ·37 ·35 ·34	2 49 36·2 2 45 27·1 2 41 18·1 2 37 9·0 2 33 0·1	+ ·30 ·29 ·28 ·26 ·25	2 49 52·I 2 45 42·I 2 41 32·I 2 37 22·2 2 33 12·4	+ ·22 ·21 ·19 ·17 ·16	2 50 3·I 2 45 52·0 2 41 40·9 2 37 29·9 2 33 18·9	+ ·14 ·12 ·10 ·08 ·06
54 55 56 57 58	2 27 42·2 2 23 34·8 2 19 27·4 2 15 20·1 2 11 12·7	.52	2 28 11·0 2 24 3·2 2 19 55·8 2 15 48·2 2 11 40·6		2 28 34·0 2 24 25·9 2 20 17·8 2 16 9·7 2 12 1·8	+ ·33 ·31 ·30 ·30	2 28 51·2 2 24 42·3 2 20 33·6 2 16 24·8 2 12 16·1		2 29 2·5 2 24 52·7 2 20 43·0 2 16 33·2 2 12 23·5	+ ·14 ·12 ·10 ·08 ·07	2 29 7·9 2 24 56·9 2 20 46·0 2 16 35·0 2 12 24·0	+ ·04 + ·02 ·00 - ·03 ·05
	1	7	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 12°	A.	L. 13°	Α.	L. 14°	Α.	L. 15°	Α.	L. 16°	Α.	L. 17°	Α.
0 4 8 12 16	·83 ·76 ·69 ·63	s. -4.22 4.20 4.19 4.18 4.17	·91 ·84 ·77 ·71	s. -4.23 4.22 4.21 4.19 4.18	s. +1.06 - .98 .91 .85	s. -4·25 4·24 4·22 4·21 4·20	1.06 .99 .93 .87	s. -4·28 4·26 4·24 4·22 4·21	s. +1·22 - 1·14 1·07 1·01	s. -4·30 4·28 4·26 4·24 4·23	s. +1·30 - 1·22 1·15 1·09 1·03	s. -4·32 4·30 4·28 4·26 4·25
20 22 24 26 28	+ ·57 ·54 ·51 ·49 ·45	4·16 4·15 4·15 4·15	+ ·65 ·62 · ·59 ·57 ·54	4·17 4·16 4·16 4·16	+ ·73 ·70 ·67 ·65 ·62	4·19 4·18 4·17 4·17	+ ·81 ·79 ·76 ·73 ·71	4·20 4·19 4·19 4·18	+ ·89 ·87 ·84 ·82 ·79	4·22 4·21 4·20 4·20	+ ·97 ·95 ·92 ·90 ·88	4·23 4·22 4·22 4·21
30 32 34 36 38	+ ·43 ·40 ·37 ·34 ·32	4·14 4·14 4·14 4·13	+ ·52 ·49 ·46 ·44 ·41	4·16 4·15 4·14 4·14	+ ·60 ·57 ·55 ·53 ·51	4·17 4·16 4·16 4·16 4·15	+ ·69 ·66 ·64 ·62 ·60	4·18 4·17 4·17 4·17	+ ·77 ·75 ·73 ·71 ·69	4·20 4·19 4·18 4·18	+ ·86 ·84 ·82 ·80 ·79	4·21 4·20 4·20 4·20
40 42 44 46 48	+ ·29 ·26 ·23 ·21 ·18	4·13 4·13 4·13 4·13	+ ·39 ·36 ·34 ·31 ·29	4·14 4·14 4·13 4·13	+ ·48 ·46 ·44 ·42 ·40	4·15 4·15 4·14 4·14	+ ·58 ·56 ·54 ·52 ·51	4·16 4·16 4·15 4·15	+ ·67 ·66 ·64 ·63 ·61	4·18 4·17 4·17 4·17	+ ·77 ·76 ·75 ·73 ·73	4·19 4·19 4·19 4·19
50 52 54 56 58	+ ·15 ·12 ·09 ·06 ·02	4·12 4·12 4·12 4·12 4·12	+ ·26 ·24 ·21 ·18 ·16	4·I3 4·I3 4·I3 4·I3	+ ·38 ·35 ·33 ·31 ·30	4·14 4·14 4·13 4·13	+ ·49 ·47 ·46 ·44 ·43	4·15 4·15 4·15 4·15 4·15	+ ·60 ·59 ·58 ·58 ·57	4·17 4·16 4·16 4·16 4·16	+ ·72 ·71 •71 ·71 ·71	4·18 4·18 4·18 4·18 4·18

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 61 LATITUDE 14°.

DECLINATION—SAME NAME AS-LATITUDE

			DECLIN	ATIO	N—SAM	$E N_{I}$	AME AS	—LA	TITUDE.			
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 18 35·2 5 35 23·6 5 26 48·8 5 18 15·2 5 9 42·5	s. + 1·11 ·86 ·82 ·77 ·73	H. M. S. 6 19 42·0 5 36 15·2 5 27 37·8 5 19 1·4 5 10 26·0	s. +1·12 ·86 ·81 ·76 ·72	H. M. S. 6 20 49·6 5 37 6·7 5 28 26·3 5 19 47·0 5 11 8·7	s. + 1·13 ·86 ·80 ·75 ·70	H. M. S. 6 21 58·1 5 37 58·0 5 29 14·4 5 20 32·0 5 11 50·6	s. + 1·15 ·85 ·80 ·74 ·69	H. M. S. 6 23 7.5 5 38 49.2 5 30 2.1 5 21 16.4 5 12 31.8	s. +1·17 ·85 ·79 ·73 ·68	H. M. S. 6 24 18·1 5 39 40·2 5 30 49·6 5 22 0·2 5 13 12·2	s. + 1·18 ·85 ·79 ·73 ·67
18 20 22 24 26	4 52 39·6 4 44 9·3 4 35 39·6 4 27 10·7	+ ·69 ·65 ·61 ·57 ·53	4 44 45.0 4 36 12.9 4 27 41.4	+ ·67 ·63 ·58 ·54 ·50	5 2 31·4 4 53 55·0 4 45 19·4 4 36 44·5 4 28 10·3	·51 ·47	5 3 10·3 4 54 30·9 4 45 52·3 4 37 14·5 4 28 37·4	+ ·64 ·59 · ·54 ·48 ·43	5 3 48·2 4 55 5·6 4 46 23·8 4 37 42·8 4 29 2·6		5 4 25·I 4 55 39·I 4 46 53·9 4 38 9·5 4 29 25·9	+ ·61 ·55 ·49 ·43 ·37
28 30 31 32 33	4 10 14·5 4 6 0·8 4 1 47·2 3 57 33·6		4 6 25·3 4 2 10·4 3 57 55·7	·41 ·39 ·37 ·34	4 II 3.8 4 6 47.4 4 2 31.3 3 58 15.1		3 58 31.9	+ ·38 ·33 ·31 ·28 ·25	4 20 22·9 4 11 43·8 4 7 24·3 4 3 5·1 3 58 45·9	·29 ·26 ·24 ·21	4 20 42·8 4 12 0·2 4 7 39·1 4 3 18·1 3 58 57·1	+ ·31 ·25 ·22 ·19 ·16
34 35 36 37 38	3 49 7·0 3 44 53·8 3 40 40·7 3 36 27·7	·31 ·29	3 53 41·1 3 49 26·6 3 45 12·1 3 40 57·8 3 36 43·6 3 32 29·4	.23	3 49 43·2 3 45 27·4 3 41 11·7 3 36 56·0	•25	3 54 14·4 3 49 57·0 3 45 39·6 3 41 22·4 3 37 5·2 3 32 48·0	+ ·23 ·20 ·18 ·15 ·12 + ·09	3 54 26·8 3 50 7·7 3 45 48·7 3 41 29·8 3 37 10·9 3 32 52·0	+ ·18 ·15 ·12 ·09 ·07 + ·04	3 54 36·3 3 50 15·4 3 45 54·6 3 41 33·9 3 37 13·1 3 32 52·4	+ ·13 ·10 ·07 ·04 + ·01 - ·02
40 41 42 43	3 28 2·0 3 23 49·2 3 19 36·5 3 15 23·9	·25 ·23 ·21 ·19	3 28 15·2 3 24 1·2 3 19 47·2	19 17 14 12 + 10	3 32 40.5 3 28 24.9 3 24 9.4 3 19 53.9 3 15 38.5 3 11 23.1	·13 ·10	3 28 30·9 3 24 13·8 3 19 56·7 3 15 39·7	·07 ·04 + ·01	3 32 52 0 3 28 33 2 3 24 14 3 3 19 55 5 3 15 36 6	+ ·01 - ·02 ·05	3 32 52.4 3 28 31.7 3 24 10.9 3 19 50.1 3 15 29.3 3 11 8.3	- ·02 ·05 ·09 ·12 ·16
45 46 47 48 49	3 6 58·8 3 2 46·4 2 58 33·9 2 54 21·5	·15 ·12 ·10 ·08	3 7 5·5 3 2 51·6	·07 ·05 + ·02	3 7 7·7 3 2 52·3 2 58 36·9 2 54 21·4 2 50 6·0	- ·03 - ·05	3 7 5·5 3 2 48·3 2 58 31·2 2 54 13·9 2 49 56·6	·07 ·10 ·14 ·17	3 6 58·7 3 2 39·7 2 58 20·5 2 54 I·3 2 49 4I·9	·15 ·18 ·22	3 6 47.3	·23 ·27 ·30 ·34 — ·38
50 51 52 53	2 45 56·7 2 41 44·3	- ·01 - ·01 - ·04	2 45 56·3 2 41 42·4	·05 ·08 ·11	2 45 50·3 2 41 34·9 2 37 19·2 2 33 3·5 2 28 47·6	·14 ·17 ·20 ·24	2 45 39·2 2 41 21·7 2 37 4·1 2 32 46·3 2 28 28·3	·23 ·27 ·30 ·34 — ·38	2 45 22·4 2 41 2·7 2 36 42·9 2 32 22·8 2 28 2·4	·33 ·37 ·40	2 44 59.9 2 40 37.8 2 36 15.5 2 31 52.8 2 27 29.8	·42 ·47 ·51 ·55 - ·60
55 56	2 24 54·9 2 20 42·5 2 16 30·0 2 12 17·5	·09 ·11 ·14 ·17	2 24 46·5 2 20 32·4 2 16 18·2 2 12 3·8	·19 ·22 ·26 ·29	2 24 31·7 2 20 15·5 2 15 59·3 2 11 42·7	·30 ·34 ·38 ·41	2 24 10·1 2 19 51·7 2 15 33·1 2 11 14·1	·42 ·46 ·50 ·54	2 23 41·7 2 19 20·8 2 14 59·5 2 10 37·7	·53 ·58 ·62 ·67	2 23 6·4 2 18 42·5 2 14 18·2	·65 ·70 ·76 ·81
A 74	T 100				o i' OF							
Alt.	L. 18°		L. 19°		L. 20°		L. 21°		L. 22°		L. 23°	
0 4 8 12 16	s. +1·38 - 1·30 1·23 1·17 1·11	s. -4·35 4·32 4·30 4·28 4·27	s. +1·47 - 1·39 1·31 1·25 1·19	s. -4·37 · 4·35 4·33 4·31 4·29	s. +1·55 - 1·47 1·40 1·33 1·27	s. -4·40 4·38 4·35 4·33 4·31	s. +1.64 - 1.55 1.48 1.41 1.36	s. -4·43 4·40 4·38 4·36 4·34	s. +1·72 - 1·64 1·56 1·50	s. -4·47 4·43 4·41 4·39 4·37	s. +1.81 - 1.73 1.65 1.58	s. -4·50 4·47 4·44 4·42 4·39
20 22 24 26 28	+1.06 1.03 1.01 .99	4·25 4·25 4·24 4·24 4·23	+1·14 1·12 1·09 1·07 1·05	4·28 4·27 4·26 4·26 4·25	+ 1·22 1·20 1·18 1·16 1·14	4·30 4·29 4·28 4·28	+1·31 1·29 1·26 1·25 1·23	4·32 4·31 4·31 4·30	+1·39 1·37 1·35 1·34 1·32	4·35 4·35 4·34 4·33 4·33	+1.48 1.46 1.44 1.43 1.41	4·38 4·37 4·36 4·36
30 32 34 36 38	+ ·95 ·93 ·91 ·90 ·88 + ·87	4·23 4·22 4·22 4·22	+1.04 1.02 1.00 .99 .98	4·25 4·25 4·24 4·24 4·24	+1·13 1·11 1·10 1·08 1·08	4·27 4·27 4·26 4·26 4·26	+ 1·22 1·20 1·19 1·18 1·17	4·30 4·29 4·29 4·29	+ 1·31 1·29 1·29 1·28 1·28	4·33 4·32 4·32 4·32	+1.40 1.39 1.38 1.38 1.38	4·35 4·35 4·35 4·35
40 42 44 46 48	•86 •85 •84 •84	4·2I 4·2I 4·2I 4·2I 4·2I	+ ·97 ·96 ·95 ·95 ·95	4·23 4·23 4·23 4·23	+1.07 1.06 1.06 1.06 1.06	4·26 4·26 4·26 4·26 4·26	+1·17 1·17 1·17 1·18	4·28 4·28 4·29 4·29	+1·27 1·27 1·28 1·28 1·30	4·31 4·32 4·32 4·32	+1·37 1·38 1·39 1·40 1·42	4·34 4·35 4·35 4·36
50 52 54 56 58	+ ·83 ·83 ·84 ·84 ·85	4·21 4·20 4·21 4·21 4·21	+ ·95 ·96 ·96 ·98 ·99	4·23 4·23 4·24 4·24	+1.07 1.08 1.09 1.11 1.14	4·26 4·26 4·26 4·27 4·28	+1·19 1·21 1·23 1·25 1·29	4·29 4·30 4·31 4·32	+1·31 1·33 1·36 1·40 1·44	4·33 4·34 4·35 4·37	+1.44 1.47 1.50 1.54 1.60	4·37 4·37 4·39 4·40 4·42

62 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 15°.

			DECLIN	ATIC	N—SAM	E N.	AME AS	-LA	TITUDE	•		
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 18 34.4 5 10 16.8 5 1 58.9 4 53 40.7	1.11	5 19 39·4 5 11 22·2	1.09	5 12 26.6	s. +1·07 1·06 1·06 1·07	5 21 47·0 5 13 30·1 5 5 13·1	1.05	5 14 32.7	1.03	5 15 34.6	s. +1.08 1.03 1.02 1.02 1.01
18 20 22 24 26	4 45 22·I 4 37 3·0 4 28 43·4 4 20 23·2 4 I2 2·4	1·14 1·16 1·18 1·20	4 46 29·2 4 38 10·9 4 29 52·2 4 21 33·1 4 13 13·4	1.16	4 30 59·2 4 22 40·9 4 14 22·2	I.II I.IO	4 48 39·1 4 40 21·8 4 32 4·4 4 23 46·7 4 15 28·7 4 7 10·3	1.09 1.09	4 49 41·9 4 41 24·8 4 33 7·8 4 24 50·5 4 16 33·1 4 8 15·4	1.04 1.04 1.05	4 50 43.4 4 42 26.4 4 34 9.5 4 25 52.5 4 17 35.4 4 9 18.2	+ 1.01 1.01 1.01 1.02 1.02 + 1.03
30 31 32 33	4 3 40·8 3 55 18·2 3 51 6·6 3 46 54·7 3 42 42·6 3 38 30·1	1·27 1·28 1·30	4 4 53·1 3 56 32·0 3 52 21·2 3 48 10·1 3 43 58·9 3 39 47·3	1·21 1·22 1·23	3 57 43·1 3 53 33·0 3 49 22·6 3 45 12·1	1·16 1·17 1·18	3 58 51·5 3 54 42·0 3 50 32·2 3 46 22·3	1·14 1·14	3 59 57.4 3 55 48.2 3 51 39.0 3 47 29.6 3 43 20.1	1.08 1.08	4 9 18·2 4 1 0·7 3 56 51·9 3 52 43·0 3 48 34·0 3 44 25·0	1.03 1.04 1.04 1.05 +1.06
35 36 37 38 39	3 34 17·3 3 30 4·2 3 25 50·7 3 21 36·8 3 17 22·5	1·33 1·35 1·37 1·39 +1·41	3 35 35.5 3 31 23.4 3 27 11.0 3 22 58.3 3 18 45.2	1·27 1·29 1·31 1·33 +1·35	3 36 50·4 3 32 39·2 3 28 27·8 3 24 16·1 3 20 4·1	1·22 1·23 1·25 1·26 +1·28	3 38 2·0 3 33 51·6 3 29 41·0 3 25 30·2 3 21 19·1	1·17 1·18 1·19 1·20 +1·22	3 39 10·5 3 35 0·7 3 30 50·7 3 26 40·6 3 22 30·3	1·11 1·12 1·13 1·14 +1·16	3 40 15.8 3 36 6.5 3 31 57.1 3 27 47.6 3 23 38.0	1.06 1.07 1.08 1.09
40 41 42 43 44 45	3 13 7.7 3 8 52.5 3 4 36.7 3 0 20.4 2 56 3.5 2 51 45.9	1.49 1.51 +1.54		1·39 1·41 1·44 +1·46	3 15 51·7 3 11 39·1 3 7 26·1 3 3 12·7 2 58 58·9 2 54 44·6	1·32 1·34 1·36 +1·38	3 17 7.7 3 12 56.1 3 8 44.2 3 4 32.0 3 0 19.4 2 56 6.5	1·25 1·27 1·28 +1·30	3 5 46.9	1·18 1·20 1·21 +1·23		1·11 1·12 1·13 1·14 +1·16
46 47 48 49 50	2 47 27.7 2 43 8.7 2 38 48.8 2 34 28.1 2 30 6.5	1.61 1.64 1.68 +1.72 1.76	2 49 1.4 2 44 44.3 2 40 26.6 2 36 8.1 2 31 48.8	1.52 1.55 1.58 +1.62 1.65	2 50 29·8 2 46 14·5 2 41 58·6 2 37 42·1 2 33 24·9	1.43 1.46 1.49 +1.52 1.55	2 51 53·1 2 47 39·4 2 43 25·1 2 39 10·3 2 34 55·0	1·35 1·37 1·40 +1·42 1·45	2 53 11·5 2 48 59·0 2 44 46·2 2 40 32·9 2 36 19·2	1·27 1·29 1·31 +1·33 1·36	2 54 25·1 2 50 13·7 2 46 2·1 2 41 50·1 2 37 37·7	1·19 1·20 1·22 +1·24 1·26
51 52 53 54 55 56	2 25 43.7 2 21 19.8 2 16 54.6 2 12 28.1 2 8 0.1 2 3 30.2	1.86		1·74 1·78 +1·83	2 16 8·1 2 11 46·4	1·62 1·66	2 30 39·0 2 26 22·4 2 22 5·1 2 17 47·0 2 13 28·0 2 9 7·9	1.52 1.55 +1.59 1.63	2 32 4·9 2 27 50·2 2 23 34·9 2 19 18·9 2 15 2·2 2 10 44·7	1.41 1.44 +1.47 1.51	2 33 25·0 2 29 11·8 2 24 58·2 2 20 44·0 2 16 29·3 2 12 13·9	1·29 1·31 1·34 + 1·36 1·39 1·43
57 58	1 58 58·4 1 54 24·5	2·15 2·22	2 I 3·4 I 56 33·9	2·01 2·08	2 2 59·4 1 58 33·8	1·86 1·92	2 4 46·9 2 0 24·7	1·72 1·78	2 6 26·3 2 2 7·0	1·59 1·64	2 7 57.9	1·46 1·50
Alt.	L. 0°	A.	L. 1°	A.	D 1' OF L. 2°	A.	L. 3°	A.	L. 4°	A.	L. 5°	Α.
0 4 8 12 16	s. - ·00 - ·08 ·15 ·24 ·32 - ·40	S. -4·14 4·14 4·15 4·15	s. + ·07 - ·00 - ·08 ·16 ·24 - ·32	S. -4·14 4·14 4·14 4·15 4·15	s. + ·15 - ·07 ·00 - ·08 ·16 - ·24	S. -4:14 4:14 4:14 4:14 4:15	S. + ·22 - ·15 + ·07 ·00 - ·08 - ·16	S. -4·15 4·14 4·14 4·14 4·14	s. + ·30 - ·22 ·14 + ·07 - ·01 - ·08	S. -4·15 4·15 4·14 4·14 4·14	s. + ·37 - ·30 ·22 ·14 + ·07 - ·00	s. -4·16 4·15 4·15 4·14 4·14
22 24 26 28	·45 ·50 ·55 ·60 — ·65	4·17 4·17 4·18 4·18	·37 ·41 ·46 ·51	4·16 4·16 4·17 4·17 4·18	·29 ·33 ·38 ·42	4·15 4·15 4·16 4·16	·21 ·25 ·29 ·34 — ·38	4·15 4·15 4·15 4·16	·13 ·17 ·21 ·25 — ·30	4·14 4·15 4·15 4·15	·05 ·08 ·13 ·17	4·14 4·14 4·14 4·15
32 34 36 38 40	·70 ·76 ·82 ·89 — ·95	4·20 4·21 4·22 4·24 4·25	·61 ·67 ·72 ·79 — ·85	4·18 4·19 4·20 4·22 4·23	·52 ·57 ·63 ·69	4·17 4·18 4·19 4·20 4·21	·43 ·48 ·53 ·59 — ·65	4·16 4·17 4·17 4·18 4·19	·34 ·39 ·44 ·49 — ·54	4·15 4·16 4·16 4·17 4·18	·25 ·30 ·34 ·40	4·15 4·15 4·16 4·16
42 44 46 48 50	1.03 1.11 1.20 1.29	4·26 4·31 4·34 4·37	.92 .99 1.08 1.16 -1.26	4·24 4·26 4·28 4·30 4·33	·81 ·88 ·96 1·04 — 1·13	4·22 4·23 4·25 4·27 4·29	.71 .77 .84 .92	4·20 4·21 4·23 4·24 4·26	·60 ·66 ·73 ·80 — ·88	4·18 4·19 4·20 4·22 4·23	·50 ·56 ·62 ·68	4·17 4·18 4·19 4·20
50 52 54 56 58	1.51 1.64 1.79 1.97	4·41 4·45 4·51 4·58	1·37 1·49 1·62 1·78	4·33 4·36 4·40 4·45 4·51	1·23 1·34 1·46 1·60	4·32 4·35 4·39 4·44	1·09 1·19 1·30 1·43	4·28 4·31 4·34 4·38	•96 1•05 1•15 1•27	4·25 4·27 4·30 4·33	.83 .91 1.01 1.11	4·22 4·24 4·26 4·28

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 63 LATITUDE 15°.

10 5 24 53.3 1.02 5 25 54.2 1.01 5 26 54.6 1.01 5 26 54.6 1.01 5 26 54.6 1.01 5 26 54.6 1.01 5 26 54.6 1.01 5 26 54.6 1.01 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5 10 6 10 5 10 6 10 6 10 1	91 4 4 49.6 91 4 0 41.0 91 3 56 32.5 91 3 52 24.0 91 3 48 15.3 91 3 44 7.0 91 3 39 58.5	43.7 + i·i 6 io 49.9 + i·i 6 ii 56.5 + i·i 54.4 .99 5 28 53.7 .98 5 29 52.6 .96 34.3 .97 5 20 32.5 .96 5 21 30·i .95 14.6 .96 5 12 11·8 .95 5 13 8·i .92 55.4 .94 5 3 51·6 .93 5 4 46·7 .91 36.5 + 93 4 55 31·8 + 91 4 56 26·0 + .86 .87 59.9 91 4 38 53·5 .88 4 39 45·7 .86 42.0 .90 4 30 35·0 .87 4 31 26·2 .84 24.3 .89 4 22 16·7 .86 4 23 7·i .82 49.6 .87 4 5 41·0 .84 4 6 30·0 .84 41.0 .87 4 5 41·0 .82 3 4 220·8 .72 32.5 .87 3 57 23·4 .83 3 58 II·8 .72 24.0 .87 3 53 14·7 .82 3 54 54·5 .73 32.5 .87 3 57 23·4 .83 3 58 II·8 .73
20	94 4 46 18.0 93 4 37 59.9 93 4 29 42.0 92 4 21 24.3 92 4 13 6.9 91 4 4 49.6 91 3 56 32.5 91 3 52 24.0 91 3 48 15.3 91 3 44 7.0 91 3 34 7.0	18·0 .92 4 47 12·5 .90 4 48 5·6 .83 59·9 .91 4 38 53·5 .88 4 39 45·7 .86 42·0 .90 4 30 35·0 .87 4 31 26·2 .84 24·3 .89 4 22 16·7 .86 4 23 7·1 .82 49·6 .87 4 5 41·0 .84 4 6 30·0 .86 .84 .81 .84 .81 .84 .81 .86 .87 .81 .82 .83 .85 .81 .81 .81 .82 .83 .85 .81 </td
30	91 4 4 49.6 91 4 0 41.0 91 3 56 32.5 91 3 52 24.0 91 3 48 15.3 91 3 44 7.0 91 3 39 58.5	49·6
35 3 41 18.0 1.01 3 42 17.3 96 3 43 13.6 36 36 37 91 32 38 8.7 96 3 43 13.6 96 3 43 13.6 96 3 43 13.6 96 3 43 13.6 96 3 43 13.6 96 3 43 13.6 97 3 3 96 3 43 13.6 97 3 34 96 3 43 13.6 98 3 26 39.5 1 39 13 14.0 3 26 39.5 1 31.3 13.6 98 3 26 39.5 1 39.7 13 30 48.0 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 13.1 </td <td>91 3 44 7·0 91 3 39 58·5</td> <td>7.0</td>	91 3 44 7·0 91 3 39 58·5	7.0
40	92 3 35 50·0 92 3 31 41·5	
45	92 3 27 33·1 92 3 23 24·6 93 3 19 16·1 93 3 15 7·6 94 3 10 59·0	16·1
50 2 38 50.6 1.17 2 39 58.3 1.08 2 41 0.6	94 3 6 50·5 95 3 2 41·8 96 2 58 33·1 97 2 54 24·4 97 2 50 15·6	33.1
52 2 30 27.4 1.21 2 31 37.1 1.11 2 32 41.0	98 2 46 6·7 99 2 41 57·7 01 2 37 48·6 02 2 33 39·4 •03 2 29 30·1	48·6
55 2 17 49 5 1 28 2 19 3 1 1 17 2 20 10 3 5 6 2 13 36 0 1 31 2 14 51 1 1 19 2 15 59 4 57 2 9 22 0 1 34 2 10 38 7 1 22 2 11 48 4		20.6 + .95 2 26 14.5 + .85 2 27 2.4 + .75
VARIATION TO 1' OF L	10 2 12 51.1	11·0 96 2 22 5·5 86 2 22 53·8 75 1·2 97 2 17 56·3 87 2 18 45·1 76

Alt.	L. 6° A.	L. 7° A.	L. 8°, A.	L. 9° A.	L. 10° A.	L. 11° A.
0 4 8 12 16	s. s. + '45 -4'17 '37 4'16 '30 4'15 '22 4'15 '15 4'14	s. s. + '53 -4'17 '45 4'17 '37 4'16 '30 4'15 '22 4'15	s. s. + ·60 -4·18 ·52 4·17 ·45 4·16 ·37 4·16 ·30 4·15	s. s. + .68 -4.19 .60 4.18 .52 4.17 .45 4.16 .38 4.16	S. S. + '76 -4'21 '68 4'19 '60 4'18 '53 4'17 '46 4'17	s. s. + ·83 -4·22 ·75 4·21 ·68 4·19 ·61 4·18 ·54 4·17
20	+ ·07 4·14	+ ·15 4·14	+ ·23 4·15	+ ·31 4·15	+ ·39 4·16	+ ·47 4·17
22	·04 4·14	·12 4·14	·20 4·15	·28 4·15	36 4·16	·44 4·17
24	·00 4·14	·08 4·14	·16 4·14	·24 4·15	·32 4·15	·40 4·16
26	- ·04 4·14	·04 4·14	·12 4·15	·21 4·15	·29 4·15	·37 4·16
28	·08 4·14	·00 4·14	·08 4·14	·17 4·14	·25 4·15	·34 4·16
30	- ·13 4·14	- ·04 4·14	+ ·05 4·14	+ ·13 4·14	+ ·22 4·15	+ ·31 4·15
32	·16 4·14	·08 4·14	+ ·01 4·14	·10 4·14	·18 4·14	·27 4·15
34	·21 4·15	·12 4·14	- ·03 4·14	·06 4·14	·15 4·14	·24 4·15
36	·25 4·15	·16 4·14	·07 4·14	+ ·02 4·14	·11 4·14	·20 4·15
38	·30 4·15	·21 4·15	·11 4·14	- ·02 4·14	·08 4·14	·17 4·15
40	- ·35 4·15	- ·25 4·15	- ·15 4·14	05 4.14	+ ·04 4·14	+ ·14 4·14
42	·40 4·16	·30 4·15	·20 4·14	.10 4.14	·00 4·14	·10 4·14
44	·45 4·16	·35 4·16	·24 4·15	.14 4.14	- ·04 4·14	·06 4·14
46	·51 4·17	·40 4·16	·29 4·15	.18 4.14	·08 4·14	·03 4·14
48	·57 4·18	·45 4·17	·34 4·16	.23 4.15	·12 4·14	+ ·01 4·14
50	- ·63 4·19	·51 4·17	- '40 4'16 '45 4'16 '52 4'17 '58 4'18 '66 4'19	- ·28 4·15	- ·16 4·14	- ·05 4·14
52	·70 4·20	··58 4·18		·33 4·15	·21 4·15	·09 4·14
54	·78 4·21	·65 4·19		·39 4·16	·26 4·15	·14 4·14
56	·86 4·23	·72 4·20		·45 4·17	·31 4·15	·18 4·14
58	·95 4·25	·81 4·22		·51 4·17	·37 4·16	·23 4·15

64 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 15°.

		1	DECLIN		N—SAM	1 1 1 1 1	11/12/210		TITUDE.			
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 13 3.6 5 30 51.2 5 22 27.1 5 14 3.8 5 5 41.1	.90	1	s. +1·13 ·96 ·94 ·91 ·88	H. M. S. 6 15 19·3 5 32 47·1 5 24 19·6 5 15 52·9 5 7 27·0	s. + 1·14 ·96 ·93 ·90 ·87	5 16 46.4	s. +1·15 ·95 ·92 ·89 ·85		s. +1·16 ·95 ·91 ·88 ·84	H. M. S. 6 18 47.7 5 35 38.7 5 27 4.6 5 18 31.5 5 9 59.4	s. + 1·17 ·95 ·90 ·87 ·83
18 20 22 24 26	4 57 19·0 4 47 57·4 4 40 36·4 4 32 15·8 4 23 55·7	+ ·87 ·85 ·83 ·81 ·79		+ ·86 ·83 ·81 ·78 ·76	4 59 1.8 4 50 37.3 4 42 13.4 4 33 50.1 4 25 27.4	+ ·84 ·81 ·78 ·76 ·73	4 59 51·6 4 51 25·3 4 42 59·8 4 34 34·8 4 26 10·5	+ ·82 ·79 ·76 ·73 ·70	5 0 40·4 4 52 12·2 4 43 44·7 4 35 17·9 4 26 51·8	+ ·80 ·77 ·74 ·70 ·67	5 I 28·2 4 52 57·9 4 44 28·3 4 35 59·5 4 27 31·3	+ ·79 ·75 ·71 ·68 ·64
28 30 31 32 33	4 15 36·0 4 7 16·7 4 3 7·2 3 58 57·8 3 54 48·4	+ ·78 ·76 ·75 ·74 ·74	4 16 21.6 4 8 1.2 4 3 51.2 3 59 41.2 3 55 31.3	+ ·74 ·72 ·71 ·70 ·69	4 17 5·2 4 8 43·4 4 4 32·8 4 0 22·2 3 56 11·7	+ ·71 ·68 ·67 ·66 ·65	4 17 46·7 4 9 23·5 4 5 12·1 4 1 0·7 3 56 49·5	+ ·67 ·65 ·63 ·62 ·61	4 18 26·2 4 10 1·2 4 5 49·0 4 1 36·8 3 57 24·8	+ ·64 ·61 ·59 ·58 ·56	4 19 3.8 4 10 36.8 4 6 23.6 4 2 10.5 3 57 57.5	+ ·61 ·57 ·56 ·54 ·52
34 35 36 37 38	3 51 39·1 3 46 29·9 3 42 20·8 3 38 11·7 3 34 2·7	·72 ·71 ·70	3 34 43.4	∙65	3 47 51·1 3 43 40·9 3 39 30·8 3 35 20·8	·60	3 52 38·4 3 48 27·5 3 44 16·6 3 40 5·8 3 35 55·2	+ ·59 ·58 ·57 ·56 ·54	3 40 37·8 3 36 26·3	·51 ·49	3 53 44·6 3 49 31·9 3 45 19·3 3 41 6·7 3 36 54·3	+ ·51 ·49 ·47 ·46 ·44
39 40 41 42 43	3 29 53·8 3 25 44·9 3 21 36·0 3 17 27·3 3 13 18·5	·68 ·68	3 26 24·7 3 22 15·5 3 18 6·3 3 13 57·3	·63 ·62 ·61	3 3I 1I·0 3 27 I·1 3 22 5I·4 3 18 4I·8 3 14 32·2	+ ·59 ·58 ·57 ·56 ·55	3 31 44.6 3 27 34.2 3 23 23.8 3 19 13.5 3 15 3.3	+ ·53 ·52 ·51 ·50 ·49	3 28 3·7 3 23 52·5 3 19 41·5 3 15 30·5	'45 '43 '42	3 32 42·1 3 28 29·8 3 24 17·8 3 20 5·7 3 15 53·8	+ ·42 ·41 ·39 ·37 ·36
44 45 46 47 48	3 9 9.8 3 5 1.2 3 0 52.6 2 56 44.0 2 52 35.5	• 66	3 5 39·3 3 1 30·4 2 57 21·5 2 53 12·7	·59 ·59 ·58	3 6 13·3 3 2 3·9 2 57 54·6 2 53 45·4	.51	3 10 53·2 3 6 43·1 3 2 33·1 2 58 23·2 2 54 13·4	·44 ·43	3 7 8·7 3 2 58·0 2 58 47·3 2 54 36·7	·35	3 II 42·0 3 7 30·3 3 3 18·6 2 59 7·0 2 54 55·4	+ ·34 ·32 ·31 ·29 ·27
51 52 53	2 44 18·4 2 40 9·9 2 36 1·4 2 31 53·0	·66 ·65 ·65 ·65	2 44 55·3 2 40 46·5 2 36 37·9 2 32 29·3	·57 ·57 ·56 ·56	2 45 27·I 2 4I I8·I 2 37 9·0 2 33 0·I	+ ·50 ·49 ·48 ·47 ·47	2 45 53.9 2 41 44.3 2 37 34.7 2 33 25.3	·41 ·39 ·38 ·37	2 50 26·2 2 46 15·8 2 42 5·4 2 37 55·1 2 33 44·8	·31 ·29 ·28	2 38 10 0 2 33 58·7	+ ·25 ·24 ·22 ·20 ·18
55 56 57	2 27 44·5 2 23 36·1 2 19 27·6 2 15 19·1 2 11 10·5	•65 •65 •66	2 28 20·7 2 24 12·2 2 20 3·7 2 15 55·2 2 11 46·7	·55 ·55	2 28 51·2 2 24 42·3 2 20 33·6 2 16 24·8 2 12 16·1	+ ·46 ·45 ·44 ·44 ·43	2 29 15·8 2 25 6·4 2 20 57·1 2 16 47·8 2 12 38·6	·35 ·34 ·33	2 29 34·6 2 25 24·5 2 21 14·4 2 17 4·3 2 12 54·3	.22	2 29 47·5 2 25 36·4 2 21 25·3 2 17 14·2 2 13 3·2	+ ·17 ·15 ·13 ·11
·,		V	ARIATIO	ON TO) 1' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 12°	Α.	L. 13°	A	L. 14°	Α.	L. 15°	Α.	L. 16°	A.	L. 17°	Α.
0 4 8 12 16	·83 ·75 ·68 ·61	s. -4·24 4·22 4·21 4·20 4·19	•91 •83 •76 •69	s. -4·25 4·24 4·22 4·21 4·20	·99 ·91 ·84 ·77	s. -4·28 4·26 4·24 4·22 4·21	1.07 .99 .92 .85	s. -4·30 4·28 4·26 4·24 4·23	1·15 1·07 1·00 ·93	s. -4·32 4·30 4·28 4·26 4·24	1·23 1·15 1·08 1·01	s. -4·34 4·32 4·30 4·28 4·26
20 22 24 26 28	+ ·55 ·52 ·48 ·45 ·42	4·18 4·17 4·17 4·16	+ ·63 ·60 ·57 ·54 ·50	4·19 4·18 4·18 4·17	+ ·71 ·68 ·65 ·62 ·59	4·20 4·20 4·19 4·19	+ ·79 ·76 ·73 ·70 ·67	4·21 4·21 4·20 4·20 4·19	+ ·87 ·84 ·81 ·79 ·76	4·23 4·23 4·22 4·22 4·21	+ ·95 ·93 ·90 ·87 ·85	4·25 4·25 4·24 4·23 4·23
30 32 34 36 38	+ ·39 ·36 ·33 ·29 ·27	4·16 4·15 4·15 4·15	+ ·48 ·44 ·42 ·39 ·36	4·17 4·16 4·16 4·16 4·16	+ ·56 ·53 ·51 ·48 ·45	4·18 4·17 4·17 4·17	+ ·65 ·62 ·60 ·57 ·55	4·19 4·18 4·18 4·18	+ ·74 ·71 ·69 ·66 ·64	4·21 4·20 4·19 4·19	+ ·82 ·80 ·78 ·75 ·74	4·22 4·22 4·21 4·21 4·21
40 42 44 46 48	+ ·23 ·20 ·17 ·13 ·10	4·15 4·14 4·14 4·14	+ ·33 ·30 ·27 ·24 ·21	4·15 4·15 4·15 4·15	+ ·42 ·40 ·37 ·34 ·32	4·16 4·16 4·16 4·15	+ ·52 ·50 ·47 ·45 ·43	4·17 4·17 4·17 4·16	+ ·62 ·60 ·58 ·56 ·54	4·19 4·18 4·18 4·18	+ ·71 ·70 ·68 ·66 ·65	4·20 4·20 4·19 4·19
50 52 54 56 58	+ ·06 + ·03 - ·01 ·05 ·09	4·I4 4·I4 4·I4 4·I4	+ ·18 ·15 ·11 ·08 ·04	4·14 4·14 4·14 4·14 4·14	+ ·29 ·26 ·24 ·21 ·18	4·15 4·15 4·15 4·15	+ ·41 ·38 ·36 ·34 ·32	4·16 4·16 4·15 4·15	+ ·52 ·50 ·49 ·47 ·46	4·17 4·17 4·17 4·17 4·17	+ ·63 ·62 ·61 ·60 ·60	4·19 4·19 4·18 4·18

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 65 LATITUDE 15°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 19 58·7 5 36 35·5 5 27 58·8 5 19 23·2 5 10 48·7		H. M. S. 6 21 10·5 5 37 32·0 5 28 52·6 5 20 14·3 5 11 37·1	.84	H. M. S. 6 22 23·2 5 38 28·4 5 29 46·0 5 21 4·8 5 12 24·8	s. +1·22 ·94 ·89 ·84 ·79	H. M. S. 6 23 36·9 5 39 24·7 5 30 39·1 5 21 54·8 5 13 11·7	s. +1·24 ·94 ·88 ·83 ·77	H. M. S. 6 24 51.6 5 40 21.0 5 31 31.9 5 22 44.3 5 13 57.9	s. +1·25 ·94 ·88 ·82 ·76	H. M. S. 6 26 7.4 5 41 17.2 5 32 24.5 5 23 33.3 5 14 43.5	s. + 1•27 ·94 ·87 ·81 ·75
18 20 22 24 26	5 2 15.0 - 4 53 42.3 4 45 10.5 4 36 39.4 4 28 9.0	.65	5 3 0.9 4 54 25.6 4 45 51.3 4 37 17.7 4 28 44.9	+ ·76 ·71 ·67 ·62 ·58	5 3 45.8 4 55 7.8 4 46 30.7 4 37 54.5 4 29 19.0	+ ·74 ·69 ·64 ·60 ·55	5 4 29.7 4 55 48.8 4 47 8.8 4 38 29.6 4 29 51.3	+ '72 '67 '62 '57 '52	5 5 12.8 4 56 28.6 4 47 45.5 4 39 3.2 4 30 21.8	+ ·71 ·65 ·60 ·55 ·49	5 5 54·8 4 57 7·3 4 48 20·8 4 39 35·2 4 30 50·4	+ ·69 ·63 ·58 ·52 ·46
28 30 31 32 33	4 19 39·3 - 4 11 10·2 4 6 55·8 4 2 41·7 3 58 27·6		4 20 12·8 4 11 41·3 4 7 25·8 4 3 10·4 3 58 55·1	·48 ·46	4 20 44·2 4 12 10·1 4 7 53·3 4 3 36·6 3 59 20·0	+ ·51 ·46 ·44 ·41 ·39	4 21 13·7 4 12 36·7 4 8 18·4 4 4 0·3 3 59 42·3	+ ·47 ·42 ·40 ·37 ·35	4 21 41·1 4 13 1·0 4 8 41·2 4 4 21·5 4 0 2·0	+ ·44 ·38 ·36 ·33 ·30	4 22 6·4 4 13 23·0 4 9 1·5 4 4 40·1 4 0 18·9	+ ·40 ·35 ·33 ·21 ·26
34 35 36 37 38	3 54 13.7 - 3 49 59.9 3 45 46.2 3 41 32.6 3 37 19.2	°44 °42 °40	3 54 40·0 3 50 25·0 3 46 10·1 3 41 55·4 3 37 40·7	·39 ·37 ·35	3 55 3.6 3 50 47.3 3 46 31.1 3 42 15.0 3 37 59.0	+ ·37 ·35 ·32 ·30 ·28	3 55 24·5 3 51 6·7 3 46 49·1 3 42 31·5 3 38 14·0	+ ·32 ·30 ·27 ·25 ·22	3 55 42·5 3 51 23·2 3 47 4·0 3 42 44·8 3 38 25·7	+ ·28 ·25 ·22 ·19 ·17	3 55 57.7 3 51 36.7 3 47 15.7 3 42 54.9 3 38 34.0	+ ·23 ·20 ·17 ·14 ·11
39 40 41 42 43	3 33 5·8 3 28 52·5 3 24 39·3 3 20 26·3 3 16 13·3	·33	3 33 26·2 3 29 11·7 3 24 57:3 3 20 43·0 3 16 28·8	·29 ·27 ·25	3 33 43.1 3 29 27.3 3 25 11.6 3 20 55.9 3 16 40.3	+ ·25 ·23 ·21 ·18 ·16	3 33 56·7 3 29 39·3 3 25 22·1 3 21 4·9 3 16 47·8	+ ·20 ·17 ·14 ·12 ·09	3 29 47·8 3 25 28·8 3 21 10·0	+ ·14 ·11 ·08 ·05 + ·02	3 34 13·2 3 29 52·5 3 25 31·7 3 21 11·0 3 16 50·3	+ ·08 ·05 + ·01 - ·02
44 45 46 47 48	3 12 0·4 3 7 47·5 3 3 34·7 2 59 22·0 2 55 9·4	·23	3 12 14·6 3 8 0·5 3 3 46·5 2 59 32·5 2 55 18·6	·18 ·16 ·14	3 12 24·7 3 8 9·2 3 3 53·8 2 59 38·3 2 55 22·9	+ ·13 ·11 ·08 ·06 + ·03	3 12 30·7 3 8 13·6 3 3 56·5 2 59 39·5 2 55 22·3	+ ·06 ·03 + ·01 - ·02 ·05	3 12 32·3 3 8 13·4 3 3 54·6 2 59 35·7 2 55 16·7	- ·01 ·04 ·07 ·10 ·14	3 12 29·5 3 8 8·7 3 3 47·9 2 59 27·0 2 55 6·0	- ·08 ·12 ·15 ·19 ·22
49 50 51 52 53	2 50 56·8 2 46 44·3 2 42 31·8 2 38 19·3 2 34 6·9	·II	2 51 4·7 2 46 50·8 2 42 36·9 2 38 23·1 2 34 9·3	·06 ·04 + ·02	2 51 7·5 2 46 52·1 2 42 36·7 2 38 21·3 2 34 5·8	+ ·00 - ·02 ·05 ·08 ·11	2 51 5·2 2 46 48·1 2 42 30·9 2 38 13·6 2 33 56·3	08 .11 .15 .18	2 50 57·7 2 46 38·6 2 42 19·2 2 38 0·1 2 33 40·7	- ·17 ·20 ·24 ·28 ·31	2 50 44.8 2 46 23.5 2 42 2.1 2 37 40.5 2 33 18.7	- ·26 ·30 ·34 ·38 ·42
54 55 56 57 58	2 25 42.1	+ ·02 ·00	2 29 55.4 2 25 41.6 2 21 27.7 2 17 13.8 2 12 59.9	·09	2 29 50·3 2 25 34·7 2 21 19·1 2 17 3·4 2 12 47·5	- ·14 ·17 ·20 ·23 ·27	2 16 45.8	- ·24 ·28 ·32 ·35 ·39	2 29 21·0 2 25 1·2 2 20 41·2 2 16 20·9 2 12 0·4	- ·35 ·39 ·43 ·48 ·52	2 28 56·7 2 24 34·3 2 20 11·6 2 15 48·6 2 11 25·2	- ·46 ·51 ·55 ·60 ·65
		V	ARIATIO	ON TO	o i' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 18°	A.	L. 19°	Α.	L. 20°	Α.	L. 21°	A.	L. 22°	Α.	L. 23°	Α.
0 4 8 12 16	s. +1·40 - 1·31 1·23 1·16 1·10	s. -4·37 4·34 4·32 4·30 4·28	s. +1·48 - 1·39 1·31 1·24 1·18	s. -4·40 4·37 4·34 4·32 4·30	s. +1.57 - 1.48 1.40 1.33 1.26	s. -4·43 4·40 4·37 4·35 4·33	s. +1.65 1.56 1.48 1.41 1.35	s. -4·46 4·42 4·40 4·37 4·35	s. +1.74 - 1.65 1.57 1.49 1.43	s. -4·49 4·46 4·43 4·40 4·38	s. +1·83 - 1·74 1·65 1·58	s. -4.53 4.49 4.46 4.43 4.41
20 22 24 26 28	•93	4·27 4·26 4·25 4·25 4·24	+ 1·12 1·10 1·07 1·05 1·02	4·29 4·28 4·28 4·27 4·26	+1·20 1·18 1·15 1·13 1·11	4·31 4·30 4·30 4·29 4·29	+1·29 1·27 1·24 1·22 1·20	4·34 4·33 4·32 4·31	+1·37 1·35 1·33 1·31 1·29	4·36 4·35 4·34 4·33	+1·46 1·44 1·41 1·40 1·38	4·39 4·38 4·37 4·37 4·36
30 32 34 36 38	·89 ·87 ·85 ·83	4·24 4·23 4·23 4·23 4·22	+1.00 .98 .96 .94	4·26 4·25 4·25 4·25 4·24	+1.09 1.07 1.05 1.04 1.03	4·28 4·28 4·27 4·27 4·27	+1·18 1·16 1·15 1·13 1·12	4·31 4·30 4·30 4·29 4·29	+ 1·27 1·25 1·24 1·23 1·22	4·33 4·32 4·32 4·32	+1·36 1·35 1·34 1·33 1·32	4·36 4·35 4·35 4·35 4·35
40 42 44 46 48	·80 ·78 ·77 ·76	4·22 4·21 4·21 4·21	+ ·91 ·90 ·89 ·88 ·87	4·24 4·24 4·23 4·23	+1.00 .99 .99	4·26 4·26 4·26 4·26 4·26	1.10 1.10 1.10 1.10 +1.11	4·29 4·28 4·28 4·29	+1·21 1·21 1·21 1·21 1·22	4·31 4·31 4·31 4·32	+1·32 1·32 1·32 1·33 1·34	4°34 4°35 4°35 4°35
50 52 54 56 58	·74 ·74 ·74	4·2I 4·2I 4·2I 4·2I 4·2I	+ ·87 ·86 ·87 ·87 ·88	4·23 4·23 4·23 4·23 4·23	+ ·99 ·99 ·99 I·01 I·02	4·26 4·26 4·26 4·26 4·26	+ 1·10 1·11 1·13 1·14 1·17	4·29 4·29 4·30 4·30	+1·23 1·24 1·26 1·28 1·32	4·32 4·33 4·34 4·34	+1·35 1·37 1·40 1·43 1·47	4·36 4·36 4·37 4·38 4·39

66 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 16°.

DECLINATION-SAME NAME AS-LATITUDE.

True Alt.	0°		Decl. Var.	1	l°	Decl. Var.		2°	Decl. Var.		3	•	Decl. Var.		4 °	Decl. Var.	5	0	Decl. Var.
0 10 12 14 16	5 10 5 1 4	s. 0·0 22·2 2·1 41·6 20·8	s. +1·15 1·16 1·17 1·18 1·20	5 11	8.8 31.8 12.1	s. +1·15 1·15 1·16 1·17	5 20 5 I:	5. S. 2 17·7 2 40·6 2 21·1 4 1·6 5 41·8	s. +1·15 1·14 1·14 1·15 1·15	6 5 5 5		s. 26·7 48·6 29·3 9·9 50·4	S. +1·15 1·13 1·13 1·13	5 2: 5 I. 5	35·7 55·9 36·5 7·1	S. +1·15 1·12 1·11 1·11	H. M. 6 5 5 24 5 15 5 7 4 59	s. 45.0 2.6 42.9 23.4 4.0	S. + 1·15 1·10 1·10 1·10
18 20 22 24 26	4 36 3 4 28 1 4 19 5	59·5 37·7 15·4 52·3 28·4	+1.21 1.23 1.24 1.26 1.29	4 29	50·5 29·1	+1·18 1·20 1·21 1·23 1·25	4 2	9 1·6 0 41·0 2 19·9	+ 1·16 1·17 1·18 1·20 1·21	4 4 4	31 23	30·8 11·1 51·0 30·7 10·0	+ 1·14 1·14 1·15 1·16 1·17	4 3 4 2	1 18·9 2 59·3 4 39·5	+1·11 1·12 1·13 1·14	4 25	5·9 46·4	+1.09 1.09 1.09
28 30 32 33 34	3 54 3		+ 1·31 1·34 1·37 1·39 1·41	4 4 3 55 3 47 3 43 3 39	57·0 31·9 18·9	+1.27 1.30 1.32 1.34 1.35	3 5 3 4 3 4 3 4	4 37·6 0 25·3	+ 1·23 1·25 1·27 1·29 1·30	3 3 3		48·8 27·2 4·8 53·4 41·7	+ 1·19 1·21 1·23 1·24 1·25	3 5 3 5 3 4 3 4	1 17·0 7 6·1 2 55·1	+1·15 1·16 1·18 1·19 1·20	4 9 4 0 3 52 3 48 3 44	26·3 16·0	+ 1·11 1·12 1·13 1·14 1·15
35 36 37 38 39	3 29 1 3 24 5 3 20 4	28·0 12·9 57·4 41·5 25·1	+ 1.43 1.45 1.47 1.49 1.52		38·1 23·8 9·1 54·0	+ 1·37 1·39 1·41 1·43 1·45	3 3 3 2		1.35 1.35	3	29 24 20	29·9 17·8 5·5 53·0 40·1	+ 1·26 1·27 1·29 1·30 1·32	3 3 3	4 32·6 5 21·1 6 9·3		3 39 3 35 3 31 3 27 3 23	22.1	+1·15 1·16 1·17 1·18 1·19
40 41 42 43 44	3 7 5		+1.54 1.57 1.60 1.63 1.66	3 13 3 5 3 5 2 56	22·5 6·0 48·9	+1.47 1.49 1.52 1.55 1.58	3	0 50·1 6 35·0 2 19·4	+ 1·40 1·42 1·44 1·47 1·49	3 3 3 2	7 3	26·9 13·4 59·5 45·3 30·6	+1·33 1·35 1·37 1·39 1·41	3 I 3 3				47·7 35·8 23·7	+1.21 1.22 1.23 1.25 1.26
45 46 47 48 49	2 46 1 2 41 5 2 37 2		+ 1.69 1.73 1.77 1.81 1.85	2 52 2 47 2 43 2 39 2 34	54·0 34·2 13·7	+1.60 1.64 1.67 1.71 1.75	2 4 2 4	9 29·6 5 11·7 0 53·2	+1·52 1·55 1·58 1·61 1·65	2 2	50	15·5 59·9 43·8 27·1 9·8	+ 1·44 1·46 1·49 1·52 1·55	2 5 2 4	2 25·1 8 10·5 3 55·4	+1·36 1·38 1·40 1·43 1·45	2 53 2 49 2 45	45.2 32.1	+1.28 1.30 1.32 1.34 1.36
50 51 52 53 54		6.1	2.06	2 26 2 21 2 17	29.8 6.3 41.7 15.8 48.5	+1.79 1.83 1.88 1.93 1.99	2 2 2 2 2 1		1·72 1·76 1·81	2 2 2	29 25 20	51·7 33·0 13·5 53·1 31·7	+ 1.58 1.61 1.65 1.69 1.74	2 3 2 2 2 2	ī 6·7 6 49·3 2 31·1	1·51 1·54 1·58		34·5 18·8 2·6	+ 1·39 1·41 1·44 1·47 1·50

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
0 2 4 6 8	s. s. - ·00 -4·16 ·04 4·16 ·08 4·16 ·13 4·16 ·17 4·16	s. s. + ·07 -4·16 + ·04 4·16 - ·01 4·16 ·05 4·16 ·09 4·16	s. s. + ·15 -4·16 ·11 4·16 ·07 4·16 + ·03 4·16 - ·01 4·16	s. s. + ·22 -4·17 ·19 4·17 ·14 4·16 ·10 4·16 ·06 4·16	s. s. + ·30 -4·17 ·26 4·17 ·22 4·17 ·18 4·17 ·14 4·16	s. s. + ·38 -4·18 ·34 4·17 ·29 4·17 ·26 4·17 ·21 4·17
10	- '21 4'17 '25 4'17 '30 4'17 '34 4'17 '39 4'18	- ·13 4·16	06 4.16	+ ·02 4·16	+ ·10 4·16	+ ·17 4·16
12		·18 4·16	.10 4.16	- ·02 4·16	·05 4·16	·13 4·16
14		·22 4·17	.14 4.16	·06 4·16	+ ·01 4·16	·09 4·16
16		·26 4·17	.18 4.16	·11 4·16	- ·03 4·16	·05 4·16
18		·31 4·17	.23 4.17	·15 4·16	·07 4·16	+ ·01 4·16
20	- '44 4'18 '48 4'19 '53 4'19 '59 4'20 '64 4'21	- ·35 4·17	- ·27 4·17	- ·19 4·16	- ·II 4·I6	- ·03 4·16
22		·40 4·18	·32 4·17	·24 4·17	·16 4·I6	·07 4·16
24		·45 4·18	·37 4·18	·28 4·17	·20 4·I6	·12 4·16
26		·50 4·19	·41 4·18	·33 4·17	·25 4·I7	·16 4·16
28		·55 4·20	·46 4·19	·38 4·18	·29 4·I7	·21 4·16
30	- ·70 4·22	- ·61 4·20	- ·52 4·19	- ·43 4·18	- ·34 4·17	- ·25 4·17
32	·76 4·23	·66 4·21	·57 4·20	·48 4·19	·39 4·18	·30 4·17
34	·82 4·24	·72 4·22	·63 4·21	·54 4·19	·44 4·18	·35 4·17
36	·89 4·25	·79 4·23	·69 4·22	·59 4·20	·50 4·19	·40 4·18
38	·96 4·27	·85 4·25	·75 4·23	·65 4·21	·55 4·20	·45 4·18
40	-1.03 4.29 1.11 4.31 1.20 4.33 1.29 4.36 1.40 4.39	- '92 4·26	- ·82 4·24	- ·71 4·22	- ·61 4·20	- ·51 4·19
42		1·00 4·28	·89 4·25	·78 4·23	·68 4·21	·57 4·20
44		1·08 4·30	·97 4·27	·85 4·25	·74 4·23	·64 4·21
46		1·17 4·32	I·05 4·29	·93 4·26	·82 4·24	·70 4·22
48		1·27 4·35	I·14 4·3I	1·02 4·28	·89 4·26	·77 4·23
50	-1·51 4·43	-1·37 4·38	-1·24 4·34	-1·11 4·31	- ·98 4·27	- ·85 4·25
52	1·64 4·47	1·49 4·42	1·35 4·37	1·21 4·33	1·07 4·30	·94 4·27
54	1·79 4·53	1·63 4·47	1·47 4·4 [†]	1·32 4·37	1·17 4·32	I·03 4·29

HOUR-ANGLES AND VARIATIONS TO 1' OF ALT., DECL., AND ALT. 67 LATITUDE 16°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 6 54·5 5 25 8·6 5 16 48·5 5 8 28·7 5 0 9·0	s. +1·16 1·09 1·09 1·08	5 17 53·4 5 9 33·0	S. + 1·16 1·09 1·07 1·06	H. M. S. 6 9 14·3 5 27 19·0 5 18 57·6 5 10 36·5 5 2 15·8	s. + 1·17 1·08 1·06 1·05 1·04	H. M. S. 6 10 24.7 5 28 23.5 5 20 1.0 5 11 39.2 5 3 17.7	S. + 1·18 1·07 1·05 1·04 1·02	H. M. S. 6 II 35.6 5 29 27.4 5 2I 4.0 5 I2 4I.0 5 4 I8.6	s. +1·18 1·06 1·04 1·02	H. M. S. 6 12 46.8 5 30 31.0 5 22 6.2 5 13 42.0 5 5 18.5	s. +1·19 1·06 1·03 1·01
18 20 22 24 26	4 51 49·5 4 43 30·1 4 35 10·7 4 26 51·4 4 18 32·0	+ 1.07 1.07 1.07 1.07	4 52 53·1 4 44 33·5 4 36 13·9 4 27 54·5 4 19 35·2	+1.05 1.04 1.04 1.04	4 53 55.5 4 45 35.4 4 37 15.5 4 28 55.8 4 20 36.4	+1.03 1.02 1.01 1.01 1.00	4 54 56.7 4 46 36.0 4 38 15.6 4 29 55.5 4 21 35.6	+1.01 1.00 .99 .98	4 55 56·7 4 47 35·2 4 39 14·1 4 30 53·4 4 22 33·0	+ ·99 ·97 ·96 ·95 ·94	4 56 55.6 4 48 33.1 4 40 11.1 4 31 49.5 4 23 28.4	+ ·97 ·95 ·94 ·92 •91
28 30 32 33 34	4 10 12·5 4 1 52·8 3 53 33·0 3 49 23·0 3 45 12·8	+ 1.07 1.08 1.09 1.09 1.10	3 50 27.1	+1.04 1.04 1.05 1.05		1.00 1.00 1.00 1.00	4 13 15·9 4 4 56·4 3 56 37·0 3 52 27·3 3 48 17·6	+ ·96 ·96 ·96 ·96 ·95	4 14 12·8 4 5 52·9 3 57 33·2 3 53 23·4 3 49 13·6	+ ·93 ·92 ·91 ·91	4 15 7.5 4 6 47.1 3 58 26.8 3 54 16.8 3 50 6.8	+ ·89 ·88 ·87 ·87 ·86
35 36 37 38 39	3 41 2.6 3 36 52.3 3 32 41.9 3 28 31.4 3 24 20.7	+1·10 1·11 1·12 1·13	0 0	+1.05 1.06 1.06 1.07	3 30 39.7	+1.00 1.01 1.01 1.01 1.02	3 44 7.9 3 39 58.3 3 35 48.6 3 31 38.9 3 27 29.1	+ ·95 ·96 ·96 ·96	3 45 3.9 3 40 54.1 3 36 44.5 3 32 34.8 3 28 25.1	+ ·91 ·90 ·90	3 45 56·9 3 41 47·1 3 37 37·2 3 33 27·5 3 29 17·7	+ ·86 ·86 ·85 ·85
40 41 42 43 44	3 20 9·9 3 15 58·9 3 11 47·7 3 7 36·4 3 3 24·9	+1·14 1·15 1·16 1·18 1·19	3 17 6·2 3 12 55·7	+1.08 1.09 1.10 1.11 1.12	3 22 19·8 3 18 9·8 3 13 59·6 3 9 49·4 3 5 39·1	1.03	3 23 19·4 3 19 9·6 3 14 59·8 3 10 49·9 3 6 39·9	+ ·96 ·97 ·97 ·97 ·98	3 24 15·4 3 20 5·8 3 15 56·1 3 11 46·4 3 7 36·7	.91 .90 .91 .91	3 25 8·0 3 20 58·3 3 16 48·6 3 12 38·9 3 8 29·2	+ ·85 ·84 ·84 ·84 ·84
45 46 47 48 49	2 59 13·1 2 55 1·0 2 50 48·7 2 46 36·1 2 42 23·2	+ 1·20 1·22 1·24 1·25 1·27	2 56 11·9 2 52 0·4	+1·13 1·14 1·16 1·17 1·18	2 53 7.4	+1.06 1.07 1.08 1.09 1.10	3 2 29.9 2 58 19.8 2 54 9.6 2 49 59.3 2 45 48.8	+ ·99 ·99 I·00 I·01 I·02	3 3 26·9 2 59 17·1 2 55 7·2 2 50 57·2 2 46 47·3	+ ·91 ·92 ·93 ·93	3 4 19·6 3 0 9·9 2 56 0·2 2 51 50·5 2 47 40·7	+ ·84 ·84 ·85 ·85 ·85
50 51 52 53 54	2 38 9.9 2 33 56.2 2 29 42.1 2 25 27.5 2 21 12.5	+ 1·29 1·31 1·34 1·36 1·39	2 39 24·7 2 35 12·3 2 30 59·4 2 26 46·2 2 22 32·7	+1·20 1·22 1·24 1·26 1·28		+1·11 1·13 1·14 1·16 1·18	2 41 38·2 2 37 27·5 2 33 16·6 2 29 5·5 2 24 54·2	+ 1.02 1.04 1.05 1.06 1.08	2 42 37·2 2 38 27·0 2 34 16·7 2 30 6·3 2 25 55·7	+ ·94 ·95 ·95 ·96 ·97	2 43 31.0 2 39 21.1 2 35 11.2 2 31 1.3 2 26 51.2	+ ·85 ·86 ·86 ·87 ·88

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
° 0 2 4 6 8	s. s.	s. S.	s. s.	s. s.	s. s.	s. s.
	+ ·45 -4·18	+ ·53 -4·19	+ ·61 -4·20	+ ·69 -4·22	+ ·76 -4·23	+ ·84 - 4·24
	·41 4·18	·49 4·19	·57 4·20	·65 4·21	·72 4·22	·80 4·24
	·37 4·18	·45 4·18	·52 4·19	·60 4·20	·68 4·22	·76 4·23
	·33 4·18	·41 4·18	·48 4·19	·56 4·20	·64 4·21	·72 4·22
	·29 4·17	·37 4·18	·44 4·18	·52 4·19	·60 4·20	·67 4·21
10 12 14 16 18	+ ·25 4·17 ·21 4·17 ·17 4·16 ·13 4·16 ·09 4·16	+ '33 4'18	+ '40 4'18 '36 4'17 '32 4'17 '28 4'17 '24 4'17	+ ·48 4·19 ·44 4·18 ·40 4·18 ·36 4·18 ·32 4·17	+ ·56 4·20 ·52 4·19 ·48 4·19 ·44 4·18 ·40 4·18	+ ·64 4·21 ·60 4·20 ·56 4·20 ·52 4·19 ·48 4·19
20	+ ·05 4·16	+ ·13 4·16	+ ·21 4·17	+ ·29 4·17	+ ·37 4·18	+ ·45 4·18
22	·00 4·16	·09 4·16	·17 4·16	·25 4·17	·33 4·17	·41 4·18
24	- ·03 4·16	+ ·04 4·16	·13 4·16	·21 4·17	·29 4·17	·37 4·18
26	·08 4·16	·00 4·16	·09 4·16	·17 4·16	·25 4·17	·34 4·17
28	·12 4·16	- ·04 4·16	·05 4·16	·13 4·16	·22 4·17	·30 4·17
30	- ·17 4·16	08 4.16	+ ·01 4·16	+ ·09 4·16	+ ·18 4·16	+ ·26 4·17
32	·21 4·16	.12 4.16	- ·03 4·16	·05 4·16	·14 4·16	·23 4·17
34	·26 4·17	.17 4.16	·08 4·16	+ ·01 4·16	·10 4·16	·19 4·16
36	·31 4·17	.21 4.17	·12 4·16	- ·03 4·16	·06 4·16	·15 4·16
38	·36 4·18	.26 4.17	·17 4·16	·07 4·16	+ ·02 4·16	·11 4·16
40	- '41 4'18 '47 4'19 '53 4'19 '59 4'20 '66 4'21	- ·31 4·17	- ·21 4·17	- ·12 4·16	- ·02 4·16	+ ·08 4·16
42		·36 4·18	·26 4·17	·16 4·16	·06 4·16	·04 4·16
44		·42 4·18	·31 4·17	·21 4·17	·11 4·16	·00 4·16
46		·48 4·19	·37 4·18	·26 4·17	·15 4·16	- ·05 4·16
48		·54 4·20	·43 4·18	·31 4·17	·20 4·17	·09 4·16
50	- ·73 4·22	- ·61 4·20	- ·49 4·19	- ·37 4·18	- ·25 4·17	- ·14 4·16
52	·81 4·24	·68 4·22	·55 4·20	·43 4·18	·31 4·17	·18 4·16
54	·89 4·26	·76 4·23	·62 4·21	·49 4·19	·36 4·18	·24 4·17

68 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 16°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 13 58·6 5 31 34·2 5 23 8·0 5 14 42·4 5 6 17·5	s. + 1·20 1·05 1·02 1·00	H. M. S. 6 15 11.0 5 32 37.0 5 24 9.1 5 15 42.0 5 7 15.7	s. +1·21 1·04 1·01 ·99 ·96	H. M. S. 6 16 23.9 5 33 39.5 5 25 9.8 5 16 41.0 5 8 13.0	s. +1·22 1·04 1·01 ·98	H. M. S. 6 17 37.6 5 34 41.7 5 26 10.1 5 17 39.3 5 9 9.4	s. + 1·23 1·03 1·00 ·97 ·93	H. M. S. 6 18 51.9 5 35 43.7 5 27 9.8 5 18 37.0 5 10 5.1	s. +1·24 1·03 ·99 ·96 ·92	H. M. S. 6 20 7·1 5 36 45·5 5 28 9·3 5 19 34·1 5 11 0·0	s. + 1·26 1·03 ·99 ·95 ·91
18 20 22 24 26	4 57 53.4 4 49 29.8 4 41 6.7 4 32 44.1 4 24 22.0	+ ·95 ·93 ·91 ·89 ·88	4 58 50·1 4 50 25·1 4 42 0·8 4 33 37·0 4 25 13·7	+ ·94 ·91 ·89 ·87 ·85	4 59 45.7 4 51 19.3 4 42 53.4 4 34 28.3 4 26 3.7	+ ·92 ·89 ·86 ·84 ·82	5 0 40·4 4 52 12·2 4 43 44·7 4 35 17·9 4 26 51·8	+ ·90 ·87 ·84 ·81 ·79	5 I 34·I 4 53 3·9 4 44 34·6 4 36 6·0 4 27 38·I	+ ·89 ·85 ·82 ·79 ·76	5 2 26·8 4 53 54·6 4 45 23·2 4 36 52·6 4 28 22·8	+ ·87 ·83 ·80 ·76 ·73
28 30 31 32 33	4 16 0·3 4 7 39·0 4 3 28·4 3 59 18·0 3 55 7·7	+ ·86 ·85 ·84 ·83 ·83	4 16 50·9 4 8 28·6 4 4 17·6 4 0 6·7 3 55 56·0	+ ·83 ·81 ·80 ·79 ·78	4 17 39 6 4 9 16 1 4 5 4 5 4 0 53 0 3 56 41 6	+ ·79 ·77 ·76 ·75 ·74	4 18 26·2 4 10 1·2 4 5 49·0 4 1 36·8 3 57 24·8	+ ·76 ·73 ·72 ·71 ·70	4 19 10·9 4 10 44·3 4 6 31·2 4 2 18·2 3 58 5·4	+ ·73 ·70 ·68 ·67 ·65	4 19 53.6 4 11 25.1 4 7 11.1 4 2 57.2 3 58 43.5	+ ·69 ·66 ·64 ·63 ·61
34 35 36 37 38	3 50 57·4 3 46 47·2 3 42 37·0 3 38 27·0 3 34 17·0	+ ·82 ·81 ·81 ·80 ·80	3 51 45.2 3 47 34.6 3 43 24.1 3 39 13.6 3 35 3.2	+ ·77 ·77 ·76 ·75 ·74	3 52 30·4 3 48 19·2 3 44 8·2 3 39 57·2 3 35 46·4	+ ·73 ·72 ·71 ·70 ·69	3 53 12·9 3 49 1·1 3 44 49·4 3 40 37·8 3 36 26·3	+ ·68 ·67 ·66 ·65 ·64	3 53 52·7 3 49 40·0 3 45 27·7 3 41 15·4 3 37 3·2	+ ·64 ·63 ·61 ·60 ·59	3 54 29·9 3 50 16·5 3 46 3·2 3 41 50·0 3 37 36·9	+ ·60 ·58 ·57 ·55 ·53
39 40 41 42 43	3 30 7·0 3 25 57·1 3 21 47·2 3 17 37·4 3 13 27·6	+ ·79 ·79 ·78 ·78 ·78	3 30 52·9 3 26 42·7 3 22 32·5 3 18 22·4 3 14 12·4	+ ·74 ·73 ·72 ·72 ·71	3 31 35.6 3 27 24.9 3 23 14.3 3 19 3.8 3 14 53.3	+ ·68 ·67 ·66 ·66 ·65	3 32 15·0 3 28 3·7 3 23 52·5 3 19 41·5 3 15 30·5	+ ·63 ·62	3 32 51·1 3 28 39·1 3 24 27·2 3 20 15·4 3 16 3·8	+ ·57 ·56 ·55 ·53 ·52	3 33 23.9 3 29 11.1 3 24 58.3 3 20 45.8 3 16 33.2	+ ·52 ·50 ·49 ·47 ·46
44 45 46 47 48	3 9 17·8 3 5 8·1 3 0 58·4 2 56 48·7 2 52 39·1	+ ·78 ·77 ·77 ·77 ·77	3 IO 2·4 3 5 52·5 3 I 42·5 2 57 32·7 2 53 22·9	+ ·71 ·70 ·70 ·70 ·69	3 10 43.0 3 6 32.7 3 2 22.4 2 58 12.3 2 54 2.2	+ ·64 ·63 ·63 ·62 ·61	3 11 19·6 3 7 8·7 3 2 58·0 2 58 47·3 2 54 36·7	+ ·58 ·57 ·56 ·55 ·55	3 II 52·2 3 7 40·7 3 3 29·3 2 59 17·9 2 55 6·7	+ ·51 ·50 ·48 ·47 ·46	3 12 20·8 3 8 8·5 3 3 56·3 2 59 44·1 2 55 32·1	+ ·44 ·43 ·41 ·40 ·38
49 50 51 52 53	2 48 29·3 2 44 19·7 2 40 10·0 2 36 0·3 2 31 50·6	+ ·77 ·77 ·77 ·77 ·77	2 49 13·1 2 45 3·4 2 40 53·6 2 36 44·0 2 32 34·3	+ ·69 ·68 ·68 ·68	2 49 52·I 2 45 42·I 2 4I 32·I 2 37 22·2 2 33 I2·3		2 50 26·2 2 46 15·8 2 42 5·4 2 37 55·1 2 33 44·8	+ ·53 ·52 ·51 ·50 ·49	2 50 55·5 2 46 44·5 2 42 33·5 2 38 22·5 2 34 II·7	+ ·45 ·44 ·42 ·41 ·40	2 51 20·1 2 47 8·2 2 42 56·4 2 38 44·6 2 34 32·9	+ ·37 ·35 ·34 ·32 ·31
54 55 56 57 58	2 27 40·8 2 23 31·1 2 19 21·2 2 15 11·3 2 11 1·4	+ ·78 ·78 ·79 ·79 ·80	2 28 24·6 2 24 14·9 2 20 5·2 2 15 55·6 2 11 45·9	+ ·68 ·68 ·68 ·68 ·68	2 29 2·5 2 24 52·7 2 20 43·0 2 16 33·2 2 12 23·5		2 29 34·6 2 25 24·4 2 21 14·4 2 17 4·3 2 12 54·3	+ ·49 ·48 ·47 ·46 ·46	2 30 0.9 2 25 50.3 2 21 39.5 2 17 28.9 2 13 18.3	+ ·39 ·38 ·37 ·35 ·34	2 30 21·3 2 26 9·8 2 21 58·3 2 17 46·9 2 13 35·5	+ ·29 ·27 ·26 ·24 ·23
		V	ARIATIO	ON TO) 1' OF	LATI'	TUDE A	ND A	LTITUD	E.		
Alt.	L. 12°	A	L. 13°	Α.	L. 14°	A.	L. 15°	Α.	L. 16°	A.	L. 17°	A.
0 4 8 12 16	·83 ·75 ·67	S. 4·26 4·24 4·23 4·21 4·20	s. +1.00 - .91 .83 .75 .68	s. -4·28 4·26 4·24 4·23 4·22	s. +1.08 - .99 .91 .83 .76	s. 4·30 4·28 4·26 4·24 4·23	s. + i·16 - i·07 ·99 ·91 ·84	s. -4·32 4·30 4·28 4·26 4·24	s. +1·24 - 1·15 1·07 ·99 ·92	s. -4·35 4·32 4·30 4·28 4·26	s. +1·33 · 1·24 1·15 1·07 1·00	s. -4·37 4·34 4·30 4·28
20 22 24 26 28	*49 *46 *42 *39	4·19 4·19 4·18 4·18 4·18	+ ·61 ·58 ·54 ·51 ·47	4·20 4·19 4·19 4·19	+ ·69 ·66 ·62 ·59 ·56	4·22 4·21 4·21 4·20 4·20	+ ·77 ·74 ·70 ·67 ·64	4·23 4·22 4·22 4·21	+ ·85 ·82 ·79 ·76 ·73	4·25 4·24 4·23 4·23 4·22	+ ·93 ·91 ·87 ·84 ·81	4·26 4·26 4·25 4·24 4·24
30 32 34 36 38	·31 ·28 ·24 ·21	4·18 4·17 4·17 4·17	+ ·44 ·40 ·37 ·34 ·31	4·19 4·18 4·17 4·17	+ ·53 ·49 ·46 ·43 ·40	4·19 4·18 4·18 4·18	+ ·61 ·58 ·55 ·52 ·49	4·21 4·20 4·20 4·19 4·19	+ ·70 ·67 ·64 ·61 ·59	4·22 4·21 4·21 4·20 4·20	+ ·79 ·76 ·73 ·71 ·68	4·23 4·22 4·22 4·22
40 42 44 46 48	·14 ·10 ·06 + ·02	4·16 4·16 4·16 4·16 4·16	+ ·27 ·23 ·20 ·17 ·13	4·17 4·17 4·16 4·16	+ ·37 ·33 ·30 ·27 ·24	4·18 4·17 4·17 4·17 4·17	+ ·46 ·43 ·41 ·38 ·35	4·19 4·18 4·18 4·18 4·18	+ ·56 ·53 ·51 ·48 ·46	4·20 4·19 4·19 4·19	+ ·66 ·64 ·61 ·59 ·57	4·2I 4·2I 4·2I 4·20 4·20
50 52 54 56 58	•06 •11 •16	4·16 4·16 4·16 4·16 4·16	+ ·09 ·05 + ·01 - ·03 ·07	4·16 4·16 4·16 4·16 4·16	+ ·21 ·17 ·14 ·10 ·07	4·17 4·16 4·16 4·16 4·16	+ ·32 ·29 ·26 ·23 ·20	4·17 4·17 4·17 4·17	+ '44 '41 '39 '37 '34	4·18 4·18 4·18 4·18 4·18	+ .·55 ·53 ·51 ·50 ·48	4·20 4·20 4·19 4·19 4·19

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 69 LATITUDE 16°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 21 23.0 5 37 47.2 5 29 8.3 5 20 30.6 5 11 54.1	s. +1·27 1·03 ·98 ·94 ·89	H. M. S. 6 22 39.9 5 38 48.7 5 30 7.0 5 21 26.6 5 12 47.5	s. +1·29 1·02 ·98 ·93 ·88	H. M. S. 6 23 57.7 5 39 50.1 5 31 5.4 5 22 22.2 5 13 40.1	s. +1·31 1·02 ·97 ·92 ·87	H. M. S. 6 25 16·6 5 40 51·4 5 32 3·6 5 23 17·2 5 14 32·2	s. +1·32 1·02 ·97 ·91 ·86	H. M. S. 6 26 36.6 5 41 52.8 5 33 1.5 5 24 11.8 5 15 23.5		H. M. S. 6 27 57·9 5 42 54·2 5 33 59·3 5 25 6·0 5 16 14·2	s. +1·36 1·02 ·96 ·90 ·84
18 20 22 24 26	5 3 18·5 4 54 44·0 4 46 10·4 4 37 37·6 4 29 5·5	+ ·85 ·81 ·77 ·74 ·70	5 4 9.4 4 55 32.3 4 46 56.2 4 38 21.0 4 29 46.6	+ ·84 ·79 ·75 ·71 ·67	5 4 59·3 4 56 19·5 4 47 40·8 4 39 2·9 4 30 26·0	+ ·82 ·78 ·73 ·68 ·64	5 5 48·3 4 57 5·6 4 48 23·9 4 39 43·3 4 31 3·5	+ ·81 ·76 ·71 ·66 ·61	5 6 36·5 4 57 50·6 4 49 5·9 4 40 22·1 4 31 39·3	+ ·79 ·74 ·69 ·63 ·58	5 7 23·8 4 58 34·6 4 49 46·5 4 40 59·4 4 32 13·3	+ ·78 ·72 ·66 ·61 ·55
28 30 31 32 33	4 20 34·3 4 12 3·7 4 7 48·7 4 3 33·8 3 59 19·1	+ .66 .62 .61 .59	4 21 13.0 4 12 40.1 4 8 23.9 4 4 7.9 3 59 52.0	+ ·63 ·59 ·57 ·55 ·53	4 21 49·8 4 13 14·3 4 8 56·9 4 4 39·6 4 0 22·5	+ ·60 ·55 ·53 ·51 ·48	4 22 24·5 4 13 46·4 4 9 27·5 4 5 8·8 4 0 50·3	+ ·56 ·51 ·49 ·47 ·44	4 22 57·3 4 14 16·1 4 9 55·8 4 5 35·6 4 1 15·5		4 23 28·1 4 14 43·6 4 10 21·7 4 5 59·8 4 1 38·2	+ ·49 ·44 ·41 ·38 ·35
34 35 36 37 38	3 55 4.4 3 50 50.0 3 46 35.7 3 42 21.5 3 38 7.4	+ ·55 ·53 ·52 ·50 ·48	3 55 36·3 3 51 20·7 3 47 5·3 3 42 49·9 3 38 34·8	+ ·51 ·49 ·47 ·45 ·43	3 56 5.5 3 51 48.6 3 47 31.9 3 43 15.4 3 38 58.9	+ ·46 ·44 ·42 ·40 ·37	3 56 32·0 3 52 13·7 3 47 55·6 3 43 37·6 3 39 19·8	+ ·42 ·39 ·37 ·34 ·32	3 56 55.7 3 52 36.0 3 48 16.3 3 43 56.8 3 39 37.4	+ ·37 ·35 ·32 ·29 ·27	3 57 16·7 3 52 55·3 3 48 34·0 3 44 12·8 3 39 51·7	+ ·33 ·29 ·27 ·24 ·21
39 40 41 42 43	3 33 53·5 3 29 39·6 3 25 25·9 3 21 12·3 3 16 58·8	+ ·46 ·45 ·43 ·41 ·39	3 34 19.7 3 30 4.7 3 25 49.9 3 21 35.1 3 17 20.5	+ '41 '39 '37 '35 - '33	3 34 42.6 3 30 26.3 3 26 10.2 3 21 54.2 3 17 38.2		3 35 2·I 3 30 44·4 3 26 26·9 3 22 9·4 3 17 52·0	+ ·30 ·27 ·25 ·22 ·20		•16	3 35 30 7 3 31 9 8 3 26 49 0 3 22 28 2 3 18 7 4	+ ·18 ·15 ·12 ·09 ·06
44 45 46 47 48	3 12 45.4 3 8 32.1 3 4 18.9 3 0 5.7 2 55 52.7	+ ·38 ·36 ·34 ·32 ·30	3 13 6·0 3 8 51·4 3 4 37·1 3 0 22·8 2 56 8·6	+ ·31 ·29 ·27 ·25 ·22	3 13 22·4 3 9 6·6 3 4 51·0 3 0 35·3 2 56 19·7	+ ·24 ·22 ·19 ·17 ·14	3 13 34·7 3 9 17·5 3 5 0·3 3 0 43·1 2 56 26·0	+ ·17 ·14 ·12 ·09 ·06	3 13 42·9 3 9 23·9 3 5 5·1 3 0 46·2 2 56 27·4	+ ·10 ·07 ·04 + ·01 - ·02	3 13 46.6 3 9 25.9 3 5 5.2 3 0 44.5 2 56 23.7	+ ·03 :00 - ·04 ·07 ·10
49 50 51 52 53	2 51 39·7 2 47 26·8 2 43 13·9 2 39 1·2 2 34 48·5	+ ·29 ·27 ·25 ·23 ·21	2 51 54·4 2 47 40·3 2 43 26·3 2 39 12·3 2 34 58·4	+ ·20 ·18 ·16 ·14 ·12	2 47 48·7 2 43 33·3 2 39 17·9	+ ·12 ·10 ·07 ·04 + ·02	2 39 17.7	+ ·04 + ·01 - ·02 ·05 ·08	2 43 30·7 2 39 II·8	- ·05 ·08 ·12 ·15 ·18	2 43 20·9 2 38 59·9	- ·14 ·17 ·21 ·25 ·29
54 55 56 57 58	2 30 35·9 2 26 23·3 2 22 10·8 2 17 58·2 2 13 45·8	.13	2 30 44·5 2 26 30·6 2 22 16·8 2 18 2·9 2 13 49·1	·07 ·04 ·02	2 30 47·0 2 26 31·6 2 22 16·2 2 18 0·8 2 13 45·3		2 30 43·5 2 26 26·3 2 22 9·0 2 17 51·7 2 13 34·2	- ·11 ·14 ·18 ·21 ·25		- ·22 ·25 ·29 ·33 ·37	2 21 33.9	- ·33 ·37 ·41 ·45 ·50
		V	ARIATI	ON TO	O 1' OF	LATI	TUDE A	ND A	LTITUE	E.		
Alt.	L. 18°	A.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α.	L. 22	A.	L. 23°	A.
° 0 4 8 12 16	s. +1·41 - 1·32 1·23 1·16 1·08	s. -4·39 4·36 4·34 4·32 4·30	S. +1·50 - 1·40 1·32 1·24 1·17	s. -4·42 4·39 4·36 4·34 4·32	s. +1·58 1·49 1·40 1·32 1·25	s. -4·45 4·42 4·39 4·36 4·34	s. +1.67 1.57 1.48 1.41 1.33	s. -4·48 4·45 4·42 4·39 4·37	s. + 1.76 1.66 1.57 1.49 1.42	s. -4·52 4·48 4·45 4·42 4·40	s. +1.85 1.75 1.66 1.58 1.51	s. -4·55 4·51 4·48 4·45 4·45
20 22 24 26 28	+ 1.02 -99 -96 -93 -90	4·28 4·27 4·27 4·26 4·26	+1·10 1·07 1·04 1·02 ·99	4·30 4·29 4·28 4·28	+1.19 1.16 1.13 1.10 1.08	4·33 4·31 4·31 4·30	+1·27 1·24 1·21 1·19 1·16	4·35 4·34 4·33 4·32	+1·36 1·33 1·30 1·28 1·25	4·38 4·37 4·36 4·36 4·35	+1.44 1.42 1.39 1.37 1.35	4·40 4·39 4·39 4·38 4·37
30 32 34 36 38	+ ·88 ·85 ·83 ·80 ·78	4·25 4·25 4·24 4·24 4·23	+ ·96 ·94 ·92 ·89 ·87	4·27 4·26 4·26 4·25 4·25	+1.05 1.03 1.01 .99	4·29 4·29 4·28 4·28 4·27	+1·14 1·12 1·10 1·08 1·07	4·32 4·31 4·30 4·30	+1·24 1·21 1·20 1·18 1·17	4·34 4·33 4·33 4·32 4·32	+1·33 1·31 1·29 1·28 1·27	4·37 4·36 4·36 4·35 4·35
40 42 44 46 48	+ ·76 ·74 ·72 ·70 ·68	4·23 4·22 4·22 4·22	+ ·85 ·84 ·82 ·81 ·79	4·25 4·24 4·24 4·24 4·24	+ ·95 ·94 ·93 ·92 ·91	4·27 4·26 4·26 4·26 4·26	+1.06 1.04 1.03 1.03 1.02	4·29 4·29 4·29 4·29 4·28	+1·16 1·15 1·14 1·14 1·14	4·32 4·32 4·31 4·31	+1·26 1·25 1·25 1·25 1·26	4·35 4·35 4·34 4·35
50 52 54 56 58	+ ·67 ·65 ·64 ·63 ·62	4·21 4·21 4·21 4·21 4·21	+ ·78 ·77 ·77 ·76 ·76	4·23 4·23 4·23 4·23	+ ·90 ·90 ·90 ·91	4·26 4·26 4·26 4·26 4·26	+1.02 1.02 1.03 1.04 1.05	4·28 4·28 4·29 4·29 4·29	+1·14 1·15 1·16 1·18 1·20	4·31 4·32 4·32 4·33 4·33	+1·26 1·28 1·29 1·32 1·35	4·35 4·36 4·36 4·37

70 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 17°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3° ·	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 18 9.1 5 9 46.3 5 1 23.1 4 52 59.5	S. + I·22 I·24 I·25 I·26 I·28	5 11 1.0	S. + 1·22 1·23 1·24 1·24 1·25	5 20 36·7 5 12 14·7 5 3 52·5	S. + 1·22 1·22 1·22 1·22 1·23	H. M. S. 6 3 40·3 5 21 49·4 5 13 27·5 5 5 5·5 4 56 43·4	S. +1·23 1·20 1·20 1·21 1·21	5 23 1·3 5 14 39·4 5 6 17·4	S. + 1·23 1·19 1·19 1·19	H. M. S. 6 6 8·0 5 24 12·6 5 15 50·4 5 7 28·3 4 59 6·4	s. +1·23 1·18 1·18 1·17
18 20 22 24 26	4 44 35.4 4 36 10.6 4 27 45.2 4 19 19.0 4 10 51.8	+1·29 1·31 1·33 1·35 1·37	4 29 4.0 4 20 39.0 4 12 13.2	1.34	4 38 44·3 4 30 20·8 4 21 56·8 4 13 32·3	+1.24 1.25 1.26 1.28 1.30	4 39 58·6 4 31 35·8 4 23 12·6 4 14 49·0	1.26	4 41 11·3 4 32 49·0 4 24 26·4 4 16 3·5	+1·19 1·20 1·20 1·21 1·22	4 42 22.5 4 34 0.4 4 25 38.3 4 17 15.9	+1·17 1·17 1·18 1·18 1·19
28 30 32 33 34	4 2 23.7 3 53 54.4 3 45 23.8 3 41 7.9 3 36 51.6		3 46 50·3 3 42 35·5 3 38 20·4	1.42 1.43 1.45	3 56 40·9 3 48 13·9 3 44 0·0 3 39 45·8	+ 1·32 1·34 1·37 1·38 1·39	4 6 24.8 3 58 0.0 3 49 34.4 3 45 21.3 3 41 7.9	+1·28 1·29 1·32 1·33 1·34	3 59 16·4 3 50 52·0 3 46 39·5 3 42 26·9	+ 1·24 1·25 1·27 1·28 1·29	3 52 6.8 3 47 54.9 3 43 42.8	
35 36 37 38 39	3 32 35·0 3 28 17·8 3 24 0·1 3 19 42·0 3 15 23·2	1·60 1·62	3 16 58.6	1.53	3 27 1·3 3 22 45·7 3 18 29·8	1.43 1.45 1.47 1.49	3 24 11·8 3 19 57·0	I·40 I·42	3 34 1.0 3 29 47.7 3 25 34.1 3 21 20.3	1.31 1.34 1.36	3 26 52·8 3 22 39·8	1·26 1·27 1·28 1·29
40 41 42 43 44	3 II 3.9 3 6 43.9 3 2 23.2 2 58 I.8 2 53 39.5	+ 1.65 1.68 1.71 1.74 1.78	3 12 40·8 3 8 22·5 3 4 3·5 2 59 43·9 2 55 23·7	+ 1.58 1.60 1.63 1.66 1.69	3 9 56·5 3 5 39·1 3 1 21·2 2 57 2·7	+ 1·51 1·53 1·55 1·58 1·61	3 15 41·8 3 11 26·2 3 7 10·2 3 2 53·8 2 58 36·8	1.46 1.48 1.50 1.53	3 12 51·7 3 8 36·9 3 4 21·7 3 0 6·1	1.43 1.43 1.45	3 14 13·1 3 9 59·3 3 5 45·2 3 1 30·7	1·32 1·34 1·35 1·37
45 46 47 48 49	2 49 16·4 2 44 52·3 2 40 27·2 2 36 1·0 2 31 33·6	1.99	2 46 40·8 2 42 18·1 2 37 54·4 2 33 29·7	1.84 1.88	2 48 23.7 2 44 3.1 2 39 41.7 2 35 19.5	+· 1·64 1·67 1·70 1·74 1·78	2 54 19·3 2 50 1·2 2 45 42·5 2 41 23·2 2 37 3·0	1.58 1.61 1.64 1.68	2 51 33·5 2 47 16·5 2 42 58·9 2 38 40·6	1.50 1.52 1.55 1.58	2 53 0.8 2 48 45.2 2 44 29.1 2 40 12.5	1.41 1.43 1.46 1.49
50 51 52 53 54	2 27 4·8 2 22 34·5 2 18 2·7 2 13 29·0 2 8 53·5	2.16	2 29 3·9 2 24 36·8 2 20 8·3 2 15 38·4 2 11 6·7	+1.93 1.98 2.03 2.09 2.15	2 22 6·5 2 17 39·8	+ 1.82 1.86 1.91 1.96 2.02	2 23 57.5	1.71 1.75 1.79 1.84 1.89	2 30 2·1 2 25 41·7 2 21 20·2	1.64 1.68 1.72		1.54 1.57 1.61

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
0 2 4 6 8	s. s. - ·oo 4·18 ·o4 4·18 ·o9 4·18 ·13 4·18 ·18 4·19	s. s. + ·08 -4·18 + ·03 4·18 - ·01 4·18 ·06 4·18 ·10 4·18	S. S. + ·15 -4·18 ·11 4·18 ·06 4·18 + ·02 4·18 - ·02 4·18	s. s. + ·23 -4·19 ·18 4·19 ·14 4·18 ·10 4·18 ·05 4·18	s. s. + '30 -4'19 '26 4'19 '22 4'19 '17 4'19 '13 4'18	s. s. + ·38 -4·20 ·34 4·20 ·29 4·19 ·25 4·19 ·20 4·19
10	- ·22 4·19	- ·15 4·18	- ·07 4·18	+ ·oi 4·18	+ ·08 4·18	+ ·16 4·19
12	·27 4·19	·19 4·19	·11 4·18	- ·o4 4·18	+ ·04 4·18	·12 4·18
14	·32 4·19	·24 4·19	·16 4·19	·o8 4·18	- ·05 4·18	·07 4·18
16	·37 4·20	·29 4·19	·21 4·19	·i3 4·18	- ·05 4·18	+ ·03 4·18
18	·42 4·20	·34 4·19	·25 4·19	·i7 4·19	- ·09 4·18	- ·01 4·18
20	- ·47 4·21	- ·38 4·20	- ·30 4·19	- ·22 4·19	- '14 4'18 '19 4'19 '23 4'19 '28 4'19 '33 4'19	06 4.18
22	·52 4·21	·44 4·20	·35 4·20	·27 4·19		.10 4.18
24	·57 4·22	·49 4·21	·40 4·20	·32 4·19		.15 4.18
26	·63 4·23	·54 4·22	·46 4·21	·37 4·20		.20 4.19
28	·69 4·24	·60 4·22	·51 4·21	·42 4·20		.25 4.19
30	- ·75 4·25	66 4.23	- ·57 4·22	- ·48 4·21	- ·39 4·20	- ·30 4·19
32	·81 4·26	.72 4.24	·62 4·23	·53 4·22	·44 4·21	·35 4·20
34	·88 4·27	.78 4.25	·69 4·24	·59 4·22	·50 4·21	·40 4·20
36	·95 4·29	.85 4.27	·75 4·25	·65 4·23	·56 4·22	·46 4·21
38	I·03 4·31	.92 4.28	·82 4·26	·72 4·24	·62 4·23	·52 4·21
40	-1·11 4·33	-1.00 4.30	- ·89	- ·79 4·26	- ·68 4·24	- ·58 4·22
42	1·20 4·35	1.08 4.32		·86 4·27	·75 4·25	·64 4·23
44	1·29 4·38	1.17 4.34		·94 4·29	·83 4·26	·71 4·24
46	1·40 4·41	1.27 4.37		I·02 4·31	·91 4·28	·79 4·26
48	1·51 4·45	1.37 4.40		I·12 4·33	·99 4·30	·87 4·27
50	-1.64 4.49	1.49 4.44	-1·35 4·40	-1·22 4·36	-1.08 4.32	- ·95 4·29
52	1.78 4.55	1.62 4.49	1·47 4·43	1·33 4·39	1.19 4.35	1·05 4·31
54	1.94 4.61	1.77 4.54	1·61 4·48	1·45 4·43	1.30 4.38	1·15 4·34

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 71 LATITUDE 17°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 7 22·0 5 25 23·3 5 17 0·7 5 8 38·3 5 0 16·1	s. +1·23 1·17 1·16 1·16	H. M. S. 6 8 36·3 5 26 33·4 5 18 10·2 5 9 47·3 5 1 24·8	s. +1·24 1·16 1·15 1·14	H. M. S. 6 9 51·0 5 27 43·0 5 19 19·1 5 10 55·5 5 2 32·4	s. +1.25 1.15 1.14 1.13 1.12	H. M. S. 6 II 6·I 5 28 52·I 5 20 27·5 5 I2 2·9 5 3 39·0	S. +1·25 1·15 1·13 1·12 1·10	H. M. S. 6 12 21.7 5 30 0.7 5 21 34.8 5 13 9.4 5 4 44.6	S. +1·26 1·14 1·12 1·10	H. M. S. 6 13 37.7 5 31 8.9 5 22 41.7 5 14 15.2 5 5 49.3	s. +1·27 1·13 1·11 1·09 1·07
18 20 22 24 26	4 51 54·1 4 43 32·1 4 35 10·2 4 26 48·2 4 18 26·2	+1·15 1·15 1·15 1·15 1·15	4 36 18·3 4 27 56·3	+1·13 1·12 1·12 1·12 1·12	4 54 9.6 4 45 47.1 4 37 24.8 4 29 2.6 4 20 40.6	+1.11 1.09 1.09	4 55 15.6 4 46 52.5 4 38 29.7 4 30 7.2 4 21 44.9	+1.09 1.08 1.07 1.06 1.05	4 56 20·4 4 47 56·6 4 39 33·1 4 31 10·0 4 22 47·2	+1.07 1.06 1.04 1.03 1.02	4 57 24·I 4 48 59·3 4 40 35·0 4 32 II·2 4 23 47·7	+1.05 1.03 1.00 1.00
-28 30 32 33 34	4 10 4.0 4 1 41.5 3 53 18.8 3 49 7.3 3 44 55.7	+1·16 1·17 1·18 1·18 1·19	4 11 12·5 4 2 50·3 3 54 28·1 3 50 16·9 3 46 5·6	+1·12 1·13 1·13 1·14 1·14		+1.08 1.09 1.09 1.09	4 13 22.8 4 5 0.8 3 56 38.8 3 52 27.9 3 48 16.9	+1.05 1.05 1.04 1.05 1.05	4 14 24·8 4 6 2·4 3 57 40·3 3 53 29·3 3 49 18·3	1.00 1.00 1.00 1.01 1.01	4 15 24·6 4 7 1·8 3 58 39·3 3 54 28·1 3 50 16·9	+ ·98 ·97 ·96 ·96 ·95
35 36 37 38 39	3 40 44·0 3 36 32·1 3 32 20·1 3 28 8·0 3 23 55·7	+1·20 1·20 1·21 1·22 1·23	3 41 54·3 3 37 42·8 3 33 31·3 3 29 19·6 3 25 7·8	+1·15 1·15 1·16 1·16 1·17	3 43 1·5 3 38 50·4 3 34 39·2 3 30 27·8 3 26 16·4	1.11 1.11 1.10 1.10 +1.10	3 44 5.9 3 39 54.9 3 35 43.9 3 31 32.8 3 27 21.7	+1.05 1.05 1.05 1.05 1.06	3 45 7·3 3 40 56·3 3 36 45·4 3 32 34·4 3 28 23·4	1.00 1.00 1.00 1.00	3 46 5.8 3 41 54.8 3 37 43.8 3 33 32.8 3 29 21.8	+ ·95 ·95 ·95 ·94 ·94
40 41 42 43 44	3 19 43·I 3 15 30·4 3 II 17·5 3 7 4·3 3 2 50·9	+1·24 1·26 1·27 1·28 1·30	3 20 55.9 3 16 43.8 3 12 31.6 3 8 19.2 3 4 6.7	+1·18 1·19 1·20 1·21 1·22	3 22 5.0 3 17 53.4 3 13 41.7 3 9 29.9 3 5 18.0	+1·12 1·13 1·14 1·14 1·15	3 18 59·3 3 14 48·0	+1.06 1.06 1.07 1.08 1.08	3 24 12·4 3 20 1·4 3 15 50·3 3 11 39·2 3 7 28·1	1.01 1.01 1.01 1.00 1.00	3 25 10·8 3 20 59·8 3 16 48·8 3 12 37·9 3 8 26·9	+ ·94 ·94 ·94 ·95 ·95
45 46 47 48 49	2 58 37·1 2 54 23·1 2 50 8·7 2 45 54·0 2 41 38·9	+1·31 1·33 1·35 1·37 1·39	2 59 53.7 2 55 40.6 2 51 27.3 2 47 13.6 2 42 59.7	+1.24 1.25 1.27 1.28 1.30	3 I 5·8 2 56 53·4 2 52 41·0 2 48 28·2 2 44 15·2	+1.16 1.18 1.19 1.20 1.22	3 2 13·5 2 58 1·8 2 53 49·9 2 49 37·9 2 45 25·7	+1.09 1.10 1.11 1.12 1.13	3 3 16·9 2 59 5·5 2 54 54·1 2 50 42·6 2 46 31·0	+1.02 1.02 1.03 1.04 1.05	3 4 15·9 3 0 4·8 2 55 53·7 2 51 42·6 2 47 31·4	+ ·95 ·95 ·96 ·96 ·96
50 51 52 53 54	2 37 23·2 2 33 7·1 2 28 50·5 2 24 33·3 2 20 15·4	1·44 1·47 1·50	2 38 45·3 2 34 30·6 2 30 15·5 2 25 59·9 2 21 43·9		2 40 2·0 2 35 48·4 2 31 34·6 2 27 20·4 2 23 5·8	+1·23 1·25 1·27 1·29 1·31	2 37 0.7 2 32 47.8 2 28 34.7	+1·14 1·16 1·17 1·19 1:21	2 42 19·3 2 38 7·4 2 33 55·3 2 29 43·1 2 25 30·7		2 43 20·I 2 39 8·7 2 34 57·3 2 30 45·6 2 26 33·9	+ ·97 ·98 ·99 ·99

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
0 2 4 6 8	s. s. + '46 -4'21 '41 4'21 '37 4'20 '33 4'20 '28 4'19	s. s. + ·54 -4·21 ·49 4·21 ·45 4·21 ·40 4·20 ·36 4·20	s. s. + ·61 -4·23 ·57 4·22 ·52 4·21 ·48 4·21 ·44 4·20	s. s. + ·69 -4·24 ·65 4·23 ·60 4·22 ·56 4·22 ·51 4·21	s. s. + ·77 -4·25 ·73 4·25 ·68 4·24 ·64 4·23 ·59 4·22	s. s. + ·85 -4·27 ·80 4·26 ·76 4·25 ·71 4·25 ·67 4·24
10	+ ·24 4·19	+ ·32 4·20	+ ·39 4·20	+ ·47 4·21	+ ·55 4·22	+ ·63 4·23
12	·19 4·19	·27 4·19	·35 4·20	·43 4·20	·51 4·21	·59 4·22
14	·15 4·18	·23 4·19	·31 4·19	·39 4·20	·47 4·21	·55 4·22
16	II 4·18	·19 4·19	·27 4·19	·35 4·20	·42 4·20	·50 4·21
18	·06 4·18	·14 4·18	·22 4·19	·30 4·19	·38 4·20	·46 4·21
20 22 24 26 28	+ ·02 4·18 - ·02 4·18 ·07 4·18 ·11 4·18 ·16 4·18	+ ·10 4·18 ·06 4·18 + ·01 4·18 - ·03 4·18 ·08 4·18	+ ·18 4·19 ·14 4·18 ·10 4·18 ·05 4·18 + ·01 4·18	+ ·26 4·19 ·22 4·19 ·18 4·19 ·14 4·18 ·09 4·18	+ '34 4'20 '30 4'19 '26 4'19 '22 4'19 '18 4'19	+ ·42 4·20 ·38 4·20 ·34 4·20 ·30 4·19 ·27 4·19
30	- ·21 4·19	- ·12 4·18	- ·03 4·18	+ ·05 4·18	+ ·14 4·18	+ ·22 4·19
32	·26 4·19	·17 4·19	·08 4·18	+ ·01 4·18	·10 4·18	·18 4·19
34	·31 4·19	·22 4·19	·13 4·18	- ·04 4·18	·05 4·18	·14 4·18
36	·36 4·20	·27 4·19	·18 4·18	·08 4·18	+ ·01 4·18	·10 4·18
38	·42 4·20	·32 4·19	·23 4·19	·13 4·18	- ·03 4·18	·06 4·18
40	- ·48 4·21	- ·38 4·20	- ·28 4·19	- ·18 4·19	08 4.18	+ ·01 4·18
42	·54 4·21	·44 4·20	·33 4·19	·23 4·19	.13 4.18	- ·03 4·18
44	·61 4·23	·50 4·21	·39 4·20	·28 4·19	.18 4.19	·07 4·18
46	·67 4·24	·56 4·22	·45 4·21	·34 4·20	.23 4.19	·12 4·18
48	·75 4·25	·63 4·23	·51 4·21	·40 4·20	.29 4.19	·17 4·19
50	- ·83 4·26	- ·70 4·24	- ·58 4·22	- ·46 4·21	- ·34 4·20	- ·23 4·19
52	·92 4·28	·78 4·26	·66 4·23	·53 4·22	·41 4·20	·28 4·19
54	I·01 4·30	·87 4·27	·74 4·25	·60 4·23	·47 4·21	·34 4·20

72 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 17°.

True Alt.		Decl. Var.	13°	Decl. Var.	N—SAM 14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 10 12 14 16	5 32 16.8 5 23 48.2 5 15 20.3 5 6 53.2	s. +1·28 1·13 1·10 1·08 1·05	H. M. S. 6 16 11:4 5 33 24:4 5 24 54:1 5 16 24:7 5 7 56:1	S. + 1·29 1·12 1·09 1·07	H. M. S. 6 17 29·2 5 34 31·7 5 25 59·6 5 17 28·5 5 8 58·2	s. + 1·30 1·12 1·09 1·06 1·03	5 35 38·7 5 27 4·6 5 18 31·5 5 9 59·4	s. +1·31 1·11 1·08 1·05	5 36 45.5	s. +1·33 1·11 1·07 1·04 1·00	H. M. S. 6 21 27·2 5 37 52·2 5 29 13·6 5 20 36·1 5 11 59·7	s. + 1·34 1·11 1·07 1·03 ·99
18 20 22 24 26	4 58 26.7 4 50 0.8 4 41 35.5 4 33 10.7 4 24 46.3	.98	4 59 28·2 4 51 1·0 4 42 34·5 4 34 8·5 4 25 43·1	+1.02 .99 .97 .95 .93	5 0 28·7 4 52 0·0 4 43 32·1 4 35 4·7 4 26 38·1	+1.00 .97 .95 .92 .90	5 I 28·2 4 52 57·9 4 44 28·3 4 35 59·5 4 27 31·3	+ ·98 ·95 ·92 ·90 ·87	4 36 52.6	+ ·97 ·93 ·90 ·87 ·84	5 3 24.5 4 54 50.1 4 46 16.8 4 37 44.2 4 29 12.5	+ ·95 ·92 •88 ·85 ·81
28 30 31 32 33	4 16 22:4 4 7 58:9 4 3 47:3 3 59 35:7 3 55 24:3	+ ·95 ·93 ·93 ·92 ·91	4 4 41.7	+ ·91 ·89 ·89 ·88 ·87	4 9 46·4 4 5 33·8 4 I 2I·3	+ ·88 ·86 ·85 ·84 ·83	4 19 3.8 4 10 36.8 4 6 23.6 4 2 10.5 3 57 57.5	+ ·85 ·82 ·81 ·80 ·79	4 11 25·1 4 7 11·1	+ ·81 ·79 ·78 ·76 ·74	4 20 41·5 4 12 11·2 4 7 56·3 4 3 41·6 3 59 27·0	+ ·78 ·75 ·73 ·72 ·70
34 35 36 37 38	3 51 12·9 3 47 1·5 3 42 50·3 3 38 39·1 3 34 27·9	·90 ·90	3 52 6·1 3 47 54·4 3 43 42·8 3 39 31·3 3 35 19·8	+ ·86 ·86 ·85 ·84 ·84	3 52 56·7 3 48 44·5 3 44 32·5 3 40 20·5 3 36 8·7	+ ·82 ·81 ·80 ·79 ·79	3 53 44·6 3 49 31·9 3 45 19·3 3 41 6·7 3 36 54·3	+ ·78 ·76 ·75 ·74 ·73	3 54 30·0 3 50 16·5 3 46 3·2 3 41 50·0 3 37 36·9	+ ·73 ·72 ·71 ·69 ·68		+ ·69 ·67 ·66 ·64 ·63
39 40 41 42 43	3 30 16·8 3 26 5·7 3 21 54·7 3 17 43·6 3 13 32·7	·89 ·88 ·88	3 31 8·5 3 26 57·2 3 22 45·9 3 18 34·7 3 14 23·5	·83 ·82 ·82	3 31 56·9 3 27 45·2 3 23 33·6 3 19 22·1 3 15 10·6	+ ·78 ·77 ·76 ·76 ·75	3 32 42·I 3 28 29·8 3 24 17·8 3 20 5·7 3 15 53·8	+ ·72 ·71 ·71 ·70 ·69	3 33 23 9 3 29 11 1 3 24 58 3 3 20 45 8 3 16 33 2	+ ·67 ·66 ·65 ·64 ·62	3 25 35·5 3 21 22·1	+ ·62 ·60 ·59 ·57 ·56
44 45 46 47 48	3 9 21·7 3 5 10·7 3 0 59·8 2 56 48·8 2 52 37·8	·88 ·88 ·88	3 10 12·5 3 6 1·4 3 1 50·4 2 57 39·3 2 53 28·3	+ ·81 ·81 ·80 ·80	3 6 47.9	+ ·75 ·74 ·73 ·73 ·73	3 II 42·0 3 7 30·2 3 3 18·6 2 59 7·0 2 54 55·5	+ ·68 ·67 ·66 ·66 ·65	3 12 20·8 3 8 8·5 3 3 56·3 2 59 44·1 2 55 32·1	+ ·61 ·60 ·59 ·58 ·57	3 12 55.7 3 8 42.6 3 4 29.7 3 0 16.8 2 56 4.1	·53 ·52 ·51 ·49
49 50 51 52 53	2 48 26·8 + 2 44 15·8 2 40 4·7 2 35 53·6 2 31 42·4	·89 ·89 •89	2 49 17·3 2 45 6·4 2 40 55·4 2 36 44·4 2 32 33·5	·80 ·80 ·80	2 50 3·1 2 45 52·0 2 41 40·9 2 37 29·9 2 33 18·9	+ ·72 ·72 ·71 ·71 ·71	2 50 44·0 2 46 32·6 2 42 21·2 2 38 10·0 2 33 58·7	·63 ·62	2 51 20·1 2 47 8·2 2 42 56·4 2 38 44·6 2 34 32·9	·54 ·53	2 51 51·4 2 47 38·8 2 43 26·3 2 39 13·9 2 35 1·6	+ ·48 ·47 ·45 ·44 ·43
54 55 56 57 58	2 27 31·1 2 23 19·8 2 19 8·4 2 14 56·9 2 10 45·2	·91 ·92 ·93	2 28 22·5 2 24 11·4 2 20 0·3 2 15 49·1 2 11 38·0	.82	2 29 7·9 2 24 56·9 2 20 46·0 2 16 35·0 2 12 24·0	+ ·71 ·71 ·71 ·71 ·71	2 29 47·5 2 25 36·4 2 21 25·3 2 17 14·2 2 13 3·2	·60 ·60	2 30 21·3 2 26 9·8 2 21 58·3 2 17 46·8 2 13 35·5		2 30 49·3 2 26 37·1 2 22 25·0 2 18 13·0 2 14 1·0	
		V	ARIATIO	ON TO	o r' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 12°	Α.	L. 13°	Α.	L. 14 °	Α.	L. 15°	Α.	L. 16°	Α.	L. 17	Α.
° 0 4 8 12 16	·84 ·75 ·66	s. 4·28 4·26 4·25 4·23 4·22	s. +1·01 - ·92 ·83 ·74 ·66	s. -4·30 4·28 4·26 4·25 4·23	1·00 ·91 ·82 ·74	s. -4·32 4·30 4·28 4·26 4·25	s. +1·17 - 1·08 ·99 ·90 ·83	s. -4·34 4·32 4·30 4·28 4·26	1·16 1·07 ·99 ·91	s. -4·37 4·34 4·32 4·30 4·28	s. +1·34 1·24 1·15 1·07	s. -4·39 4·36 4·34 4·32 4·30
20 22 24 26 28	.47 .43 .39 .35	4·21 4·20 4·20 4·20	+ ·59 ·55 ·51 ·47 ·44	4·22 4·21 4·21 4·20	+ ·67 ·63 ·59 ·56 ·52	4·23 4·23 4·22 4·22 4·21	+ ·75 ·71 ·68 ·64 ·61	4·25 4·25 4·24 4·23 4·23	+ ·83 ·80 ·76 ·73 ·69	4·26 4·26 4·25 4·25 4·24	+ ·92 ·88 ·85 ·81 ·78	4·28 4·28 4·27 4·26 4·25
30 32 34 36 38	·27 ·23 ·19 ·15	4·20 4·19 4·19 4·19	+ ·40 ·36 ·32 ·29 ·25	4·20 4·20 4·19 4·19	+ '49 '45 '42 '38 '34	4·21 4·20 4·20 4·20	+ ·57 ·54 ·51 ·47 ·44	4·22 4·21 4·21 4·21	+ ·66 ·63 ·60 ·57 ·54	4·24 4·23 4·23 4·22 4·22	+ ·75 ·72 ·69 ·66 ·63	4·25 4·24 4·24 4·23 4·23
40 42 44 46 48	+ ·07 + ·03 - ·01	4·18 4·18 4·18 4·18 4·18	+ ·21 ·17 ·13 ·09 ·05	4·19 4·18 4·18 4·18	+ ·31 ·27 ·24 ·20 ·16	4·19 4·19 4·19 4·19	+ ·41 ·37 ·34 ·31 ·27	4·20 4·20 4·19 4·19	+ ·50 ·47 ·44 ·41 ·38	4·21 4·21 4·21 4·20 4·20	+ ·60 ·57 ·55 ·52 ·49	4·22 4·22 4·21 4·21
50 52 54 56 58	·16 ·21 ·27	4·18 4·19 4·19 4·19	+ ·01 - ·04 ·09 ·14 ·19	4·18 4·18 4·19 4·19	+ ·12 ·08 ·04 ·00 ·05	4·18 4·18 4·18 4·18 4·18	+ ·24 ·20 ·17 ·13 ·09	4·19 4·19 4·18 4·18	+ ·35 ·32 ·29 ·26 ·23	4·20 4·19 4·19 4·19	+ ·47 ·44 ·42 ·39 ·37	4·21 4·21 4·20 4·20 4·20

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 73 LATITUDE 17°.

1	7		DECLIN		N—SAM		AME AS		ITTUDE.			
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 22 48·3 5 38 58·8 5 30 17·6 5 21 37·6 5 12 58·8	s. + 1·36 1·11 1·06 1·02 ·98	H. M. S. 6 24 10·3 5 40 5·3 5 31 21·2 5 22 38·6 5 13 57·2	s. + 1·37 1·11 1·06 1·01	H. M. S. 6 25 33·3 5 41 11·7 5 32 24·7 5 23 39·1 5 14 54·9	s. +1·39 1·11 1·05 1·00 ·96	H. M. S. 6 26 57.5 5 42 18.2 5 33 27.9 5 24 39.2 5 15 52.0	s. + 1·41 1·11 1·05 1·00 ·95	H. M. S. 6 28 22.9 5 43 24.6 5 34 31.0 5 25 39.0 5 16 48.5	1·11 1·05 ·99 ·94	H. M. S. 6 29 49.6 5 44 31.3 5 35 34.0 5 26 38.4 5 17 44.4	s. + 1·45 1·11 1·05 ·99
18 20 22 24 26	5 4 21·2 4 55 44·6 4 47 9·0 4 38 34·3 4 30 0·5	·82 ·78	5 5 17·0 4 56 38·0 4 47 59·9 4 39 22·9 4 30 46·7	·80 ·76	5 6 12·0 4 57 30·2 4 48 49·6 4 40 9·9 4 31 31·2	·77	5 7 6·1 4 58 21·5 4 49 38·0 4 40 55·5 4 32 14·1	·75 ·70	5 7 59.4 4 59 11.7 4 50 25.1 4 41 39.7 4 32 55.2	·77 ·72 ·67	5 8 52·0 5 0 0·9 4 51 11·0 4 42 22·3 4 33 34·6	+ ·87 ·81 ·75 ·70 ·64
28 30 31 32 33	4 2I 27·4 4 I2 55·I 4 8 39·3 4 4 23·6 4 0 8·0	+ ·75 ·71 ·69 ·68 ·66	4 22 11·4 4 13 36·9 4 9 19·9 4 5 3·1 4 0 46·5	+ ·72 ·68 ·66 ·64 ·62	4 22 53.5 4 14 16.5 4 9 58.3 4 5 40.3 4 1 22.4	+ ·68 ·64 ·62 ·60 ·58	4 1 55.8	+ ·65 ·60 ·58 ·56 ·53	4 24 11·8 4 15 29·2 4 11 8·2 4 6 47·4 4 2 26·7	+ ·62 ·57 ·54 ·52 ·49	4 24 48·0 4 16 2·3 4 11 39·7 4 7 17·3 4 2 55·1	+ ·59 ·53 ·50 ·48 ·45
34 35 36 37 38	3 51 37·4 3 47 22·3 3 43 7·4 3 38 52·6	+ ·64 ·63 ·61 ·59 ·58	3 56 30·0 3 52 13·7 3 47 57·6 3 43 41·6 3 39 25·7	·58 ·56 ·54 ·52	3 39 55.7	.47	3 44 40·9 3 40 22·5	+ ·51 ·49 ·47 ·44 ·42	3 53 46·0 3 49 25·9 3 45 5·9 3 40 46·1	·44 ·42 ·39 ·36	3 58 33.0 3 54 II.2 3 49 49.4 3 45 27.8 3 4I 6.4	·39 ·37 ·34 ·31
39 40 41 42 43	3 34 37 9 3 30 23 4 3 26 9 0 3 21 54 7 3 17 40 6	+ ·56 ·54 ·53 ·51 ·50	3 35 10·0 3 30 54·4 3 26 39·0 3 22 23·6 3 18 8·5	'43	3 35 38·8 3 31 22·0 3 27 5·4 3 22 48·8 3 18 32·5	+ ·45 ·43 ·41 ·39 ·37	3 36 4·3 3 31 46·1 3 27 28·1 3 23 10·3 3 18 52·5		3 19 8.6	+ ·34 ·31 ·29 ·26 ·23	3 36 45·1 3 32 23·8 3 28 2·7 3 23 41·6 3 19 20·7	·25 ·23 ·20 ·17
44 45 46 47 48	3 13 26·5 3 9 12·6 3 4 58·7 3 0 45·0 2 56 31·4 2 52 17·9	+ ·48 ·46 ·45 ·43 ·42	3 13 53·3 3 9 38·4 3 5 23·5 3 1 8·7 2 56 54·0 2 52 39·4	+ ·41 ·39 ·38 ·36 ·34	3 14 16·2 3 9 59·9 3 5 44·0 3 1 27·9 2 57 11·9	١.	3 14 34·8 3 10 17·3 3 5 59·8 3 1 42·4 2 57 25:1 2 53 7·8	·25 ·23 ·20 ·18	3 10 30·3 3 6 11·3 3 1 52·3 2 57 33·4	·15 ·12 ·10	3 14 59·8 3 10 38·9 3 6 18·2 3 1 57·4 2 57 36·7	·11 ·08 ·04 + ·01
50 51 52 53	2 48 4.4 2 43 51.0 2 39 37.7 2 35 24.5 2 31 11.4	+ ·40 ·38 ·37 ·35 ·34 + ·32	2 32 39 4 2 48 24 9 2 44 10 5 2 39 56 1 2 35 41 9 2 31 27 7	+ ·32 ·30 ·28 ·26 ·24 + ·22	2 48 40·4 2 44 24·6 2 40 9·0 2 35 53·4	•21	2 53 7.8 2 48 50.6 2 44 33.4 2 40 16.3 2 35 59.2 2 31 42.1	·10	2 53 14·5 2 48 55·6 2 44 36·8 2 40 17·9 2 35 59·0 2 31 40·2	- ·02	2 53 16·0 2 48 55·2 2 44 34·5 2 40 13·7 2 35 52·8 2 31 31·9	·05 ·08 ·12 ·15
55 56 57 58	2 26 58·4 2 22 45·4 2 18 32·5 2 14 19·7	·30 ·29 ·27 ·25	2 27 13·5 2 22 59·5 2 18 45·4 2 14 31·4	·20 ·18	2 27 22.4 2 23 6.9 2 18 51.5	·10 ·07 ·05	2 27 25·0 2 23 7·9	- 01	2 27 21·2 2 23 2·3 2 18 43·2	·12 ·15 ·19		·23 ·27 ·31
	1		1		O 1' OF		1		1		1 .	
Alt.	L. 18°	A.	L. 19°	A.	L. 20°	A.	L. 21°	A.	L. 22	A.	L. 23	° A.
0 4 8 12 16	s. +1·43 - 1·33 1·24 1·15 1·07	s. -4·42 4·39 4·36 4·34 4·32	s. +1·51 - 1·41 1·32 1·23 1·16	s. -4·45 4·41 4·38 4·36 4·34	s. +1.60 - 1.50 1.40 1.32 1.24	s. -4·48 4·44 4·41 4·38 4·36	S. +1.69 1.58 1.49 1.40 1.32	s. -4·51 4·47 4·44 4·41 4·39	s. +1.78 1.67 1.58 1.49 1.41	s. -4·54 4·50 4·47 4·44 4·41	s. + 1·87 1·76 1·66 1·58 1·50	s. -4·58 4·54 4·50 4·47 4·44
20 22 24 26 28	+1.00 .96 .93 .90 .87	4·30 4·29 4·28 4·28 4·27	+1.08 1.05 1.02 .99 .96	4·32 4·31 4·30 4·30 4·29	+1·17 1·14 1·11 1·07 1·04	4·34 4·33 4·32 4·31	+1.26 1.22 1.19 1.16 1.13	4·37 4·36 4·35 4·34 4·33	+1·34 1·31 1·28 1·25 1·22	4·39 4·38 4·36 4·36	+1·43 1·40 1·37 1·34 1·31	4·42 4·41 4·40 4·39 4·38
30 32 34 36 38	+ ·84 ·81 ·78 ·75 ·73 + ·70	4·27 4·26 4·26 4·25 4·24	+ ·93 ·90 ·87 ·85 ·82 + ·80	4·29 4·28 4·27 4·27 4·26	+1.02 -99 -97 -94 -92	4·30 4·30 4·29 4·28	+1·11 1·08 1·06 1·04 1·02	4·33 4·32 4·31 4·31	+1·20 1·18 1·15 1·14 1·12	4·35 4·34 4·33 4·33	+ 1·29 1·27 1·25 1·23 1·22	4·38 4·37 4·36 4·36
40 42 44 46 48	·68 ·65 ·63 ·61	4·24 4·23 4·23 4·23	·78 ·76 ·74 ·72	4·25 4·25 4·25 4·24	+ ·90 ·88 ·86 ·85 ·83	4·27 4·27 4·27 4·26	+ 1.00 .98 .97 .96	4·30 4·30 4·29 4·29	1.09 1.08 1.07 1.06	4·32 4·32 4·32 4·31	+1·20 1·19 1·18 1·18	4·35 4·35 4·35 4·35 4·34
50 52 54 56 58	+ ·58 ·56 ·54 ·52 ·51	4·22 4·22 4·22 4·21	+ ·70 ·69 ·67 •66 ·65	4·24 4·24 4·23 4·23	+ ·82 ·81 ·80 ·79 ·79	4·26 4·26 4·26 4·26 4·25	+ ·94 ·93 ·93 ·93 ·93	4·29 4·28 4·28 4·28 4·28	+1.06 1.06 1.06 1.07 1.08	4·31 4·31 4·32 4·32	+1·18 1·18 1·19 1·21 1·23	4·35 4·35 4·35 4·36

74 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 18°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5 °	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 17 55.1 5 9 29.4 5 1 3.3 4 52 36.6	s. +1·30 1·32 1·33 1·34 1·36		s. +1·30 1·31 1·31 1·32 1·33	5 12 7.2	s. +1·30 1·29 1·30 1·31	H. M. S. 6 3 54.2 5 21 49.5 5 13 24.7 5 4 59.9 4 56 35.0	s. +1·30 1·28 1·28 1·29	5 23 6·0 5 14 41·3 5 6 16·6	s. +I·31 I·27 I·27 I·27 I·27	5 15 57·1 5 7 32·3	s. +1·31 1·26 1·25 1·25
18 20 22 24 26	4 44 9.4 4 35 41.5 4 27 12.9 4 18 43.3 4 10 12.7		4 45 31·1 4 37 4·2 4 28 36·7 4 20 8·5 4 11 39·3	+ 1·35 1·36 1·38 1·40 1·42	4 46 51·2 4 38 25·1 4 29 58·6 4 21 31·4 4 13 3·6	1.36	4 48 9.8 4 39 44.4 4 31 18.6 4 22 52.4 4 14 25.6	+1·30 1·31 1·32 1·33 1·35	4 4I 2.0 4 32 36.8 4 24 II.2	1.29	4 50 42·8 4 42 18·1 4 33 53·2 4 25 28·1 4 17 2·7	+ 1·25 1·25 1·26 1·26 1·27
28 30 32 33 34	4 I 40·9 3 53 7·8 3 44 33·2 3 40 15·2 3 35 56·8	+1.49 1.53 1.56 1.58 1.60	3 54 38.0	+1.45 1.48 1.51 1.53 1.55	3 56 5·3 3 47 34·7 3 43 18·9	+ 1·41 1·43 1·46 1·48 1·49	3 57 29·9 3 49 0·8	+ 1·36 1·38 1·41 1·42 1·44	3 58 51·7 3 50 24·0 3 46 9·7	+1·32 1·34 1·36 1·37 1·38	4 8 37.0 4 0 11.0 3 51 44.2 3 47 30.6 3 43 16.9	+ 1.28 1.30 1.31 1.32 1.33
35 36 37 38 39	3 31 38·0 3 27 18·6 3 22 58·6 3 18 38·0 3 14 16·8	1.65 1.68 1.70	3 33 13·9 3 28 55·8 3 24 37·3 3 20 18·2 3 15 58·6	1.61 1.64	3 30 29·4 3 26 12·1	+1·51 1·53 1·55 1·57 1·59	3 31 59·3 3 27 43·2 3 23 26·6	+ 1.45 1.47 1.49 1.50 1.52	3 33 25·8 3 29 10·5	+ 1·40 1·41 1·43 1·44 1·46		+ 1.34 1.35 1.37 1.38 1.39
40 41 42 43 44	3 9 54·8 3 5 32·2 3 1 8·7 2 56 44·4 2 52 19·1	1.79 1.83 1.87		+1.69 1.72 1.75 1.78 1.81	3 8 58·2 3 4 38·4 3 0 17·9	+ 1.61 1.64 1.67 1.70 1.73	3 10 34.5	+1.54 1.57 1.59 1.62 1.64	3 12 6·4 3 7 49·4 3 3 31·9	+ 1.48 1.50 1.52 1.54 1.56	3 9 18·2 3 5 2·0	I.43
45 46 47 48 49	2 47 52·8 2 43 25·4 2 38 56·8 2 34 26·9 2 29 55·6	2.08	2 49 46.6 2 45 21.6 2 40 55.6 2 36 28.7 2 32 0.3	1.89	2 42 48·4 2 38 23·9	+1.76 1.79 1.83 1.87 1.91	2 53 17·7 2 48 57·0 2 44 35·4 2 40 13·1 2 35 49·9	+ 1.67 1.70 1.74 1.77 1.81	2 50 36·4 2 46 16·8 2 41 56·4	+1.59 1.61 1.64 1.67	2 47 52.7	1.58
50 51 52 53 54	2 25 22·7 2 20 48·1 2 16 11·6 2 11 33·1 2 6 52·2	2·32 2·39	2 27 30·7 2 22 59·6 2 18 26·9 2 13 52·4 2 9 15·9	+2.07 2.13 2.19 2.25 2.32	2 25 3·6 2 20 34·2	2·06 2·12	2 31 25.7 2 27 0.5 2 22 34.1 2 18 6.5 2 13 37.5	+1.85 1.89 1.94 1.99 2.04	2 28 50·6 2 24 26·9	+ 1.74 1.78 1.82 1.87 1.91		1.67 1.71 1.75

l						
Alt.	L. 0° A.	L. 1 ° A.	L. 2° A.	L. 3 ° A.	L. 4° A.	L. 5 ° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	S. S.	s. s.	s. s.
	·00 -4·20	+ ·08 -4·21	+ ·15 -4·21	+ '23 -4'21	+ '31 -4'22	+ '38 -4'22
	·05 4·21	+ ·03 4·21	·11 4·21	'18 4'21	'26 4'21	'34 4'22
	·09 4·21	- ·02 4·20	·06 4·21	'14 4'21	'21 4'21	'29 4'22
	·14 4·21	·06 4·21	+ ·01 4·21	'09 4'21	'17 4'21	" '25 4'21
	·19 4·21	·11 4·21	- ·03 4·20	+ '04 4'20	'12 4'21	'20 4'21
10	- ·24 4·21	- ·16 4·21	08 4.21	- ·01 4·21	+ ·07 4·21	+ ·15 4·21
12	·29 4·21	·21 4·21	.13 4.21	·05 4·21	+ ·02 4·20	·10 4·21
14	·34 4·22	·26 4·21	.18 4.21	·10 4·21	- ·02 4·20	·05 4·21
16	·39 4·22	·31 4·22	.23 4.21	·15 4·21	·07 4·20	+ ·01 4·20
18	·45 4·23	·36 4·22	.28 4.21	·20 4·21	·12 4·21	- ·04 4·20
20	- ·50 4·23	- ·42 4·22	- ·33 4·22	- ·25 4·21	- ·17 4·21	- ·09 4·20
22	·56 4·24	·47 4·23	·39 4·22	·30 4·21	·22 4·21	·13 4·21
24	·61 4·25	·53 4·24	·44 4·23	·36 4·22	·27 4·21	·19 4·21
26	·67 4·26	·59 4·24	·50 4·23	·41 4·22	·32 4·22	·24 4·21
28	·74 4·27	·65 4·25	·56 4·24	·47 4·23	·38 4·22	·29 4·21
30	- ·80 4·28	- ·71 4·26	- ·62 4·25	- ·52 4·24	- ·43 4·23	- ·34 4·22
32	·87 4·29	·77 4·27	·68 4·26	·59 4·25	·49 4·23	·40 4·22
34	·94 4·31	·84 4·29	·75 4·27	·65 4·25	·55 4·24	·46 4·23
36	I·02 4·33	·92 4·30	·82 4·28	·72 4·27	·62 4·25	·52 4·24
38	I·10 4·35	I·00 4·32	·89 4·30	·79 4·28	·68 4·26	·58 4·25
40	-1·19 4·37	-1.08 4.34	- ·97 4·31	- ·86 4·29	·76 4·27	- ·65 4·25
42	1·29 4·39	1.17 4.36	1·05 4·33	·94 4·31	·83 4·28	·72 4·27
44	1·39 4·43	1.27 4.39	1·15 4·36	I·03 4·33	·91 4·30	·80 4·28
46	1·50 4·47	1.37 4.42	1·24 4·39	I·12 4·35	I·00 4·32	·88 4·30
48	1·63 4·51	1.49 4.46	1·35 4·42	I·22 4·38	I·09 4·35	·97 4·32
50	-1.77 4.56	-1.62 4.51	-1.47 4.46	-1·33 4·41	-1·19 4·37	-1.06 4.34
52	1.92 4.62	1.76 4.56	1.60 4.50	1·45 4·45	1·31 4·40	1.17 4.36
54	2.11 4.70	1.92 4.63	1.75 4.55	1·59 4·50	1·43 4·44	1.28 4.40

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 7 49.7 5 25 37.4 5 17 12.0 5 8 47.0 5 0 22.1	s. +1·31 1·25 1·24 1·24 1·23	H. M. S. 6 9 8.8 5 26 52.1 5 18 26.2 5 10 0.7 5 1 35.5	I·24 I·23	H. M. S. 6 10 28·1 5 28 6·4 5 19 39·7 5 11 13·7 5 2 47·9	s. +1·33 1·23 1·22 1·21 1·20	5 29 20·2 5 20 52·7	s. +1·33 1·23 1·21 1·19	H. M. S. 6 13 8·3 5 30 33·5 5 22 5·0 5 13 37·1 5 5 9·7	s. +1·34 1·22 1·20 1·18 1·16	H. M. S. 6 14 29·1 5 31 46·5 5 23 16·7 5 14 47·6 5 6 19·1	s. +1·35 1·21 1·19 1·17
18 20 22 24 26	4 51 57·3 4 43 32·6 4 35 7·9 4 26 43·1 4 18 18·2	+1.23 1.23 1.23 1.23 1.24	4 53 10·5 4 44 45·7 4 36 20·9 4 27 56·2 4 19 31·5	1·20 1·20	4 45 57·3 4 37 32·3 4 29 7·5 4 20 42·8	+1·19 1·18 1·17 1·17	4 47 7.6 4 38 42.2 4 30 17.0 4 21 52.1	+1·17 1·16 1·15 1·14 1·14	4 48 16·5 4 39 50·5 4 31 24·9 4 22 59·6	+1·15 1·14 1·12 1·12 1·11	4 57 51.4 4 49 24.1 4 40 57.3 4 32 31.0 4 24 5.1	+1.13 1.10 1.09 1.08
28 30 32 33 34	4 9 53.0 4 1 27.5 3 53 1.7 3 48 48.6 3 44 35.4	1·25 1·27 1·27 1·28	4 II 6.6 4 2 4I.7 3 54 I6.4 3 50 3.7 3 45 50.9	+ I·2I I·21 I·23 I·23	4 3 53·3 3 55 28·5 3 51 16·0 3 47 3·5	+1·17 1·17 1·18 1·18 1·18	4 5 2.6 3 56 37.9 3 52 25.5 3 48 13.2	I·14 I·14	4 6 9.6 3 57 44.8 3 53 32.4 3 49 20.0	1.09	3 58 49·0 3 54 36·6 3 50 24·1	+1.07 1.06 1.05 1.05
35 36 37 38 39	3 40 22·0 3 36 8·5 3 31 54·7 3 27 40·8 3 23 26·7	+1·29 1·30 1·31 1·32 1·33	3 41 37·9 3 37 24·9 3 33 11·7 3 28 58·3 3 24 44·9	1.26	3 42 50·8 3 38 38·1 3 34 25·3 3 30 12·5 3 25 59·5	+1·19 1·20 1·21 1·21	3 39 48·3 3 35 35·7 3 31 23·2 3 27 10·5	1·14 1·15 1·15	3 40 55·3 3 36 43·0 3 32 30·5 3 28 18·1	1.00 1.00 1.00 1.00	3 41 59·4 3 37 47·0 3 33 34·7	1.04 1.04 1.04 1.04 1.04
40 41 42 43 44	3 19 12·3 3 14 57·7 3 10 42·8 3 6 27·7 3 2 12·1	+1·35 1·36 1·37 1·39 1·41	3 20 31·2 3 16 17·3 3 12 3·3 3 7 48·9 3 3 34·4	+ 1·28 1·29 1·31 1·32 1·33	3 13 19·6 3 9 6·0 3 4 52·2	+ 1·22 1·23 1·24 1·25 1·26	3 14 32·0 3 10 19·0	+ 1·16 1·17 1·17 1·18 1·19	3 19 53·1 3 15 40·5 3 11 27·9	+ 1·10 1·10 1·11 1·11 1·12	3 I2 32·7 3 8 20·2	+ 1.04 1.04 1.05 1.05
45 46 47 48 49	2 57 56·3 2 53 40·0 2 49 23·3 2 45 6·2 2 40 48·6	1.45 1.47 1.49 1.52	2 46 33·1 2 42 16·8	+ 1·35 1·37 1·38 1·40 1·42	2 47 54·7 2 43 39·6	1·29 1·30 1·34	2 53 25·2 2 49 II·3 2 44 57·I	+1·20 1·21 1·23 1·25	2 54 36·2 2 50 22·9 2 46 9·5	+1·13 1·14 1·15 1·16	2 51 29·7 2 47 16·8	+ 1.06 1.07 1.07 1.08
50 51 52 53 54	2 36 30·4 2 32 11·6 2 27 52·2 2 23 32·1 2 19 11·1	1.57 1.60 1.64	2 38 0·1 2 33 42·9 2 29 25·2 2 25 6·9 2 20 48·0	1·47 1·50 1·53	2 39 24·2 2 35 8·3 2 30 52·1 2 26 35·4 2 22 18·2	+1·35 1·38 1·40 1·42 1·45	2 36 28·0 2 32 13·0 2 27 57·6		2 37 42.1	+1·18 1·19 1·20 1·22 1·24	2 43 3.8 2 38 50.5 2 34 37.4 2 30 23.9 2 26 10.2	+1.09 1.10 1.11 1.12 1.13

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L: 11° A.
0 2 4 6 8	s. s. + ·46 -4·23 ·42 4·23 ·37 4·22 ·32 4·22 ·27 4·21	s. s. + ·54 -4·24 ·50 4·24 ·45 4·23 ·40 4·22 ·35 4·22	s. s. + ·62 -4·25 ·57 4·24 ·52 4·24 ·48 4·23 ·43 4·23	s. s. + ·70 -4·26 ·65 4·26 ·60 4·25 ·56 4·24 ·51 4·23	s. s. + ·78 -4·28 ·73 4·27 ·68 4·26 ·63 4·26 ·59 4·25	s. s. + ·86 -4·29 ·81 4·28 ·76 4·27 ·71 4·27 ·67 4·26
10	+ ·23 4·21	+ ·31	+ ·38 4·22	+ ·46 4·23	+ ·54 4·24	+ ·62 4·25
12	·18 4·21		·34 4·22	·42 4·23	·50 4·23	·58 4·24
14	·13 4·21		·29 4·21	·37 4·22	·45 4·23	·53 4·24
16	·09 4·21		·25 4·21	·33 4·22	·41 4·22	·49 4·23
18	+ ·04 4·20		·20 4·21	·28 4·21	·36 4·22	·44 4·23
20	- ·00 4·20	+ ·08 4·21	+ ·16 4·21	+ ·24 4·21	+ ·32 4·22	+ ·40 4·22
22	·05 4·20	+ ·03 4·20	·11 4·21	·19 4·21	·28 4·21	·36 4·22
24	·10 4·21	- ·02 4·20	·06 4·21	·15 4·21	·23 4·21	·31 4·22
26	·15 4·21	·07 4·21	+ ·02 4·20	·10 4·21	·19 4·21	·27 4·21
28	·20 4·21	·12 4·21	- ·03 4·20	·06 4·20	·14 4·21	·23 4·21
30	- ·25 4·21	- ·17 4·21	- ·08 4·21	+ ·0I 4·20	+ ·10 4·21	+ ·18 4·21
32	·31 4·22	·22 4·21	·13 4·21	- ·04 4·20	+ ·05 4·20	·14 4·21
34	·36 4·22	·27 4·21	·18 4·21	·09 4·2I	- ·00 4·20	·10 4·21
36	·42 4·23	·33 4·22	·23 4·21	·14 4·2I	- ·04 4·20	+ ·05 4·21
38	·48 4·23	·38 4·22	·29 4·21	·19 4·2I	·09 4·21	·00 4·20
40	- ·55 4·24	- ·44 4·23	- ·34 4·22	- ·24 4·21	- ·14 4·21	- ·04 4·20
42	·61 4·25	·51 4·23	·40 4·22	·30 4·21	·20 4·21	·09 4·20
44	·69 4·26	·58 4·24	·47 4·23	·36 4·22	·25 4·21	·15 4·21
46	·76 4·27	·65 4·25	·53 4·24	·42 4·23	·31 4·22	·20 4·21
48	·84 4·29	·72 4·27	·60 4·25	·49 4·23	·37 4·22	·26 4·21
50	- ·93 4·31	- ·80 4·28	- •68 4·26	- ·56 4·24	- '44 4'23	- ·32 4·22
52	1·03 4·33	·89 4·30	•76 4·27	·63 4·25	'51 4'24	·38 4·22
54	1·13 4·36	·99 4·32	•85 4·29	·71 4·27	'58 4'25	·45 4·23

76 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 18°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Dec. Var·
0 10 12 14 16	H. M. S. 6 15 50·5 5 32 59·1 5 24 27·9 5 15 57·5 5 7 27·8	s. +1·36 1·21 1·18 1·16 1·13	H. M. S. 6 17 12·5 5 34 11·5 5 25 38·6 5 17 6·6 5 8 35·5	s. +1·37 1·20 1·17 1·15	H. M. S. 6 18 35·2 5 35 23·6 5 26 48·8 5 18 15·2 5 9 42·5	1·20 1·17 1·14		1·20 1·16	H. M. S. 6 21 23.0 5 37 47.2 5 29 8.3 5 20 30.6 5 11 54.1	s. +1.41 1.19 1.16 1.12 1.08	5 38 58·8 5 30 17·6 5 21 37·6	s. +1.43 1.19 1.15 1.11
18 20 22 24 26	4 58 58·8 4 50 30·5 4 42 2·7 4 33 35·5 4 25 8·7	1.08	5 0 5·2 4 51 35·6 4 43 6·7 4 34 38·4 4 26 10·6	+1·10 1·07 1·05 1·03 1·01	5 I 10·6 4 52 39·6 4 44 9·3 4 35 39·6 4 27 10·7	+1.08 1.06 1.03 1.01	4 53 42·3 4 45 10·5	+1.06 1.04 1.01 .98	5 3 18·5 4 54 44·0 4 46 10·4 4 37 37·6 4 29 5·5	+1.05 1.02 .99 .96		+1.03 .96 .93
28 30 31 32 33	4 16 42·4 4 8 16·5 4 4 3·7 3 59 50·9 3 55 38·2	+1.03 1.02 1.01 1.01 1.00	4 5 3.4 4 0 50.2	+ 1.00 .98 .97 .97 .96	4 18 42·3 4 10 14·5 4 6 0·8 4 1 47·2 3 57 33·6	+ ·96 ·95 ·94 ·93 ·92	4 19 39·3 4 11 10·2 4 6 55·8 4 2 41·7 3 58 27·6	+ ·93 ·91 ·90 ·89 ·88		+ ·90 ·87 ·86 ·85 ·84	4 12 55·1 4 8 39·3 4 4 23·6	+ ·87 ·84 ·82 ·81 ·79
34 35 36 37 38	3 51 25.6 3 47 13.0 3 43 0.4 3 38 48.0 3 34 35.5	+1.00 .99 .99	3 52 24·3 3 48 11·4 3 43 58·6 3 39 45·8 3 35 33·2	+ ·95 ·95 ·94 ·94 ·93	3 53 20·3 3 49 7·0 3 44 53·8 3 40 40·7 3 36 27·7	+ ·91 ·90 ·90 ·89 ·88	3 54 13.7 3 49 59.9 3 45 46.2 3 41 32.6 3 37 19.2	+ ·87 ·86 ·85 ·84 ·83	3 55 4.4 3 50 50.0 3 46 35.7 3 42 21.5 3 38 7.4	+ ·82 ·81 ·80 ·79 ·78	3 51 37·4 3 47 22·3	+ ·78 ·77 ·75 ·74 ·73
39 40 41 42 43	3 30 23·1 3 26 10·7 3 21 58·4 3 17 46·0 3 13 33·7	+ ·98 ·98 ·98 ·98 ·98	3 27 8·1 3 22 55·6 3 18 43·1	+ ·93 ·93 ·92 ·92 ·92	3 32 14·8 3 28 2·0 3 23 49·2 3 19 36·5 3 15 23·9	+ ·88 ·87 ·86 ·86 ·85	3 33 5.8 3 28 52.5 3 24 39.3 3 20 26.3 3 16 13.3	+ ·82 ·81 ·80 ·80 ·79	3 33 53·5 3 29 39·6 3 25 25·9 3 21 12·3 3 16 58·8	+ ·77 ·76 ·75 ·74 ·73	3 26 9.0	+ ·71 ·70 ·69 ·68 ·66
44 45 46 47 48	3 9 21·4 3 5 9·0 3 0 56·6 2 56 44·1 2 52 31·7	+ ·98 ·98 ·99 ·99	3 10 18·3 3 6 6·0 3 1 53·6 2 57 41·3 2 53 28·9	+ ·92 ·91 ·91 ·91	3 11 11·4 3 6 58·8 3 2 46·4 2 58 33·9 2 54 21·5	+ ·85 ·85 ·84 ·84 ·84	3 12 0.4 3 7 47.5 3 3 34.8 2 59 22.0 2 55 9.4	+ ·78 ·78 ·77 ·76 ·76	3 12 45.4 3 8 32.1 3 4 18.9 3 0 5.7 2 55 52.7	+ ·72 ·71 ·70 ·69 ·68	3 9 12.6	+ ·65 ·64 ·63 ·62 ·61
49 50 51 52 53	2 48 19·1 2 44 6·6 2 39 53·9 2 35 41·1 2 31 28·2	1.01	2 45 4·2 2 40 51·6 2 36 39·3	+ ·92 ·92 ·92 ·92 ·93	2 50 9·1 2 45 56·7 2 41 44·3 2 37 32·0 2 33 19·7	+ ·84 ·83 ·83 ·83 ·83	2 42 31·8 2 38 19·3	+ ·75 ·75 ·75 ·74 ·74	2 51 39.7 2 47 26.8 2 43 13.9 2 39 1.2 2 34 48.5	+ ·68 ·67 ·66 ·65 ·65	2 48 4·4 2 43 51·0 2 39 37·7	+ ·59 ·58 ·57 ·56 ·55
54 55 56 57 58	2 27 15·2 2 23 2·1 2 18 48·7 2 14 35·3 2 10 21·6		2 15 36.0	+ ·93 ·94 ·95 ·96 ·97	2 29 7·3 2 24 54·9 2 20 42·5 2 16 30·0 2 12 17·5	+ ·84 ·84 ·84 ·84 ·85		+ ·74 ·74 ·74 ·73 ·74	2 17 58.2	·64 ·63 ·63		+ ·54 ·53 ·52 ·52 ·51
		V	ARIATI	ON TO	O 1' OF	LATI	TUDE A	ND A	TTITUD	E.		
Alt.	L. 12°	A.	L. 13°	A.	L. 14°	A.	L. 15°	A.	L. 16	A.	L. 17°	Α.
0 4 8 12 16	s. + ·94 - ·84 ·75 ·66 ·57	s. -4·31 4·29 4·27 4·26 4·24	s. +1·02 ·92 ·83 ·74 ·65	s. -4·33 4·31 4·28 4·27 4·26	s. +1·11 1·00 ·91 ·82 ·73	s. +4·35 4·32 4·30 4·28 4·27	s. +1·19 1·09 ·99 ·90 ·81	s. -4·37 4·34 4·32 4·30 4·28	s. +1·27 1·17 1·07 ·98 ·89	s. -4·39 4·36 4·34 4·32 4·30	s. +1·36 1·25 1·15 1·06 ·98	s. -4·42 4·39 4·36 4·34 4·32
20 22 24 26 28	+ ·48 ·44 ·40 ·36 ·31	4·23 4·23 4·22 4·22 4·22	+ ·57 ·52 ·48 ·44 ·40	4·24 4·24 4·23 4·23	+ ·65 ·61 ·57 ·53 ·49	4·25 4·25 4·24 4·24 4·23	+ ·73 ·69 ·65 ·61 ·57	4·27 4·26 4·25 4·25 4·24	+ ·81 ·77 ·74 ·70 ·66	4·28 4·28 4·27 4·26 4·26	+ ·90 ·86 ·82 ·78 ·75	4·30 4·29 4·28 4·28 4·27
30 32 34 36 38	+ ·27 ·23 ·19 ·14 ·10	4·22 4·21 4·21 4·21 4·21	+ ·36 ·32 ·28 ·24 ·19	4·22 4·21 4·21 4·21	+ '45 '41 '37 '33 '29	4·23 4·22 4·22 4·22	+ ·54 ·50 ·46 ·42 ·38	4·24 4·23 4·23 4·23 4·22	+ ·62 ·59 ·55 ·52 ·48	4·25 4·25 4·24 4·24 4·23	+ ·71 ·68 ·64 ·61 ·58	4·27 4·26 4·26 4·25 4·25
40 42 44 46 48	+ ·05 + ·01 - ·04 ·09 ·14	4·20 4·20 4·21 4·21 4·21	+ ·15 ·11 ·06 + ·02 - ·03	4·2I 4·20 4·2I 4·2I 4·2I	+ ·25 ·21 ·17 ·12 ·08	4·21 4·21 4·21 4·21	+ ·35 ·31 ·27 ·23 ·19	4·22 4·21 4·21 4·21	+ '45 '41 '38 '34 '30	4·23 4·22 4·22 4·22	+ ·54 ·51 ·48 ·45 ·42	4·24 4·24 4·23 4·23 4·23
50 52 54 56 58	- ·20 ·26 ·32 ·38 ·45	4·21 4·21 4·22 4·22 4·23	- ·08 ·13 ·19 ·25 ·31	4.21 4.21 4.21 4.21 4.22	+ ·03 - ·01 ·06 ·11 ·17	4·21 4·20 4·21 4·21 4·21	+ ·15 ·11 ·07 + ·02 - ·03	4·2I 4·2I 4·2I 4·2I 4·2I	+ ·27 ·23 ·19 ·15 ·11	4·21 4·21 4·21 4·21 4·21	+ ·38 ·35 ·32 ·29 ·25	4·22 4·22 4·22 4·22 4·22

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 77 LATITUDE 18°.

	1	- ·	DECLIN		N—SAM		AME AS		TITUDE			1
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 24 14·5 5 40 10·3 5 31 26·5 5 22 44·0 5 14 2·9	s. +1·44 1·19 1·15 1·10	5 23 50·0 5 15 6·3	I·19 I·14	H. M. S. 6 27 10·0 5 42 33·3 5 33 43·7 5 24 55·6 5 16 9·1	s. + 1·48 1·19 1·14 1·09	H. M. S. 6 28 39·6 5 43 45·0 5 34 52·0 5 26 1·0 5 17 11·3	s. +1·50 1·19 1·14 1·08 1·03	H. M. S. 6 30 10.4 5 44 56.6 5 36 0.3 5 27 5.8 5 18 13.0	s. +1·52 1·19 1·14 1·08 1·02	H. M. S. 6 31 42.6 5 46 8.5 5 37 8.6 5 28 10.5 5 19 14.1	s. + 1·55 1·20 1·13 1·07
18 20 22 24 26	5 5 22·9 4 56 44·1 4 48 6·3 4 39 29·5 4 30 53·6		5 6 23.8 4 57 42.5 4 49 2.3 4 40 23.2 4 31 45.1	+1.01 .96 .92 .88	5 7 23.8 4 58 39.9 4 49 57.1 4 41 15.6 4 32 34.9	+ ·99 ·95 ·90 ·86 ·82	5 8 23·I 4 59 36·3 4 50 50·8 4 42 6·4 4 33 23·I	+ ·98 ·93 ·88 ·83 ·79	5 9 21.6 5 0 31.7 4 51 43.2 4 42 55.8 4 34 9.6	+ ·97 ·91 ·86 ·81 ·76	5 10 19·4 5 1 26·2 4 52 34·4 4 43 43·8 4 34 54·4	+ ·96 ·90 ·84 ·79 ·73
28 30 31 32 33	4 22 18·6 4 13 44·4 4 9 27·6 4 5 11·0 4 0 54·5	+ ·84 ·80 ·79 ·77 ·75	4 14 31.5	+ ·80 ·77 ·75 ·73 ·71	4 23 55·3 4 15 16·5 4 10 57·5 4 6 38·6 4 2 20·0	+ ·77 ·73 ·71 ·69 ·67	4 24 40·8 4 15 59·4 4 11 39·0 4 7 19·0 4 2 59·0	+ ·74 ·70 ·67 ·65 ·63	4 25 24·4 4 16 40·2 4 12 18·4 4 7 56·9 4 3 35·5	+ ·71 ·66 ·64 ·61 ·59	4 26 6·1 4 17 18·8 4 12 55·5 4 8 32·4 4 4 9·5	+ ·68 ·62 ·60 ·57 ·54
34 35 36 37 38	3 56 38·2 3 52 22·1 3 48 6·1 3 43 50·3 3 39 34·6		3 57 21·2 3 53 4·0 3 48 47·0 3 44 30·2 3 40 13·6	+ ·69 ·67 ·66 ·64 ·62	3 58 1·5 3 53 43·2 3 49 25·1 3 45 7·2 3 40 49·4	+ ·65 ·63 ·61 ·59 ·57	3 58 39·2 3 54 19·7 3 50 0·3 3 45 41·1 3 41 22·1	+ ·61 ·58 ·56 ·54 ·52	3 59 14·4 3 54 53·4 3 50 32·6 3 46 12·0 3 41 51·6	+ ·56 ·54 ·51 ·49 ·46	3 59 46·9 3 55 24·4 3 51 2·1 3 46 39·9 3 42 18·0	+ ·52 ·49 ·46 ·44 ·41
39 40 41 42 43	3 35 19·1 3 31 3·8 3 26 48·5 3 22 33·4 3 18 19·5	•60	3 35 57·I 3 3I 40·8 3 27 24·5 3 23 8·5 3 18 52·6	+ ·60 ·59 ·57 ·55 ·54	3 36 31·8 3 32 14·3 3 27 57·0 3 23 39·9 3 19 22·8	-47	3 37 3·2 3 32 44·5 3 28 25·9 3 24 7·5 3 19 49·2	·4 I	3 37 31·4 3 33 11·2 3 28 51•2 3 24 31·4 3 20 11·7	·37 ·34	3 37 56·1 3 33 34·5 3 29 12·9 3 24 51·5 3 20 30·2	+ ·38 ·36 ·33 ·30 ·27
44 45 46 47 48	3 14 3.6 3 9 48.9 3 5 34.3 3 1 19.8 2 57 5.4	·54 ·53	3 14 36·8 3 10 21·1 3 6 5·5 3 1 50·1 2 57 34·8	+ ·52 ·50 ·48 ·47 ·45	3 15 5.9 3 10 49.1 3 6 32.5 3 2 15.9 2 57 59.5	+ ·45 ·43 ·41 ·39 ·37	3 15 31·1 3 11 12·9 3 6 55·1 3 2 37·2 2 58 19·5	+ ·38 ·36 ·34 ·32 ·29	3 2 53·9 2 58 34·8	+ ·32 ·29 ·26 ·24 ·21	3 16 9·0 3 11 47·9 3 7 26·9 3 3 5·9 2 58 45·1	+ ·25 ·22 ·19 ·16 ·13
49 50 51 52 53	2 48 37·0 2 44 22·8 2 40 8·8 2 35 54·8	·50 ·49 ·47 ·46	2 49 4·5 2 44 49·5 2 40 34·6 2 36 19·7	+ ·43 ·42 ·40 ·38 ·37	2 49 27.0 2 45 10.8 2 40 54.8 2 36 38.8	.27		+ ·27 ·25 ·22 ·20 ·17	2 54 15·6 2 49 56·5 2 45 37·5 2 41 18·6 2 36 59·7	·16 ·13 ·10	2 45 42·7 2 41 22·0 2 37 I·3	+ ·10 ·07 ·04 + ·01 - ·02
54 55 56 57 58	2 3I 4I·I 2 27 27·4 2 23 13·8 2 19 0·2 2 14 46·7	·43 ·42	2 32 5·0 2 27 50·3 2 23 35·8 2 19 21·3 2 15 6·9		2 32 22·9 2 28 7·1 2 23 51·4 2 19 35·8 2 15 20·1	+ ·25 ·23 ·21 ·18 ·16	2 19 43.4	+ ·15 ·12 ·10 ·07 ·04	2 32 40·8 2 28 21·9 2 24 3·1 2 19 44·3 2 15 25·4	.04	2 32 40·5 2 28 19·7 2 23 58·9 2 19 38·1 2 15 17·1	- ·06 ·09 ·13 ·16 ·20
		V	ARIATIO		O 1' OF	LATI			1			
Alt.	L. 18°	A.	L. 19°	A.	L. 20°	A.	L. 21°	Α.	L. 22°	A.	L. 23°	Α.
0 4 8 12 16	s. +1·44 - 1·34 1·24 1·15 1·06	s. -4·44 4·41 4·38 4·36 4·34	s. +1·53 - 1·42 1·32 1·23 1·15	s. -4·47 4·44 4·41 4·38 4·36	s. +1·62 - 1·51 1·41 1·31 1·23	s. -4·51 4·47 4·43 4·40 4·38	s. +1·71 - 1·60 1·49 1·40 1·32	s. -4·54 4·50 4·46 4·43 4·41	s. +1·80 - 1·69 1·58 1·49 1·40	s. -4·57 4·53 4·49 4·46 4·43	s. +1·89 - 1·78 1·67 1·58 1·49	s. -4·61 4·56 4·52 4·49 4·46
20 22 24 26 28	+ ·98 ·94 ·91 ·87 ·84	4·32 4·31 4·30 4·29 4·29	+1.07 1.03 .99 .96	4·34 4·33 4·31 4·31	+1·15 1·12 1·08 1·05 1·01	4·36 4·35 4·34 4·33	+ 1·24 1·20 1·17 1·13 1·10	4·38 4·37 4·36 4·35 4·35	+ 1·33 1·29 1·26 1·22 1·19	4·41 4·40 4·39 4·38 4·37	+1·41 1·38 1·35 1·32 1·29	4·44 4·43 4·42 4·41 4·40
30 32 34 36 38	+ ·80 ·77 ·74 ·70 ·67	4·28 4·27 4·27 4·26 4·26	+ ·89 ·86 ·83 ·80 ·77	4·30 4·29 4·28 4·28	+ ·98 ·95 ·92 ·90 ·87	4·32 4·31 4·30 4·30	+ 1.07 1.04 1.02 .99 .97	4·34 4·33 4·32 4·31	+ 1·17 1·14 1·11 1·09 1·07	4·36 4·36 4·35 4·34 4·34	+ 1·26 1·23 1·21 1·19 1·17	4·39 4·38 4·38 4·37 4·36
40 42 44 46 48	+ ·64 ·61 ·59 ·56	4.25 4.25 4.25 4.24 4.24	+ ·74 ·72 ·69 ·66 ·64	4·27 4·27 4·26 4·26 4·25	+ ·84 ·82 ·80 ·77 ·75	4·28 4·28 4·28 4·27	+ ·95 ·92 ·90 ·88 ·87	4·30 4·30 4·30 4·30	+ 1.05 1.03 1.01 1.00 .98	4·33 4·33 4·32 4·32	+1·15 1·13 1·12 1·11 1·10	4·36 4·35 4·35 4·35
50 52 54 56 58	+ ·50 ·47 ·45 ·42 ·39	4·24 4·23 4·23 4·23	+ ·62 ·60 ·57 ·55 ·53	4·25 4·25 4·24 4·24 4·24	+ ·73 ·72 ·70 ·69 ·67	4·27 4·27 4·26 4·26 4·26	+ ·85 ·84 ·83 ·82 ·82	4·29 4·29 4·29 4·29	+ •97 •97 •96 •96 •96	4·32 4·31 4·31 4·31 4·31	+ 1.09 1.09 1.09 1.11	4·35 4·34 4·35 4·35 4·35

78 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 19°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 17 40.2 5 9 11.3 5 0 42.1 4 52 12.3	s. + 1·38 1·40 1·41 1·42 1·44	H. M. S. 6 I 22.7 5 I9 3.8 5 IO 35.5 5 2 6.9 4 53 37.9	s. + 1·38 1·39 1·39 1·40 1·41	H. M. S. 6 2 45.4 5 20 26.6 5 11 58.7 5 3 30.6 4 55 2.2	s. + 1·38 1·37 1·38 1·38	H. M. S. 6 4 8.2 5 21 48.7 5 13 21.0 5 4 53.2 4 56 25.2	s. + 1·38 1·36 1·36 1·37	H. M. S. 6 5 31·1 5 23 10·0 5 14 42·3 5 6 14·6 4 57 46·9	s. + 1·38 1·35 1·35 1·35	H. M. S. 6 6 54·3 5 24 30·7 5 16 2·8 5 7 35·1 4 59 7·5	s. + 1·39 1·34 1·33 1·33
18 20 22 24 26	4 43 41.7 4 35 10.5 4 26 38.3 4 18 5.1 4 9 30.8		4 45 8·4 4 36 38·2 4 28 7·3 4 19 35·6 4 11 2·8	+ 1·43 1·45 1·47 1·49 1·51	4 46 33.5 4 38 4.1 4 29 34.3 4 21 3.8 4 12 32.4	1.45	4 47 57·0 4 39 28·4 4 30 59·4 4 22 29·8 4 13 59·6	+ 1·38 1·39 1·40 1·42 1·43	4 32 22.6 4 23 53.8	+1·36 1·36 1·37 1·38 1·40	4 50 39·8 4 42 12·0 4 33 44·1 4 25 15·9 4 16 47·3	+1·33 1·34 1·34 1·35 1·36
28 30 32 33 34	4 0 55·I 3 52 18·0 3 43 39·I 3 39 18·9 3 34 58·2	+ 1·59 1·62 1·66 1·68 1·71	4 2 29.0 3 53 53.8 3 45 17.2 3 40 58.3 3 36 38.9	1.63	4 4 0·1 3 55 26·8 3 46 52·1 3 42 34·3 3 38 16·1	+1.50 1.52 1.56 1.57 1.59	3 56 56·9 3 48 24·0	+ 1.45 1.48 1.50 1.52 1.53	3 58 24·2 3 49 52·7 3 45 36·7	+1.41 1.43 1.45 1.47 1.48	4 8 18·3 3 59 48·8 3 51 18·6 3 47 3·2 3 42 47·6	+1·37 1·39 1·41 1·42 1·43
35 36 37 38 39	3 30 37·0 3 26 15·1 3 21 52·6 3 17 29·4 3 13 5·5	+1.73 1.76 1.78 1.81 1.84	3 32 19·0 3 27 58·7 3 23 37·7 3 19 16·2 3 14 54·0	+ 1.67 1.69 1.72 1.74 1.77	3 33 57.4 3 29 38.4 3 25 18.8 3 20 58.7 3 16 38.1	1·63	3 35 32·3 3 31 14·4 3 26 56·0 3 22 37·3 3 18 18·0	1.59	3 32 46·8 3 28 29·5 3 24 11·8	+1.49 1.51 1.53 1.54 1.56	3 38 31.8 3 34 15.7 3 29 59.3 3 25 42.7 3 21 25.7	+ 1.44 1.45 1.47 1.48 1.50
40 41 42 43 44	3 8 40·8 3 4 15·2 2 59 48·7 2 55 21·2 2 50 52·7		3 10 31·1 3 6 7·5 3 1 43·1 2 57 17·9 2 52 51·6	1.83 1.86 1.90	3 12 16·9 3 7 55·1 3 3 32·5 2 59 9·3 2 54 45·2	+1.72 1.75 1.78 1.81 1.85	3 13 58·3 3 9 38·0 3 5 17·2 3 0 55·7 2 56 33·5	+ 1.65 1.68 1.70 1.73 1.76	3 15 35.4 3 11 16.5 3 6 57.1 3 2 37.2 2 58 16.7		3 17 8·4 3 12 50·7 3 8 32·6 3 4 14·0 2 59 54·9	+1.52 1.53 1.55 1.58 1.60
45 46 47 48 49	2 46 22.9 2 41 51.9 2 37 19.5 2 32 45.6 2 28 10.1		2 48 24·4 2 43 56·1 2 39 26·6 2 34 55·8 2 30 23·6	2·02 2·07 2·II	2 50 20·2 2 45 54·3 2 41 27·4 2 36 59·4 2 32 30·3	1·92 1·96 2·01	2 52 10·5 2 47 46·8 2 43 22·2 2 38 56·6 2 34 30·1	+1.79 1.83 1.86 1.90 1.94	2 53 55·5 2 49 33·7 2 45 11·1 2 40 47·8 2 36 23·5	1·77 1·80	2 55 35.4 2 51 15.2 2 46 54.5 2 42 33.0 2 38 10.9	+ 1.62 1.65 1.68 1.71 1.74
50 51 52 53 54	2 23 32·7 2 18 53·3 2 14 11·7 2 9 27·7 2 4 40·8	2.49	2 21 14·3 2 16 36·9 2 11 57·4	2·28 2·35	2 23 27·5 2 18 53·9 2 14 18·5	2·16 2·22 2·28	2 30 2·3 2 25 33·4 2 21 3·0 2 16 31·2 2 11 57·7	+1.99 2.04 2.09 2.15 2.21	2 31 58·3 2 27 32·1 2 23 4·7 2 18 36·1 2 14 6·0	1.92	2 24 59.3	+1.77 1.81 1.85 1.90 1.94

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
° 0 2 4 6	s. s. - '00 -4.23 '05 4.23 '10 4.23 '15 4.23 '20 4.23	s. s. + .08 -4.23 + .03 4.23 02 4.23 .08 4.23 .12 4.23	s. s. + ·15 -4·23 ·10 4·23 ·05 4·23 + ·01 4·23 - ·05 4·23	s. s. + ·23 -4·24 ·18 4·24 ·13 4·23 ·08 4·23 + ·03 4·23	S. S. + '31 -4'24 '26 4'24 '21 4'24 '16 4'24 '11 4'23	s. s. + ·39 -4·25 ·34 4·25 ·29 4·24 ·24 4·24 ·19 4·23
10	- ·26 4·24	- ·18 4·23	- ·10 4·23	- ·02 4·23	+ ·06 4·23	+ ·14 4·23
12	·31 4·24	·23 4·24	·15 4·23	·07 4·23	+ ·01 4·23	·09 4·23
14	·36 4·24	·28 4·24	·20 4·23	·12 4·23	- ·04 4·23	+ ·04 4·23
16	·42 4·25	·34 4·24	·25 4·24	·17 4·23	·09 4·23	- ·01 4·23
18	·48 4·26	·39 4·25	·31 4·24	·23 4·23	·14 4·23	·06 4·23
20	- ·53 4·26	- ·45 4·25	- ·36 4·24	- ·28 4·24	- ·20 4·23	- ·II 4·23
22	·59 4·27	·51 4·26	·42 4·25	·34 4·24	·25 4·24	·I7 4·23
24	·66 4·28	·57 4·27	·48 4·26	·39 -4·25	·31 4·24	·22 4·23
26	·72 4·29	·63 4·28	·54 4·26	·45 4·25	·36 4·24	·28 4·24
28	·79 4·30	·70 4·29	·60 4·27	·51 4·26	·42 4·25	·33 4·24
30	- ·86 4·31	- ·76 4·30	- ·67 4·28	- ·57 4·27	- ·48 4·25	- ·39 4·25
32	·93 4·33	·83 4·31	·74 4·29	·64 4·28	·55 4·26	·45 4·25
34	I·01 4·35	·91 4·33	·81 4·31	·71 4·29	·61 4·27	·52 4·26
36	I·09 4·37	·99 4·34	·88 4·32	·78 4·30	·68 4·28	·58 4·27
38	I·18 4·39	1·07 4·36	·96 4·34	·86 4·32	·75 4·30	·65 4·28
40	-1·28 4·42	-1·16 4·39	-1.05 4.36	- '94 4'33	- ·83 4·31	- ·72 4·29
42	1·38 4·45	1·26 4·41	1.14 4.38	1'03 4'35	·91 4·33	·80 4·30
44	1·49 4·49	1·36 4·45	1.24 4.41	1'12 4'38	I·00 4·35	·88 4·32
46	1·62 4·53	1·48 4·48	1.35 4.44	1'22 4'40	I·09 4·37	·97 4·34
48	1·75 4·58	1·61 4·52	1.47 4.48	1'33 4'43	I·20 4·40	I·07 4·36
50	-1.90 4.64	-1.75 4.58	-1.60 4.52	-1.45 4.47	-1·31 4·43	-1·17 4·39
52	2.08 4.71	1.91 4.64	1.74 4.57	1.59 4.52	1·43 4·47	1·29 4·42
54	2.28 4.80	2.09 4.72	1.91 4.64	1.74 4.57	1·57 4·51	1·42 4·46

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 79 LATITUDE 19°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 8 17.8 5 25 50.7 5 17 22.6 5 8 54.6 5 0 26.8		H. M. S. 6 9 41·6 5 27 10·2 5 18 41·5 5 10 13·1 5 1 45·0	s. +1.40 1.32 1.31 1.30	H. M. S. 6 II 5.7 5 28 29.2 5 19 59.8 5 II 30.9 5 3 2.3	1·31 1·30 1·29	H. M. S. 6 12 30·3 5 29 47·8 5 21 17·5 5 12 47·7 5 4 18·5	s. +1·41 1·30 1·29 1·27	H. M. S. 6 13 55.4 5 31 5.9 5 22 34.5 5 14 3.8 5 5 33.8	s. +1·42 1·30 1·28 1·26	H. M. S. 6 15 21 0 5 32 23 6 5 23 51 0 5 15 19 2 5 6 48 0	S. +1·43 1·29 1·27 1·25 1·23
18 20 22 24 26	4 51 59·1 4 43 31·5 4 35 3·8 4 26 35·9 4 18 7·9	+1·31 i·31 i·31 i·32 i·32	4 53 17·2 4 44 49·4 4 36 21·8 4 27 54·1 4 19 26·4	+1·29 1·29 1·29 1·29 1·29	4 54 34.0 4 46 6.0 4 37 38.2 4 29 10.5 4 20 42.8	1.26		+ I·25 I·24 I·23 I·23 I·22		+1·23 1·22 1·21 1·20 1·19	4 58 17·5 4 49 47·6 4 41 18·1 4 32 49·1 4 24 20·4	+1·21 1·20 1·18 1·17 1·16
28 30 32 33 34	4 9 39.5 4 1 10.9 3 52 41.6 3 48 26.8 3 44 11.8	+ 1·33 1·34 1·36 1·37 1·38	4 10 58·4 4 2 30·3 3 54 1·8 3 49 47·4 3 45 32·9	+1·29 1·30 1·31 1·32 1·33	4 3 47·3 3 55 19·3 3 51 5·3 3 46 51·1	+ 1·26 1·26 1·27 1·27 1·28	4 5 1.9 3 56 34.2 3 52 20.3 3 48 6.4		3 53 32·6 3 49 18·8	1.18 1.18 1.18	4 15 52·I 4 7 24·I 3 58 56·2 3 54 42·3 3 50 28·5	+1·15 1·14 1·14 1·14 1·14
35 36 37 38 39	3 39 56·6 3 35 41·2 3 31 25·7 3 27 9·8 3 22 53·7	+ I·39 I·40 I·41 I·42 I·43	3 32 48·5 3 28 33·3 3 24 18·0	1·33 1·34 1·35 1·36	3 38 22·5 3 34 8·0 3 29 53·4 3 25 38·6	1.31	3 39 38·3 3 35 24·2 3 31 10·0 3 26 55·6	1·24 1·24 1·25 1·25	3 40 51·1 3 36 37·1 3 32 23·2 3 28 9·2	1.10 1.10	3 33 33·I 3 19·2	+ 1·14 1·14 1·14 1·14 1·14
40 41 42 43 44	3 18 37·3 3 14 20·7 3 10 3·7 3 5 46·3 3 1 28·5	+ 1.45 1.46 1.48 1.50 1.52	3 11 30·5 3 7 14·1 3 2 57·4	1·41 1·43 1·44	3 17 8·5 3 12 53·2 3 8 37·6 3 4 21·8	I·34 I·36 I·37	3 18 26.6 3 14 11.9 3 9 57.0 3 5 41.9	+1·26 1·27 1·28 1·29 1·30	3 19 40·9 3 15 26·6 3 11 12·2 3 6 57·7	1.23	3 20 51·4 3 16 37·4 3 12 23·4 3 8 9·3	+ 1·14 1·15 1·15 1·16
45 46 47 48 49	2 57 10·3 2 52 51·6 2 48 32·4 2 44 12·7 2 39 52·3	1.61 1.64	2 54 22.9 2 50 5.1 2 45 46.8 2 41 28.0	1.48 1.50 1.52 1.55	2 55 49.4 2 51 32.7 2 47 15.7 2 42 58.2	1·40 1·42 1·44 1·46	2 57 II·2 2 52 55·4 2 48 39·3 2 44 23·0	1	2 58 28·2 2 54 13·2 2 49 58·0 2 45 42·6	+1.24 1.25 1.26 1.27 1.28	2 59 40·7 2 55 26·3 2 51 11·7 2 46 56·9	I·19 I·20
50 51 52 53 54	2 35 31·3 2 31 9·6 2 26 47·0 2 22 23·7 2 17 59·3	1·71 1·74 1·78	2 32 48·8 2 28 28·3	1.60 1.63	2 34 22·0 2 30 3·1	1.53	2 35 49.3	I·41 I·43 I·45	2 32 54.6	1.33	2 38 26·9 2 34 II·6	I·22 I·23 I·25

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
	+ ·47 -4·26	+ :55 -4:26	+ ·63 -4·28	+ ·7π -4·29	+ ·79 -4·30	+ ·87 -4·32
	·42 4·25	·50 4:26	·58 4·27	·66 4·28	·74 4·29	·82 4·31
	·37 4·24	·45 4:25	·52 4·26	·60 4·27	·68 4·28	·77 4·30
	·32 4·24	·40 4:25	·48 4·26	·56 4·27	·64 4·28	·72 4·29
	·27 4·24	·35 4:24	·42 4·25	·50 4·26	·58 4·27	·66 4·28
10	+ ·22 4·24	+ ·30 4·24 ·25 4·24 ·20 4·23 ·15 4·23 ·10 4·23	+ ·38 4·25	+ ·46 4·26	+ ·54 4·27	+ ·62 4·28
12	·17 4·23		·33 4·24	·41 4·25	·49 4·26	·57 4·27
14	·12 4·23		·28 4·24	·36 4·24	·44 4·25	·52 4·26
16	·07 4·23		·23 4·24	·31 4·24	·39 4·25	·47 4·26
18	+ ·02 4·23		·18 4·23	·26 4·24	·34 4·24	·42 4·25
20	- ·03 4·23	+ ·05 4·23	+ ·13 4·23	+ ·21 4·23	+ ·30 4·24	+ ·38 4·25
22	·08 4·23	·00 4·23	·08 4·23	·17 4·23	·25 4·24	·33 4·24
24	·14 4·23	- ·05 4·23	+ ·03 4·23	·12 4·23	·20 4·23	·29 4·24
26	·19 4·23	·10 4·23	- ·02 4·23	·07 4·23	·15 4·23	·24 4·24
28	·24 4·24	·16 4·23	·07 4·23	+ ·02 4·23	·10 4/23	·19 4·23
30	- ·30 4·24	- ·2I 4·23	- ·12 4·23	- ·03 4·23	+ ·05 4·23	+ ·14 4·23
32	·36 4·24	·27 4·24	·18 4·23	·08 4·23	·00 4·23	·10 4·23
34	·42 4·25	·33 4·24	·23 4·24	·14 4·23	- ·04 4·23	+ ·05 4·23
36	·48 4·26	·39 4·25	·29 4·24	·19 4·23	·10 4·23	·00 4·23
38	·55 4·27	·45 4·25	·35 4·24	·25 4·24	·15 4·23	- ·05 4·23
40	- ·62 4·27	- '51 4'26	- '41 4'25	- ·31 4·24	- ·21 4·23	- ·11 4·23
42	·69 4·28	'58 4'27	'48 4'26	·37 4·24	·27 4·24	·16 4·23
44	·77 4·30	'66 4'28	'55 4'26	·44 4·25	·33 4·24	·22 4·24
46	·85 4·32	'73 4'29	'62 4'28	·50 4·26	·39 4·25	·28 4·24
48	·94 4·33	'82 4'31	'70 4'29	·58 4·27	·46 4·25	·34 4·24
50	-1.04 4.36	- '91 4'33	- ·78 4·30	- ·65 4·28	- ·53 4·26	- ·41 4·25
52	1.15 4.38	1'01 4'35	·87 4·32	·74 4·29	·61 4·27	·48 4·26
54	1.26 4.41	1'11 4'37	·97 4·34	·83 4·31	·69 4·29	·56 4·27

80 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 19°.

DECLINATION—SAME NAME AS—LATITUDE. Decl.

Var.

Decl. Var.

15°

Decl. Var.

17°

16°

Decl. Var.

True Alt.

12°

Decl. Var.

13°

Decl. Var.

14°

				I		
0 10 12 14 16	H. M. S. S. 6 16 47·3 1·4. 1·2. 1·2. 1·2. 1·2. 1·2. 1·2. 1·2. 1·2	5 34 58·3 1·28 5 26 22·6 1·25 5 17 48·0 1·23	H. M. S. S. +1.47 5 36 15.2 1.28 5 27 37.8 1.25 5 19 1.4 1.22 5 10 26.0 1.19	H. M. S. S. +1·48 5 37 32·0 1·28 5 28 52·5 1·24 5 20 14·3 1·21 5 11 37·1 1·18	H. M. S. S. 6 22 39.9 +1.50 5 38 48.7 1.28 5 30 7.0 1.24 5 21 26.6 1.20 5 12 47.5 1.17	H. M. S. S. 6 24 10·3 +1·51 128 5 31 21·2 1·23 5 22 38·6 1·19 5 13 57·2 1·16
18 20 22 24 26	4 59 29.9 4 50 58.9 4 42 28.5 4 33 58.7 4 25 29.2 + 1.20 1.11 1.12 1.13	3 4 52 9.0 1.16 5 4 43 37.4 1.14 4 35 6.5 1.12 4 26 36.2 1.10	5 I 51·5 +1·16 4 53 I7·9 I·14 4 44 45·0 I·11 4 36 I2·9 I·09 4 27 41·4 I·07	4 28 44.9 1.04	4 46 56.2 1.07	5 5 17·0 +1·12 4 56 38·0 1·08 4 47 59·9 1·05 4 39 22·9 1·02 4 30 46·7 ·99
28 30 31 32 33	4 17 0·3 +1·1: 4 8 31·7 1·1: 4 4 17·4 1·1: 4 0 3·4 1·1: 3 55 49·4 1·0:	1 4 9 37·1 1·07 4 5 22·5 1·06 4 1 8·2 1·06	4 19 10·6 4 10 40·3 4 6 25·3 4 2 10·4 3 57 55·7 1·01	4 20 12·8 4 11 41·3 4 7 25·8 4 3 10·4 3 58 55·1 97	4 21 13.0 + .99 4 12 40.1 .96 4 8 24.0 .95 4 4 7.9 .94 3 59 52.0 .93	4 22 II·4 + ·96 4 I3 36·9 ·93 4 9 I9·9 ·9I 4 5 3·I ·90 4 0 46·5 ·89
34 35 36 37 38	3 51 35.4 +1.00 3 47 21.4 1.00 3 43 7.5 1.00 3 38 53.6 1.00 3 34 39.8 1.00	3 48 25·4 I·04 3 44 II·3 I·04 3 39 57·2 I·03 3 35 43·2 I·03		3 54 40·0 + ·96 3 50 25·0 - ·95 3 46 10·1 - ·94 3 41 55·4 - ·93 3 37 40·7 - ·93	3 55 36·3 + ·92 3 51 20·7 ·90 3 47 5·3 ·89 3 42 50·0 ·88 3 38 34·8 ·87	3 56 30·0 + ·87 3 52 13·7 ·86 3 47 57·6 ·85 3 43 41·6 ·83 3 39 25·7 ·82
39 40 41 42 43	3 30 26·0 +1·0 3 26 12·1 1·0 3 21 58·3 1·0 3 17 44·5 1·0 3 13 30·6 1·0	3 27 15.4 1.02 3 23 1.5 1.02 3 18 47.7 1.02 3 14 33.8 1.02	3 32 29.4 + .97 3 28 15.2 3 24 1.2 .96 3 19 47.2 .96 3 15 33.2 .96	3 33 26·2 + ·92 3 29 11·7 ·91 3 24 57·3 ·90 3 20 43·0 ·90 3 16 28·8 ·89	3 34 19·7 + ·86 3 30 4·7 ·85 3 25 49·9 ·85 3 21 35·1 ·84 3 17 20·5 ·83	3 35 10·0 + ·81 3 30 54·4 3 26 39·0 · ·79 3 22 23·6 · ·78 3 18 8·5 · ·77
44 45 46 47 48	3 9 16·7 +1·00 3 5 2·7 1·00 3 0 48·7 1·10 2 56 34·7 1·10 2 52 20·5 1·1	3 6 6·2 1·02 3 1 52·3 1·02 2 57 38·5 1·02 2 53 24·5 1·03	3 11 19·3 + ·95 3 7 5·5 3 2 51·6 2 58 37·7 2 54 23·9 ·95	3 12 14·6 + ·89 3 8 0·5 ·88 3 3 46·5 ·88 2 59 32·5 ·88 2 55 18·6 ·87	3 13 60 + 82 3 8 51 4 82 3 4 37 1 81 3 0 22 8 80 2 56 8 6 79	3 13 53:3 + ·76 3 9 38·4 ·75 3 5 23:5 ·74 3 1 8·7 ·73 2 56 54·0 ·72
49 50 51 52 53	2 48 6·3 +1·1: 2 43 51·9 1·1: 2 39 37·4 1·1: 2 35 22·8 1·1: 2 31 8·0 1·1:	2 44 56·7 1·04 2 40 42·6 1·04 2 36 28·4 1·05 2 32 14·2 1·05	2 50 10·1 + ·95 2 45 56·2	2 51 4.7 + .87 2 46 50.8 2 42 36.9 2 38 23.1 .86 2 34 9.3 .86	2 51 54.4 + .79 2 47 40.3 .78 2 43 26.3 .78 2 39 12.3 .77 2 34 58.4 .77	2 52 39·4 + ·71 2 48 24·9 2 44 10·5 ·69 2 39 56·1 ·69 2 35 41·9 ·68
54 55 56 57 58	2 26 53·0 + 1·10 2 22 37·8 1·10 2 18 22·3 1·10 2 14 6·6 1·2: 2 9 50·6 1·2:	2 23 45·3 1·07 2 19 30·6 1·08 2 15 15·8 1·10	2 29 0.6 + .96 2 24 46.5 .97 2 20 32.4 .98 2 16 18.2 .98 2 12 3.8 .99	2 29 55.4 + ·87 2 25 41·6 ·87 2 21 27·7 ·87 2 17 13·8 ·87 2 12 59·9 ·88	2 30 44·5 + ·77 2 26 30·6 2 22 16·8 2 18 2·9 2 13 49·1 ·76	2 31 27·7 + ·67 2 27 13·5 2 22 59·5 2 18 45·4 2 14 31·4 ·65
		VARIATION T	O 1' OF LATI	TUDE AND A	LTITUDE.	
Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.
0 4 8 12 16	s. s. + '95 -4'34 ·85 4'31 ·74 4'30 ·65 4'28 ·55 4'27	s. s. +1.04 -4.35 .93 4.33 .83 4.31 .73 4.29 .64 4.28	s. s. +1·12 -4·37 ·01 4·35 ·91 4·33 ·81 4·31 ·72 4·29	s. s. +1·20 -4·40 1·09 4·37 ·99 4·34 ·89 4·32 ·80 4·30	s. s. +1·29 -4·42 1·18 4·39 1·07 4·36 ·98 4·34 ·88 4·32	S. S. +1·37 -4·45 1·26 4·41 1·16 4·38 1·06 4·36 ·97 4·34
20 22 24 26 28	+ ·46 4·25 ·42 4·25 ·37 4·25 ·32 4·24 ·28 4·24	+ ·54 4·26 ·50 4·26 ·45 4·25 ·41 4·25 ·37 4·24	+ ·63	+ ·7I 4·29 ·67 4·28 ·62 4·28 ·58 4·27 ·54 4·26	+ ·79 4·30 ·75 4·30 ·71 4·29 ·67 4·28 ·63 4·28	+ ·88 4·32 ·84 4·31 ·80 4·30 ·76 4·30 ·72 4·29
30 32 34 36 38	+ ·23 4·24 ·19 4·23 ·14 4·23 ·09 4·23 + ·04 4·23	+ ·32 4·24 ·28 4·24 ·23 4·24 ·18 4·23 ·14 4·23	+ '41 4'25 '37 4'25 '32 4'24 '28 4'24 '24 4'24	+ ·50 4·26 ·46 4·25 ·41 4·25 ·37 4·25 ·33 4·24	+ ·59 4·27 ·55 4·26 ·51 4·26 ·47 4·25 ·43 4·25	+ ·68 4·29 ·64 4·28 ·60 4·27 ·56 4·27 ·53 4·26
40 42 44 46 48	- ·01 4·23 ·06 4·23 ·11 4·23 ·17 4·23 ·23 4·24	+ ·09 4·23 + ·04 4·23 - ·01 4·23 ·06 4·23 ·11 4·23	+ ·19 4·23 ·14 4·23 ·10 4·23 + ·05 4·23 ·00 4·23	+ ·29 4·24 ·25 4·24 ·20 4·24 ·16 4·23 ·11 4·23	+ '39 4'25 '35 4'24 '31 4'24 '27 4'24 '22 4'24	+ ·49 4·26 ·45 4·25 ·41 4·25 ·38 4·25 ·34 4·24
50 52 54 56 58	- ·29 4·24 ·35 4·24 ·42 4·25 ·50 4·26 ·58 4·27		- ·05 4·23 ·11 4·23 ·16 4·23 ·22 4·24 ·29 4·24	+ ·06 4·23 + ·02 4·23 - ·03 4·23 ·09 4·23 ·15 4·23	+ ·18 4·23 ·14 4·23 ·09 4·23 ·04 4·23 ·00 4·23	+ ·30 4·24 ·26 4·24 ·22 4·24 ·18 4·23 ·14 4·23

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 81 LATITUDE 19°.

I		-			ON—SAM		AME AS	ł	TITUDE	1		
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 25 41.7 5 41 21.8 5 32 35.2 5 23 50.0 5 15 6.3	s. + 1·53 1·27 1·23 1·19 1·15	H. M. S. 6 27 14·2 5 42 38·4 5 33 49·0 5 25 1·1 5 16 14·8	1·28 1·23 1·18	H. M. S. 6 28 47·9 5 43 55·1 5 35 2·6 5 26 11·9 5 17 22·7	S. +1·57 1·28 1·22 1·18 1·13	H. M. S. 6 30 22.9 5 45 11.8 5 36 16.1 5 27 22.3 5 18 30.1	1.22	5 46 28·8 5 37 29·6 5 28 32·4	s. + 1.62 1.28 1.22 1.17	5 47 46.0 5 38 43.I	s. + 1.64 1.29 1.22 1.16
18 20 22 24 26	4 57 42·5 4 49 2·3 4 40 23·2 4 31 45·1	·96	5 7 29·8 4 58 46·0 4 50 3·6 4 41 22·2 4 32 41·8	+ 1.09 1.05 1.01 .97 .93	5 8 35.0 4 59 48.6 4 51 3.5 4 42 19.7 4 33 37.0	•95 •90	5 9 39.4 5 0 50.2 4 52 2.4 4 43 15.8 4 34 30.4	·92 ·88	5 I 50·9 4 53 0·1 4 44 I0·6 4 35 22·3	+ 1.06 1.00 .95 .90 .85	5 II 46·3 5 2 50·7 4 53 56·7 4 45 4·0 4 36 I2·6	+ 1.04 .99 .93 .88 .82
28 30 31 32 33	4 14 31·5 4 10 13·6 4 5 56·0 4 1 38·5	∙84	4 24 2·5 4 15 24·0 4 11 5·2 4 6 46·5 4 2 28·0	·8o	4 16 14·5 4 11 54·5 4 7 34·7 4 3 15·1	+ ·86 ·83 ·80 ·78 ·76	4 25 46·1 4 17 2·8 4 12 41·6 4 8 20·5 4 3 59·7	+ ·83 ·79 ·77 ·74 ·72	4 17 49·1 4 13 26·5 4 9 4·1 4 4 41·9	+ ·80 ·75 ·73 ·71 ·68	4 27 22·4 4 18 33·3 4 14 9·2 4 9 45·3 4 5 21·6	+ ·77 ·72 ·69 ·67 ·64
37 38	3 53 4·0 3 48 47·0 3 44 30·2 3 40 13·6	·78 ·77	3 49 33·7 3 45 15·9 3 40 58·4	·75 ·74 ·72	3 54 36·5 3 50 17·5 3 45 58·7 3 41 40·1	·69 ·67	3 59 39·1 3 55 18·7 3 50 58·5 3 46 38·5 3 42 18·7	·66 ·64 ·62	3 55 58·2 3 51 36·6 3 47 15·3 3 42 54·2	+ ·66 ·63 ·61 ·59 ·56	4 0 58·2 3 56 35·0 3 52 12·0 3 47 49·1 3 43 26·5	+ ·61 ·59 ·56 ·54 ·51
39 40 41 42 43	3 31 40·8 3 27 24·5 3 23 8·5 3 18 52·6	+ ·76 ·74 ·73 ·72 ·70	3 36 41.0 3 32 23.7 3 28 6.6 3 23 49.7 3 19 32.9	+ ·70 ·69 ·67 ·66 ·64	3 33 3·3 3 28 45·2 3 24 27·2 3 20 9·4	+ ·65 ·63 ·61 ·59 ·58		·53	3 34 12·4 3 29 51·8 3 25 31·3 3 21 10·9	*49 *47 *47	3 39 4·1 3 34 41·8 3 30 19·7 3 25 57·7 3 21 35·9	+ ·49 ·46 ·43 ·41 ·38
47 48	3 10 21·1 3 6 5·5 3 1 50·1 2 57 34·8	·65 ·64	3 2 27·I 2 58 II·O	+ ·62 ·61 ·59 ·58 ·56	3 15 51.7 3 11 34.2 3 7 16.9 3 2 59.6 2 58 42.5		3 3 27·6 2 59 9·3	·45 ·43 ·41	3 3 51·1 2 59 31·5	+ ·42 ·40 ·38 ·35 ·33	3 4 9·9 2 59 48·8	+ ·36 ·33 ·30 ·28 ·25
50 51 52 53	2 53 19·6 2 49 4·5 2 44 49·5 2 40 34·6 2 36 19·7	·62 ·61 ·60 ·58	2 49 39.0 2 45 23.2 2 41 7.6 2 36 51.9	+ ·55 ·53 ·52 ·50 ·49	2 54 25.5 2 50 8.6 2 45 51.8 2 41 35.1 2 37 18.6	·43 ·41 ·40	2 54 51·1 2 50 33·1 2 46 15·1 2 41 57·3 2 37 39·5	·34 ·32 ·30	2 55 11·9 2 50 52·4 2 46 33·1 2 42 13·8 2 37 54·7	·28 ·25 ·23 ·20	3 42 24·8 2 38 4·0	+ ·22 ·19 ·16 ·13 ·11
54 55 56 57 58	2 32 5.0 2 27 50.3 2 23 35.8 2 19 21.3 2 15 6.9	·56 ·55	2 32 36·5 2 28 21·1 2 24 5·8 2 19 50·7 2 15 35·5	+ ·48 ·46 ·45 ·43 ·42	2 33 2·1 2 28 45·8 2 24 29·5 2 20 13·3 2 15 57·2		2 33 21·8 2 29 4·3 2 24 46·8 2 20 29·4 2 16 12·0	·26 ·23	2 33 35.6 2 29 16.6 2 24 57.5 2 20 38.6 2 16 19.7	·15	2 33 43·2 2 29 22·5 2 25 1·7 2 20 41·0 2 16 20·3	+ ·07 ·04 + ·01 - ·02 ·05
					O r' OF					E.		
Alt.	L. 18°	Α.	L. 19°		L. 20°	A.	L. 21°	-	L. 22°	A.	L. 23°	A.
0 4 8 12 16	1·35 1·24 1·14 1·05	s. 4·47 4·44 4·41 4·38 4·36	s. +1·55 - 1·43 1·33 1·23 1·14	s. -4·50 4·47 4·43 4·40 4·38	S. +1·64 - 1·52 1·41 1·31 1·22	s. -4·54 4·50 4·46 4·43 4·40	s. +1·73 - 1·61 1·50 1·40 1·31	s. -4·57 4·53 4·49 4·45 4·45	s. +1·83 - 1·70 1·59 1·49 1·40	s. -4.61 4.56 4.52 4.48 4.45	s. +1·92 - 1·79 1·68 1·58 1·48	s. -4.64 4.59 4.55 4.51 4.48
20 22 24 26 28	·84 ·80	4·34 4·33 4·32 4·32 4·31	+1.05 1.01 .97 .93 .89	4·36 4·35 4·34 4·33 4·32	+1·14 1·10 1·06 1·02 ·98	4·38 4·37 4·36 4·35 4·34	+1·22 1·18 1·15 1·11 1·07	4·40 4·39 4·38 4·37 4·36	+1·31 1·27 1·23 1·20 1·16	4·43 4·42 4·41 4·40 4·39	+1.40 1.36 1.32 1.29 1.26	4.45 4.44 4.43 4.42 4.41
30 32 34 36 38	·73 ·69 ·66 ·62	4·30 4·29 4·29 4·28 4·27	+ ·86 ·82 ·79 ·75 ·72	4·32 4·31 4·30 4·30 4·29	+ ·95 ·91 ·88 ·85 ·82	4·33 4·33 4·31 4·31	+1.04 1.01 .98 .95 .92	4·35 4·35 4·34 4·33 4·33	+1·13 1·10 1·07 1·04 1·02	4·38 4·37 4·36 4·36 4·35	+ 1·23 1·20 1·17 1·14 1·12	4·40 4·39 4·39 4·38 4·37
40 42 44 46 48	·55 ·52 ·48 ·45	4·27 4·27 4·26 4·26 4·25	+ ·69 ·66 ·62 ·59 ·56	4·29 4·28 4·27 4·27	+ ·79 ·76 ·73 ·70 ·68	4·30 4·30 4·29 4·29 4·28	+ ·89 ·86 ·84 ·81 ·79	4·32 4·31 4·31 4·30	+ ·99 ·97 ·95 ·93 ·91	4·34 4·33 4·33 4·33	+ 1.09 1.07 1.05 1.04 1.02	4·37 4·36 4·36 4·36 4·35
50 52 54 56 58	·38 ·35 ·31	4·25 4·25 4·24 4·24 4·24	+ ·53 ·50 ·48 ·45 ·42	4·26 4·26 4·25 4·25	+ ·65 ·63 ·60 ·58 ·56	4·28 4·28 4·27 4·27 4·27	+ •77 •75 •73 •72 •70	4·30 4·30 4·29 4·29 4·29	+ ·89 ·88 ·86 ·85 ·85	4·32 4·32 4·32 4·31	+1.00 1.00 .99	4·35 4·35 4·35 4·35 4·34

82 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 20°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 17 24.2 5 8 52.1 5 0 19.5 4 51 46.2	s. + 1·45 1·48 1·49 1·51 1·52	H. M. S. 6 I 27·3 5 I8 52·7 5 IO 21·2 5 I 49·3 4 53 I6·9	s. +1·46 1·47 1·47 1·49	H. M. S. 6 2 54·8 5 20 20·3 5 11 49·2 5 3 17·8 4 54 46·1	s. + 1·46 1·45 1·46 1·47 1·48	H. M. S. 6 4 22·3 5 21 47·1 5 13 16·3 5 4 45·3 4 56 14·1	S. + I·46 I·44 I·45 I·45	H. M. S. 6 5 50.0 5 23 13.2 5 14 42.4 5 6 11.6 4 57 40.7	s. + 1·46 1·43 1·43 1·43	5 16 7·7 5 7 36·9	s. +1·47 1·42 1·41 1·41
18 20 22 24 26	4 43 12·2 4 34 37·4 4 26 1·5 4 17 24·5 4 8 46·1	1.59 1.61	4 44 43.9 4 36 10.2 4 27 35.7 4 19 0.2 4 10 23.6	+ 1.51 1.53 1.55 1.58 1.60	4 46 14·0 4 37 41·3 4 29 7·9 4 20 33·7 4 11 58·6	I·52 I·54	4 47 42.6 4 39 10.6 4 30 38.1 4 22 5.1 4 13 31.2	+ 1.46 1.47 1.49 1.50 1.52		+ 1.44 1.45 1.46 1.47 1.48	4 50 35·2 4 42 4·2 4 33 33·0 4 25 1·4 4 16 29·5	+ 1.42 1.42 1.43 1.44 1.45
28 30 32 33 34	4 0 6·3 3 51 24·8 3 42 41·3 3 38 18·7 3 33 55·6	+ 1.68 1.72 1.76 1.79 1.81	4 I 45.7 3 53 6.4 3 44 25.4 3 40 4.2 3 35 42.4	+ 1.63 1.67 1.71 1.73 1.75	4 3 22·4 3 54 45·0 3 46 6·2 3 41 46·1 3 37 25·7	+ 1.59 1.62 1.65 1.67 1.69	3 47 43·8 3 43 24·8	+ 1·54 1·57 1·60 1·62 1·63	4 6 28·0 3 57 53·6 3 49 18·3 3 45 0·2 3 40 41·8	+ 1·50 1·52 1·55 1·56 1·58	4 7 57·0 3 59 23·8 3 50 49·8 3 46 32·5 3 42 14·9	+1.46 1.48 1.50 1.51 1.52
35 36 37 38 39	3 29 31·8 3 25 7·3 3 20 42·1 3 16 16·1 3 11 49·3	+ 1.84 1.86 1.90 1.93 1.96	3 31 20·1 3 26 57·3 3 22 33·7 3 18 9·5 3 13 44·6	+ 1.77 1.80 1.83 1.85 1.88	3 33 4·7 3 28 43·3 3 24 21·2 3 19 58·6 3 15 35·4	+ 1.71 1.73 1.76 1.78 1.81	3 21 43.6	+ 1.65 1.67 1.69 1.71 1.74	3 32 4.0	+1.59 1.61 1.63 1.65 1.67	3 25 1.6	+ 1.54 1.55 1.57 1.58 1.60
40 41 42 43 44	3 7 21·5 3 2 52·8 2 58 23·1 2 53 52·1 2 49 20·0	+1.99 2.03 2.07 2.12 2.16	2 55 56.3	+1.91 1.95 1.98 2.02 2.06	2 57 55·I	+1.84 1.87 1.90 1.94 1.97	3 12 59·6 3 8 36·6 3 4 13·0 2 59 48·7 2 55 23·5	+ 1.76 1.79 1.82 1.85 1.88	3 10 21·9 3 5 59·8 3 1 37·2	+ 1.69 1.72 1.74 1.77 1.80	3 16 22·7 3 12 2·7 3 7 42·1 3 3 21·0 2 58 59·3	+ 1.62 1.64 1.66 1.69 1.72
45 46 47 48 49	2 44 46·5 2 40 11·5 2 35 34·9 2 30 56·7 2 26 16·5		2 46 56·I 2 42 24·I 2 37 50·7 2 33 I5·8 2 28 39·3	+2·11 2·16 2·21 2·26 2·32	2 39 59.8	+2.01 2.05 2.10 2.15 2.20	2 50 57·5 2 46 30·6 2 42 2·6 2 37 33·5 2 33 3·2	+ 1.92 1.96 2.00 2.04 2.09	2 48 25·I 2 43 59·4 2 39 32·7			+ 1.74 1.77 1.80 1.84 1.87
50 51 52 53 54	2 21 34·1 2 16 49·5 2 12 2·2 2 7 12·1 2 2 18·7	+2·51 2·59 2·67 2·75 2·83	2 19 20·5 2 14 38·0 2 9 52·9	2·45 2·52	2 17 5·0 2 12 24·5	2.45	2 28 31.6 2 23 58.5 2 19 23.8 2 14 47.3 2 10 8.9	+2·14 2·19 2·25 2·31 2·38	2 26 6·2 2 21 34·8 2 17 1·8	2.18	2 32 34·2 2 28 6·8 2 23 38·3 2 19 8·6 2 14 37·4	

Alt.	L. 0° A.	L. 1 ° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
	- ·00 -4·26	+ ·08 -4·26	+ ·16 -4·26	+ ·24 -4·26	+ ·32 -4·26	+ '40 -4.27
	·05 4·26	+ ·03 4·26	·10 4·26	·18 4·26	·26 4·26	'34 4.27
	·11 4·26	- ·03 4·26	+ ·05 4·26	·13 4·26	·21 4·26	'29 4.26
	·16 4·26	·08 4·26	- ·01 4·26	·08 4·26	·15 4·26	'23 4.26
	·22 4·26	·14 4·26	·06 4·26	+ ·02 4·26	·10 4·26	'18 4.26
10	- ·27 4·27	- ·19 4·26	- ·II 4·26	- ·03 4·26	+ ·05	+ ·13 4·26
12	·33 4·27	·25 4·26	·17 4·26	·09 4·26		·07 4·26
14	·39 4·27	·30 4·27	·22 4·26	·14 4·26		+ ·02 4·26
16	·45 4·28	·36 4·27	·28 4·26	·20 4·26		- ·03 4·26
18	·51 4·29	·42 4·28	·34 4·27	·25 4·26		·09 4·26
20	- ·57 4·29	- ·48 4·28	- '40 4.27	- ·31 4·27	- ·23 4·26	- ·14 4·26
22	·63 4·30	·54 4·29	'46 4.28	·37 4·27	·28 4·26	·20 4·26
24	·70 4·31	·61 4·30	'52 4.29	·43 4·28	·34 4·27	·26 4·26
26	·77 4·32	·67 4·31	'58 4.29	·49 4·28	·41 4·27	·32 4·27
28	·84 4·34	·74 4·32	'65 4.30	·56 4·29	·47 4·28	·38 4·27
30	- ·91 4·35	- ·82 4·33	- ·72 4·31	- ·63 4·30	- ·53 4·29	- ·44 4·28
32	·99 4·37	·89 4·35	·79 4·33	·70 4·31	·60 4·30	·51 4·29
34	I·08 4·39	·97 4·37	·87 4·34	·77 4·32	·67 4·31	·57 4·29
36	I·17 4·41	I·06 4·39	·95 4·36	·85 4·34	·75 4·32	·64 4·30
38	I·26 4·44	I·15 4·41	I·04 4·38	·93 4·36	·82 4·33	·72 4·32
40	-1·36 4·47	-1·25 4·43	-1·13 4·40 1·23 4·43 1·34 4·46 1·45 4·50 1·58 4·54	-1.02 4.38	- ·9I 4·35	- ·80 4·33
42	1·48 4·50	1·35 4·46		1.11 4.40	I·00 4·37	·88 4·34
44	1·60 4·55	1·47 4·50		1.21 4.43	I·09 4·39	·97 4·37
46	1·73 4·60	1·59 4·54		1.32 4.46	I·19 4·42	I·07 4·39
48	1·88 4·65	1·73 4·59		1.44 4.49	I·31 4·45	I·17 4·42
50	-2.05 4.72	-1·89 4·66	-1.73 4.59	-1.58 4.54	-1.43 4.49	-1:29 4:45
52	2.24 4.81	2·06 4·73	1.89 4.66	1.72 4.59	1.57 4.54	1:41 4:48
54	2.47 4.92	2·27 4·82	2.07 4.73	1.89 4.66	1.72 4.59	1:56 4:53

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 83 LATITUDE 20°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 8 46·2 5 26 3·5 5 17 32·3 5 9 1·2 5 0 30·3	S. +1.47 1.41 1.40 1.40 1.39	5 27 27 8 5 18 56 0 5 10 24 6	s. +1.48 1.40 1.39 1.38 1.38	H. M. S. 6 II 43.7 5 28 51.6 5 20 19.1 5 II 47.1 5 3 15.5	s. + 1·49 1·39 1·38 1·37 1·36	H. M. S. 6 13 13·2 5 30 15·0 5 21 41·6 5 13 8·9 5 4 36·6	s. +1·49 1·38 1·37 1·35	H. M. S. 6 14 43·1 5 31 37·8 5 23 3·5 5 14 29·8 5 5 56·7	s. +1·50 1·38 1·36 1·34 1·33	H. M. s. 6 16 13.7 5 33 0.5 5 24 24.8 5 15 50.0 5 7 16.0	s. +1·51 1·37 1·35 1·33 1·31
18 20 22 24 26	4 51 59·5 4 43 28·7 4 34 57·8 4 26 26·7 4 17 55·3	+1·39 1·39 1·40 1·40 1·41	4 44 51.7 4 36 20.9 4 27 50.0	+1·37 1·37 1·37 1·38	4 37 42·3 4 29 II·5	+1·35 1·35 1·34 1·34 1·34	4 56 4·8 4 47 33·3 4 39 2·2 4 30 31·2 4 22 0·3	+1·33 1·32 1·31 1·31	4 57 24·2 4 48 52·1 4 40 20·5 4 31 49·1 4 23 18·0	+1.31 1.30 1.29 1.28 1.28	4 58 42·5 4 50 9·7 4 4I 37·3 4 33 5·4 4 24 33·8	+1·29 1·28 1·27 1·26 1·25
28 30 32 33 34	4 9 23.6 4 0 51.3 3 52 18.5 3 48 1.8 3 43 44.9		4 2 16.3	+1·38 1·39 1·41 1·41 1·42	4 12 9.7 4 3 38.7 3 55 7.3 3 50 51.5 3 46 35.6	+1·35 1·35 1·36 1·37 1·37	4 13 29·5 4 4 58·6 3 56 27·7 3 52 12·1 3 47 56·5	+1·31 1·31 1·32 1·32 1·32	4 14 47·1 4 6 16·2 3 57 45·5 3 53 30·0 3 49 14·6	+1.27 1.27 1.27 1.27 1.28	4 16 2·5 4 7 31·5 3 59 0·6 3 54 45·2 3 50 29·8	+ 1·24 1·23 1·23 1·23 1·23
35 36 37 38 39	3 39 27·8 3 35 10·4 3 30 52·8 3 26 34·9 3 22 16·7		3 36 38·5 3 32 21·6 3 28 4·5	+1·43 1·44 1·45 1·46 1·47	3 29 30.5	+1·38 1·39 1·39 1·40 1·41	3 43 40·8 3 39 25·0 3 35 9·1 3 30 53·1 3 26 36·9	+ 1.33 1.33 1.34 1.35 1.35	3 44 59·I 3 40 43·5 3 36 27·9 3 32 I2·2 3 27 56·5	1.29	3 46 14·4 3 41 59·0 3 37 43·5 3 33 28·1 3 29 12·5	+1·23 1·23 1·23 1·24 1·24
40 41 42 43 44	3 17 58·1 3 13 39·2 3 9 19·8 3 5 0·1 3 0 39·8	+ 1.55 1.57 1.59 1.61 1.63	3 15 11·5 3 10 53·2 3 6 34·6	+1.49 1.50 1.52 1.54 1.56		+1·42 I·44 I·45 I·47 I·48	3 22 20·6 3 18 4·1 3 13 47·4 3 9 30·6 3 5 13·4		3 23 40·6 3 19 24·6 3 15 8·5 3 10 52·2 3 6 35·8	1·31 1·32	3 24 57·0 3 20 41·3 3 16 25·6 3 12 9·7 3 7 53·8	+ 1·24 1·25 1·25 1·26 1·27
45 46 47 48 49	2 56 19·0 2 51 57·7 2 47 35·8 2 43 13·2 2 38 49·8	1.77	2 53 36·2 2 49 15·8 2 44 54·8 2 40 33·3	+1.58 1.60 1.62 1.65 1.68	2 55 9·7 2 50 50·6 2 46 31·1	+1.50 1.52 1.54 1.56 1.58	3 0 56·0 2 56 38·3 2 52 20·3 2 48 2·0 2 43 43·2	+ 1.42 1.44 1.45 1.47 1.49	3 2 19·1 2 58 2·2 2 53 45·1 2 49 27·7 2 45 10·1	+1.35 1.36 1.37 1.39 1.40	3 3 37.7 2 59 21.5 2 55 5.1 2 50 48.5 3 46 31.6	+1·27 1·28 1·29 1·30 1·32
50 51 52 53 54	2 34 25.7 2 30 0.7 2 25 34.7 2 21 7.8 2 16 39.6	1.88 1.93	2 36 11·1 2 31 48·1 2 27 24·4 2 22 59·8 2 18 34·2	+1.71 1.74 1.77 1.81 1.85	2 29 7·5 2 24 45·0	+ 1.61 1.64 1.67 1.70 1.73	2 39 24·I 2 35 4·4 2 30 44·3 2 26 23·5 2 22 2·2		2 40 52·I 2 36 33·7 2 32 I5·0 2 27 55·7 2 23 36·0	+ 1·42 1·44 1·46 1·48 1·51		+1.33 1.35 1.36 1.38 1.40

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
° 0 2 4 6 8	s. s.					
	+ ·48 -4·28	+ ·55 -4·29	+ ·64 -4·30	+ '72 -4'31	+ ·80 -4·33	+ ·88 -4·35
	·42 4·28	·50 4·29	·58 4·30	'66 4'31	·74 4·32	·83 4·34
	·37 4·27	·45 4·28	·53 4·29	'61 4'30	·69 4·31	·77 4·33
	·31 4·27	·39 4·28	·47 4·28	'55 4'29	·64 4·31	·71 4·32
	·26 4·26	·34 4·27	·42 4·28	'50 4'29	·58 4·30	·66 4·31
10	+ ·2I 4·26	+ ·29 4·27	+ ·37 4·27	+ '45 4'28	+ ·53 4·29	+ ·61 4·30
12	·15 4·26	·23 4·26	·32 4·27	'40 4'27	·48 4·28	·56 4·29
14	·10 4·26	·18 4·26	·26 4·26	'34 4'27	·43 4·28	·51 4·29
16	+ ·05 4·26	·13 4·26	·21 4·26	'29 4'27	·37 4·27	·46 4·28
18	- ·0I 4·26	·08 4·26	·16 4·26	'24 4'26	·32 4·27	·41 4·27
20	- ·06 4·26	+ ·02 4·26	+ ·II 4·26	+ ·19 4·26	+ ·27 4·26	+ ·36 4·27
22	·11 4·26	- ·03 4·26	·05 4·26	·14 4·26	·22 4·26	·31 4·27
24	·17 4·26	·08 4·26	+ ·00 4·26	·08 4·26	·17 4·26	·26 4·26
26	·23 4·26	·14 4·26	- ·05 4·26	+ ·03 4·26	·12 4·26	·21 4·26
28	·29 4·26	·20 4·26	·II 4·26	- ·02 4·26	·07 4·26	·15 4·26
30	- ·35 4·27	- ·26 4·26	- ·16 4·26	- ·08 4·26	+ ·01 4·26	+ ·IO 4·26
32	·41 4·28	·32 4·27	·22 4·26	·13 4·26	- ·04 4·26	·05 4·26
34	·48 4·28	·38 4·27	·28 4·27	·19 4·26	·10 4·26	+ ·00 4·26
36	·54 4·29	·44 4·28	·35 4·27	·25 4·26	·15 4·26	- ·06 4·26
38	·61 4·30	·51 4·29	·41 4·27	·31 4·27	·21 4·26	·II 4·26
40	- ·69 4·31	- ·58 4·30	- ·48 4·28	- ·38 4·27	- ·27 4·26	- ·17 4·26
42	·77 4·32	·66 4·31	·55 4·29	·44 4·28	·34 4·27	·23 4·26
44	·85 4·34	·74 4·32	·63 4·30	·51 4·29	·40 4·28	·30 4·27
46	·95 4·36	·82 4·34	·71 4·31	·59 4·30	·47 4·28	·36 4·27
48	I·04 4·38	·92 4·35	·79 4·33	·67 4·31	·55 4·29	·43 4·28
50	-1·15 4·41	-1.02 4.38	- ·88 4·35	- ·76 4·32	- ·63 4·30	- ·51 4·29
52	1·27 4·44	1.12 4.40	·98 4·37	·85 4·34	·72 4·32	·59 4·30
54	1·40 4·48	1.24 4.43	I·09 4·40	·95 4·36	·81 4·33	·67 4·31

84 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 20°.

DECLINATION—SAME NAME AS—LATITUDE.

True	100	Decl.		Decl.	N—SAM	Decl.		Decl.	TITUDE.	Decl.		Decl.
Alt.	12°	Var.	13°	Var.	14°	Var.	15°	Var.	16°	Var.	17°	Var.
0 10 12 14 16	H. M. S. 6 17 44.9 5 34 22.8 5 25 45.7 5 17 9.6 5 8 34.4	1.30	H. M. S. 6 19 16·8 5 35 44·8 5 27 6·2 5 18 28·6 5 9 51·9	s. +1·54 1·36 1·34 1·31 1·28	H. M. S. 6 20 49·6 5 37 6·7 5 28 26·3 5 19 47·0 5 11 8·7	1·33 1·30 1·27		I·33			H. M. S. 6 25 33.3 5 41 11.7 5 32 24.7 5 23 39.1 5 14 54.9	s. +1.60 1.36 1.32 1.28 1.24
18 20 22 24 26	4 59 59·8 4 51 26·0 4 42 52·7 4 34 20·0 4 25 47·8	I·24 I·23 I·22	5 I 16·I 4 52 4I·0 4 44 6·7 4 35 33·0 4 27 0·0	+1.26 1.24 1.22 1.20 1.19	5 2 31·4 4 53 55·0 4 45 19·4 4 36 44·5 4 28 10·3	1.19	5 3 45.8 4 55 7.8 4 46 30.7 4 37 54.5 4 29 19.0	1.13	4 47 40·8 4 39 2·9 4 30 26·0	1·16 1·13	5 6 12·0 4 57 30·2 4 48 49·6 4 40 10·0 4 31 31·2	+ 1·20 1·17 1·14 1·11 1·07
28 30 31 32 33	4 17 16·0 4 8 44·5 4 4 28·8 4 0 13·3 3 55 57·8	1.10 1.10	4 18 27.4 4 9 55.2 4 5 39.3 4 1 23.5 3 57 7.7	+ 1·17 1·16 1·15 1·15 1·14	4 19 36·8 4 11 3·8 4 6 47·4 4 2 31·3 3 58 15·1	+1·14 1·12 1·12 1·11 1·10	4 20 44·2 4 12 10·1 4 7 53·3 4 3 36·6 3 59 20·0	+1·11 1·09 1·08 1·07 1·06	4 8 56·9 4 4 39·6 4 0 22·5	1.04 1.03 1.02	4 5 40·3 4 I 22·4	+ 1.04 1.02 1.00 .99
34 35 36 37 38	3 51 42·3 3 47 26·8 3 43 11·4 3 38 56·0 3 34 40·6	1.18 1.18	3 52 52·0 3 48 36·4 3 44 20·9 3 40 5·4 3 35 50·0	+1·14 1·13 1·13 1·13	3 53 59·1 3 49 43·2 3 45 27·4 3 41 11·7 3 36 56·0	1.09 1.08 1.08 1.07	3 55 3.6 3 50 47.3 3 46 31.1 3 42 15.0 3 37 59.0	I·04 I·03 I·02	3 56 5.5 3 51 48.6 3 47 31.9 3 43 15.4 3 38 58.9	·99 ·98 ·97	3 57 4·8 3 52 47·3 3 48 29·9 3 44 12·7 3 39 55·7	+ ·97 ·95 ·94 ·93 ·92
39 40 41 42 43	3 30 25·2 3 26 9·8 3 21 54·3 3 17 38·8 3 13 23·3	1·19 1·19	3 14 32 9	+1:13 1:12 1:12 1:13 1:13	3 32 40·5 3 28 24·9 3 24 9·4 3 19 54·0 3 15 38·5	1.07 1.06 1.06 1.06	3 33 43·1 3 29 27·3 3 25 11·6 3 20 55·9 3 16 40·3	1.00 1.00	3 30 26·3 3 26 10·2 3 21 54·2 3 17 38·3	·94 ·93	3 35 38·8 3 31 22·0 3 27 5·4 3 22 48·8 3 18 32·5	+ ·91 ·90 ·89 ·88 ·87 + ·86
44 45 46 47 48	3 9 7.7 3 4 52.0 3 0 36.2 2 56 20.3 2 52 4.3		3 10 17·4 3 6 1·9 3 1 46·4 2 57 30·9 2 53 15·2	+1·13 1·13 1·14 1·14	3 II 23·I 3 7 7·7 3 2 52·3 2 58 36·9 2 54 2I·4	1.06 1.06 1.06	3 12 24.7 3 8 9.2 3 3 53.8 2 59 38.3 2 55 22.9	+ ·99 ·99 ·99 ·99	3 13 22·4 3 9 6·6 3 4 51·0 3 0 35·3 2 56 19·7	-	3 5 44.0 3 1 27.9 2 57 11.9	·85 ·85 ·84 ·83
49 50 51 52 53	2 47 48·1 2 43 31·7 2 39 15·2 2 34 58·5 2 30 41·5	1·27 1·28	2 48 59·5 2 44 43·5 2 40 27·6 2 36 II·7 2 3I 55·4	1·16 1·17 1·18	2 50 6·0 2 45 50·3 3 41 34·9 2 37 19·2 2 33 3·5	1.07 1.08 1.09	2 38 21·3 2 34 5·8	+ ·98 ·99 ·99 ·99	2 52 4·2 2 47 48·7 2 43 33·3 2 39 17·8 2 35 2·4	·90 ·90 ·90		·82 ·81 ·81 ·80
54 55 56 57 58	2 26 24·2 2 22 6·6 2 17 48·8 2 13 30·5 2 9 11·8	1·33	2 27 39·0 2 23 22·3 2 19 5·5 2 14 48·3 2 10 30·9	+1·19 1·21 1·22 1·24 1·26	2 28 47·6 2 24 31·7 2 20 15·5 2 15 59·3 2 11 42·7	+1.09 1.10 1.11 1.13 1.14	2 29 50·3 2 25 34·7 2 21 19·1 2 17 3·4 2 12 47·5		2 30 47·0 2 26 31·6 2 22 16·2 2 18 0·8 2 13 45·3	·90 ·90	2 31 37·9 2 27 22·4 2 23 6·9 2 18 51·5 2 14 36·5	+ ·80 ·80 ·79 ·79 ·79
		v	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 12°	Α.	L. 13°	A.	L. 14°	Α.	L. 15°	Α.	L. 16°	Α.	L. 17°	A.
8 12 16	s. + ·97 - ·85 ·74 ·64 ·54	s. -4·36 4·34 4·32 4·30 4·29	s. +1.05 - .93 .83 .72 .62	s. -4·38 4·36 4·34 4·32 4·30	1·02 ·91 ·80 ·70	s. -4·40 4·38 4·35 4·33 4·31	1·10 ·99 ·89 ·79	s. -4·43 4·40 4·37 4·35 4·33	1·19 1·07 ·97 ·87	s. -4·45 4·42 4·39 4·36 4·34	1·27 1·16 1·05 ·96	s. -4·48 4·44 4·41 4·38 4·36
20 22 24 26 28	+ '44 '39 '34 '29 '24	4·28 4·27 4·27 4·27 4·26	+ ·52 ·48 ·43 ·38 ·33	4·29 4·28 4·28 4·27 4·27	+ ·61 ·56 ·54 ·47 ·42	4·30 4·30 4·29 4·28 4·28	+ ·69 ·64 ·60 ·55 ·51	4·31 4·30 4·30 4·29 4·29	+ ·78 ·73 ·68 ·64 ·60	4·33 4·32 4·31 4·30 4·30	+ ·86 ·82 ·77 ·73 ·68	4·34 4·34 4·32 4·31
30 32 34 36 38	+ ·19 ·14 ·09 + ·04 - ·01	4·26 4·26 4·26 4·26 4·26	+ ·28 ·23 ·18 ·13 ·08	4·26 4·26 4·26 4·26 4·26	+ ·37 ·32 ·28 ·23 ·18	4·27 4·27 4·26 4·26 4·26	+ ·46 ·41 ·37 ·32 ·28	4·28 4·28 4·27 4·27 4·27	+ ·55 ·51 ·46 ·42 ·37	4·29 4·28 4·28 4·27	+ ·64 ·60 ·56 ·51 ·47	4·31 4·30 4·29 4·29
40 42 44 46 48	- ·07 ·13 ·19 ·25 ·31	4·26 4·26 4·26 4·26 4·27	+ ·03 - ·02 ·08 ·14 ·20	4·26 4·25 4·26 4·26 4·26	+ ·13 ·08 + ·03 - ·03 ·08	4·26 4·26 4·26 4·26 4·26	+ ·23 ·18 ·13 ·08 + ·03	4·26 4·26 4·26 4·26 4·26	+ ·33 ·28 ·24 ·19 ·14	4·27 4·26 4·26 4·26	+ ·43 ·39 ·35 ·30 ·26	4·28 4·27 4·27 4·27 4·26
50 52 54 56 58	- ·38 ·46 ·53 ·62 ·71	4·27 4·28 4·29 4·30 4·31	- ·26 ·33 ·40 ·48 ·56	4·27 4·28 4·28 4·29	- ·14 ·20 ·27 ·34 ·41	4·26 4·26 4·26 4·27 4·28	- ·02 ·08 ·14 ·20 ·27	4·26 4·26 4·26 4·26 4·26	+ ·10 + ·04 - ·01 ·06 ·12	4·26 4·26 4·26 4·26 4·26	+ ·21 ·17 ·12 ·07 ·02	4·26 4·26 4·26 4·26 4·25

DECLINATION—SAME NAME AS—LATITUDE.

Decl. Decl. Decl. Decl. Decl. Decl. True 18° 19° 20° 21° 22° 23° Var. Var. Var. Var. Var. Alt. H. M. s. H. M. s. H. M. 6 33 49·5 5 48 I·I +1.62 +1.64 6 30 27.0 +1.66 +1·74 1·38 6 27 10.0 6 28 47.9 6 32 +1.69 +1.71 6 35 33.0 0 45 16.8 1.36 46 38.9 1.37 5 49 23.8 1.37 IO 42 33.3 1.36 5 43 55·I 1.36 5 5 5 38 58.9 5 40 17.8 1.31 5 2.6 1.31 5 37 40.2 1.31 12 33 43.7 1.31 36 21.4 1.31 1.31 28 43.4 58.8 24 55.6 1.27 26 11.9 1.27 27 27.7 1.26 1.26 5 29 1.25 5 31 14.1 1.25 1.19 16 5 18 35.7 1.21 5 19 48.4 1.21 5 21 0.5 1.20 5 22 12.4 9.1 1.23 5 17 22.7 7 23.8 8 35:0 +1.18 4.0 +1.14 18 5 5 +1.17 5 10 55.0 +1.15 5 12 5 13 12.5 +1.19 9 45.3 +1.14 58 39.9 59 48.6 4 14.4 T-08 1.12 1.14 0 56.4 1.12 5 2 3.3 1.11 2 3 9.2 1.09 5 20 51 3.5 1.10 4 52 8.8 1.08 4 53 12.9 1.06 4 54 τ6.0 1.04 4 55 17.9 1.02 22 4 49 1.12 4 41 15.6 1.08 42 19.7 **1.**06 4 43 22.5 1.03 4 44 24.0 1.01 4 24.1 .99 4 46 22.9 .97 1.05 4 33 37.0 .99 4 35 36.2 4 36 26 4 32 34.9 1.02 4 34 37.4 .97 33.5 ·94 4 37 29.3 .92 -89 4 28 37.0 .86 28 +1.01 .98 4 26 49.7 ·92 23 55.3 4 24 4 25 53.4 •95 4 27 44.3 55.2 4 18 15 16.5 10.4 ·91 ·89 .98 16 4 17 10.4 4 12 49.3 18 56·I .85 46.0 ·81 30 4 14.5 .95 4.3 4 19 13 42.0 .86 4 14 32.5 82 4 15 20.8 4 10 57.5 .97 •93 .79 31 4 11 54.5 4 38.6 8 28.4 ٠88 .84 ·80 4 10 .76 .95 9 19.9 4 10 9.1 56·o 32 34.7 ·OI .86 4 4 58.0 82 4 46.0 .78 6 31.4 2 20.0 •90 7.7 5 14 .74 33 4 •94 4 3 15.1 4 .84 58 47.3 36.4 ·80 34 3 1.5 .92 3 58 55.7 .88 3 59 0 I 23.0 .75 2 7·I .71 .78 54 36.5 ·86 3 55 27·I ·82 3 56 15·1 3 57 0.3 -68 35 3 53 43.2 ·91 3 .73 3 57 43.0 ·90 3 50 17·5 ·88 3 45 58·7 .76 36 3 49 25.1 -85 ·80 3 51 53·9 3 52 ·71 3 53 19·1 ·69 3 48 55·5 3 51 7.1 37.9 ٠66 .78 3 47 33.0 3 48 .83 47.3 3 46 15.7 .64 7.2 .74 37 3 45 38 .87 ·66 3 44 32·I .82 3 42 27.7 .72 3 43 53.7 ·61 3 40 49.4 3 41 40.1 ·77 3 43 12·2 3 36 31.8 .86 3 37 21.6 ·80 3 38 8.2 3 38 51.6 31.8 ٠64 3 40 8.8 •75 .70 3 39 •59 30 ·84 •79 •77 •76 33 49.0 .73 34 31.3 ·68 10.2 .62 3 35 45.8 32 14.3 3 33 3·3 3 28 45·2 3 35 40 3 3 3 .57 •83 ·66 3 48.8 27 57.0 3 30 11.1 .60 41 3 3 29 29.9 ·7I 30 3 31 23.0 •54 ·82 26 27.6 •58 42 3 23 39.9 3 24 27.2 3 25 11.0 .70 3 25 51.1 .64 3 3 27 0.4 .51 3 20 52.2 43 19 22.8 ·81 3 20 9.4 .74 •68 3 21 31.3 •62 3 22 6.5 •55 3 22 37.9 .49 3 18 15.6 45.6 .46 3 15 .80 3 15 51.7 3 16 33.7 .66 3 17 11.6 ·60 5.9 + + .73 3 17 .53 44 ·79 •58 •72 ∙65 45 3 IO 49'I 3 II 34.2 3 12 15.2 3 12 52.1 3 13 24.9 ·51 3 13 53.4 44 46 16.8 8 32.7 6 32.5. .70 •56 7 3 7 57.0 ·63 3 3 4.3 .49 42 3 9 31.5 •69 2 15.9 •76 59.6 38.8 .62 4 13.6 3 9.6 •54 .47 3 .39 48 57 59.5 .75 2 58 42.5 ·68 2 59 20.8 60 2 59 54.5 0 23.6 .52 3 47.9 •36 .44 13 -66 2 55 .58 2 55 35.6 2 56 49 2 53 43.2 .74 2 54 25°5 50 8°6 2.9 .50 3.4 .42 2 56 26.3 .34 ٠65 ·57 2 51 16·8 4.8 50 2 49 27.0 .73 2 50 2 50 45.2 ·48 2 51 43·4 •40 2 52 .31 51.8 10.8 .73 2 45 .64 2 46 27.6 •55 2 46 58.2 •47 2 .38 2 47 43.5 51 2 45 47 23.5 .29 .63 54.8 2 42 10.1 2 42 39.6 3.7 40 2 41 35.1 .54 ·45 2 43 *35 2 43 22.2 .26 .62 2 36 38.8 2 37 18.6 2 38 2 38 2 39 53 ·71 2 37 52.7 .52 21.2 •43 .23 44 · I •33 1.1 ·60 ·4I 2 32 22-9 .70 2 2.1 2 33 ·51 2 34 2 2 33 35.5 3.0 34 .31 34 40.0 ·2I 2 28 .69 28 45.8 ·59 ·58 2 29 18.3 2 29 2 ·18 7·I 2 •49 44.7 •39 30 5.0 .29 30 19.0 ·69 •48 56 23 51.4 2 24 29.5 2 25 1.3 2 25 26.7 2 25 45.7 .26 2 25 58.1 •15 •37 35.8 2 20 44.3 8.6 57 58 2 19 2 20 13.3 .57 •46 2 21 2 21 26.4 .24

VARIATION TO 1' OF LATITUDE AND ALTITUDE.

.45

2 16 50.8

.56

.67

2 15 57.2

15 20.1 2 16 27.5

.35

.33 2 17 7.2 2 21

2 17 16.5

.2T

37.3

.12

.09

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
0 4 8 12 16	s. s. +1·48 -4·51 1·36 4·47 1·24 4·43 1·14 4·40 1·04 4·38	s. s. +1·57 -4·54 1·45 4·50 1·33 4·46 1·22 4·43 1·13 4·40	S. S. +1.66 -4.57 1.53 4.52 1.42 4.49 1.31 4.45 1.21 4.43	s. s. +1.75 -4.60 1.62 4.56 1.51 4.52 1.40 4.48 1.30 4.45	s. s. +1.85 -4.64 1.72 4.59 1.60 4.55 1.49 4.51 1.39 4.48	s. s. +1.95 -4.68 1.81 4.62 1.69 4.58 1.58 4.54 1.48 4.51
20 22 24 26 28	+ ·95	+1.03 4.38 .99 4.37 .95 4.36 .90 4.35 .86 4.34	+1·12 4·40 1·08 4·39 1·03 4·38 ·99 4·37 ·95 4·36	+1·21 4·42 1·17 4·41 1·12 4·40 1·08 4·39 1·04 4·38	+1·30 4·45 1·25 4·44 1·21 4·43 1·17 4·41 1·14 4·40	+1·39 4·48 1·34 4·46 1·30 4·45 1·27 4·44 1·23 4·43
30	+ ·73 4·32	+ ·82 4·33	+ ·91 4·35	+1·01 4·37	+1·10 4·40	+1·19 4·42 1·16 4·41 1·13 4·40 1·10 4·39 1·07 4·39
32	·69 4·31	·78 4·33	·88 4·34	·97 4·36	1·06 4·39	
34	·65 4·30	·74 4·32	·84 4·34	·93 4·36	1·03 4·38	
36	·61 4·30	·71 4·31	·80 4·33	·90 4·35	1·00 4·37	
38	·57 4·29	·67 4·31	·77 4·32	·87 4·34	·97 4·36	
40	+ ·53 4·29	+ ·63 4·30	+ ·73 4·32	+ ·83 4·34	+ ·94 4·36	+1.04 4.38
42	·49 4·28	·59 4·30	·70 4·31	·80 4·33	·91 4·35	1.01 4.37
44	·45 4·28	·56 4·29	·66 4·31	·77 4·33	·88 4·35	.99 4.37
46	·41 4·28	·52 4·29	·63 4·30	·74 4·32	·85 4·34	.97 4.36
48	·37 4·27	·49 4·28	·60 4·30	·71 4·32	·83 4·34	.95 4.36
50	+ ·33 4·27	+ '45 4'28 '41 4'28 '38 4'27 '34 4'27 '30 4'27	+ ·57 4·29	+ ·69 4·31	+ ·81 4·33	+ '93 4'36
52	·29 4·27		·54 4·29	·66 4·31	·79 4·33	'91 4'35
54	·25 4·26		·51 4·29	·64 4·30	·77 4·33	'90 4'35
56	·21 4·26		·48 4·28	·61 4·30	·75 4·32	'89 4'35
58	·16 4·26		·45 4·28	·59 4·30	·73 4·32	'88 4'35

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	0° 1		1°		Decl. Var.	2°		Decl. Var.	3°		•	Decl. Var.	4 °		Decl. Var.	5°			Decl. Var.
0 10 12 14 16	6 o 6 5 17 5 8 3 4 59 5	s. 0·0 7·3 1·7 5·5 8·6	s. + 1·53 1·56 1·57 1·59 1·61	5 IO 5 I	40·6 5·7 30·2	s. +1.53 1.55 1.56 1.57 1.58	5 11	4·3 13·1 38·6	s. +1·54 1·53 1·54 1·55 1·56	6 5 5 5	21 13 4	s. 36·7 44·8 10·5 36·1 1·5	s. +1.54 1.52 1.52 1.53 1.54	5 1 5	6 9·1	s. + 1·54 1·51 1·51 1·51	5 ¹ 5	7 41 24 46 16 11 7 32		s. + 1·55 1·50 1·50 1·49
18 20 22 24 26	4 34 4 25 2 4 16 4	0·9 2·2 2·4 1·2 8·6	+ 1.63 1.65 1.67 1.70 1.74		40·2 1·8		4 37 4 28 4 20	16·4 39·3	+1.57 1.59 1.61 1.63 1.65	4 4 4		26·4 50·9 14·7 37·9 0·2	+1.55 1.56 1.57 1.59 1.61	4 4 4 4 4 4 4	8 58·5 0 23·6 1 48·4 3 12·4 4 35·8	1.53	4 3 4 3	11 54 33 20 24 44	9·1 4·7 0·0 4·8 9·2	+1.50 1.50 1.51 1.52 1.54
28 30 31 32 33	3 46 3 41 3	4·3 8·1 4·2 9·7 4·6		4 0 3 52 3 47 3 43 3 39	15.6	+1.73 1.77 1.79 1.81 1.83	3 54	0·1 38·6 16·7	+ 1.68 1.71 1.73 1.75 1.77	3	51 47	21.4 41.5 21.0 0.2 38.9	+ 1.64 1.67 1.68 1.70 1.72	3 5		+ 1.59 1.62 1.63 1.65 1.66	3 :	58 55 54 35 50 15		+1.55 1.57 1.58 1.60 1.61
34 35 36 37 38	3 23 5 3 19 2	2·3 5·0	+1.92 1.94 1.97 2.01 2.04	3 34 3 30 3 25 3 21 3 16	17·0 51·5 25·2	+1.85 1.88 1.91 1.94 1.97	3 32 3 27 3 23	8·0 43·9 19·3	+ 1.79 1.82 1.84 1.87 1.89	3 3 3	33 29 25	17·3 55·1 32·4 9·3 45·5	+ 1.73 1.75 1.78 1.80 1.82	3 3 3 3 3	1 17·2 6 55·3	1·70 1·71 1·73	3 3 3 3 3	32 5	8·7 8·3 7·5	+ 1.62 1.64 1.65 1.67 1.69
39 40 41 42 43		6·9 4·8 1·4	+2.08 2.12 2.16 2.20 2.25	3 12 3 8 3 3 2 59 2 54	1·4 31·6 0·8	+2.00 2.03 2.07 2.11 2.15	3 IO 3 5 3 I	33·4 4·8	+1.92 1.95 1.99 2.02 2.06	3 3 3		21·1 56·0 30·2 3·6 36·2	+ 1.85 1.88 1.91 1.94 1.97	3 3	8 10 0 3 46 4 9 22 3 4 57 5 0 32 0	1.80 1.83 1.86	3 :		2·5 9·9 6·7	+ 1.71 1.73 1.75 1.78 1.81
44 45 46 47 48	2 47 40 2 43 3 2 38 23 2 33 42 2 28 59	3·2 3·9 2·8	+2·30 2·35 2·41 2·47 2·54	2 49 2 45 2 40 2 36 2 31	21·1 45·0 7·5 28·1	+2·20 2·25 2·30 2·35 2·41	2 47 2 42 2 38	4.5 32.8 59.6 25.2 49.2	+2·10 2·14 2·19 2·24 2·29	2 2 2	54 49 45 40 36	7·8 38·5 8·0 36·3 3·4	+2.01 2.05 2.09 2.13 2.18	2 4	6 5.6 1 38.5 7 10.3 2 41.2 8 11.0	1.95 1.99 2.03	2 4	53 3	7·0 0·1	+ 1.84 1.86 1.90 1.93 1.97
49 50 51 52 53	2 24 14 2 19 20 2 14 30 2 9 42 2 4 45	6·5 6·1 2 ·5	+2.61 2.69 2.77 2.85 2.95	2 22 2 17	3·5 17·8 29·4	2·62 2·70	2 24 2 19 2 15	32·2 50·7	+2·35 2·41 2·48 2·55 2·63	2 2 2	26 22 17			2 2 2 2 2	3 39·5 9 6·7 4 32·5 9 56·7 5 19·0	2·17 2·22 2·28	2 2 2	35 4: 31 1: 26 4: 22 :	3·3 2·1 9·5	+2.01 2.05 2.10 2.15 2.21

Alt.	L. 0° A.	L. 1 ° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5 ° A.		
° 0 2 4 6 8	S. S.	s. s.	S. S.	S. S.	s. s.	s. s.		
	- '00 -4'28	+ ·08 -4·28	+ ·16 -4·29	+ '24 -4'29	+ ·32 -4·29	+ ·40 -4·30		
	'06 4'29	+ ·02 4·29	·10 4·29	·18 4'29	·26 4·29	·34 4·30		
	'11 4'28	- ·03 4·28	+ ·04 4·28	·12 4'29	·20 4·29	·29 4·29		
	'17 4'29	·09 4·29	- ·01 4·29	·07 4'29	·15 4·29	·23 4·29		
	'23 4'29	·15 4·29	·07 4·28	+ ·01 4'28	·09 4·28	·17 4·29		
10	- ·29 4·29	- ·2I 4·29	- ·13 4·29	- ·04 4·28	+ ·03 4·28	+ ·II 4·29		
12	·35 4·30	·27 4·29	·18 4·29	·10 4·28	- ·02 4·28	·06 4·28		
14	·41 4·30	·33 4·30	·24 4·29	·16 4·29	·08 4·28	+ ·00 4·28		
16	·47 4·31	·39 4·30	·30 4·29	·22 4·29	·14 4·29	- ·05 4·28		
18	·54 4·32	·45 4·3I	·37 4·30	·28 4·29	·20 4·29	·II 4·28		
20	- ·60 4·33	- ·52 4·31	- ·43 4·30	- ·34 4·30	- ·26 4·29	- ·17 4·29		
22	·67 4·34	·58 4·32	·49 4·31	·41 4·30	·32 4·29	·23 4·29		
24	·74 4·35	·65 4·33	·56 4·32	·47 4·31	·38 4·30	·29 4·29		
26	·82 4·36	·72 4·34	·63 4·33	·54 4·32	·45 4·31	·36 4·30		
28	·89 4·37	·80 4·36	·70 4·34	·61 4·33	·51 4·32	·42 4·30		
30	- ·97 4·39	- ·87 4·37	- ·78 4·35	- ·68 4·33	- ·58 4·32	- ·49 4·31		
32	I·06 4·4I	·96 4·39	·85 4·37	·76 4·35	·66 4·33	·56 4·32		
34	I·15 4·43	I·04 4·4I	·94 4·38	·83 4·36	·73 4·34	·63 4·33		
36	I·24 4·46	I·13 4·43	I·02 4·40	·92 4·38	·81 4·36	·71 4·34		
38	I·35 4·49	I·23 4·46	I·12 4·43	I·0I 4·40	·90 4·37	·79 4·36		
40	-1·46 4·52	-1·34 4·49	-1·22 4·45	-1·10 4·42	- '99 4'39	- ·88 4·37		
42	1·58 4·57	1·45 4·52	1·32 4·48	1·20 4·45	1'08 4'42	·97 4·39		
44	1·71 4·61	1·57 4·56	1·44 4·52	1·31 4·48	1'18 4'45	I·06 4·4I		
46	1·86 4·67	1·71 4·61	1·57 4·56	1·43 4·52	1'30 4'48	I·17 4·44		
48	2·02 4·74	1·86 4·67	1·71 4·61	1·56 4·56	1'42 4'51	I·28 4·47		
50	-2·2I 4·82	-2·03 -4·74	-1.87 4.67	-1·71 4·61	-1·56 4·56	-1·41 4·51		
52	2·42 4·92	2·23 4·83	2.05 4.75	1·87 4·68		1·55 4·56		

LATITUDE 21°.

DECLINATION—SAME NAME AS—LATITUDE

			DECLIN	ATIO	N-SAM	E NZ	IME AS	—LA	TITUDE.			
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 9 15.0 5 26 15.7 5 17 41.1 5 9 6.8 5 0 32.6	s. +1·55 1·49 1·48 1·48	H. M. S. 6 10 48·3 5 27 44·8 5 19 9·8 5 10 35·1 5 2 0·6	s. +1·56 1·48 1·47 1·46	H. M. S. 6 12 22·2 5 29 13·4 5 20 37·7 5 12 2·5 5 3 27·7	s. + 1·57 1·47 1·46 1·45	H. M. S. 6 13 56.6 5 30 41.6 5 22 5.1 5 13 29.1 5 4 53.7	s. + 1·58 1·47 1·45 1·44	H. M. S. 6 15 31·5 5 32 9·5 5 23 31·8 5 14 55·0 5 6 18·7	s. +1·59 1·46 1·44 1·42 1·41	H. M. S. 6 17 7.0 5 33 36.9 5 24 58.1 5 16 20.2 5 7 43.0	s. + 1·60 1·45 1·43 1·41 1·39
18 20 22 24 26	4 51 58·4 4 43 24·2 4 34 49·9 4 26 15·3 4 17 40·4	+1.48 1.48 1.48 1.49 1.50	4 53 26·4 4 44 52·2 4 36 18·1 4 27 43·8 4 19 9·3	+1·46 1·45 1·46 1·46 1·46	4 54 53·I 4 46 18·8 4 37 44·7 4 29 10·5 4 20 36·3	+ 1·43 1·43 1·43 1·43 1·43	4 56 18·7 4 47 44·0 4 39 9·6 4 30 35·4 4 22 1·2		4 57 43·I 4 49 7·9 4 40 33·0 4 3I 58·5 4 23 24·2	+1.40 1.39 1.38 1.37 1.37	4 59 6·4 4 50 30·4 4 41 55·0 4 33 19·9 4 24 45·2	+ 1.38 1.36 1.35 1.34 1.33
28 30 32 33 34	4 9 5.0 4 0 29.0 3 51 52.2 3 47 33.5 3 43 14.5	+1.51 1.53 1.55 1.56 1.57	3 53 23.6 3 49 5.5 3 44 47.2	+1.47 1.49 1.50 1.51 1.52	4 12 1.9 4 3 27.3 3 54 52.3 3 50 34.6 3 46 16.8		4 13 27·0 4 4 52·7 3 56 18·3 3 52 1·0 3 47 43·5	+ 1.40 1.40 1.41 1.41 1.42	3 57 41.6 3 53 24.5	1.37	3 59 2.3	+ 1·33 1·32 1·32 1·32
35 36 37 38 39	3 38 55·3 3 34 35·8 3 30 16·0 3 25 55·8 3 21 35·3	+ 1.58 1.60 1.61 1.63 1.64	3 31 50·9 3 27 31·7 3 23 12·1	+ I·53 I·54 I·55 I·57 I·58	3 41 58·9 3 37 40·7 3 33 22·4 3 29 3·8 3 24 45·1	+1.48 1.48 1.50 1.51 1.52	3 43 25.9 3 39 8.3 3 34 50.5 3 30 32.5 3 26 14.3	+1·42 1·43 1·44 1·45 1·46	3 40 32.6	+ 1·37 1·38 1·38 1·39 1·40	3 33 19.4	+ 1·33 1·33 1·33 1·34
40 41 42 43 44	3 17 14·4 3 12 53·0 3 8 31·2 3 4 8·8 2 59 45·9	+ 1.66 1.68 1.70 1.73 1.75	3 18 52·2 3 14 31·9 3 10 11·2 3 5 50·2 3 1 28·6	+ 1.60 1.61 1.63 1.65 1.67	3 20 26·0 3 16 6·6 3 11 47·0 3 7 27·0 3 3 6·7	+1.53 1.54 1.56 1.58 1.60		+ 1.47 1.48 1.49 1.51 1.52	3 14 46·1 3 10 27·7		3 20 27·2 3 16 9·5 3 11 51·7	1·34 1·36 1·36 1·36
45 46 47 48 49	2 55 22·3 2 50 58·1 2 46 33·2 2 42 7·4 2 37 40·8	+1·78 1·81 1·84 1·87 1·91	2 48 20·7 2 43 56·8	+ 1.70 1.72 1.75 1.78 1.81	2 58 45·8 2 54 24·6 2 50 2·8 2 45 40·6 2 41 17·7		3 0 20·4 2 56 0·3 2 51 39·8 2 47 18·9 2 42 57·5		2 57 31·2 2 53 11·8 2 48 52·0	+1.46 1.47 1.49 1.51 1.53	3 3 15.6 2 58 57.3 2 54 38.7 2 50 19.9 2 46 0.8	1.41 1.42 1.44 1.44
50 51 52 53 54	2 33 13·3 2 28 44·7 2 24 15·0 2 19 44·0 2 15 11·6		2 35 6.8 2 30 40.6 2 26 13.3 2 21 45.0 2 17 15.6		2 36 54·2 2 32 29·9 2 28 4·9 2 23 39·0 2 19 12·2	+ 1·74 1·77 1·81 1·84 1·88	2 38 35·6 2 34 13·1 2 29 50·0 2 25 26·1 2 21 1·5	+ 1.64 1.67 1.70 1.73 1.76	2 35 50·2 2 31 28·7 2 27 6·6	I·57	2 33 I·3 2 28 40·7	
		V	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUE	E.		<u></u>
Alt.	L. 6°	A.	L. 7°	Α.	L. 8°	A.	L. 9°	A.	L. 10°	. A.	L. 11	A.
0 2 4 6 8	s. + ·48 - ·42 ·37 ·31 ·25	s. -4·31 4·30 4·30 4·29	·50 ·45 ·39 ·33	s. -4·32 4·31 4·30 4·30	·59 ·53 ·47 ·41	s. -4·33 4·33 4·32 4·31 4·30	s. + ·73 ·67 ·61 ·55 ·50	s. -4·35 4·34 4·33 4·32 4·31	s. + ·81 ·75 ·69 ·63 ·58	s. -4·36 4·35 4·34 4·33 4·32	s. + ·89 ·74 ·77 ·72 ·66	s. -4·37 4·36 4·35 4·34 4·33
10 12 14 16 18	+ ·20 ·14 ·08 + ·03 - ·03	4·29 4·28 4·28 4·28	+ ·28 ·22 ·17 ·11 + ·05	4·30 4·29 4·29 4·28 4·28	+ ·36 ·30 ·25 ·19 ·14	4·30 4·29 4·29 4·29	+ ·44 ·39 ·33 ·27 ·22	4·31 4·30 4·30 4·29 4·29	+ ·52 ·47 ·41 ·36 ·30	4·32 4·31 4·30 4·30 4·29	+ ·61 ·55 ·50 ·44 ·39	4·33 4·32 4·31 4·30
20	09	4·28 4·28	00	4·28 4·28	+ .08	4.28	+ .16	4.29	+ .25	4.29	+ .33	4.30

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4.33

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4.40

4·43 4·46

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·71 ·80

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+ .06

88 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 21°.

True	12°	Decl.	13°	Decl.	14°	Decl.	15°	Decl.	16°	Decl.	17°	Decl.
Alt.		Var.		Var.		Var.		Var.		Var.		Var.
0 10 12 14 16	H. M. S. 6 18 43·2 5 35 4·2 5 26 24·0 5 17 44·7 5 9 6·3	s. + 1·61 1·45 1·43 1·40 1·38	H. M. S. 6 20 20·2 5 36 31·2 5 27 49·3 5 19 8·6 5 10 28·8	s. +1.62 1.45 1.42 1.39 1.37	H. M. S. 6 21 58·1 5 37 58·0 5 29 14·4 5 20 32·0 5 11 50·6	1·41 1·38	H. M. S. 6 23 36·9 5 39 24·7 5 30 39·1 5 21 54·8 5 13 11·7	s. +1.65 1.44 1.41 1.38 1.35	H. M. S. 6 25 16·6 5 40 51·4 5 32 3·6 5 23 17·2 5 14 32·2	I·44 I·41 I·37	H. M. S. 6 26 57.5 5 42 18.2 5 33 27.9 5 24 39.2 5 15 52.0	s. +1·69 1·45 1·40 1·36 1·32
18 20 22 24 26	5 0 28.6 4 51 51.8 4 43 15.5 4 34 39.7 4 26 4.4	+1'36 1'34 1'33 1'32 1'30	5 I 50·0 4 53 II·9 4 44 34·6 4 35 57·9 4 27 2I·7	+ 1·35 1·32 1·31 1·29 1·27	5 3 10·3 4 54 30·9 4 45 52·3 4 37 14·5 4 28 37·4	+1·33 1·31 1·28 1·26 1·24	5 4 29.7 4 55 48.8 4 47 8.8 4 38 29.6 4 29 51.3	1.24	5 5 48·3 4 57 5·6 4 48 24·0 4 39 43·3 4 31 3·5		5 7 6·1 4 58 21·5 4 49 38·0 4 40 55·5 4 32 14·1	+1·29 1·26 1·22 1·19 1·16
28 30 31 32 33	4 17 29·5 4 8 54·8 4 4 37·6 4 0 20·5 3 56 3·4	+1·29 1·29 1·28 1·28 1·28	4 18 46·1 4 10 11·0 4 5 53·5 4 1 36·2 3 57 18·9	+ 1·26 1·25 1·24 1·24 1·24	4 20 0.9 4 11 24.9 4 7 7.1 4 2 49.4 3 58 31.9	+1.23 1.21 1.21 1.20 1.19	4 21 13·7 4 12 36·7 4 8 18·4 4 4 0·3 3 59 42·3	+ 1·20 1·18 1·17 1·16 1·15	4 22 24·5 4 13 46·4 4 9 27·5 4 5 8·8 4 0 50·3	+1·16 1·14 1·13 1·12 1·11		+1·13 1·11 1·09 1·08 1·07
34 35 36 37 38	3 51 46·3 3 47 29·2 3 43 12·1 3 38 55·0 3 34 38·0	+1.28 1.28 1.28 1.28 1.28 1.28	3 53 1.7 3 48 44.5 3 44 27.3 3 40 10.2 3 35 53.1	+1.23 1.23 1.23 1.23 1.23	3 54 14·4 3 49 57·0 3 45 39·6 3 41 22·4 3 37 5·2	+ 1·19 1·18 1·18 1·18 1·17	3 55 24.5 3 51 6.7 3 46 49.1 3 42 31.5 3 8 14.0	+ 1·15 1·14 1·13 1·13 1·12	3 56 32·0 3 52 13·7 3 47 55·6 3 43 37·6 3 39 19·8	1.08	3 57 36.9 3 53 18.0 3 48 59.4 3 44 40.9 3 40 22.5	+ 1.06 1.05 1.04 1.03 1.02
39 40 41 42 43	3 30 20·8 3 26 3·7 3 21 46·4 3 17 29·1 3 13 11·7	+1.28 1.28 1.29 1.29 1.30	3 31 36·1 3 27 19·0 3 23 1·9 3 18 44·8 3 14 27·6	+ 1·23 1·23 1·23 1·23 1·23	3 32 48·0 3 28 30·9 3 24 13·8 3 19 56·7 3 15 39·7	+ 1·17 1·17 1·17 1·17 1·17	3 33 56·7 3 29 39·3 3 25 22·1 3 21 4·9 3 16 47·8	1.11	3 22 9.4	1.05	3 36 4·3 3 31 46·1 3 27 28·1 3 23 10·3 3 18 52·5	+ 1·01 1·00 ·98 ·98
44 45 46 47 48	3 8 54·2 3 4 36·6 3 0 18·8 2 56 0·9 2 51 42·8	+1·31 1·31 1·32 1·33 1·34	3 10 10·5 3 5 53·1 3 1 35·8 2 57 18·2 2 53 0·8	+1·24 1·24 1·25 1·25 1·26	3 11 22.6 3 7 5.5 3 2 48.3 2 58 31.2 2 54 13.9	+1·17 1·17 1·17 1·18 1·18	3 12 30·6 3 8 13·6 3 3 56·5 2 59 39·5 2 55 22·3	1.10 1.10		+ 1.03 1.03 1.03 1.02 1.02	3 14 34·8 3 10 17·3 3 5 59·8 3 1 42·4 2 57 25·1	+ ·97 ·96 ·96 ·95 ·95
49 50 51 52 53	2 47 24·5 2 43 6·0 2 38 47·1 2 34 28·0 2 30 8·6	+1·35 1·37 1·38 1·40 1·41	2 48 43·I 2 44 25·2 2 40 7·I 2 35 48·9 2 31 30·3	+1·27 1·28 1·29 1·30 1·31	2 49 56·6 2 45 39·2 2 41 21·7 2 37 4·1 2 32 46·3	+1·18 1·19 1·20 1·21 1·22	2 51 5.2 2 46 48.1 2 42 30.9 2 38 13.6 2 33 56.6	1.11 1.11	2 52 8·9 2 47 51·8 2 43 34·8 2 39 17·7 2 35 0·6	I·02 I·02	2 53 7·8 2 48 50·6 2 44 33·4 2 40 16·3 2 35 59·2	+ ·94 ·94 ·93 ·93 ·93
54 55 56 57 58	2 25 48·8 2 21 28·5 2 17 7·9 2 12 46·7 2 8 25·0	+1.43 1.46 1.48 1.51 1.53	2 27 11.6 2 22 52.6 2 18 33.2 2 14 13.5 2 9 53.3		2 28 28·3 2 24 10·1 2 19 51·7 2 15 33·1 2 11 14·1	+ 1·23 1·24 1·25 1·27 1·29	2 21 3·6 2 16 45·8	1·13 1·14 1·15	2 30 43·5 2 26 26·3 2 22 9·0 2 17 51·7 2 13 34·2	+ 1.03 1.03 1.04 1.04 1.05	2 31 42·1 2 27 25·0 2 23 7·9 2 18 50·9 2 14 33·7	+ ·93 ·93 ·93 ·93 ·93
		V	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 12°	A.	L. 13°	Α.	L. 14°	A.	L. 15°	Α.	L. 16°	A.	L. 17°	Α.
0 4 8 12 16	s. + '98 - '86 '74 '63 '52	s. -4·39 4·37 4·35 4·33 4·32	s. +1.06 - .94 .83 .71 .61	s. -4·41 4·39 4·36 4·34 4·33	s. +1·15 - 1·03 ·91 ·80 ·69	s. -4·43 4·40 4·38 4·36 4·34	s. +1·24 - 1·11 ·99 ·88 ·77	s. -4·46 4·42 4·40 4·37 4·35	s. +1·32 - 1·20 1·08 ·97 ·86	s. -4·48 4·45 4·42 4·39 4·37	1·28 1·16 1·05 '95	s. -4·51 4·47 4·44 4·41 4·39
20 22 24 26 28	+ '42 '36 '31 '26 '21	4·30 4·30 4·29 4·29	+ ·50 ·45 ·40 ·35 ·29	4·31 4·30 4·30 4·29	+ ·59 ·54 ·48 ·43 ·38	4·32 4·31 4·31 4·30	+ ·67 ·62 ·57 ·52 ·47	4·34 4·33 4·32 4·31 4·31	+ ·76 ·71 ·66 ·61 ·56	4·35 4·34 4·33 4·33	+ ·84 ·80 ·75 ·70 ·65	4·37 4·36 4·35 4·34 4·33
30 32 34 36 38	+ ·15 ·10 + ·04 - ·01 ·07	4·29 4·28 4·28 4·28 4·28	+ ·24 •19 •14 •08 + ·02	4·29 4·29 4·28 4·29	+ ·33 ·28 ·23 ·18 ·12	4·30 4·29 4·29 4·29 4·29	+ ·42 ·37 ·32 ·27 ·22	4·30 4·30 4·30 4·29 4·29	+ ·51 ·47 ·42 ·37 ·32	4·31 4·30 4·30 4·30	+ ·60 ·56 ·51 ·47 ·42	4·33 4·31 4·31 4·30
40 42 44 46 48	- ·13 ·20 ·26 ·33 ·40	4·29 4·29 4·30 4·30	- ·03 ·09 ·15 ·22 ·28	4.28 4.28 4.29 4.29 4.29	+ ·07 - ·01 ·04 ·10 ·17	4·28 4·28 4·28 4·29 4·29	+ ·17 ·12 ·06 + ·01 - ·05	4·29 4·29 4·28 4·28 4·29	+ ·27 ·22 ·17 ·12 ·06	4·29 4·29 4·29 4·29 4·28	+ ·37 ·32 ·28 ·23 ·18	4·30 4·30 4·29 4·29 4·29
50 52 54 56 58	- ·48 ·56 ·65 ·74 ·85	4·31 4·32 4·33 4·35 4·37	- ·35 ·43 ·51 ·60 ·69	4·30 4·31 4·31 4·34	- ·23 ·30 ·38 ·46 ·54	4·29 4·30 4·31 4·32	- ·11 ·18 ·24 ·32 ·39	4·29 4·29 4·30 4·30	+ ·oi - ·o5 ·ii ·i8 ·25	4·28 4·29 4·29 4·29	+ ·13 ·07 + ·02 - ·04 ·10	4·29 4·28 4·28 4·29

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 89 LATITUDE 21°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 28 39·6 5 43 45·0 5 34 52·0 5 26 1·0 5 17 11·3	s. +1·71 1·45 1·40 1·36 1·32	H. M. S. 6 30 22·9 5 45 11·8 5 36 16·1 5 27 22·3 5 18 30·1	s. +1·73 1·45 1·40 1·35 1·31	H. M. S. 6 32 7.5 5 46 38.9 5 37 40.2 5 28 43.4 5 19 48.4	s. +1.75 1.45 1.40 1.35 1.30	5 39 4·2 5 30 4·2	s. +1.78 1.46 1.40 1.35 1.29		s. + 1·81 1·46 1·40 1·34 1·29	5 51 1.8 5 41 52.6	s. +1.84 1.47 1.40 1.34 1.28
18 20 22 24 26	5 8 23·I 4 59 36·3 4 50 50·8 4 42 6·4 4 33 23·I	1.17	5 9 39.4 5 0 50.2 4 52 2.4 4 43 15.8 4 34 30.4	+1·26 1·22 1·18 1·15 1·11	5 10 55·0 5 2 3·3 4 53 12·9 4 44 24·0 4 35 36·2	1.12		+1·24 1·19 1·15 1·10 1·06	5 I3 24·4 5 4 26·7 4 55 30·7 4 46 36·3 4 37 43·3	+1.23 1.18 1.13 1.08 1.03	5 14 38·2 5 5 37·3 4 56 38·1 4 47 40·6 4 38 44·5	+ 1·22 1·17 1·11 1·06 1·01
28 30 31 32 33	4 24 40·8 4 15 59·4 4 11 39·0 4 7 19·0 4 2 59·0	+1·10 1·07 1·06 1·04 1·03	4 25 46·1 4 17 2·8 4 12 41·6 4 8 20·5 4 3 59·7	+ 1.07 1.04 1.02 1.01 •99	4 26 49.7 4 18 4.3 4 13 42.0 4 9 19.9 4 4 58.0	+ 1.04 1.01 .99 .97	4 14 40.2	+ 1.01 .97 .95 .93	4 28 51.6 4 20 1.1 4 15 36.3 4 11 11.8 4 6 47.6	·92 ·90 ·87	4 7 38.8	+ ·96 ·91 ·88 ·86 ·83
34 35 36 37 38	3 58 39·2 3 54 19·7 3 50 0·3 3 45 41·1 3 41 22·1	·99	3 59 39·1 3 55 18·7 3 50 58·5 3 46 38·5 3 42 18·7	+ ·98 ·96 ·95 ·93 ·92	4 0 36·4 3 56 15·1 3 51 53·9 3 47 33·0 3 43 12·2	+ ·93 ·92 ·90 ·88 ·87	3 52 46·5 3 48 24·5	+ ·89 ·87 ·85 ·83 ·82	4 2 23.6 3 57 59.9 3 53 36.4 3 49 13.2 3 44 50.2	·83	3 58 48.4	+ ·81 ·78 ·76 ·74 ·71
39 40 41 42 43	3 37 3·2 3 32 44·5 3 28 25·9 3 24 7·5 3 19 49·2	·94 ·93 ·92	3 37 59.0 3 33 39.5 3 29 20.2 3 25 1.1 3 20 42.1	+ ·90 ·89 ·88 ·86 ·85	3 38 51.6 3 34 31.3 3 30 11.1 3 25 51.1 3 21 31.3	.82	3 39 41·1 3 35 19·7 3 30 58·5 3 26 37·5 3 22 16·7	+ ·80 ·78 ·76 ·74 ·72	3 40 27·4 3 36 4·8 3 31 42·4 3 27 20·3 3 22 58·3	+ ·74 ·72 ·70 ·68 ·66	3 41 10·5 3 36 46·6 3 32 22·9 3 27 59·4 3 23 36·2	+ ·69 ·67 ·64 ·62 ·60
44 45 46 47 48	3 15 31·0 3 11 12·9 3 6 55·0 3 2 37·2 2 58 19·5	·89 ·88 ·88	3 16 23·3 3 12 4·6 3 7 46·0 3 3 27·6 2 59 9·3	+ ·84 •83 ·81 ·80 ·79	3 17 11.6 3 12 52.1 3 8 32.7 3 4 13.6 2 59 54.5	+ •77 •76 •74 •73 •71	3 17 56·0 3 13 35·6 3 9 15·3 3 4 55·1 3 0 35·1	+ ·71 ·69 ·67 ·65 ·64	3 18 36·5 3 14 14·9 3 9 53·5 3 5 32·2 3 1 11·1	+ ·64 ·62 ·60 ·58 ·56	3 14 50.2	+ ·57 ·55 ·53 ·51 ·48
49 50 51 52 53	2 54 I·9 2 49 44·3 2 45 26·9 2 4I 9·5 2 36 52·2	·85 ·84 ·84	2 54 51·1 2 50 33·1 2 46 15·1 2 41 57·3 2 37 39·5	+ ·78 ·77 ·76 ·75 ·74	2 55 35.6 2 51 16.8 2 46 58.2 2 42 39.6 2 38 21.2	·67 ·66 ·65	2 56 15·3 2 51 55·6 2 47 36·1 2 43 16·6 2 38 57·3	+ ·62 ·60 ·59 ·57 ·55	2 56 50·2 2 52 29·4 2 48 8·7 2 43 48·2 2 39 27·8	•50	2 48 36·1 2 44 14·3	+ ·46 ·43 ·41 ·39 ·36
54 55 56 57 58	2 32 34·9 2 28 17·7 2 24 0·5 2 19 43·4 2 15 26·3	·83 ·82 ·82	2 33 21·8 2 29 4·3 2 24 46·8 2 20 29·4 2 16 12·0	+ ·73 ·72 ·72 ·71 ·70	2 34 3.0 2 29 44.7 2 25 26.7 2 21 8.6 2 16 50.8	∙60		+ ·54 ·52 ·51 ·49 ·47	2 35 7.6 2 30 47.4 2 26 27.4 2 22 7.5 2 17 47.7	·40 ·38	2 35 31·0 2 31 9·5 2 26 48·2 2 22 26·9 2 18 5·7	·32 ·29 ·27
		7	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUI	E.		
Alt.	L. 18°	Α.	L. 19	A.	L. 20°	A.	L. 21	A.	L. 22	° A.	L. 23°	° A.
0 4 8 12 16	s. +1.50 - 1.37 1.25 1.14 1.03	s. -4·54 4·50 4·46 4·43 4·41	s. +1.59 1.46 1.34 1.22 1.12	s. -4·57 4·53 4·49 4·45 4·43	S. +1.69 1.55 1.43 1.31 1.21	s. -4.60 4.56 4.52 4.48 4.45	S. +1.78 1.64 1.52 1.40 1.29	s. -4.64 4.59 4.54 4.51 4.47	s. + i·88 i·73 i·6i i·49 i·38	s. -4.67 4.62 4.58 4.54 4.50	s. +1.97 1.83 1.70 1.58 1.47	s. -4·72 4·66 4·61 4·57 4·53
20 22 24 26 28	+ ·93 ·88 ·83 ·79 ·74	4·38 4·37 4·36 4·35 4·35	+1.02 .97 .92 .88 .83	4·40 4·39 4·38 4·37 4·36	+1·11 1·06 1·01 ·97 ·92	4·42 4·41 4·40 4·39 4·38	+1·19 1·15 1·10 1·06 1·01	4.45 4.43 4.42 4.41 4.40	+1·28 1·24 1·19 1·15 1·11	4·47 4·46 4·45 4·44 4·42	+1·37 1·33 1·28 1·24 1·20	4·50 4·48 4·47 4·46 4·45
30 32 34 36 . 38	+ ·70 ·65 ·61 ·56 ·52	4·34 4·33 4·32 4·31	+ ·79 ·74 ·70 ·66 ·62	4·35 4·35 4·34 4·33 4·33	+ ·88 ·84 ·80 ·76 ·72	4·37 4·36 4·36 4·35 4·34	+ ·97 ·93 ·89 ·85 ·82	4·39 4·38 4·38 4·37 4·36	+1.07 1.03 .99 .95 .92	4·42 4·40 4·40 4·39 4·38	+1·16 1·12 1·09 1·05 1·02	4·44 4·43 4·42 4·41 4·40
40 42 44 46 48	+ '47 '43 '38 '34 '29	4·31 4·30 4·30 4·30 4·29	+ ·57 ·53 ·49 ·45 ·41	4·32 4·31 4·31 4·30	+ ·68 ·64 ·60 ·56 ·52	4·34 4·33 4·32 4·32	+ ·78 ·74 ·71 ·67 ·64	4·35 4·35 4·34 4·34 4·33	+ ·88 ·85 ·82 ·78 ·75	4·37 4·36 4·36 4·35	+ ·99 ·95 ·93 ·90 ·87	4·39 4·39 4·38 4·38 4·37
50 52 54 56 58	+ ·25 ·20 ·15 ·10 ·04	4·29 4·29 4·29 4·29 4·28	+ ·36 ·32 ·28 ·23 ·19	4·30 4·30 4·29 4·29 4·29	+ ·48 ·45 ·41 ·37 ·33	4·31 4·30 4·30 4·30	+ ·60 ·57 ·54 ·51 ·47	4·33 4·32 4·31 4·31	+ ·72 ·70 ·67 ·64 ·62	4·35 4·34 4·34 4·33 4·33	+ ·84 ·82 ·80 ·78 ·76	4·37 4·36 4·36 4·35 4·35

LATITUDE 22°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 16 49.4 5 8 10.0 4 59 30.1 4 50 49.3	s. + 1.61 1.64 1.66 1.67 1.69	5 18 27·6 5 9 49·0	s. +1.62 1.63 1.64 1.65 1.67	H. M. S. 6 3 14.0 5 20 5.0 5 11 26.9 5 2 48.4 4 54 9.4	s. +1.62 1.62 1.62 1.63 1.64	H. M. S. 6 4 51·2 5 21 41·6 5 13 3·8 5 4 25·7 4 55 47·4	S. + 1.62 1.60 1.61 1.61 1.62	5 23 17·4 5 14 39·7 5 6 2·0	s. + 1·62 1·59 1·59 1·59	H. M. S. 6 8 6·2 5 24 52·6 5 16 14·9 5 7 37·1 4 58 59·4	s. +1.63 1.58 1.58 1.58
18 20 22 24 26	4 42 7.6 4 33 24.8 4 24 40.8 4 15 55.2 4 7 8.1	+1.71 1.74 1.77 1.80 1.83		+1.68 1.71 1.73 1.76 1.79	4 45 29.9 4 36 49.6 4 28 8.4 4 19 26.3 4 10 42.9	+1.66 1.67 1.69 1.72 1.75	4 47 8.6 4 38 29.2 4 29 49.2 4 21 8.4 4 12 26.5	+ 1.63 1.65 1.66 1.68 1.70	4 40 7·2 4 31 28·0 4 22 48·2	+1.61 1.62 1.63 1.65 1.67	4 4I 43.4 4 33 5.0 4 24 26.0	+1.58 1.59 1.60 1.61 1.63
28 30 31 32 33	3 58 19·1 3 49 27·9 3 45 1·4 3 40 34·1 3 36 6·3	+ 1.87 1.92 1.94 1.97 2.00	3 51 21·4 3 46 56·3 3 42 30·6	+ 1.82 1.86 1.89 1.91 1.93	4 I 58·I 3 53 II·7 3 48 47·9 3 44 23·5 3 39 58·6	+ 1.78 1.81 1.83 1.85 1.87	4 3 43.4 3 54 59.0 3 50 36.3 3 46 13.0 3 41 49.4	+1.73 1.76 1.78 1.80 1.82	3 52 21·5 3 47 59·3	+1.69 1.71 1.73 1.74 1.76	4 7 6·1 3 58 24·9 3 54 3·8 3 49 42·5 3 45 20·9	+ 1.65 1.67 1.68 1.69 1.71
34 35 36 37 38	3 31 37.7 3 27 8.2 3 22 37.9 3 18 6.7 3 13 34.4	2.12	3 33 37·3 3 29 9·6 3 24 41·2 3 20 11·9 3 15 41·7	+1.96 1.99 2.02 2.05 2.08	3 35 33·I 3 3I 7·0 3 26 40·2 3 22 I2·7 3 I7 44·4	+ 1.90 1.92 1.95 1.98 2.01	3 37 25·2 3 33 0·5 3 28 35·2 3 24 9·3 3 19 42·7	+1.84 1.86 1.88 1.91 1.93	3 34 50·2 3 30 26·3		3 40 58·9 3 36 36·5 3 32 13·7 3 27 50·4 3 23 26·7	+ 1.72 1.74 1.76 1.78 1.80
39 40 41 42 43	3 9 1·1 3 4 26·5 2 59 50·7 2 55 13·6 2 50 34·9	+2·20 2·24 2·29 2·34 2·39	3 6 38·5 3 2 5·2 2 57 30·8	+2·12 2·16 2·20 2·24 2·29	3 13 15·4 3 8 45·3 3 4 14·4 2 59 42·4 2 55 9·3	+2.04 2.07 2.11 2.15 2.19	3 15 15.4 3 10 47.4 3 6 18.5 3 1 48.7 2 57 17.9	+1.96 1.99 2.03 2.06 2.10	3 12 44·7 3 8 17·7 3 3 49·8	+1.89 1.92 1.95 1.98 2.01	3 19 2.4 3 14 37.6 3 10 12.2 3 5 46.1 3 1 19.2	+ 1.82 1.84 1.87 1.90 1.93
44 45 46 47 48	2 45 54.6 2 41 12.6 2 36 28.6 2 31 42.6 2 26 54.2	+2.44 2.50 2.56 2.63 2.70		+2·33 2·39 2·44 2·51 2·57	2 50 34·9 2 45 59·2 2 41 22·0 2 36 43·3 2 32 2·7	+2·23 2·28 2·33 2·39 2·45	2 52 46·0 2 48 13·0 2 43 38·7 2 39 3·1 2 34 25·9	2.23	2 50 20·9 2 45 49·2	+2.05 2.08 2.12 2.17 2.22	2 56 51.6 2 52 23.1 2 47 53.7 2 43 23.4 2 38 51.8	+1.96 1.99 2.03 2.07 2.11
49 50 51 52 53	2 22 3·2 2 17 9·4 2 12 12·4 2 7 11·9 2 2 7·4	+2.78 2.86 2.95 3.05 3.15	2 I5 5·3 2 IO IO·7	+2.64 2.72 2.80 2.90 3.00	2 12 59 5	2.74	2 29 47·1 2 25 6·5 2 20 23·9 2 15 39·0 2 10 51·7			2·38 2·45	2 34 19·1 2 29 45·0 2 25 9·6 2 20 32·5 2 15 53·6	+2·15 2·20 2·25 2·31 2·37

I ———						
Alt.	L. 0° A.	L. 1 ° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
	- '00 -4'31	+ ·08 - 4·31	+ ·16 -4·31	+ '24 -4'32	+ '32 -4'32	+ '41 -4'33
	'06 4'32	+ ·02 4·32	·10 4·32	·18 4'32	'26 4'32	'34 4'33
	'12 4'31	- ·04 4·31	+ ·04 4·31	·12 4'32	'20 4'32	'28 4'32
	'18 4'32	·10 4·32	- ·02 4·32	·06 4'32	'14 4'32	'22 4'32
	'24 4'32	·16 4·32	·08 4·31	+ '00 4'31	'08 4'31	'16 4'32
10	- ·31 4·32	- ·22 4·32	- '14 4'32	06 4.31	+ ·02 4·31	+ ·10 4·31
12	·37 4·33	·29 4·32	'20 4'32	.12 4.31	- ·04 4·31	+ ·04 4·31
14	·44 4·34	·35 4·33	'27 4'32	.18 4.32	·10 4·31	- ·02 4·31
16	·50 4·34	·42 4·33	'33 4'32	.25 4.32	·16 4·32	·08 4·31
18	·57 4·35	·48 4·34	'40 4'33	.31 4.32	·22 4·32	·14 4·31
20	- '64 4'36 '71 4'37 '79 4'39 '87 4'40 '95 4'42	- '55 4'35	- '46 4'34	- ·38 4·33	- ·29 4·32	- ·20 4·32
22		·62 4'36	'53 4'35	·44 4·33	·36 4·33	·27 4·32
24		·70 4'37	'60 4'35	·51 4·34	·42 4·33	·33 4·33
26		·77 4'38	'68 4'37	·58 4·35	·49 4·34	·40 4·33
28		·85 4'40	'75 4'38	·66 4·36	·56 4·35	·47 4·34
30	-1.03 4.44	- ·93	- ·83 4·39	- ·73 4·37	- ·64 4·36	- ·54 4·34
32	1.12 4.46		·92 4·41	·82 4·39	·72 4·37	·62 4·36
34	1.22 4.48		I·01 4·43	·90 4·41	·80 4·39	·69 4·37
36	1.32 4.51		I·10 4·45	·99 4·43	·88 4·40	·78 4·38
38	1.44 4.55		I·20 4·48	I·08 4·45	·97 4·42	·86 4·40
40	-1.55 4.59	-1:43 4:54	-1·31 4·51	-1·19 4·47	-1.07 4.44	- ·95 4·42
42	1.68 4.63	1:55 4:58	1·42 4·54	1·30 4·50	1.17 4.47	1·05 4·44
44	1.83 4.69	1:69 4:63	1·55 4·58	1·42 4·54	1.29 4.50	1·16 4·47
46	1.99 4.75	1:83 4:69	1·69 4·63	1·55 4·58	1.41 4.54	1·27 4·50
48	2.17 4.83	2:00 4:75	1·84 4·69	1·69 4·63	1.54 4.58	1·40 4·54
50	-2·37 4·92	-2·19 4·84	-2.01 4.76	-1.85 4.69	-1.69 4.63	-1.54 4.58
52	2·61 5·04	2·40 4·94	2.21 4.85	2.03 4.77	1.86 4.70	1.69 4.63

LATITUDE 22°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 9 44·I 5 26 27·2 5 17 49·I 5 9 II·3 5 0 33·6	s. +1.63 1.57 1.56 1.56 1.56	5 28 1·2 5 19 22·7 5 10 44·6	s. + 1.64 1.56 1.55 1.55	H. M. S. 6 13 1·2 5 29 34·8 5 20 55·6 5 12 17·0 5 3 38·7	s. +1.65 1.55 1.54 1.53 1.52	5 31 7.9 5 22 28.0 5 13 48.6	s. + 1.66 1.55 1.53 1.52 1.51	H. M. S. 6 16 20.6 5 32 40.7 5 23 59.7 5 15 19.5 5 6 39.8	s. +1·67 I·54 I·52 I·51 I·49	H. M. S. 6 18 1.0 5 34 13.1 5 25 30.8 5 16 49.5 5 8 9.0	s. +1.68 1.54 1.52 1.50 1.48
18 20 22 24 26	4 51 55.9 4 43 18.1 4 34 40.1 4 26 1.8 4 17 23.0	+ 1.56 1.56 1.57 1.58 1.59	4 44 51·2 4 36 13·5 4 27 35·5	+ 1.54 1.54 1.54 1.55 1.55	4 37 45·2 4 29 7·5	+1.52 1.52 1.51 1.52 1.52	4 47 53·2 4 39 15·3 4 30 37·6	+ 1.50 1.49 1.49 1.49 1.49	4 58 0.8 4 49 22.1 4 40 43.9 4 32 6.0 4 23 28.2	+ 1·48 1·47 1·46 1·46 1·45	4 59 29·1 4 50 49·8 4 42 11·0 4 33 32·6 4 24 54·5	+ 1.46 1.45 1.44 1.43 1.42
28 30 32 33 34	4 8 43.7 4 0 3.6 3 51 22.6 3 47 1.8 3 42 40.7	+ 1.60 1.62 1.64 1.66 1.67	3 52 59·9 3 48 39·7	+ 1.56 1.58 1.60 1.61 1.62	4 3 13.2	+1.53 1.54 1.55 1.56 1.57	4 4 44·2 3 56 5·9	+ 1.49 1.49 1.50 1.51 1.52	4 14 50·5 4 6 12·7 3 57 34·9 3 53 15·9 3 48 56·8	+ 1·45 1·45 1·46 1·46 1·47	4 16 16·6 4 7 38·9 3 59 1·2 3 54 42·3 3 50 23·4	+ I·42 I·42 I·42 I·42 I·42
35 36 37 38 39	3 38 19·2 3 33 57·4 3 29 35·2 3 25 12·7 3 20 49·6	+1.68 1.70 1.72 1.73 1.75	3 35 37·6 3 31 16·4 3 26 54·7	+ 1.63 1.64 1.66 1.67 1.69		+ 1.57 1.59 1.60 1.61 1.62	3 38 48·0 3 34 28·1 3 30 8·0	+ 1.52 1.53 1.54 1.55 1.56	3 44 37.6 3 40 18.3 3 35 58.9 3 31 39.3 3 27 19.6	+1.47 1.48 1.48 1.49 1.50	3 46 4.4 3 41 45.4 3 37 26.3 3 33 7.2 3 28 47.9	+ I·42 I·43 I·43 I·44 I·44
40 41 42 43 - 44	3 16 26·1 3 12 2·1 3 7 37·5 3 3 12·4 2 58 46·5	+ 1.77 1.79 1.82 1.85 1.87	3 9 24·6 3 5 0·7	+ 1·70 1·72 1·74 1·77 1·79	3 15 29·1 3 11 7·0 3 6 44·5	+ 1.64 1.65 1.67 1.69 1.71	3 12 45·2 3 8 23·7	+ 1.57 1.59 1.60 1.62 1.63	3 22 59·7 3 18 39·5 3 14 19·2 3 9 58·6 3 5 37·7	+ 1.51 1.52 1.53 1.55 1.56	3 24 28·4 3 20 8·9 3 15 49·2 3 11 29·2 3 7 9·1	+1.45 1.46 1.47 1.48 1.49
45 46 47 48 49	2 54 19·9 2 49 52·6 2 45 24·4 2 40 55·2 2 36 25·0	+1.90 1.93 1.97 2.01 2.05	2 51 45 9	+ 1.82 1.84 1.87 1.91 1.94	2 57 58·0 2 53 34·0 2 49 9·4 2 44 44·1 2 40 18·1	+1.73 1.76 1.78 1.81 1.84	2 50 53·7 2 46 30·0 2 42 5·7	+1.65 1.67 1.70 1.72 1.75	3 I 16·5 2 56 54·9 2 52 33·0 2 48 10·5 2 43 47·7	+1.58 1.59 1.61 1.63 1.65	3 2 48·7 2 58 28·0 2 54 7·1 2 49 45·8 2 45 24·2	+ 1.50 1.51 1.53 1.54 1.56
50 51 52 53 54	2 31 53·7 2 27 21·2 2 22 47·3 2 18 11·9 2 13 34·8	+2.09 2.13 2.18 2.24 2.30	2 24 54·7 2 20 22·4	+1.98 2.02 2.06 2.11 2.16		+ 1.88 1.91 1.95 1.99 2.04	2 33 15·1 2 28 48·7 2 24 21·4	+1.77 1.80 1.84 1.87 1.91	2 39 24·3 2 35 0·3 2 30 35·8 2 26 10·5 2 21 44·4	+ 1.68 1.70 1.73 1.76 1.80	2 41 2·1 2 36 39·6 2 32 16·5 2 27 52·9 2 23 28·8	+ 1.58 1.60 1.63 1.65 1.68

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
0 2 4 6 8	s. s. + '49 -4'34 '43 4'33 '37 4'33 '31 4'33 '25 4'32	s. s. + ·57 -4·35 ·51 4·35 ·45 4·34 ·39 4·33 ·33 4·33	s. s. + ·65 -4·36 ·59 4·36 ·53 4·35 ·47 4·34 ·41 4·33	s. s. + ·74 -4·38 ·67 4·37 ·61 4·36 ·55 4·35 ·49 4·34	s. s. + ·82 -4·39 ·76 4·38 ·70 4·37 ·63 4·36 ·57 4·35	s. s. + '94 - 4'41 '84 4'40 '78 4'38 '72 4'38 '66 4'36
10	+ ·19 4·32	+ ·27 4·32	+ '35 4'33	+ '43 4'34	+ '52 4'35	+ ·60 4·36
12	·13 4·31	·21 4·32	'29 4'32	'37 4'33	'46 4'34	·54 4·35
14	·07 4·31	·15 4·32	'23 4'32	'31 4'32	'40 4'33	·48 4·34
16	+ ·00 4·31	·09 4·31	'17 4'32	'26 4'32	'34 4'33	·42 4·33
18	- ·05 4·31	+ ·03 4·31	'11 4'31	'20 4'32	'28 4'32	·37 4·33
20	- ·12 4·31	- ·03 4·31	+ ·05 4·31	+ ·14 4·32	+ ·22 4·32	+ ·31 4·32
22	·18 4·32	·09 4·31	- ·01 4·31	·08 4·31	·17 4·32	·25 4·32
24	·24 4·32	·15 4·32	·07 4·31	+ ·02 4·31	·11 4·31	·19 4·32
26	·31 4·32	·22 4·32	·13 4·31	- ·04 4·31	+ ·05 4·31	·14 4·32
28	·38 4·33	·28 4·32	·19 4·32	·10 4·31	- ·01 4·31	·08 4·31
30	- '45 4'34	- ·35 4·33	- ·26 4·32	- ·16 4·32	- ·07 4·31	$ \begin{array}{ccccc} + & \cdot 02 & 4 \cdot 31 \\ - & \cdot 04 & 4 \cdot 31 \\ & \cdot 10 & 4 \cdot 31 \\ & \cdot 17 & 4 \cdot 32 \\ & \cdot 23 & 4 \cdot 32 \end{array} $
32	'52 4'34	·42 4·33	·33 4·33	·23 4·32	·14 4·31	
34	'59 4'35	·49 4·34	·40 4·33	·30 4·32	·20 4·32	
36	'67 4'37	·57 4·35	·47 4·34	·37 4·33	·27 4·32	
38	'75 4'38	·65 4·36	·54 4·35	·44 4·34	·34 4·33	
40	- ·84 4·39	- ·73 4·37	- ·62 4·36	- ·52 4·34	- '41 4'33	- ·30 4·32
42	·94 4·41	·82 4·39	·71 4·37	·59 4·35	'48 4'34	·37 4·33
44	I·04 4·44	·91 4·41	·80 4·39	·68 4·37	'56 4'35	·45 4·34
46	I·14 4·46	I·02 4·43	·89 4·40	·77 4·38	'65 4'36	·53 4·35
48	I·26 4·49	I·12 4·46	·99 4·43	·86 4·40	'74 4'38	·62 4·36
50	-1·39 4·53	-1.24 4.49	1·10 4·45	- ·97 4·42	- ·84 4·39	- ·71 4·37
52	1·53 4·58	1.38 4.53	1·23 4·48	1·08 4·45	·94 4·41	·80 4·39
54	1·69 4·63	1.52 4.57	1·36 4·52	1·21 4·48	I·05 4·44	·91 4·41

92 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 22°.

			DECLINA	ATIO	N—SAM	$E N_{2}$	AME AS	-LA	TITUDE	- 1		
True Alt.	12°	Decl. Var.		Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 19 42.4 5 35 45.3 5 27 1.7 5 18 19.1 5 9 37.3	s. + 1.69 1.53 1.51 1.49 1.47	H. M. S. 6 21 24·5 + 5 37 17·3 5 28 32·1 5 19 48·0 5 11 5·0	1·50 1·48	5 38 49·2 5 30 2·1	s. +1·72 1·53 1·50 1·47 1·44	H. M. S. 6 24 51·6 5 40 21·0 5 31 32·0 5 22 44·3 5 13 57·9	s. + 1.74 1.53 1.49 1.46 1.43	H. M. S. 6 26 36.6 5 41 52.8 5 33 1.5 5 24 11.8 5 15 23.5	s. +1·76 1·53 1·49 1·45 1·42	H. M. S. 6 28 22·9 5 43 24·6 5 34 31·0 5 25 39·0 5 16 48·5	s. + 1·78 1·53 1·49 1·45 1·41
18 20 22 24 26	5 0 56·4 4 52 16·2 4 43 36·6 4 34 57·6 4 26 19·0	+1.45 1.43 1.41 1.40 1.39	5 2 22·8 + 4 53 41·5 4 45 0·9 4 36 21·0 4 27 41·7	1.43 1.41 1.39 1.38 1.36	5 3 48·2 4 55 5·6 4 46 23·8 4 37 42·8 4 29 2·6	+1·42 1·39 1·37 1·35 1·33	5 5 12.8 4 56 28.6 4 47 45.5 4 39 3.2 4 30 21.8	+1.40 1.37 1.35 1.33 1.30	5 6 36·5 4 57 50·6 4 49 5·9 4 40 22·1 4 31 39·3	+1·39 1·36 1·33 1·30 1·28	5 7 59.4 4 59 11.7 4 50 25.1 4 41 39.7 4 32 55.2	+ 1·38 1·34 1·31 1·28 1·25
28 30 31 32 33	4 17 40.7 4 9 2.7 4 4 43.8 4 0 25.0 3 56 6.1 3 51 47.3		4 10 24·4 4 6 5·3 4 1 46·2 3 57 27·3	1·34 1·33 1·33	4 3 5.1	1·30 1·29	4 13 1.0 4 8 41.2	+1·29 1·27 1·26 1·25 1·25	4 22 57·3 4 14 16·1 4 9 55·8 4 5 35·6 4 1 15·5 3 56 55·7	+1·25 1·23 1·21 1·21 +1·20	4 II 8·2 4 6 47·4	+ 1·22 1·20 1·19 1·18 1·16 + 1·15
35 36 37 38 39	3 47 28.4 3 43 9.5 3 38 50.6 3 34 31.7 3 30 12.7	1·37 1·38 1·38 1·38	3 48 49·5 3 44 30·6 3 40 11·7 3 35 52·9 3 31 34·0 +	1·33 1·32 1·33	3 50 7.7 3 45 48.7 3 41 29.8 3 37 10.9 3 32 52.0	1·28 1·28 1·27 1·27 +1·27	3 51 23·2 3 47 4·0 3 42 44·8 3 38 25·7 3 34 6·7	1·23 1·23 1·22 1·22 +1·22	3 52 36·0 3 48 16·3 3 43 56·8 3 39 37·4 3 35 18·2	1·19 1·17 1·17 +1·16	3 53 46·0 3 49 25·9 3 45 5·9 3 40 46·1 3 36 26·3	1·14 1·14 1·12 1·12
40 41 42 43 44	3 25 53.6 3 21 34.4 3 17 15.1 3 12 55.7 3 8 36.1	1·39 1·40 1·41 +1·42		1·33 1·34 1·35	1	1·27 1·27 1·27 +1·28	3 29 47·8 3 25 28·8 3 21 10·0 3 16 51·1 3 12 32·3	1·21 1·21 +1·21	3 26 39.8 3 22 20.8 3 18 1.8 3 13 42.8	1·15 1·15 1·15 +1·14	3 32 6·8 3 27 47·3 3 23 27·9 3 19 8·6 3 14 49·4	1·10 1·09 1·09 1·08 +1·08
45 46 47 48 49	3 4 16·4 2 59 56·5 2 55 36·4 2 51 16·0 2 46 55·3	1·46 +1·47	3 I 20·3 2 57 0·8 2 52 4I·I 2 48 2I·2 +	1·36 1·37 1·38		+1.30	3 8 13·4 3 3 54·5 2 59 35·7 2 55 16·7 2 50 57·7 2 46 38·6	1·21 1·22 +1·22	3 9 23·9 3 5 5·1 3 0 46·2 2 56 27·4 2 52 8·5	1·14 1·14 1·14 +1·14	3 I 52·3 2 57 33·4	1.07 1.07 1.06 1.06 +1.06
50 51 52 53 54	2 42 34·3 2 38 12·9 2 33 51·2 2 29 29·1 2 25 6·4 2 20 43·3	1·51 1·53	2 39 40·6 2 35 20·0 2 30 58·9 2 26 37·6 +	1·41 1·43 1·45	2 36 42.8	1·32 1·35 +1·36	2 42 19.2	I·24 I·25	2 47 49.6 2 43 30.7 2 39 11.7 2 34 52.7 2 30 33.6 2 26 14.4	1·15 1·15 1·16	2 44 36·8 2 40 17·9 2 35 59·0 2 31 40·2 2 27 21·2	1.06 1.06 1.06 1.06
55 56 57 58	2 16 19·4 2 11 55·1 2 7 29·9	1.63 1.69	2 17 53·6 2 13 30·9	1·51 1·54 1·56	2 19 20·8 2 14 59·5 2 10 37·4	I·40 I·42 I·44	2 20 41·2 2 16 20·9 2 12 0·4	1·32 1·32	2 21 54·9 2 17 35·5 2 13 15·8	1·18 1·19 1·20		1·07 1·07 1·08
Alt.	L. 12°			Α.	L. 14°	A.	L. 15°	Α.	L. 16°	A.	L. 17 °	Α
° 0 4 8 12 16	·86 ·74 ·62 ·51	s. -4·43 4·40 4·38 4·36 4·34	+1.08 -4 -95 4 -83 4 -71 4 -59 4	s. -44 -42 -39 -37 -35	1.03 .91 .79 .68	s. -4·47 4·43 4·41 4·39 4·37	s. +1·25 - 1·12 1·00 ·88 ·76	s. -4·49 4·46 4·43 4·40 4·38	s. +1·34 1·21 1·08 ·96 ·85	s. -4·52 4·48 4·45 4·42 4·40	1·30 1·17 1·05 ·94	s. 4·54 4·50 4·47 4·44 4·41
20 22 24 26 28	+ ·40 ·34 ·28 ·23 ·17	4·33 4·33 4·32 4·32 4·32	*43 4 *37 4 *31 4 *26 4	1·34 1·33 1·32 1·32	+ ·57 ·51 ·46 ·40 ·35	4·35 4·34 4·33 4·33	+ ·65 ·60 ·55 ·49 ·44	4·36 4·36 4·35 4·34 4·33	+ ·74 ·69 ·63 ·58 ·53	4·38 4·37 4·36 4·35 4·35	+ ·83 ·77 ·72 ·67 ·62	4·39 4·38 4·37 4·37 4·36
30 32 34 36 38	+ ·II + ·05 - ·01 ·07 ·13 - ·20	4·32 4·31 4·31 4·32 4·32	·14 4 ·09 4 + ·03 4 - ·03 4	·32 ·32 ·31 ·31 ·32	+ ·29 ·24 ·18 ·12 ·07 + ·01	4·32 4·32 4·31 4·31 4·31	+ ·38 ·33 ·28 ·22 ·17 + ·11	4·33 4·33 4·32 4·32 4·32 4·31	+ ·48 ·42 ·37 ·32 ·27 -	4·34 4·33 4·32 4·32 4·32	+ ·57 ·52 ·47 ·42 ·36 + ·31	4·35 4·34 4·33 4·33 4·32
40 42 44 46 48	- ·20 ·27 ·34 ·41 ·49 - ·58	4·32 4·33 4·33 4·34 4·35	·16 2 ·23 2 ·30 2 ·37 4	1·32 4·32 4·32 4·33	+ ·01 - ·05 ·12 ·18 ·25 - ·33	4·31 4·32 4·32 4·32 4·33	+ ·05 - ·01 ·07 ·14 - ·20	4·31 4·31 4·31 4·32 4·32	+ ·21 ·16 ·10 + ·04 - ·02 - ·08	4·32 4·32 4·31 4·31 4·31	- 31 -26 -21 -15 -10	4·32 4·32 4·32 4·31 4·31
50 52 54 56 58	•67 •77 •87 •99	4·36 4·38 4·40 4·42	·54 ·62 ·72	4·35 4·36 4·37 4·39	- 133 -40 -49 -58 -67	4'33 4'33 4'34 4'35 4'37	·28 ·35 ·43 ·52	4·32 4·33 4·34 4·34	·15 ·22 ·29 ·37	4·32 4·32 4·32 4·33	- ·04 - ·02 ·08 ·15 ·22	4·31 4·31 4·32 4·32

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 93 LATITUDE 22°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20° "	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 30 10·4 5 44 56·6 5 36 0·3 5 27 5·8 5 18 13·0	s. + 1.80 1.53 1.49 1.44 1.40	H. M. S. 6 31 59·2 5 46 28·8 5 37 29·6 5 28 32·4 5 19 37·0	s. + 1·83 1·54 1·49 1·44 1·40	H. M. S. 6 33 49·5 5 48 1·1 5 38 58·9 5 29 58·8 5 21 0·5	s. + 1·85 1·54 1·49 1·44 1·39	H. M. S. 6 35 41·3 5 49 33·8 5 40 28·3 5 31 25·0 5 22 23·7	s. + 1.88 1.55 1.49 1.44 1.38	H. M. S. 6 37 34·7 5 51 6·9 5 41 57·9 5 32 51·2 5 23 46·6	I·55 I·49 I·43	5 43 27.6	s. + 1.94 1.56 1.50 1.43 1.37
18 20 22 24 26	5 9 21·6 5 0 31·7 4 51 43·2 4 42 55·8 4 34 9·6	+1.36 1.33 1.29 1.26 1.22	5 10 43·2 5 1 50·9 4 53 0·1 4 44 10·6 4 35 22·3	+1·35 1·31 1·27 1·23 1·20	5 12 4·0 5 3 9·2 4 54 16·0 4 45 24·1 4 36 33·5	+1.34 1.30 1.25 1.21 1.17	5 13 24·4 5 4 26·7 4 55 30·7 4 46 36·3 4 37 43·3	1.10	5 14 44·1 5 5 43·4 4 56 44·6 4 47 47·3 4 38 51·5		5 6 59·4 4 57 57·4 4 48 57·1	+1·32 1·26 1·20 1·15 1·10
28 30 31 32 33	4 25 24·4 4 16 40·2 4 12 18·4 4 7 56·9 4 3 35·5	+1·19 1·17 1·15 1·14 1·12	4 26 35·2 4 17 49·1 4 13 26·5 4 9 4·1 4 4 41·9	+1.16 1.13 1.12 1.10 1.09	4 27 44·3 4 18 56·1 4 14 32·5 4 10 9·1 4 5 46·0	+ I·14 I·10 I·08 I·06 I·05	4 28 51.6 4 20 1.1 4 15 36.3 4 11 11.8 4 6 47.6		4 2I 4·2 4 I6 38·2 4 I2 I2·4	1.01	4 31 1·2 4 22 5·3 4 17 37·9 4 13 10·8 4 8 44·0	+1.05 1.00 .98 .95 .93
34 35 36 37 38	3 59 14·4 3 54 53·4 3 50 32·6 3 46 12·0 3 41 51·6	1.08 1.10	4 0 20·0 3 55 58·2 3 51 36·6 3 47 15·3 3 42 54·2	I.03	4 I 23.0 3 57 0.3 3 52 37.9 3 48 I5.7 3 43 53.7		4 2 23.6 3 57 59.9 3 53 36.4 3 49 13.2 3 44 50.2	·95 ·93	4 3 21.8 3 58 56.9 3 54 32.3 3 50 7.8 3 45 43.7	.89	4 4 17.5 3 59 51.3 3 55 25.3 3 50 59.7 3 46 34.2	+ ·91 ·88 ·86 ·84 ·82
39 40 41 42 43	3 37 31·4 3 33 11·2 3 28 51·2 3 24 31·4 3 20 11·7	I·04 I·03	3 38 33·2 3 34 12·4 3 29 51·8 3 25 31·3 3 21 10·9	+1.00 .99 .98 .97	3 39 31·8 3 35 10·2 3 30 48·8 3 26 27·6 3 22 6·5		3 40 27.4 3 36 4.8 3 31 42.4 3 27 20.3 3 22 58.3	∙86	3 41 19·8 3 36 56·1 3 32 32·7 3 28 9·4 3 23 46·4	+ ·85 ·83 ·81 ·79 ·77	3 42 9·I 3 37 44·I 3 33 I9·4 3 28 55·0 3 24 30·7	+ ·79 ·77 ·75 ·73 ·71
44 45 46 47 48	3 15 52·1 3 11 32·6 3 7 13·2 3 2 53·9 2 58 34·7	+1.01 1.00 1.00 .99	3 16 50·8 3 12 30·8 3 8 10·9 3 3 51·1 2 59 31·5	+ ·95 ·94 ·93 ·92 ·91	3 17 45·6 3 13 24·9 3 9 4·3 3 4 43·9 3 0 23·6	+ ·88 ·87 ·85 ·84 ·83	3 18 36·5 3 14 14·9 3 9 53·5 3 5 32·2 3 1 11·1	+ ·82 ·80 ·78 ·77 ·75	3 19 23.6 3 15 0.9 3 10 38.4 3 6 16.2 3 1 54.0	+ ·75 ·73 ·71 ·70 ·68	3 20 6·7 3 15 42·8 3 11 19·1 3 6 55·7 3 2 32·4	+ ·68 ·66 ·64 ·62 ·60
51 52	2 54 15·6 2 49 56·5 2 45 37·5 2 41 18·6 2 36 59·7	·97 ·97 ·97	2 55 II·9 2 50 52·4 2 46 33·I 2 42 I3·8 2 37 54·7		2 56 3·4 2 51 43·4 2 47 23·5 2 43 3·7 2 38 44·I	+ ·82 ·81 ·80 ·79 ·78	2 56 50·2 2 52 29·4 2 48 8·7 2 43 48·2 2 39 27·8	+ ·74 ·72 ·71 ·70 ·68	2 57 32·I 2 53 I0·4 2 48 48·7 2 44 27·3 2 40 5·9	+ .66 .64 .62 .61	2 58 9·3 2 53 46·3 2 49 23·5 2 45 0·9 2 40 38·4	+ ·58 ·56 ·54 ·51 ·49
57	2 32 40·8 2 28 21·9 2 24 3·1 2 19 44·3 2 15 25·4		2 33 35·6 2 29 16·5 2 24 57·5 2 20 38·6 2 16 19·7	+ ·86 ·86 ·85 ·85 ·85	2 34 24·5 2 30 5·0 2 25 45·7 2 21 26·4 2 17 7·2	+ ·77 ·76 ·75 ·74 ·73	2 35 7.6 2 30 47.4 2 26 27.4 2 22 7.5 2 17 47.7	.63	2 35 44.8 2 31 23.8 2 27 2.8 2 22 42.1 2 18 21.4	. 52	2 36 16·1 2 31 53·9 2 27 31·8 2 23 9·9 2 18 48·1	+ ·47 ·45 ·43 ·41 ·39
		V	ARIATIO	ON TO	ı' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α.	L. 22°	Α.	L. 23°	Α.
0 4 8 12 16	s. +1·52 - 1·38 1·26 1·14 1·02	s. -4·57 4·53 4·49 4·46 4·43	s. +1.62 - 1.48 1.35 1.22 1.11	s. -4.61 4.56 4.52 4.48 4.45	s. +1·71 - 1·57 1·43 1·31 1·20	s. -4·64 4·59 4·55 4·51 4·48	s. +1.81 - 1.66 1.53 1.40 1.29	s. -4·67 4·62 4·58 4·54 4·50	s. +1·90 - 1·75 1·62 1·49 1·38	s. -4·71 4·66 4·61 4·56 4·53	s. +2.00 - 1.85 1.71 1.58 1.47	s. -4·75 4·69 4·64 4·59
20 22 24 26 28	+ ·91 ·86 ·81 ·76 ·71	4·41 4·40 4·39 4·38 4·37	+1·00 ·95 ·90 ·85 ·80	4·43 4·42 4·41 4·40 4·39	+1.09 1.04 .99 .94 .89	4·45 4·44 4·43 4·41 4·40	+1·18 1·08 1·03 ·99	4·47 4·46 4·45 4·44 4·42	+1·27 1·22 1·17 1·12 1·08	4·50 4·48 4·47 4·46 4·45	+1·36 1·31 1·26 1·22 1·17	4·52 4·51 4·49 4·48 4·47
30 32 34 36 38	+ ·66 ·61 ·56 ·51 ·46	4·36 4·36 4·35 4·34 4·34	+ ·75 ·71 ·66 ·61 ·56	4·38 4·37 4·36 4·36 4·35	+ ·85 ·80 ·75 ·71 ·66	4·40 4·39 4·38 4·37 4·36	+ ·94 ·90 ·85 ·81 ·77	4·42 4·40 4·40 4·39 4·38	+1.03 .99 .95 .91 .87	4·44 4·43 4·42 4·41 4·40	+ 1·13 1·09 1·05 1·01 ·97	4·46 4·45 4·44 4·43 4·42
40 42 44 46 48	+ ·42 ·37 ·32 ·26 ·21	4·33 4·33 4·32 4·32	+ ·52 ·47 ·42 ·38 ·33	4·34 4·33 4·33 4·33	+ ·62 ·58 ·53 ·49 ·44	4·36 4·35 4·34 4·34	+ ·72 ·68 ·64 ·60 ·56	4·37 4·36 4·36 4·35	+ ·83 ·79 ·75 ·71 ·68	4·39 4·39 4·37 4·37	+ ·93 ·89 ·86 ·83 ·79	4·41 4·40 4·40 4·39 4·39
50 52 54 56 58	+ ·16 ·10 + ·05 - ·01 ·08	4·32 4·31 4·31 4·31	+ ·28 ·23 ·18 ·12 ·07	4·32 4·32 4·32 4·31	+ ·40 ·35 ·31 ·26 ·21	4·33 4·33 4·32 4·32	+ ·52 ·48 ·44 ·40 ·36	4·35 4·34 4·33 4·33	+ ·64 ·61 ·57 ·54 ·50	4·36 4·35 4·35 4·34	+ ·76 ·73 ·70 ·67 ·65	4·38 4·38 4·37 4·37 4·36

94 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 23°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl Var.
° 0 10 12 14 16	H. M. S. 6 0 0.0 5 16 30.3 5 7 47.1 4 59 3.1 4 50 18.2	s. +1·70 1·73 1·74 1·76 1·78	H. M. S. 6 1 41·9 5 18 13·6 5 9 31·1 5 0 48·0 4 52 4·2	S. + 1·70 1·71 1·72 1·74 1·75	H. M. S. 6 3 23.9 5 19 56.0 5 11 14.0 5 2 31.6 4 53 48.7	S. +1·70 1·70 1·71 1·72 1·73	H. M. S. 6 5 5.9 5 21 37.6 5 12 56.0 5 4 14.0 4 55 31.8	S. + 1·70 1·69 1·70 1·71	H. M. S. 6 6 48·2 5 23 18·4 5 14 36·9 5 5 55·5 4 57 13·6	s. + 1·71 1·67 1·67 1·68 1·68	H. M. S. 6 8 30·8 5 24 58·5 5 16 17·0 5 7 35·6 4 58 54·0	s. + 1·71 1·66 1·66 1·66
18 20 22 24 26	4 41 32·3 4 32 45·2 4 23 56·7 4 15 6·5 4 6 14·5	+1.80 1.83 1.86 1.89 1.93	4 43 19·6 4 34 33·9 4 25 47·1 4 16 58·8 4 8 9·0	+1.77 1.79 1.82 1.85 1.88	4 45 5·I 4 36 20·7 4 27 35·3 4 18 48·8 4 10 0·8	+ 1.74 1.76 1.79 1.81 1.84	4 46 49·1 4 38 5·7 4 29 21·5 4 20 36·3 4 11 50·0	+ 1·72 1·73 1·75 1·77 1·80	4 31 5.6 4 22 21.6	+ 1.69 1.70 1.72 1.74 1.76	4 50 12·3 4 41 30·3 4 32 47·9 4 24 4·9 4 15 21·1	+1.67 1.68 1.69 1.70 1.72
28 29 30 31 32	3 57 20·4 3 52 52·5 3 48 23·9 3 43 54·6 3 39 24·6	+1.97 2.00 2.02 2.05 2.07	3 59 17.4 3 54 50.7 3 50 23.6 3 45 55.8 3 41 27.3	+1.92 1.94 1.97 1.99 2.01	3 47 53·5 3 43 26·5	+1.87 1.89 1.91 1.93 1.96	4 3 2·4 3 58 38·0 3 54 13·2 3 49 48·0 3 45 22·2	+1.83 1.84 1.86 1.88 1.90	3 56 3·4 3 51 39·2	+1.78 1.80 1.81 1.83 1.84	4 6 36·4 4 2 13·8 3 57 50·7 3 53 27·4 3 49 3·7	+1.74 1.75 1.76 1.78 1.79
33 34 35 36 37	3 34 53.8 3 30 22.1 3 25 49.5 3 21 16.0 3 16 41.3	+2·10 2·14 2·17 2·20 2·24	3 36 58·2 3 32 28·3 3 27 57·6 3 23 26·1 3 18 53·6	+2.04 2.07 2.10 2.13 2.17	3 25 31·9 3 21 1·3	+1.98 2.01 2.03 2.06 2.09	3 40 55.9 3 36 29.1 3 32 1.6 3 27 33.5 3 23 4.7	+1.92 1.94 1.97 1.99 2.02	3 29 31·2 3 25 3·9	1.95	3 44 39.7 3 40 15.2 3 35 50.3 3 31 25.0 3 26 59.0	+ 1.81 1.83 1.84 1.86 1.89
38 39 40 41 42	3 12 5.5 3 7 28.5 3 2 50.2 2 58 10.5 2 53 29.1	+2·28 2·32 2·37 2·42 2·47	3 14 20·1 3 9 45·6 3 5 9·8 3 0 32·8 2 55 54·5	+2·20 2·24 2·28 2·33 2·37	3 16 29·9 3 11 57·6 3 7 24·2 3 2 49·7 2 58 14·0	+ 2·12 2·16 2·20 2·24 2·28	3 18 35·2 3 14 4·7 3 9 33·5 3 5 1·2 3 0 27·9	+2.05 2.08 2.11 2.15 2.19	3 2 36.5	+1.98 2.00 2.03 2.07 2.10	3 22 32·6 3 18 5·5 3 13 37·8 3 9 9·3 3 4 40·1	+ 1.91 1.93 1.96 1.99 2.02
43 44 45 46 47	2 48 46·1 2 44 1·3 2 39 14·4 2 34 25·3 2 29 33·8	+2·53 2·59 2·65 2·72 2·80	2 51 14·6 2 46 33·2 2 41 49·9 2 37 4·8 2 32 17·5	+2·42 2·48 2·54 2·60 2·66	2 53 37·0 2 48 58·6 2 44 18·7 2 39 37·1 2 34 53·6	+2·32 2·37 2·42 2·48 2·54	2 55 53·5 2 51 17·9 2 46 40·9 2 42 2·5 2 37 22·5	2.42	2 53 31·3 2 48 57·0 2 44 21·4 2 39 44·4	+2:14 2:18 2:22 2:26 2:31	3 0 10·1 2 55 39·1 2 51 7·1 2 46 34·1 2 41 59·9	+2.05 2.08 2.12 2.16 2.21
48 49 50 51 52	2 24 39·6 2 19 42·4 2 14 41·9 2 9 37·7 2 4 29·4	+2.88 2.96 3.05 3.14 3.24	2 27 27·9 2 22 35·7 2 17 40·7 2 12 42·6 2 7 40·9		2 20 30·4 2 15 37·5	+2.61 2.68 2.75 2.84 2.93	2 32 40·7 2 27 57·0 2 23 11·2 2 18 23·1 2 13 32·4	+ 2·48 2·54 2·61 2·69 2·77	2 25 44·0 2 2I 0·0	2.55	2 37 24·4 2 32 47·5 2 28 9·0 2 23 28·8 2 18 46·7	+2·25 2·30 2·36 2·41 2·48

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
	- ·00 -4·34	+ ·08 -4·34	+ ·16 -4·35	+ ·25 -4·35	+ ·33 -4·36	+ '41 -4'36
	·06 4·35	+ ·02 4·34	·10 4·35	·18 4·35	·26 4·35	'35 4'36
	·13 4·35	- ·05 4·34	+ ·04 4·34	·11 4·35	·20 4·35	'28 4'35
	·19 4·35	·11 4·35	- ·03 4·34	+ ·05 4·35	·14 4·35	'22 4'35
	·26 4·35	·18 4·35	·09 4·34	- ·01 4·34	·07 4·35	'15 4'35
10	- ·32 4·36	- ·24 4·35	- ·16 4·35	- ·07 4·34	+ ·00 4·34	+ ·09 4·35
12	·39 4·36	·31 4·36	·22 4·35	·14 4·35	- ·05 4·34	+ ·03 4·34
14	·46 4·37	·38 4·36	·29 4·35	·21 4·35	·12 4·35	- ·03 4·34
16	·53 4·38	·45 4·37	·35 4·36	·27 4·35	·19 4·35	·10 4·34
18	·60 4·39	·52 4·38	·42 4·36	·34 4·36	·25 4·35	·17 4·35
20	- ·68 4·40	- ·60 4·38	- ·49 4·37	- ·40 4·36	- ·33 4·35	- ·23 4·35
22	·76 4·41	·66 4·39	·58 4·38	·48 4·37	·39 4·36	·30 4·35
24	·84 4·42	·74 4·41	·65 4·39	·55 4·38	·47 4·37	·37 4·36
26	·91 4·44	·83 4·42	·73 4·41	·63 4·39	·54 4·38	·44 4·37
28	I·01 4·46	·90 4·44	·81 4·42	·71 4·40	·62 4·39	·52 4·37
30	-1·10 4·48	-1.00 4.45	·89 4·43	- ·79 4·41	- ·70 4·40	- ·59 4·38
32	1·19 4·50	1.09 4.48	·99 4·45	·89 4·43	·77 4·41	·67 4·40
34	1·30 4·53	1.29 4.50	I·07 4·48	·96 4·45	·87 4·43	·76 4·41
36	1·41 4·57	1.29 4.53	I·18 4·50	I·06 4·47	·95 4·45	·85 4·43
38	1·53 4·60	1.40 4.56	I·28 4·53	I·17 4·50	I·05 4·47	·94 4·44
40	-1.66 4.65	-1.53 4.61	-1·40 4·56	-1·28 4·53	-1·16 4·49 1·27 4·52 1·39 4·56 1·52 4·60 1·67 4·65	-1.04 4.47
42	1.80 4.70	1.66 4.65	1·52 4·60	1·39 4·56		1.14 4.49
44	1.95 4.76	1.81 4.71	1·66 4·65	1·52 4·60		1.26 4.52
46	2.13 4.84	1.97 4.77	1·81 4·71	1·66 4·65		1.38 4.56
48	2.32 4.93	2.15 4.85	1·98 4·78	1·82 4·71		1.52 4.60
50	-2·55 5·04	-2·36 4·94	-2·17 4·86	-2·00 4·78	-1.83 4.72	-1.67 4.66
52	2·81 5·18	2·60 5·06	2·39 4·96	2·20 4·87	2.01 4.79	1.84 4.72

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 95 LATITUDE 23°.

	DECLINATION—SAME NAME AS—LATITUDE.											
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. H. S. 6 10 13.7 5 26 38.1 5 17 56.3 5 9 14.8 5 0 33.3	S. +1·72 1·65 1·65 1·64 1·64	H. M S. 6 11 57.0 5 28 17.1 5 19 34.9 5 10 53.1 5 2 11.5	s. +1·72 1·65 1·64 1·63 1·63	H. M. S. 6 13 40·8 5 29 55·7 5 21 12·8 5 12 30·5 5 3 48·6	s. +1·73 1·64 1·63 1·62 1·61	5 14 7·1 5 5 24·6	s. +1·74 1·63 1·62 1·60 1·59	H. M. S. 6 17 10·2 5 33 11·5 5 24 26·9 5 15 43·0 5 6 59·8	s. + 1·76 1·63 1·61 1·59	H. M. S. 6 18 56·0 5 34 48·9 5 26 3·1 5 17 18·2 5 8 34·0	s. +1.77 1.62 1.60 1.58 1.56
18 20 22 24 26	4 51 51·9 4 43 10·2 4 34 28·3 4 25 46·0 4 17 3·2	+ 1.65 1.65 1.66 1.67 1.68	4 53 30·0 4 44 48·5 4 36 7·0 4 27 25·1 4 18 43·0	+ 1.62 1.63 1.63 1.64 1.64	4 55 6·9 4 46 25·4 4 37 43·9 4 29 2·4 4 20 20·7	+ 1.60 1.60 1.60 1.61	4 56 42.6 4 48 0.8 4 39 19.3 4 30 37.8 4 21 56.4	+1.58 1.58 1.58 1.57 1.58	4 58 17·2 4 49 35·0 4 40 53·1 4 32 11·4 4 23 30·0	+1.57 1.56 1.55 1.55 1.54	4 59 50·6 4 51 7·7 4 42 25·4 4 33 43·4 4 25 1·7	+ 1.55 1.54 1.53 1.52 1.51
28 30 32 33 34	4 8 19·6 3 59 35·2 3 50 49·8 3 46 26·7 3 42 3·1	+ 1·70 1·72 1·74 1·76 1·77	4 10 0.4 4 1 17.0 3 52 32.9 3 48 10.5 3 43 47.8	+1.66 1.67 1.69 1.70 1.72	4 II 38·7 4 2 56·2 3 54 I3·I 3 49 5I·3 3 45 29·2	+ 1.62 1.63 1.65 1.65 1.66	4 13 14·7 4 4 32·8 3 55 50·5 3 51 29·1 3 47 7·6	+ 1·58 1·59 1·60 1·61 1·61	4 14 48·5 4 6 7·0 3 57 25·2 3 53 4·1 3 48 43·1	+ 1·54 1·55 1·56 1·56 1·56	4 16 20·1 4 7 38·7 3 58 57·3 3 54 36·4 3 50 15·5	+ 1·51 1·51 1·51 1·51 1·52
35 36 37 38 39	3 37 39·3 3 33 15·0 3 28 50·3 3 24 25·1 3 19 59·4	+1.79 1.80 1.82 1.84 1.86	3 39 24.8 3 35 1.5 3 30 37.8 3 26 13.7 3 21 49.2	+1·73 1·74 1·76 1·78 1·80	3 41 7·0 3 36 44·5 3 32 21·7 3 27 58·5 3 23 35·0	+ 1.68 1.69 1.70 1.71 1.73		+ 1.62 1.63 1.64 1.65 1.67	3 44 21.8 3 40 0.4 3 35 38.9 3 31 17.1 3 26 55.2		3 37 12·4 3 32 51·2	+1.52 1.53 1.53 1.54 1.55
40 41 42 43 44	3 15 33·1 3 11 6·3 3 6 38·8 3 2 10·5 2 57 41·5	+1.89 1.91 1.94 1.97 2.00	3 17 24·2 3 12 58·7 3 8 32·7 3 4 6·1 2 59 38·8	+1.82 1.84 1.86 1.89 1.91	3 19 11·1 3 14 46·8 3 10 22·1 3 5 56·8 3 1 31·0	+1.75 1.77 1.79 1.81 1.83	3 20 54·0 3 16 30·7 3 12 7·1 3 7 43·0 3 3 18·5	+1.68 1.70 1.71 1.73 1.75	3 22 33·0 3 18 10·5 3 13 47·8 3 9 24·7 3 5 1·3	1.64	3 24 8·1 3 19 46·3 3 15 24·3 3 11 2·1 3 6 39·6	+1.55 1.56 1.57 1.59 1.60
45 46 47 48 49	2 53 11·7 2 48 40·9 2 44 9·1 2 39 36·2 2 35 2·1	+2.03 2.06 2.10 2.14 2.19	2 55 10·8 2 50 42·0 2 46 12·3 2 41 41·7 2 37 10·2	+1.94 1.97 2.01 2.04 2.08	2 57 4·6 2 52 37·6 2 48 9·8 2 43 4I·3 2 39 II·9	+1.86 1.88 1.91 1.94 1.98	2 58 53·5 2 54 28·0 2 50 1·8 2 45 35·0 2 41 7·6	+1.77 1.80 1.82 1.85 1.88	3 0 37·5 2 56 13·2 2 51 48·5 2 47 23·2 2 42 57·4	+1.69 1.71 1.73 1.76 1.78	3 2 16·7 2 57 53·5 2 53 30·0 2 49 6·0 2 44 41·5	+1.62 1.63 1.65 1.67 1.69
50 51 52 53 54	2 30 26.7 2 25 49.8 2 21 11.4 2 16 31.1 2 11 48.9	2.41	2 32 37.4 2 28 3.5 2 23 28.2 2 18 51.4 2 14 12.9	+2·12 2·17 2·22 2·27 2·33	2 34 41.6 2 30 10.2 2 25 37.7 2 21 3.9 2 16 28.8	+2.01 2.06 2.10 2.15 2.20	2 36 39·3 2 32 10·2 2 27 40·1 2 23 9·0 2 18 36·7	+1.91 1.95 1.98 2.03 2.07	2 38 30·9 2 34 3·8 2 29 35·8 2 25 7·0 2 20 37·3	1.91		+ 1.71 1.74 1.77 1.80 1.83
		V	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUE	E.	•	
Alt.	L. 6°	A.	L. 7°	Α.	L. 8°	Α.	L. 9°	Α.	L. 10	° A.	L. 11°	. A.
0 2 4 6 8	s. + ·50 ·43 ·37 ·30 ·24	s. -4·37 4·36 4·36 4·36 4·35	s. + ·58 - ·51 ·45 ·38 ·32	s. -4·38 4·38 4·37 4·36 4·36	s. + .66 - .60 .53 .47 .40	s. -4·39 4·39 4·38 4·37 4·36	s. + ·75 ·68 ·62 ·55 ·49	s. -4·41 4·40 4·39 4·38 4·37	s. + ·83 ·77 ·70 ·63 ·57	s. -4·42 4·41 4·40 4·39 4·38	s. + ·92 ·85 ·78 ·72 ·66	s. -4·44 4·43 4·41 4·40 4·39
10 12 14 16 18	+ ·17 ·11 + ·05 - ·02 ·08	4·35 4·35 4·34 4·34 4·34	+ ·26 ·20 ·13 ·07 + ·00	4·35 4·35 4·35 4·34	+ ·34 ·28 ·22 ·15 ·09	4·36 4·35 4·35 4·35 4·35	+ '43 ·36 ·30 ·24 ·18	4·37 4·36 4·35 4·35 4·35	+ ·51 ·45 ·38 ·32 ·26	4·38 4·37 4·36 4·36 4·35	+ ·60 · ·53 ·47 ·41 ·35	4·39 4·38 4·37 4·36 4·36
20 22 24 26 28	- ·15 ·21 ·28 ·35 ·42	4·35 4·35 4·36 4·36	- ·06 ·12 ·19 ·26 ·33	4·34 4·35 4·35 4·36	+ ·03 - ·03 ·10 ·17 ·23	4·34 4·34 4·35 4·35	+ ·II + ·05 - ·01 ·08 ·14	4·35 4·34 4·34 4·35	+ ·20 ·14 ·07 + ·01 - ·05	4·35 4·35 4·34 4·34	+ ·29 ·23 ·16 ·10 + ·04	4·35 4·35 4·35 4·34
30 32 34 36 38	- ·50 ·58 ·66 ·74 ·83	4·37 4·38 4·39 4·41 4·42	- ·40 ·48 ·55 ·63 ·72	4·36 4·37 4·38 4·39 4·40	- ·31 ·38 ·45 ·53 ·61	4·35 4·36 4·37 4·38 4·39	- ·21 ·28 ·35 ·43 ·51	4·35 4·36 4·37 4·37	- ·12 ·18 ·25 ·33 ·40	4·34 4·35 4·35 4·36 4·36	- ·02 ·09 ·15 ·22 ·30	4·34 4·34 4·35 4·35 4·35
40 42 44 46 48	- ·92 I·02 I·13 I·25 I·38	4·44 4·46 4·49 4·52 4·56	- ·81 ·91 I·01 I·12 I·24	4·42 4·44 4·46 4·49 4·52	- ·70 ·79 ·89 ·99 I·10	4·40 4·41 4·43 4·46 4·48	- ·59 ·67 ·77 ·86 ·97	4·38 4·40 4·41 4·43 4·45	- ·48 ·56 ·65 ·74 ·84	4·37 4·38 4·39 4·41 4·43	- ·37 ·45 ·53 ·62 ·71	4·36 4·37 4·38 4·39 4·40
=0	- T.F.O	4.60	_ T.27	4.56	_ 7.22	ALET	_ T.OS	4.48	Io.	4.40	.0-	4.40

4.48

4·51 4·55

-1.08

1.21

1.34

4.51 4.55 4.60

- I·22

1·36 1·50

1·51 1·67

- I·37

4·56 4·60 4·66

4·60 4·66

4.72

-1·52 1·67

1.85

50

52

·81

.92

1.04

4·42 4·44 4·47

4·45 4·47 4·50

· 94 1·06

1.19

96 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 23°.

			DECLIN	AIIC	M— SAM	E IV	AME AS	-LA	TITUDE	•		
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 20 42.4 5 36 26.2 5 27 39.0 5 18 52.8 5 10 7.5	s. + 1·78 1·62 1·59 1·57	H. M. S. 6 22 29.7 5 38 3.2 5 29 14.4 5 20 26.8 5 11 40.2	s. +1.80 1.62 1.59 1.56 1.54	H. M. S. 6 24 18·1 5 39 40·2 5 30 49·6 5 22 0·2 5 13 12·2	s. + 1·81 1·61 1·58 1·55	H. M. S. 6 26 7.4 5 41 17.2 5 32 24.5 5 23 33.3 5 14 43.5	1.61 1.58 1.55	H. M. S. 6 27 57.9 5 42 54.2 5 33 59.3 5 25 6.0 5 16 14.2	1.62 1.58 1.54	H. M. S. 6 29 49.6 5 44 31.3 5 35 34.0 5 26 38.4 5 17 44.4	s. +1.87 1.62 1.58 1.54 1.50
18 20 22 24 26	5 I 23·I 4 52 39·3 4 43 56·3 4 35 I3·7 4 26 3I·6	+ 1.53 1.52 1.50 1.49 1.48	5 2 54·6 4 54 9·8 4 45 25·8 4 36 42·4 4 27 59·6	1.48	5 4 25·I 4 55 39·I 4 46 54·0 4 38 9·5 4 29 25·9	+1.50 1.48 1.46 1.44 1.42	5 5 54·8 4 57 7·3 4 48 20·8 4 39 35·2 4 30 50·4	I:44 I:41	5 7 23.8 4 58 34.6 4 49 46.5 4 40 59.4 4 32 13.3	1.39		+1.46 1.43 1.40 1.37 1.34
28 30 31 32 33	4 17 49·7 4 9 8·1 4 4 47·4 4 0 26·7 3 56 6·0	1.47	4 19 17·2 4 10 35·3 4 6 14·4 4 1 53·6 3 57 32·8	+1·44 1·43 1·43 1·43 1·43		1.40 1.39 1.38	4 22 6·4 4 13 23·0 4 9 1·5 4 4 40·1 4 0 18·9	1·36 1·35 1·34	4 I 38·2	1·33 1·32 1·31 1·30	4 2 55·I	+1·31 1·29 1·28 1·27 1·26
34 35 36 37 38	3 51 45·2 3 47 24·4 3 43 3·6 3 38 42·7 3 34 21·8	1.48	3 53 12·1 3 48 51·4 3 44 30·6 3 40 9·8 3 35 49·1	1·42 1·42 1·43	3 54 36·3 3 50 15·4 3 45 54·6 3 41 33·9 3 37 13·1	1.38	3 55 57.7 3 51 36.7 3 47 15.7 3 42 54.9 3 38 34.0	I.33	3 57 16·7 3 52 55·3 3 48 34·0 3 44 12·8 3 39 51·7	1·29 1·28 1·27 1·27	3 58 33.0 3 54 11.2 3 49 49.4 3 45 27.8 3 41 6.4	+1·25 1·24 1·23 1·22 1·22
39 40 41 42 43	3 30 0·8 3 25 39·6 3 21 18·3 3 16 56·9 3 12 35·3	1·49 1·50 1·51 1·52		1·43 1·44 1·45	3 32 52·4 3 28 31·7 3 24 10·9 3 19 50·1 3 15 29·3		3 34 13·2 3 29 52·5 3 25 31·7 3 21 11·0 3 16 50·3	1.32	3 26 49·0 3 22 28·2 3 18 7·4	1.25	3 36 45·1 3 32 23·8 3 28 2·7 3 23 41·6 3 19 20·7	+1·21 1·20 1·20 1·19 1·19
44 45 46 47 48	3 8 13·4 3 3 51·4 2 59 29·1 2 55 6·5 2 50 43·5	1·57 1·58	3 9 43.0 3 5 21.6 3 0 59.9 2 56 38.1 2 52 16.0	1·48 1·49 1·50	3 II 8·3 3 6 47·3 3 2 26·I 2 58 4·8 2 53 43·4		3 12 29·5 3 8 8·7 3 3 47·9 2 59 27·0 2 55 6·0	+1·32 1·32 1·33 1·33 1·34	3 13 46·6 3 9 25·9 3 5 5·2 3 0 44·5 2 56 23·7	1·25 1·25 1·26	3 14 59·8 3 10 38·9 3 6 18·2 3 1 57·4 2 57 36·7	+1·19 1·18 1·18 1·18
49 50 51 52 53	2 46 20·3 2 41 56·6 2 37 32·8 2 33 7·9 2 28 42·7	1·62 1·64 1·66	2 47 53.6 2 43 31.0 2 39 8.0 2 34 44.6 2 30, 20.8	1·53 1·54 1·56	2 44 59.9 2 40 37.8 2 36 15.5 2 31 52.8	1·44 1·45 1·47 1·48	2 50 44·8 2 46 23·5 2 42 2·1 2 37 40·5 2 33 18·7		2 52 2·9 2 47 42·0 2 43 20·9 2 38 59·9 2 34 38·7	I·27 I·28	2 53 16·0 2 48 55·2 2 44 34·5 2 40 13·7 2 35 52·8	+1·18 1·18 1·18 1·18
54 55 56 57 58	2 24 16·9 2 19 50·5 2 15 23·3 2 10 55·2 2 6 26·2	1·78 1·82	2 25 56·6 2 21 31·8 2 17 6·4 2 12 40·4 2 8 13·7	1.66	2 27 29·8 2 23 6·4 2 18 42·5 2 14 18·2 2 9 53·2	1·52 1·54 1·57	2 28 56·6 2 24 34·3 2 20 11·6 2 15 48·6 2 11 25·2	1.43	2 30 17·3 2 25 55·7 2 21 33·9 2 17 11·9 2 12 49·7	1.32	2 31 31·9 2 27 10·9 2 22 49·7 2 18 28·3 2 14 6·9	+1·19 1·20 1·21 1·22 1·23
		V	ARIATIO	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 12°	Α.	L. 13°	Α.	L. 14°	Α.	L. 15°	A.	L. 16°	Α.	L. 17°	A.
° 0 4 8 12 16	·87 ·74 ·62 ·49	s. -4·46 4·43 4·41 4·39 4·37	·96 ·82 ·70 ·58	s. -4·48 4·45 4·42 4·40 4·38	1·04 ·91 ·79 ·66	s. -4·50 4·47 4·44 4·42 4·39	1·13 1·00 ·87 ·75	s. -4·53 4·49 4·46 4·43 4·41	1·22 1·08 ·96 ·84	s. -4·55 4·51 4·48 4·45 4·42	1·31 1·17 1·05 ·92	s. -4·58 4·54 4·50 4·47 4·44
20 22 24 26 28	+ ·37 ·31 ·25 ·19 ·13	4·36 4·35 4·35 4·35	+ ·46 + ·40 -34 -28 -22	4·37 4·36 4·36 4·35 4·35	+ ·55 - ·49 ·43 ·37 ·31	-4·38 4·37 4·37 4·36 4·36	+ ·63 ·57 ·52 ·46 ·40	4·39 4·38 4·37 4·36	+ ·72 ·66 ·61 ·55 ·49	4·40 4·39 4·38 4·37	+ ·81 ·75 ·70 ·64 ·59	4·42 4·41 4·40 4·39 4·38
30 32 34 36 38	+ ·07 + ·00 - ·06 - ·13 - ·19	4·35 4·34 4·35 4·35	+ ·16 ·10 + ·04 - ·02 ·09	4·35 4·35 4·34 4·34 4·35	+ ·25 ·19 ·13 ·07 + ·01	4·35 4·35 4·35 4·35	+ ·35 ·29 ·23 ·17 ·11	4·36 4·35 4·35 4·35 4·35	+ '44 ' '38 '33 '27 '21	4·37 4·36 4·36 4·35 4·35	+ ·53 ·48 ·42 ·37 ·31	4·38 4·37 4·37 4·36 4·36
40 42 44 46 48	- ·26 ·34 ·42 ·50 ·59	4·35 4·36 4·37 4·37 4·38	- ·16 ·23 ·31 ·38 ·46	4·35 4·35 4·36 4·36 4·37	- ·05 ·12 ·19 ·27 ·34	4·34 4·35 4·35 4·36	+ ·05 - ·01 ·08 ·15 ·22	4·34 4·35 4·35 4·35	+ ·15 ·09 + ·03 - ·04 ·10	4·35 4·35 4·35 4·35 4·35	+ ·25 ·20 ·14 + ·08 - ·01	4·35 4·35 4·35 4·35 4·35
50 52 54 56 58	- ·68 ·78 ·89 I·00 I·14	4·40 4·42 4·43 4·46 4·48	- ·55 ·64 ·74 ·85 ·97	4·38 4·39 4·41 4·43 4·45	- ·42 ·51 ·60 ·70 ·81	4·37 4·37 4·39 4·40 4·42	- ·30 ·38 ·46 ·55 ·65	4·36 4·36 4·37 4·38 4·39	- ·17 ·25 ·33 ·41 ·50	4·35 4·36 4·36 4·37	- ·05 ·12 ·19 ·27 ·35	4·35 4·35 4·35 4·36

LATITUDE 23°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 31 42.6 5 46 8.5 5 37 8.6 5 28 10.5 5 19 14.1	s. +1.89 1.62 1.58 1.53 1.49	5 47 46·0 5 38 43·I	s. +1.92 1.63 1.58 1.53 1.48	H. M. S. 6 35 33.0 5 49 23.8 5 40 17.8 5 31 14.1 5 22 12.4	s. +1.95 1.63 1.58 1.53 1.48	H. M. S. 6 37 30·6 5 51 1·8 5 41 52·6 5 32 45·7 5 23 40·9	s. + 1.97 1.64 1.58 1.53 1.47	H. M. S. 6 39 30·0 5 52 40·4 5 43 27·6 5 34 17·3 5 25 9·2	s. +2.00 1.65 1.58 1.53 1.47	H. M. S. 6 41 31·3 5 54 19·5 5 45 2·9 5 35 48·9 5 26 37·4	s. +2.04 1.66 1.59 1.53 1.47
18 20 22 24 26	5 10 19·4 5 1 26·2 4 52 34·4 4 43 43·8 4 34 54·4	1.35	4 53 56.7	+ 1.44 1.40 1.36 1.32 1.29	5 13 12·5 5 4 14·4 4 55 17·9 4 46 22·9 4 37 29·3	+1.43 1.39 1.34 1.30 1.27	5 14 38·2 5 5 37·3 4 56 38·1 4 47 40·6 4 38 44·5	+ 1·42 1·37 1·33 1·28 1·24	5 16 3·4 5 6 59·4 4 57 57·4 4 48 57·1 4 39 58·4	1.26	5 17 28·1 5 8 21·0 4 59 15·8 4 50 12·4 4 41 10·8	+ 1.41 1.35 1.30 1.25 1.19
28 30 31 32 33	4 26 6·1 4 17 18·8 4 12 55·5 4 8 32·4 4 4 9·5	+1.29 1.26 1.24 1.23 1.22	4 14 9·2 4 9 45·3		4 28 37·0 4 19 4 6 ·0 4 15 20·8 4 10 56·0 4 6 31·4	1.18	4 29 50·0 4 20 56·6 4 16 30·4 4 12 4·5 4 7 38·8	+1.20 1.16 1.14 1.12 1.10	4 31 1·2 4 22 5·3 4 17 37·9 4 13 10·8 4 8 44·0	1.09	4 32 10·7 4 23 12·2 4 18 43·4 4 14 15·0 4 9 46·9	+ 1·14 1·10 1·07 1·05 1·03
34 35 36 37 38	3 59 46·9 3 55 24·4 3 51 2·1 3 46 39·9 3 42 18·0	1·19		1.14	3 48 55.5	1.10	4 3 13·5 3 58 48·4 3 54 23·6 3 49 59·0 3 45 34·6	1.03	4 4 17.5 3 59 51.3 3 55 25.3 3 50 59.7 3 46 34.2	+1.05 1.03 1.01 1.99 .97	4 5 19·1 4 0 51·7 3 56 24·4 3 51 57·5 3 47 30·9	+ 1.01 -98 -96 -94 -92
39 40 41 42 43	3 37 56·I 3 33 34·5 3 29 I2·9 3 24 5I·5 3 20 30·2		3 39 4·I 3 34 4I·8 3 30 I9·7 3 25 57·7 3 2I 35·9	+ 1·10 1·09 1·08 1·07 1·06	3 40 8·8 3 35 45·8 3 31 23·0 3 27 0·4 3 22 37·9	+ 1.05 1.04 1.03 1.01 1.00	3 41 10·5 3 36 46·6 3 32 22·9 3 27 59·4 3 23 36·2	+ r·oo •99 •97 •95 •94	3 42 9·I 3 37 44·I 3 33 I9·4 3 28 55·0 3 24 30·7		3 43 4·5 3 38 38·4 3 34 12·6 3 29 46·9 3 25 21·5	+ ·90 ·88 ·86 ·83 ·82
44 45 46 47 48	3 16 9·0 3 11 47·9 3 7 26·9 3 3 5·9 2 58 45·1	+1·12 1·11 1·11 1·10 1·10	3 17 14·2 3 12 52·7 3 8 31·3 3 4 9·9 2 59 48·8	+ 1.05 1.05 1.04 1.03 1.02	3 18 15·6 3 13 53·4 3 9 31·5 3 5 9·6 3 0 47·9	+ ·99 ·98 ·97 ·96 ·95	3 19 13.0 3 14 50.2 3 10 27.4 3 6 4.9 3 1 42.4	+ ·93 ·91 ·90 ·88 ·87	3 20 6.7 3 15 42.8 3 11 19.1 3 6 55.7 3 2 32.4	+ ·86 ·84 ·83 ·81 ·79		+ ·80 ·78 ·76 ·74 ·72
49 50 51 52 53	2 54 24·2 2 50 3·5 2 45 42·7 2 41 22·0 2 37 1·3	+1.10 1.09 1.09	2 55 27.7 2 51 6.6 2 46 45.7 2 42 24.8 2 38 4.0	+1.02 1.01 1.01 1.00 1.00	2 56 26·3 2 52 4·8 2 47 43·5 2 43 22·2 2 39 I·I	+ ·94 ·93 ·92 ·91 ·90	2 57 20·2 2 52 58·1 2 48 36·1 2 44 14·3 2 39 52·6	+ ·86 ·84 ·83 ·82 ·81	2 58 9·3 2 53 46·3 2 49 23·5 2 45 0·9 2 40 38·4	+ ·78 ·76 ·75 ·73 ·72	2 58 53.6 2 54 29.6 2 50 5.8 2 45 42.2 2 41 18.7	+ ·70 ·68 ·66 ·64 ·62
54 55 56 57 58	2 32 40·5 2 28 19·7 2 23 58·9 2 19 38·1 2 15 17·1	1.11 1.10 1.10 1.10	2 29 22·5 2 25 I·7 2 20 4I·0	+ r·00 ·99 ·99 ·99	2 34 40·0 2 30 19·0 2 25 58·1 2 21 37·3 2 17 16·5	+ ·90 ·89 ·89 ·88 ·88	2 35 31·0 2 31 9·5 2 26 48·2 2 22 26·9 2 18 5·7	+ ·80 ·79 ·78 ·77 ·76	2 36 16·1 2 31 53·9 2 27 31·8 2 23 9·9 2 18 48·1		2 32 32.2	+ ·60 ·59 ·57 ·55 ·53
		7	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUI	E.		
Alt.	L. 18	° A.	L. 19°	A.	L. 20°	A.	L. 21°	° A.	L. 22	° A.	L. 23°	A.
0 4 8 12 16	s. +1·54 1·40 1·26 1·13 1·01	s. -4.61 4.56 4.52 4.49 4.46	s. +1.64 1.49 1.35 1.22 1.10	s. -4.64 4.59 4.55 4.51 4.48	s. +1·74 1·58 1·44 1·31 1·19	s. -4.68 4.62 4.58 4.54 4.51	s. + 1.84 1.68 1.54 1.40 1.28	s. -4·72 4·66 4·61 4·57 4·53	s. +1.94 1.77 1.63 1.50 1.37	s. -4·75 4·69 4·64 4·59 4·5 6	s. +2.04 1.87 1.72 1.59 1.47	s. -4·80 4·73 4·67 4·62 4·58
20 22 24 26 28	+ ·90 ·84 ·79 ·74 ·68	4:44 4:43 4:42 4:41 4:40	+ ·99 ·93 ·88 ·82 ·77	4·45 4·45 4·43 4·42 4·41	+1.08 1.02 .97 .92 .86	4·48 4·46 4·45 4·44 4·43	+1·17 1·12 1·06 1·01 ·96	4·50 4·48 4·47 4·46 4·45	+1.26 1.20 1.15 1.10 1.05	4·52 4·51 4·49 4·48 4·47	+1.35 1.30 1.25 1.19 1.14	4·55 4·53 4·52 4·51 4·49
30 32 34 36 38	+ ·63 ·57 ·52 ·46 ·41	4·39 4·38 4·37 4·36	+ ·72 ·67 ·62 ·56 ·51	4·41 4·39 4·38 4·37	+ ·80 ·76 ·71 ·66 ·61	4·42 4·41 4·40 4·39 4·39	+ ·91 ·86 ·81 ·76 ·71	4·44 4·43 4·42 4·41 4·40	+1.00 .95 .91 .86 .82	4·46 4·45 4·44 4·43 4·42	+1·10 1·05 1·01 ·96 ·92	4·48 4·47 4·46 4·45 4·44
40 42 44 46 48	+ ·36 ·30 ·25 ·19 ·13	4·36 4·35 4·35 4·35 4·35	+ ·46 ·41 ·36 ·30 ·25	4·37 4·36 4·36 4·36 4·35	+ ·57 ·51 ·46 ·42 ·36	4·38 4·37 4·37 4·36 4·36	+ ·67 ·62 ·57 ·53 ·48	4·39 4·38 4·38 4·37	+ ·77 ·73 ·68 ·64 ·60	4·41 4·40 4·39 4·39	+ ·88 ·83 ·80 ·76 ·72	4·43 4·42 4·41 4·40
50 52 54 56 58	+ ·07 + ·01 - ·06 ·13 ·20	4·35 4·35 4·35 4·35 4·35	+ ·19 ·13 ·07 + ·01 - ·05	4·35 4·35 4·35 4·35 4·35	+ ·31 ·26 ·21 ·15 ·09	4·36 4·35 4·35 4·35 4·35	+ ·43 ·39 ·34 ·29 ·24	4·37 4·36 4·36 4·35 4·35	+ ·56 ·51 ·47 ·43 ·39	4·38 4·38 4·37 4·37 4·36	+ ·68 ·64 ·60 ·57 ·53	4·40 4·39 4·39 4·38 4·38

98 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 24°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 16 10.2 5 7 22.8 4 58 34.5 4 49 45.3	s. + 1·78 1·81 1·83 1·85 1·87	H. M. S. 6 I 46.9 5 I7 58.6 5 9 I2.0 5 0 24.7 4 5I 36.6	s. +1.78 1.80 1.81 1.83 1.84	H. M. S. 6 3 33.8 5 19 46.1 5 11 0.0 5 2 13.5 4 53 26.4	s. + 1·79 1·78 1·79 1·80 1·82	H. M. S. 6 5 20·9 5 21 32·7 5 12 47·0 5 4 1·1 4 55 14·7	s. +1·79 1·77 1·78 1·78 1·79	H. M. S. 6 7 8·2 5 23 18·5 5 14 33·1 5 5 47·5 4 57 1·6	s. +1.80 1.76 1.76 1.77	H. M. S. 6 8 55.8 5 25 3.7 5 16 18.3 5 7 32.8 4 58 47.3	s. +1·80 1·75 1·75 1·74 1·75
18 20 22 24 26	4 40 55.0 4 32 3.2 4 23 10.0 4 14 14.9 4 5 17.8	+1.89 1.92 1.95 1.99 2.03	4 25 6·0 4 16 13·0	+1.86 1.89 1.91 1.95 1.98	4 44 38·5 4 35 49·7 4 26 59·8 4 18 8·5 4 9 15·7	1.85 1.88 1.90	4 46 27.7 4 37 40.0 4 28 51.4 4 20 1.7 4 11 10.7	+ 1.81 1.82 1.84 1.87 1.90	4 39 28·5 4 30 41·0 4 21 52·6	+ 1.78 1.79 1.81 1.83 1.85		+ 1.76 1.77 1.78 1.80 1.81
28 29 30 31 32	3 56 18·2 3 51 47·5 3 47 16·0 3 42 43·8 3 38 10·7	+2.08 2.10 2.13 2.16 2.19	3 58 21·2 3 53 51·9 3 49 22·0 3 44 51·3 3 40 20·0	+2.02 2.05 2.07 2.09 2.12		+1.97 1.99 2.01 2.03 2.06	3 53 23.9 3 48 56.0	+1.93 1.94 1.96 1.98 2.00	3 59 46·4 3 55 20·1 3 50 53·3	+1.88 1.91 1.91 1.95	3 57 13·4 3 52 47·6	1.86
33 34 35 36 37	3 33 36.7 3 29 1.8 3 24 25.9 3 19 48.8 3 15 10.6	+2·22 2·25 2·29 2·33 2·37	3 35 47.8 3 31 14.8 3 26 40.9 3 22 6.1 3 17 30.1	+2·15 2·18 2·22 2·25 2·28	3 37 55.0 3 33 23.8 3 28 51.7 3 24 18.8 3 19 45.0	+2.08 2.12 2.14 2.18 2.21	3 39 58·5 3 35 28·8 3 30 58·4 3 26 27·3 3 21 55·3	+2·03 2·05 2·08 2·10 2·14	3 37 30·0 3 33 1·1 3 28 31·6	1·99 2·02 2·04	3 43 54·8 3 39 27·7 3 35 0·1 3 30 32·0 3 26 3·2	1.93 1.95
38 39 40 41 42	3 10 31.0 3 5 50.1 3 1 7.7 2 56 23.6 2 51 37.8	+2·41 2·46 2·51 2·56 2·62	3 12 53·1 3 8 14·8 3 3 35·1 2 58 54·2 2 54 11·6	+2·32 2·37 2·41 2·46 2·51	3 15 10·2 3 10 34·3 3 5 57·2 3 1 18·9 2 56 39·3	+2·24 2·28 2·32 2·37 2·41	3 17 22·5 3 12 48·8 3 8 14·0 3 3 38·2 2 59 1·2	2.24	3 14 58·5 3 10 25·8 3 5 52·2	2·13 2·16	3 8 1·2 3 3 28·6	2·05 2·08 2·11
43 44 45 46 47	2 46 50·0 2 42 0·1 2 37 8·0 2 32 13·3 2 27 15·8	+2.68 2.74 2.81 2.89 2.97	2 49 27·3 2 44 41·1 2 39 53·0 2 35 2·6 2 30 9·9	+2.57 2.63 2.69 2.76 2.83	2 51 58·1 2 47 15·3 2 42 30·8 2 37 44·3 2 32 55·8	+2.46 2.52 2.57 2.63 2.70	2 45 I·8		2 52 4.7 2 47 26.3 2 42 46.5	2·31 2·36 2·41	2 54 20·4 2 49 44·7 2 45 7·7	2·22 2·26 2·30
48 49 50 51 52	2 22 15·2 2 17 11·2 2 12 3·3 2 6 51·1 2 1 34·1	+3.06 3.16 3.26 3.37 3.48	2 20 15·9 2 15 14·2		2 28 4.9 2 23 11.4 2 18 15.1 2 13 15.6 2 8 12.6	2·85 2·94 3·03	2 21 6·8 2 16 12·6	2·71 2·79 2·87	2 28 36.9	2·58 2·65 2·72	2 31 7·9 2 26 24·6 2 21 39·3	2·46 2·52 2·58

1						
Alt.	L. 0° A.	L. 1 ° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
0 2 4 6 8	s. s. - ·00 -4·38 ·07 4·38 ·14 4·38 ·21 4·38 ·28 4·38	s. s. + ·08 -4·38 + ·01 4·38 - ·05 4·38 - ·12 4·38 - ·19 4·38	s. s. + ·16 -4·38 ·10 4·38 + ·03 4·38 - ·04 4·38 ·11 4·38	s. s. + ·25 -4·38 ·18 4·38 ·11 4·38 + ·05 4·38 - ·02 4·38	s. s. + '34 - 4'39 -27 4'39 -20 4'38 -13 4'38 + '06 4'38	s. s. + '42 -4'40 '35 4'39 '28 4'39 '22 4'39 '15 4'38
10	- ·34 4·39	- ·26 4·38	- ·18 4·38	- ·09 4·38	- ·oi 4·38	+ ·08 4·38
12	·42 4·40	·33 4·39	·24 4·38	•16 4·38	·o7 4·38	+ ·01 4·38
14	·49 4·40	·40 4·40	·31 4·39	•23 4·38	·i4 4·38	- ·06 4·38
16	·56 4·41	·47 4·40	·38 4·39	•30 4·39	·2i 4·38	·12 4·38
18	·64 4·42	·55 4·41	·46 4·40	•37 4·39	·28 4·38	·19 4·38
20	- ·72 4·44	- ·63 4·42	- ·53 4·41	- '44 4'40	- ·36 4·39	- ·27 4·39
22	·80 4·45	·70 4·43	·61 4·42	'52 4'41	·43 4·40	·34 4·39
24	·89 4·47	·79 4·45	·70 4·43	'60 4'42	·51 4·41	·41 4·40
26	·98 4·48	·88 4·46	·78 4·45	'68 4'43	·58 4·42	·49 4·40
28	I·07 4·5I	·96 4·48	·86 4·46	'76 4'44	·67 4·43	·57 4·41
30	-1·17 4·53	-1.06 4.50	96 4.48	- ·85 4·46	- ·75 4·44	- ·65 4·42
32	1·27 4·56	1.16 4.53	1.05 4.50	·94 4·48	·84 4·46	·73 4·44
34	1·38 4·59	1.26 4.55	1.15 4.53	I·04 4·50	·93 4·48	·83 4·45
36	1·50 4·63	1.38 4.59	1.26 4.55	I·14 4·52	I·03 4·50	·92 4·47
38	1·62 4·67	1.50 4.63	1.37 4.59	I·25 4·55	I·13 4·52	I·02 4·49
40	-1.76 4.72	-1.63 4.67	-1.50 4.63	-1·37 4·59	-1·25 4·55	-1·13 4·52
42	1.92 4.78	1.77 4.72	1.63 4.68	1·50 4·63	1·37 4·59	1·24 4·55
44	2.09 4.85	1.93 -4.79	1.78 4.73	1·64 4·67	1·50 4·63	1·36 4·59
46	2.28 4.93	2.11 4.86	1.94 4.79	1·79 4·73	1·64 4·68	1·50 4·63
48	2.49 5.04	2.31 4.95	2.13 4.87	1·96 4·80	1·80 4·73	1·65 4·68
50	-2·74 5·17	-2·54 5·06	-2·34 4·96	-2·16 4·88	-1.98 4.80	-1.81 4.74
52	3·04 5·33	2·80 5·19	2·58 5·08	2·38 4·98	2.18 4.89	2.00 4.81

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 10 43.8 5 26 48.3 5 18 2.6 5 9 17.1 5 0 31.7	s. + 1.80 1.74 1.73 1.73	H. M. S. 6 12 32·1 5 28 32·4 5 19 46·3 5 11 0·6 5 2 15·0		H. M. S. 6 14 21 0 5 30 16 0 5 21 29 2 5 12 43 1 5 3 57 2	s. +1.82 1.72 1.71 1.70 1.70	H. M. S. 6 16 10·5 5 31 59·1 5 23 11·6 5 14 24·8 5 5 38·5	s. +1.83 1.72 1.70 1.69 1.68	H. M. S. 6 18 0.6 5 33 42.0 5 24 53.5 5 16 5.8 5 7 18.8	s. +1.84 1.71 1.69 1.68 1.66	5 17 46.1	s. +1.86 1.71 1.69 1.67 1.65
18 20 22 24 26	4 51 46·2 4 43 0·5 4 34 14·5 4 25 28·0 4 16 40·8	1.76	4 53 29.6 4 44 44.1 4 35 58.5 4 27 12.5 4 18 26.1	+ 1·71 1·72 1·73 1·74	4 55 11.6 4 46 26.2 4 37 40.8 4 28 55.2 4 20 9.4	1.69	4 56 52.6 4 48 6.9 4 39 21.5 4 30 36.0 4 21 50.5		4 58 32·3 4 49 46·3 4 41 0·6 4 32 15·0 4 23 29·6	+ 1.65 1.64 1.64 1.64 1.64		+ 1.64 1.62 1.61 1.61 1.60
28 30 32 33 34	4 7 52.8 3 59 3.8 3 50 13.6 3 45 48.0 3 41 21.9	1.82	4 9 39·2 4 0 51·3 3 52 2·6 3 47 37·8 3 43 12·7	+1.75 1.77 1.79 1.80 1.82	4 II 23·I 4 2 36·3 3 53 48·7 3 49 24·6 3 45 0·2	+ 1.71 1.73 1.75 1.75 1.76	4 13 4·8 4 4 18·6 3 55 32·0 3 51 8·4 3 46 44·6	1.68	4 14 44·1 4 5 58·5 3 57 12·5 3 52 49·3 3 48 26·0	+ 1.64 1.64 1.65 1.66 1.66	4 16 21·3 4 7 35·9 3 58 50·3 3 54 27·4 3 50 4·4	+ 1.61 1.61 1.61
35 36 37 38 39	3 36 55.4 3 32 28.5 3 28 1.0 3 23 33.0 3 19 4.5	1.03	3 38 47·2 3 34 21·3 3 29 55:0 3 25 28·2 3 21 1·0	1.87	3 40 35.6 3 36 10.6 3 31 45.3 3 27 19.6 3 22 53.4	+1.78 1.79 1.81 1.82 1.84	3 42 20·7 3 37 56·4 3 33 31·9 3 29 7·1 3 24 42·0		3 44 2.6 3 39 39.0 3 35 15.1 3 30 51.0 3 26 26.6		3 45 41.4 3 41 18.2 3 36 54.8 3 32 31.3 3 28 7.6	+1.62 1.63 1.63 1.64 1.65
40 41 42 43 44	3 14 35·2 3 10 5·3 3 5 34·6 3 1 3·1 2 56 30·6	+2·01 2·03 2·06 2·09 2·12	3 16 33·2 3 12 4·8 3 7 35·7 3 3 5·9 2 58 35·4	+1.93 1.95 1.98 2.01 2.04	3 18 26.9 3 13 59.8 3 9 32.2 3 5 4.0 3 0 35.1	+1.86 1.88 1.90 1.93 1.95	3 20 16·4 3 15 50·5 3 11 24·1 3 6 57·3 3 2 29·8	+1.79 1.81 1.83 1.85 1.87	3 17 37·0 3 13 11·7 3 8 46·0	+1.73 1.74 1.76 1.77 1.79	3 23 43.6 3 19 19.4 3 14 55.0 3 10 30.2 3 6 5.1	+1.66 1.68 1.69 1.70 1.72
45 46 47 48 49	2 51 57·2 2 47 22·7 2 42 47·0 2 38 10·1 2 33 31·7	+2·16 2·20 2·24 2·29 2·34	2 54 4·I 2 49 3I·8 2 44 58·5 2 40 24·I 2 35 48·5	2·10 2·14	2 56 5.6 2 51 35.2 2 47 4.1 2 42 31.9 2 37 58.8	+1.98 2.01 2.04 2.08 2.12	2 53 33·2 2 49 3·9 2 44 33·8	+1.90 1.92 1.95 1.98 2.02	2 55 26·0 2 50 58·2 2 46 29·8	+1.81 1.84 1.86 1.89 1.92	2 57 13·6 2 52 47·2 2 48 20·3	+ 1.73 1.75 1.77 1.80 1.82
50 51 52 53 54	2 28 51.8 2 24 10.2 2 19 26.7 2 14 41.0 2 9 53.1		2 31 11·6 2 26 33·3 2 21 53·4 2 17 11·6 2 12 27·9	+2·27 2·32 2·38 2·44 2·51	2 33 24·6 2 28 49·1 2 24 12·3 2 19 34·0 2 14 54·1	+2·16 2·21 2·25 2·31 2·37	2 35 30·9 2 30 58·0 2 26 23·9 2 21 48·8 2 17 11·9	+2.05 2.09 2.13 2.18 2.23	2 33 0·2 2 28 28·5 2 23 55·8	+1.95 1.98 2.02 2.06 2.10	2 39 24.7 2 34 56.0 2 30 26.3 2 25 55.9 2 21 24.5	+1.85 1.88 1.91 1.94 1.98

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
	+ '51 -4'40	+ ·59 -4·42	+ .68 -4.43	+ .76 -4.44	+ ·85 -4·46	+ '93 -4'48
	'43 4'40	·52 4·41	.61 4.42	.69 4.43	·78 4·45	'86 4'46
	'37 4'39	·45 4·40	.54 4.41	.62 4.42	·71 4·44	'79 4'45
	'30 4'39	·38 4·39	.47 4.40	.55 4.41	·64 4·43	'72 4'44
	'23 4'38	·32 4·39	.40 4.40	.49 4.41	·57 4·42	'66 4'43
10	+ ·16 4·38	+ ·25 4·38	+ ·33 4·39	+ '42 4'40 '35 4'39 '29 4'39 '22 4'38 '16 4'38	+ ·50 4·41	+ ·59 4·42
12	·10 4·38	·18 4·38	·27 4·39		·44 4·40	- ·52 4·41
14	+ ·03 4·38	·12 4·38	·20 4·38		·37 4·40	·46 4·40
16	- ·04 4·38	+ ·05 4·38	·13 4·38		·31 4·39	·39 4·40
18	·11 4·38	- ·02 4·38	·07 4·38		·24 4·39	·33 4•39
20	- ·18 4·38	- · · · · · · · · · · · · · · · · · · ·	+ ·00 4·38	+ ·09 4·38	+ ·18 4·38	+ ·26 4·39
22	·25 4·39		- ·07 4·38	+ ·02 4·38	·11 4·38	·20 4·38
24	·32 4·39		·14 4·38	- ·05 4·38	+ ·04 4·38	·13 4·38
26	·39 4·40		·21 4·38	·12 4·38	- ·03 4·38	+ ·07 4·38
28	·47 4·40		·28 4·39	·19 4·38	·09 4·38	·00 4·38
30	- ·55 4·41	- '45 4'40	- ·36 4·39	- ·26 4·39	- ·17 4·38	- ·07 4·38
32	·63 4·42	'53 4'41	·43 4·40	·33 4·39	·24 4·38	·14 4·38
34	·72 4·44	'62 4'42	·51 4·41	·41 4·40	·31 4·39	·21 4·38
36	·81 4·45	'70 4'43	·60 4·42	·49 4·41	·39 4·40	·29 4·39
38	·91 4·47	'79 4'45	·68 4·43	·57 4·42	·47 4·40	·36 4·39
40	-1.01 4.49	- ·89 4·47	- ·78 4·45	66 4.43	- ·55 4·41	- '44 4'40
42	1.11 4.52	·99 4·49	·87 4·47	.76 4.45	·64 4·42	'53 4'41
44	1.23 4.55	I·10 4·51	·98 4·49	.86 4.46	·74 4·44	'62 4'42
46	1.36 4.58	• I·22 4·55	I·09 4·51	.96 4.48	·84 4·46	'71 4'44
48	1.50 4.63	'1·35 4·58	I·21 4·54	I.08 4.51	·94 4·48	'81 4'45
50	-1.65 4.68	-1.50 4.63	-1.35 4.58	-1·20 4·54	-1.06 4.50	- ·92 4·47
52	1.82 4.74	1.65 4.68	1.49 4.63	1·34 4·58	1.19 4.54	1·04 4·50
54	2.02 4.82	1.83 4.75	1.66 4.68	1·49 4·62	1.32 4.58	1·17 4·54

100 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 24°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 21 43.4 5 37 6.9 5 28 15.8 5 19 25.8 5 10 36.8	s. + 1.87 1.70 1.68 1.66 1.64	H. M. S. 6 23 36·0 5 38 49·1 5 29 56·4 5 21 5·0 5 12 14·6	s. + 1·88 1·70 1·67 1·65 1·63	H. M. S. 6 25 29.6 5 40 31.2 5 31 36.7 5 22 43.7 5 13 51.8	s. +1.90 1.70 1.67 1.64 1.61	H. M. S. 6 27 24.4 5 42 13.4 5 33 16.9 5 24 21.9 5 15 28.4	1·70 1·67 1·63	H. M. S. 6 29 20·4 5 43 55·6 5 34 56·8 5 25 59·8 5 17 4·3	s. +1.94 1.70 1.67 1.63 1.60		S. +1·96 1·71 1·66 1·62 1·59
18 20 22 24 26	5 I 48.6 4 53 I.2 4 44 I4.3 4 35 28.0 4 26 42.I	+1.62 1.60 1.59 1.58 1.57	4 54 36·8 4 45 49·I	+ 1.60 1.58 1.57 1.56 1.55	5 5 1·1 4 56 11·4 4 47 22·6 4 38 34·5 4 29 47·3	+1.59 1.57 1.55 1.53 1.51	5 6 36·0 4 57 44·9 4 48 54·8 4 40 5·6 4 31 17·3	1·53 1·50	5 8 10·2 4 59 17·4 4 50 25·8 4 41 35·2 4 32 45·6		5 9 43.7 5 0 49.0 4 51 55.7 4 43 3.5 4 34 12.4	+1.55 1.52 1.49 1.46 1.43
28 30 31 32 33	4 17 56·4 4 9 11·0 4 4 48·3 4 0 25·5 3 56 2·8	+1.57 1.56 1.56 1.57 1.57	4 10 43.7	+ 1.53 1.52 1.52 1.52 1.52	4 7 51·3 4 3 28·4	+ 1·50 1·49 1·48 1·48	4 22 29·6 4 13 42·6 4 9 19·3 4 4 56·2 4 0 33·1		4 15 8.9 4 10 45.1 4 6 21.6	+ 1·44 1·42 1·41 1·40 1·40		+ 1.41 1.39 1.38 1.37 1.35
34 35 36 37 38	3 51 40·0 3 47 17·2 3 42 54·3 3 38 31·3 3 34 8·2	+ 1.57 1.57 1.57 1.58 1.58	3 48 50·0 3 44 27·3 3 40 4·5 3 35 41·6	+1.52 1.52 1.52 1.53 1.53	3 54 42.8 3 50 20.0 3 45 57.3 3 41 34.6 3 37 11.8	+ 1·48 1·48 1·48 1·47 1·47	3 56 10·1 3 51 47·2 3 47 24·4 3 43 1·6 3 38 38·8	1·43 1·43 1·42	3 57 34·8 3 53 11·6 3 48 48·6 3 44 25·6 3 40 2·7	+1·39 1·38 1·37 1·37	3 54 33.4 3 50 10.0	+1·35 1·34 1·33 1·32
39 40 41 42 43	3 29 45.0 3 25 21.5 3 20 58.0 3 16 34.2 3 12 10.2	1·62 1·63	3 26 55.7 3 22 32.6 3 18 9.3 3 13 45.9	+ 1.53 1.54 1.55 1.55 1.56	3 19 40·5 3 15 17·5	+1.47 1.48 1.48 1.49 1.49	3 34 16·1 3 29 53·4 3 25 30·7 3 21 8·0 3 16 45·1	1·42 1·43	3 31 17·0 3 26 54·3 3 22 31·5 3 18 8·9	1·36	3 37 0·3 3 32 37·3 3 28 14·3 3 23 51·5 3 19 28·7	+1.31 1.30 1.30
44 45 46 47 48	3 7 45.9 3 3 21.3 2 58 56.4 2 54 31.1 2 50 5.4	+ 1.64 1.66 1.67 1.69 1.71	3 4 58·4 3 0 34·3 2 56 10·0 2 51 45·3	1.57 1.58 1.59 1.61 1.62	3 10 54·4 3 6 31·1 3 2 7·6 2 57 44·0 2 53 20·1	+1.50 1.51 1.52 1.53 1.54	3 12 22·3 3 7 59·4 3 3 36·4 2 59 13·2 2 54 49·9		3 9 23.4 3 5 0.6 3 0 37.8 2 56 14.9	1·37 1·38	3 10 43·2 3 6 20·5 3 1 57·7 2 57 35·0	+ 1·30 1·29 1·29 1·30
49 50 51 52 53	2 45 39·3 2 41 12·7 2 36 45·5 2 32 17·7 2 27 49·2	+ 1.73 1.75 1.77 1.80 1.83	2 42 54·9 2 38 29·0 2 34 2·7 2 29 35·8	1.64 1.66 1.68 1.70 1.72	2 35 41·7 2 31 16·2	+1.55 1.57 1.58 1.60 1.62	2 50 26·4 2 46 2·8 2 41 38·9 2 37 14·7 2 32 50·3	I·50 I·52	2 47 28·7 2 43 5·4 2 38 42·0 2 34 18·3	1·39 1·40 1·41 1·42	2 53 12·3 2 48 49·4 2 44 26·6 2 40 3·6 2 35 40·5	+ 1·30 1·31 1·31 1·32
54 55 56 57 58	2 23 19·9 2 18 49·4 2 14 18·8 2 9 46·7 2 5 13·4	+1.87 1.90 1.94 1.99 2.03	2 20 40·2 2 16 11·3	+ 1·75 1·79 1·81 1·85 1·89		+ 1.64 1.67 1.69 1.72 1.76	2 28 25·4 2 24 0·3 2 19 34·7 2 15 8·5 2 10 41·9	1.53 1.55 1.58 1.60 1.63	2 25 30.2	1·45 1·46 1·48	2 31 17·2 2 26 53·8 2 22 30·2 2 18 6·3 2 13 42·2	+ 1·33 1·34 1·35 1·36 1·38
			ARIATIO	ON T			TUDE A	ND A	LTITUD	E.	4	
Alt.	L. 12°		L. 13°	A.	L. 14°	A.	L. 15°	A.	L. 16°	' A.	L. 17°	Α.
0 4 8 12 16	s. +1.02 - .88 .74 .61 .48	s. -4·50 4·47 4·44 4·42 4·40	s. +1·11 - ·97 ·83 ·70 ·57	s. -4·52 4·48 4·46 4·43 4·41	s. +1·20 - 1·06 ·92 ·78 ·65	s. -4·54 4·50 4·47 4·45 4·43	s. +1·29 - 1·14 1·00 ·87 ·74	s. -4·56 4·52 4·49 4·46 4·44	s. +1·39 ·1·24 ·1·09 ·96 ·83	s. -4·59 4·55 4·51 4·48 4·46	s. +1·48 1·32 1·18 1·05 ·92	s. -4.62 4.57 4.53 4.50 4.47
20 22 24 26 28	+ ·35 ·29 ·22 ·16 ·09	4·39 4·38 4·38 4·38		4·40 4·39 4·39 4·39 4·38	+ •53 •46 •40 •34 •28	4·4I 4·40 4·39 4·39	+ ·62 ·55 ·49 ·43 ·37	4·42 4·41 4·40 4·39	+ ·71 ·64 ·58 ·52 ·46	4·43 4·43 4·42 4·41 4·40	+ ·79 ·73 ·67 ·61 ·55	4·45 4·44 4·43 4·42 4·41
30 32 34 36 38	+ ·03 - ·04 ·11 ·19 ·26	4·38 4·38 4·38 4·38 4·39	+ ·12 + ·05 - ·02 ·08 ·15	4·38 4·38 4·38 4·38 4·38	+ ·21 ·15 ·08 + ·02 - ·05	4·38 4·38 4·38 4·38 4·38	+ ·31 ·24 ·18 ·12 + ·05	4·39 4·38 4·38 4·38 4·38	+ ·40 ·34 ·28 ·22 ·15	4·40 4·39 4·38 4·38	+ ·49 ·44 ·38 ·32 ·25	4·41 4·40 4·39 4·39
40 42 44 46 48	- ·34 ·42 ·50 ·59 ·68	4·39 4·40 4·41 4·42 4·43	- ·23 ·31 ·39 ·47 ·56	4·38 4·39 4·40 4·40 4·41	- ·12 ·20 ·27 ·35 ·43	4·38 4·39 4·39 4·40	- ·02 ·09 ·16 ·23 ·31	4·38 4·38 4·38 4·38 4·39	+ ·09 + ·02 - ·05 ·12 ·19	4·38 4·38 4·38 4·38 4·38	+ ·19 ·13 + ·06 ·00 - ·07	4·38 4·38 4·38 4·38 4·38
50 52 54 56 58	- ·79 ·90 I·01 I·15 I·29	4·45 4·47 4·50 4·52 4·55	- ·65 ·76 ·87 ·99 I·12	4.43 4.44 4.46 4.49 4.52	- ·52 ·62 ·72 ·83 ·95	4·41 4·42 4·44 4·46 4·48	- ·39 ·48 ·58 ·68 ·79	4·40 4·42 4·43 4·44	- ·27 ·35 ·44 ·53 ·63	4·39 4·39 4·40 4·41 4·42	- ·14 ·22 ·30 ·39 ·48	4·38 4·38 4·39 4·40 4·40

HOUR-ANGLES AND VARIATIONS TO 1° OF LAT., DECL., AND ALT. 101 LATITUDE 24°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 33 16·3 5 47 20·5 5 38 16·7 5 29 14·9 5 20 14·8	s. + 1.99 1.71 1.66 1.62 1.58	H. M. S. 6 35 16·4 5 49 3·4 5 39 56·7 5 30 52·0 5 21 49·5	S. +2.01 1.72 1.67 1.62 1.57	H. M. S. 6 37 18·2 5 50 46·6 5 41 36·8 5 32 29·2 5 23 23·7		H. M. S. 6 39 21·7 5 52 30·3 5 43 17·0 5 34 6·3 5 24 57·8	s. + 2·07 1·73 1·67 1·62 1·56	5 35 43.4	S. +2·11 1·74 1·68 1·62 1·56	H. M. S. 6 43 34·5 5 55 59·2 5 46 38·5 5 37 20·6 5 28 5·3	s. +2·14 1·75 1·68 1·62 1·56
18 20 22 24 26	5 11 16·5 5 2 19·7 4 53 24·4 4 44 30·4 4 35 37·6	+1·54 1·51 1·47 1·44 1·41	5 12 48·7 5 3 49·6 4 54 52·1 4 45 56·0 4 37 1·3	+ 1.53 1.49 1.45 1.42 1.38	5 14 20·3 5 5 18·7 4 56 18·8 4 47 20·4 4 38 23·5	1.40		1.38	5 8 14·7 4 59 9·3	+1·51 1·46 1·41 1·36 1·31	5 18 52·4 5 9 41·8 5 0 33·2 4 51 26·6 4 42 21·8	+ 1·50 1·45 1·39 1·34 1·29
28 30 31 32 33	4 26 46·0 4 17 55·3 4 13 30·3 4 9 5·6 4 4 41·0	+1·38 1·35 1·34 1·33 1·31	4 28 7·8 4 19 15·5 4 14 49·7 4 10 24·1 4 5 58·9		4 29 28·0 4 20 33·7 4 16 7·0 4 11 40·6 4 7 14·4		4 30 46·5 4 21 50·1 4 17 22·3 4 12 54·9 4 8 27·7	+ 1·30 1·25 1·24 1·22 1·20	4 23 4·5 4 18 35·6 4 14 7·0	I·19	4 33 18·7 4 24 17·1 4 19 47·0 4 15 17·1 4 10 47·5	+1.25 1.20 1.17 1.16 1.14
34 35 36 37 38	4 0 16·7 3 55 52·5 3 51 28·5 3 47 4·7 3 42 41·0	+1.30 1.30 1.29 1.28 1.27	4 I 33.8 3 57 9.0 3 52 44.4 3 48 20.0 3 43 55.7	+1.26 1.25 1.24 1.23 1.22	4 2 48·5 3 58 22·9 3 53 57·5 3 49 32·3 3 45 7·3	+ 1·23 1·21 1·20 1·18 1·17	4 4 0.9 3 59 34.3 3 55 8.0 3 50 41.8 3 46 16.0		3 56 15·7 3 51 48·6	1.00		+1·11 1·09 1·07 1·05 1·04
39 40 41 42 43	3 38 17·5 3 33 54·1 3 29 30·9 3 25 7·7 3 20 44·7	+ 1·26 1·25 1·25 1·24 1·24	3 39 31.6 3 35 7.7 3 30 44.0 3 26 20.3 3 21 57.0	+ 1.21 1.20 1.19 1.18 1.17	3 40 42.6 3 36 18.0 3 31 53.6 3 27 29.4 3 23 5.4		3 41 50·4 3 37 25·0 3 32 59·9 3 28 34·9 3 24 10·1	1.07	3 38 28·8 3 34 2·7 3 29 36·9	I·04 I·02	3 43 56·9 3 39 29·4 3 35 2·3 3 30 35·3 3 26 8·6	+1.01 .99 .97 .95 .92
44 45 46 47 48	3 16 21·7 3 11 58·8 3 7 36·0 3 3 13·2 2 58 50·5	+ 1·23 1·23 1·22 1·22 1·22	3 17 33.6 3 13 10.3 3 8 47.2 3 4 24.2 3 0 1.3	+1·16 1·16 1·15 1·15 1·14	3 9 54.2	+1·10 1·09 1·08 1·07 1·06			3 16 20·6 3 11 55·6		3 21 42·2 3 17 15·9 3 12 49·9 3 8 24·1 3 3 58·5	+ ·91 ·89 ·87 ·85 ·84
49 50 51 52 53	2 54 27·7 2 50 5·0 2 45 42·3 2 41 19·6 2 36 56·8	+ 1·22 1·22 1·22 1·22 1·22	2 55 38·4 2 51 15·6 2 46 52·8 2 42 30·1 2 38 7·4	+ 1·14 1·13 1·13 1·13 1·13	2 52 21.1	1·05 1·04 1·04	2 57 45·3 2 53 21·6 2 48 58·2 2 44 34·8 2 40 11·5	+ ·98 ·97 ·96 ·95 ·94	2 54 17·2 2 49 53·1 2 45 29·1	+ ·90 ·88 ·87 ·86 ·85	2 59 33·1 2 55 7·9 2 50 42·8 2 46 17·9 2 41 53·3	+ ·82 ·80 ·78 ·77 ·75
54 55 56 57 58	2 32 34·0 2 28 11·0 2 23 48·0 2 19 24·8 2 15 1·4	1.25	2 33 44.6 2 29 22.0 2 24 59.2 2 20 36.4 2 16 13.5	1.13	2 34 49·5 2 30 26·7 2 26 4·0 2 21 41·3 2 17 18·5		2 35 48·4 2 31 25·3 2 27 2·4 2 22 39·5 2 18 16·6	+ ·93 ·93 ·92 ·91 ·91	2 27 54.4		2 37 28·7 2 33 4·3 2 28 40·1 2 24 16·0 2 19 52·0	+ ·74 ·72 ·71 ·69 ·68
		V	ARIATIO	ON TO) 1' OF	LATI'	TUDE A	ND A	LTITUD	E.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α.	_L. 22°	Α.	L. 23°	Α.
0 4 8 12 16	1·42 1·27 1·14 1·01	s. -4.65 4.60 4.56 4.52 4.49	s. +1.67 - 1.51 1.36 1.23 1.10	s. -4.68 4.63 4.59 4.55 4.52	s. +1·77 - 1·60 1·46 1·32 1·19	s. -4·72 4·67 4·62 4·57 4·54	s. +1.87 - 1.70 1.55 1.41 1.28	s. -4·76 4·70 4·64 4·60 4·56	s. +1.97 - 1.80 1.64 1.50 1.37	s. -4·80 4·73 4·68 4·63 4·59	s. +2.07 - 1.90 1.74 1.60 1.46	s. -4·84 4·77 4·70 4·66 4·62
20 22 24 26 28	+ ·88 ·82 ·76 ·71 ·65	4·47 4·45 4·44 4·43 4·42	+ ·97 ·91 ·86 ·80 ·74	4·49 4·47 4·46 4·45 4·44	+1.06 1.01 .95 .89	4·50 4·49 4·48 4·47 4·46	+1·16 1·10 1·04 ·98	4.53 4.51 4.50 4.49 4.48	+1·25 1·19 1·13 1·08 1·02	4·55 4·54 4·52 4·51 4·50	+1·34 1·28 1·23 1·17 1·12	4·58 4·56 4·55 4·53 4·52
30 32 34 36 38	+ ·59 ·53 ·47 ·42 ·36	4·42 4·41 4·40 4·39	+ ·68 ·63 ·57 ·52 ·46	4·43 4·42 4·41 4·40	+ ·78 ·72 ·67 ·62 ·56	4·45 4·44 4·43 4·42 4·42	+ ·87 ·82 ·77 ·72 ·66	4·47 4·46 4·45 4·44 4·43	+ '97 '92 '87 '82 '77	4·49 4·47 4·46 4·45 4·44	+1.07 1.02 .97 .92 .87	4·51 4·50 4·48 4·47 4·46
40 42 44 46 48	+ ·30 ·24 ·18 ·11 + ·05	4·39 4·38 4·38 4·38	+ ·40 ·35 ·29 ·23 ·17	4·40 4·39 4·38 4·38	+ ·51 ·45 ·40 ·34 ·28	4·4I 4·40 4·39 4·39	+ ·61 ·56 ·51 ·46 ·40	4·42 4·41 4·40 4·40	+ ·72 ·67 ·62 ·57 ·52	4·44 4·43 4·42 4·41	+ ·82 ·78 ·73 ·68 ·64	4·45 4·44 4·43 4·42
50 52 54 56 58	- ·02 ·09 ·16 ·24 ·33	4·38 4·38 4·38 4·38 4·39	+ ·10 + ·04 - ·03 ·10 ·18	4·38 4·38 4·38 4·38 4·38	+ ·23 ·17 ·11 + ·04 - ·03	4·38 4·38 4·38 4·38 4·38	+ ·35 ·29 ·24 ·18 ·12	4·39 4·39 4·38 4·38 4·38	+ ·47 ·42 ·37 ·32 ·27	4·40 4·39 4·39 4·39	+ ·59 ·55 ·51 ·46 ·42	4·42 4·41 4·40 4·40

LATITUDE 25°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 15 49.0 5 6 57.1 4 58 4.4 4 49 10.6	s. + 1.86 1.90 1.92 1.93 1.96	H. M. S. 6 I 51·9 5 I7 42·4 5 8 51·5 4 59 59·8 4 51 7·2	s. +1.87 1.88 1.90 1.91 1.93	H. M. S. 6 3 43.9 5 19 35.1 5 10 44.8 5 1 53.9 4 53 2.3	s. +1.87 1.87 1.88 1.89 1.90	H. M. S. 6 5 36·1 5 21 26·9 5 12 37·0 5 3 46·7 4 54 56·0	s. + 1.87 1.85 1.86 1.87 1.88	H. M. S. 6 7 28·4 5 23 17·9 5 14 28·2 5 5 38·3 4 56 48·2	s. + 1.88 1.84 1.84 1.85 1.86	5 16 18.5	s. + 1.88 1.83 1.83 1.83
18 20 22 24 26	4 40 15·5 4 31 18·9 4 22 20·5 4 13 20·2 4 4 17·6	+1.98 2.01 2.05 2.09 2.13		+1.95 1.98 2.01 2.04 2.08	4 44 9.9 4 35 16.4 4 26 21.7 4 17 25.5 4 8 27.5	+1.92 1.94 1.97 2.00 2.04	4 46 4·5 4 37 12·2 4 28 19·0 4 19 24·4 4 10 28·4	+ 1.89 1.93 1.96 1.99	4 47 57·5 4 39 6·2 4 30 14·1 4 21 21·0 4 12 26·6		4 49 49.0 4 40 58.4 4 32 7.3 4 23 15.3 4 14 22.4	+ 1.84 1.85 1.87 1.89 1.91
27 28 29 30 31	3 59 45·3 3 55 12·3 3 50 38·6 3 46 4·1 3 41 28·7	+2·16 2·18 2·21 2·24 2·27	4 I 53·I 3 57 2I·6 3 52 49·4 3 48 I6·4 3 43 42·8	+2·10 2·13 2·15 2·18 2·20	4 3 57·9 3 59 27·6 3 54 56·8 3 50 25·4 3 45 53·3	+2.06 2.07 2.10 2.12 2.13	3 57 I·I 3 52 3I·0	+2.01 2.02 2.05 2.07 2.08	4 7 59.0 4 3 30.8 3 59 2.3 3 54 33.3 3 50 3.8	+1.96 1.98 2.00 2.01 2.03	4 9 55.5 4 5 28.2 4 I 0.7 3 56 32.7 3 52 4.3	+ 1.92 1.93 1.95 1.96 1.98
32 33 34 35 36	3 36 52·3 3 32 15·0 3 27 36·6 3 22 57·0 3 18 16·2	+2·30 2·33 2·37 2·41 2·45	3 39 8·3 3 34 32·9 3 29 56·6 3 25 19·3 3 20 40·8	+2·23 2·26 2·30 2·33 2·37	3 4I 20·4 3 36 46·8 3 32 I2·4 3 27 37·I 3 23 0·8	+2·17 2·20 2·23 2·26 2·29	3 43 28·9 3 38 56·9 3 34 24·1 3 29 50·6 3 25 16·2	+2·11 2·13 2·16 2·19 2·22	3 45 33.8 3 41 3.2 3 36 32.0 3 32 0.1 3 27 27.4	+2.05 2.07 2.10 2.13 2.15	3 47 35.4 3 43 6.0 3 38 36.1 3 34 5.6 3 29 34.5	+2.00 2.02 2.04 2.06 2.08
37 38 39 40 41	3 13 34·1 3 8 50·5 3 4 5·3 2 59 18·5 2 54 29·8	+2·49 2·54 2·59 2·64 2·70		+2.41 2.45 2.50 2.55 2.60	3 18 23·4 3 13 45·0 3 9 5·3 3 4 24·3 2 59 41·9	+2·33 2·37 2·41 2·46 2·50	3 20 41·0 3 16 4·7 3 11 27·3 3 6 48·8 3 2 9·1	+2·25 2·29 2·33 2·36 2·41	3 22 54·0 3 18 19·7 3 13 44·4 3 9 8·2 3 4 30·9	+2·18 2·21 2·24 2·28 2·32		+2·11 2·14 2·17 2·20 2·23
42 43 44 45 46	2 49 39·I 2 44 46·2 2 39 50·9 2 34 52·9 2 29 52·I	+2.76 2.83 2.91 2.98 3.07	2 52 21·7 2 47 32·6 2 42 41·4 2 37 47·8 2 32 51·8	+2.66 2.72 2.78 2.85 2.93	2 54 57·9 2 50 12·2 2 45 24·7 2 40 35·2 2 35 43·4	+2.55 2.61 2.66 2.73 2.80	2 57 28·0 2 52 45·5 2 48 1·2 2 43 15·3 2 38 27·4	+2.45 2.50 2.56 2.61 2.67	2 59 52·3 2 55 12·6 2 50 31·4 2 45 48·6 2 41 4·2		3 2 II·2 2 57 33·9 2 52 55·4 2 48 I5·5 2 43 34·2	+2·27 2·31 2·35 2·40 2·45
47 48 49 50 51	2 24 48·0 2 19 40·4 2 14 28·7 2 9 12·7 2 3 51·5	+3·16 3·26 3·36 3·48 3·60	2 12 36.4	+3.01 3.10 3.20 3.31 3.43	2 30 49·3 2 25 52·4 2 20 52·6 2 15 49·4 2 10 42·6	+2.87 2.95 3.04 3.13 3.24	2 33 37·4 2 28 45·1 2 23 50·2 2 18 52·5 2 13 51·6	+2.74 2.81 2.89 2.97 3.07	2 21 46.3	2.82	2 38 51·3 2 34 6·7 2 29 20·1 2 24 31·5 2 19 40·5	+2.50 2.56 2.62 2.69 2.76

Alt.	L. 0° A.	L. 1 ° A.	L. 2 ° A.	L. 3 ° A.	L. 4° A.	L. 5° A.
° 0 2 4 6 8	S. S00 -4.41 .07 4.41 .14 4.42 .21 4.42 .29 4.42	S. S. + ·08 -4·41 + ·01 4·41 - ·06 4·41 - ·13 4·42 - ·20 4·42	S. S. + ·17 -4·42 ·10 4·41 + ·03 4·41 - ·05 4·41 ·12 4·41	s. s. + ·26 -4·42 ·18 4·42 ·11 4·41 + ·04 4·41 - ·03 4·41	s. s. + '34 -4'42 '27 4'42 '20 4'42 '13 4'41 + '05 4'41	s. s. + '43 -4'43 '35 4'43 '28 4'42 '21 4'42 '14 4'42
10	- ·36 4·43	- ·28 4·42	·19 4·42	- ·II 4·42	- ·02 4·41	+ ·07 4·41
12	·44 4·44	·35 4·43	·26 4·42	·I8 4·42	·09 4·41	·00 4·41
14	·52 4·44	·43 4·43	·34 4·43	·25 4·42	·16 4·42	- ·08 4·41
16	·60 4·45	·50 4·44	·42 4·43	·33 4·43	·24 4·42	·15 4·42
18	·68 4·46	·58 4·45	·49 4·44	·40 4·43	·31 4·42	·22 4·42
20	- ·76 4·48 ·85 4·49 ·94 4·51 1·03 4·53 1·13 4·56	- ·67 4·46	- ·57 4·45	'48 4'44	- ·39 4·43	- ·30 4·42
22		·75 4·47	·66 4·46	'56 4'45	·47 4·44	·37 4·43
24		·84 4·49	·74 4·48	'64 4'46	·55 4·45	·46 4·44
26		·93 4·51	·83 4·49	'73 4'47	·63 4·46	·54 4·45
28		I·02 4·53	·92 4·51	'82 4'49	·72 4·47	·62 4·46
30	1·23 4·58	-1·13 4·55	-1·02 4·53	- ·91 4·50	- ·82 4·48	- ·71 4·47
32	1·35 4·61	1·23 4·58	1·12 4·55	1·01 4·53	·90 4·50	·80 4·48
34	1·46 4·65	1·35 4·61	1·23 4·58	1·11 4·55	I·00 4·53	·89 4·50
36	1·59 4·69	1·46 4·65	1·34 4·61	1·22 4·58	I·II 4·55	·99 4·52
38	1·73 4·74	1·60 4·69	1·47 4·65	1·34 4·61	I·22 4·58	I·IO 4·55
40	-1.88 4.80	-1.73 4.74	-1.60 4.69	-1.47 4.65	-1·34 4·61	-1·22 4·58 1·34 4·61 1·47 4·65 1·62 4·70 1·78 4·76 1·96 4·83
42	2.04 4.86	1.89 4.80	1.75 4.75	1.61 4.61	1·47 4·65	
44	2.23 4.94	2.06 4.87	1.91 4.81	1.76 4.75	1·61 4·70	
46	2.44 5.04	2.26 4.96	2.09 4.88	1.93 4.82	1·77 4·75	
48	2.67 5.16	2.48 5.06	2.29 4.97	2.11 4.89	1·94 4·82	
50	2.95 5.31	2.73 5.19	2.52 5.08	2.33 4.99	2·14 4·90	

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 103 LATITUDE 25°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 II 14·2 5 26 58·0 5 18 8·1 5 9 18·4 5 0 28·8	1.82	5 28 47·0 5 19 56·8 5 11 7·0	s. +1·90 1·81 1·80 1·80	H. M. S. 6 15 1.8 5 30 35.7 5 21 45.0 5 12 54.7 5 4 4.7	1.78	5 32 24·0 5 23 32·5 5 14 41·6	s. +1.92 1.80 1.79 1.77 1.76	H. M. S. 6 18 51.9 5 34 12.0 5 25 19.5 5 16 27.8 5 7 36.7	s. +1.93 1.80 1.78 1.76 1.75	H. M. S. 6 20 48·I 5 35 59·7 5 27 6·0 5 18 13·2 5 9 21·3	s. + 1·94 1·79 1·77 1·74
18 20 22 24 26	4 51 39.0 4 42 49.0 4 33 58.5 4 25 7.5 4 16 15.7	1.84	4 53 27·7 4 44 38·0 4 35 48·0 4 26 57·6 4 18 6·7	+ 1.80 1.80 1.81 1.82 1.83	4 55 15.0 4 46 25.4 4 37 35.7 4 28 45.8 4 19 55.6	1.78	4 57 I·2 4 48 II·4 4 39 2I·8 4 30 32·I 4 2I 42·3	+ 1.76 1.75 1.75 1.75 1.76	4 58 46·2 4 49 56·1 4 41 6·3 4 32 16·6 4 23 27·0	+1.74 1.73 1.73 1.73 1.73	5 0 30·I 4 5I 39·4 4 42 49·2 4 33 59·4 4 25 9·7	+ 1.72 1.71 1.70 1.70 1.69
28 30 32 33 34	4 7 23.0 3 58 29.0 3 49 33.7 3 45 5.4 3 40 36.7	1.96	4 9 15·1 4 0 22·6 3 51 28·9 3 47 1·5 3 42 33·8	1.91	4 II 4.8 4 2 13.4 3 53 21.0 3 48 54.4 3 44 27.6	1.86	4 12 52·2 4 4 1·5 3 55 10·3 3 50 44·3 3 46 18·1	+1.77 1.78 1.80 1.81 1.81	4 14 37·2 4 5 47·2 3 56 56·7 3 52 31·3 3 48 5·6	+1.73 1.74 1.75 1.76 1.76	4 16 20·0 4 7 30·3 3 58 40·4 3 54 15·3 3 49 50·0	+ 1.69 1.69 1.71 1.71 1.72
35 36 37 38 39	3 36 7·4 3 31 37·7 3 27 7·3 3 22 36·3 3 18 4·6	+2.00 2.02 2.04 2.07 2.09	3 33 37·0 3 29 7·9 3 24 38·3	+1.94 1.96 1.98 2.00 2.02	3 40 0·3 3 35 32·7 3 31 4·7 3 26 36·3 3 22 7·3		3 4I 5I·7 3 37 24·9 3 32 57·8 3 28 30·3 3 24 2·5	+ 1.83 1.84 1.86 1.87 1.89	3 43 39·8 3 39 13·7 3 34 47·4 3 30 20·7 3 25 53·8	+ 1.77 1.78 1.79 1.81 1.82	3 45 24·7 3 40 59·2 3 36 33·4 3 32 7·5 3 27 41·3	+1.72 1.73 1.74 1.75 1.76
40 41 42 43 44	3 13 32·2 3 8 59·0 3 4 24·8 2 59 49·7 2 55 13·5	+2·12 2·15 2·18 2·22 2·26	3 15 37·2 3 11 5·6 3 6 33·3 3 2 0·2 2 57 26·2	+2.05 2.07 2.10 2.13 2.17	3 17 37·8 3 13 7·8 3 8 37·1 3 4 5·7 2 59 33·5	+1.97 2.00 2.02 2.05 2.08		+1.90 1.92 1.94 1.97 2.00	3 21 26·5 3 16 58·8 3 12 30·7 3 8 2·1 3 3 33·0	+ 1.83 1.85 1.87 1.89 1.91	3 23 14·8 3 18 48·0 3 14 20·9 3 9 53·4 3 5 25·4	+1.77 1.78 1.80 1.82 1.84
45 46 47 48 49	2 50 36·3 2 45 57·7 2 41 17·9 2 36 36·4 2 31 53·4	2.44	2 52 51·2 2 48 15·1 2 43 37·9 2 38 59·3 2 34 19·4	+2·20 2·24 2·28 2·33 2·38	2 55 0·5 2 50 26·6 2 45 51·7 2 41 15·7 2 36 38·5	+2·11 2·14 2·18 2·22 2·26	2 57 4·5 2 52 32·5 2 47 59·6 2 43 25·9 2 38 51·1	+2.02 2.05 2.08 2.12 2.16	2 59 3·2 2 54 32·9 2 50 I·8 2 45 30·I 2 40 57·4	+1.94 1.96 1.99 2.02 2;05	3 0 57·0 2 56 28·1 2 51 58·6 2 47 28·5 2 42 57·7	+ 1.86 1.88 1.90 1.93 1.96
50 51 52 53 54	2 27 8.6 2 22 21.7 2 17 32.6 2 12 41.1 2 7 46.8	2·62 2·69	2 24 54.8	2.55	2 32 0·0 2 27 20·1 2 22 38·6 2 17 55·3 2 13 10·0	+2·31 2·36 2·42 2·48 2·54		+2·20 2·24 2·29 2·34 2·40	2 36 23.8 2 31 49.3 2 27 13.5 2 22 36.6 2 17 58.2	+2.09 2.13 2.17 2.22 2.27	2 38 26·I 2 33 53·7 2 29 20·3 2 24 46·0 2 20 I0·4	+1.99 2.02 2.06 2.10 2.14
		V	ARIATIO	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	A.	L. 9°	A.	L. 10°	Α.	L. 11°	Α.
o 2 4 6 8	s. + ·51 - ·44 ·37 ·30 ·23	s. -4·44 4·43 4·42 4·42	s. + ·6o - ·53 ·45 ·38 ·31	s. -4·46 4·44 4·43 4·42 4·42	s. + ·69 - ·61 ·54 ·47 ·40	s. -4·47 4·46 4·45 4·44 4·43	s. + ·77 · ·70 ·63 ·55 ·48	s. -4·48 4·47 4·46 4·45 4·44	s. + ·86 - ·79 ·71 ·64 ·57	s. -4·50 4·48 4·47 4·46 4·45	s. + ·95 - ·88 ·80 ·73 ·66	s. -4·51 4·50 4·48 4·47 4·46
10 12 14 16 18	+ ·15 ·08 + ·01 - ·06 ·13	4·42 4·41 4·41 4·42	+ ·24 ·17 ·10 + ·03 - ·04	4·42 4·41 4·41 4·41	+ ·33 ·26 ·18 ·11 + ·04	4·43 4·42 4·42 4·41	+ ·4I ·34 ·27 ·20 ·I3	4·43 4·43 4·42 4·42 4·42	+ ·50 ·43 ·36 ·29 ·22	4·44 4·43 4·43 4·42 4·42	+ ·59 ·52 ·45 ·38 ·31	4·45 4·44 4·44 4·43 4·42
20 22 24 26 28	- ·21 ·28 ·36 ·44 ·52	4·42 4·43 4·44 4·45	- ·12 ·19 ·27 ·35 ·43	4·42 4·42 4·43 4·43	- ·03 ·10 ·17 ·25 ·33	4.41 4.42 4.42 4.43	+ ·06 - ·01 ·08 ·16 ·23	4·4I 4·4I 4·42 4·42	+ ·15 ·08 + ·01 - ·06 ·14	4·42 4·41 4·41 4·42	+ ·24 ·17 ·10 + ·03 - ·04	4·42 4·41 4·41 4·41
30 32	- ·60 ·69	4·45 4·47	- ·51 ·59 ·68	4:44 4:45	- ·41 ·49 ·58	4·43 4·44 4·45	- ·31 ·39 ·47	4·42 4·43 4·44	- ·21 ·29 ·37	4·42 4·42 4·43	- ·12 ·19 ·27	4·42 4·42 4·42

·79 ·88

.99

- r·10

1.21

I:34

1·47 1·63

-1.79

1.98

2.20

4.48

4.20

4.52

4.58

4.61

4.65

4.70

4.76

4.84

4.93

34 36

38

40

42

44 46

48

50

52

54

·59 ·68

·77 ·87

- .98

r.09

I:20

I·33 I·48

1.81

2.00

-r·63

4.46

4.48

4.20

4.52

4.54

4·57 4·61

4.65

4.70

4·77 4·84

·49 ·58 ·66

.76

•96

r.08

1.20

I.33

1.64

1.82

- I·47

- ⋅86

4·45 4·46

4.48

4.20

4.52

4.54

4.57 4.61

4.65

4.71

4.77

·39 ·47 ·56 ·65

·74 ·84

·95

1.19

1.47

1.65

- I·32

4·44 4·45

4.46

4.47

4.49

4.51

4.54

4.57

4.61

4.65

4.71

4.43

4.44

4.45

4.46

4.47

4.49

4.51

4.54

4·57 4·61

4.66

.37

°45

.54

•63

·72

•93

1.05

1.32

1.47

- r·18

4.42

4.43

4.44

4.44

4.45

4.47

4.49

4.51

4·53 4·56 4·60

.27

•35

.43

.52

·61

·70 ·81

.92

-1.03

1.31

104 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 25°.

			DECLIN	ATIO	N— <i>SAM</i>	E N A	1ME AS	—LA	ITTODE.			
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 22 45.2 5 37 47.3 5 28 52.2 5 19 58.2 5 11 5.2	s. +1.96 1.79 1.76 1.73 1.72	H. M. S. 6 24 43·3 5 39 34·7 5 30 38·0 5 21 42·6 5 12 48·2	s. +1.98 1.79 1.76 1.73	H. M. S. 6 26 42.4 5 41 22.2 5 32 23.6 5 23 26.5 5 14 30.7	s. + 1·99 1·79 1·76 1·72 1·70	H. M. S. 6 28 42.6 5 43 9.6 5 34 9.0 5 25 10.0 5 16 12.5	S. + 2·02 1·79 1·76 1·72 1·68	H. M. S. 6 30 44.2 5 44 57.1 5 35 54.3 5 26 53.2 5 17 53.8	S. +2.04 1.79 1.75 1.72 1.68	H. M. S. 6 32 47·I 5 46 44·9 5 37 39·6 5 28 36·2 5 19 34·6	S. + 2.06 1.80 1.75 1.71 1.68
18 20 22 24 26	5 2 13·0 4 53 21·6 4 44 30·8 4 35 40·5 4 26 50·5	+ 1.71 1.69 1.68 1.67 1.66	5 3 55.0 4 55 2.6 4 46 10.9 4 37 20.0 4 28 29.5	+1.69 1.67 1.66 1.64 1.63	5 5 36·1 4 56 42·4 4 47 49·8 4 38 58·0 4 30 6·7	+ 1.68 1.65 1.64 1.62 1.60	5 7 16·3 4 58 21·3 4 49 27·4 4 40 34·4 4 31 42·2		5 8 55·8 4 59 59·2 4 51 3·8 4 42 9·4 4 33 16·1	+ 1.65 1.62 1.60 1.57 1.55	4 52 39·I 4 43 43·I	+1.64 1.61 1.58 1.55 1.52
28 30 31 32 33	4 18 0.8 4 9 11.1 4 4 46.3 4 0 21.5 3 55 56.6	+ 1.66 1.65 1.66 1.66 1.66	4 19 39.4 4 10 49.6 4 6 24.8 4 2 0.0 3 57 35.2	+ 1.62 1.62 1.62 1.62 1.62	4 21 16·0 4 12 25·8 4 8 0·8 4 3 36·0 3 59 11·1	+ 1.59 1.58 1.58 1.58 1.58	4 13 59·9 4 9 34·7 4 5 9·5 4 0 44·5	1·55 1·54 1·54 1·53	4 2 15.4	1.21	4 3 43.9	+1·50 1·48 1·47 1·46 1·45
34 35 36 37 38	3 51 31·6 3 47 6·6 3 42 41·4 3 38 16·1 3 33 50·7	+ 1.67 1.68 1.68 1.69	3 53 10·3 3 48 45·4 3 44 20·5 3 39 55·5 3 35 30·5	+ 1.62 1.63 1.63 1.63	3 54 46·3 3 50 21·4 3 45 56·6 3 41 31·8 3 37 6·9	1·58 1·58 1·58	3 47 29·7 3 43 4·9 3 38 40·1	1.53 1.53 1.53	3 40 10.1	1·48 1·47	3 54 52·7 3 50 27·4 3 46 2·2 3 41 37·0	+ 1·44 1·44 1·43 1·42
39 40 41 42 43	3 29 25·1 3 24 59·2 3 20 33·2 3 16 6·9 3 11 40·3	+ 1.70 1.71 1.72 1.73 1.75	3 31 5·3 3 26 40·0 3 22 14·4 3 17 48·7 3 13 22·9	1.65 1.65 1.66 1.67	3 32 42·0 3 28 17·0 3 23 51·9 3 19 26·6 3 15 1·3	1.59 1.60 1.61	1	I·53	3 26 55·6 3 22 30·8 3 18 6·0	1.47	3 32 47.0 3 28 22.1 3 23 57.3 3 19 32.5	+ I·42 I·41 I·41 I·41 I·41
44 45 46 47 48	3 7 13·3 3 2 46·0 2 58 18·3 2 53 50·1 2 49 21·4	+ 1.76 1.78 1.79 1.81 1.84	3 8 56.7 3 4 30.3 3 0 3.5 2 55 36.4 2 51 8.9	+ 1.69 1.70 1.71 1.73 1.75	3 10 35.7 3 6 10.0 3 1 44.0 2 57 17.8 2 52 51.2	+ 1.61 1.62 1.64 1.65 1.66	3 3 19·8 2 58 54·2 2 54 28·4	1	3 9 16·2 3 4 51·1 3 0 26·0 2 56 0·7	1·48 1·49 1·50	3 10 42·8 3 6 18·0 3 1 53·1 2 57 28·2	1·41 1·41 1·41 1·41 1·42
49 50 51 52 53	2 44 52·I 2 40 22·2 2 35 5I·7 2 3I 20·4 2 26 48·2	+ 1.86 1.89 1.91 1.95 1.98	2 46 41·0 2 42 12·5 2 37 43·5 2 33 13·9 2 28 43·7	+ 1·77 1·79 1·81 1·84 1·87	2 48 24·3 2 43 57·1 2 39 29·4 2 35 1·2 2 30 32·6	+ 1.68 1.70 1.72 1.74 1.76	2 41 9·5 2 36 42·4 2 32 15·1	1.60 1.62 1.64 1.66	2 51 35·3 2 47 9·7 2 42 43·8 2 38 17·8 2 33 51·4	I·54 I·55	2 48 38·0 2 44 12·8 2 39 47·3 2 35 21·7	1·43 1·44 1·46
54 55 56 57 58	2 22 15·1 2 17 41·0 2 13 5·7 2 8 29·0 2 3 51·0	+2.02 2.06 2.10 2.15 2.20	2 24 12·6 2 19 40·8 2 15 8·0 2 10 34·1 2 5 59·1	1.94 1.97 2.02 2.06	2 26 3.4 2 21 33.3 2 17 2.6 2 12 31.1 2 7 58.7	1.85	2 27 47·2 2 23 18·9 2 18 50·0 2 14 20·4 2 9 50·1	1.73	2 29 24·7 2 24 57·6 2 20 30·1 2 16 2·1 2 11 33·6	1.61 1.63	2 30 55.9 2 26 29.7 2 22 3.4 2 17 36.6 2 13 9.5	+1·47 1·48 1·50 1·52 1·54
		V	ARIATI	ON TO	O I' OF	LATI					1	
Alt.	L. 12°	A.	L. 13°	A.	L. 14°	A.	L. 15°	Α.	L. 16°	Α.	L. 17°	Α.
0 4 8 12 16	s. +1.04 - .89 .74 .60	s. -4·53 4·50 4·48 4·46 4·44	s. +1·13 - ·98 ·83 ·69 ·55	s. -4·56 4·52 4·49 4·47 4·45	s. +1·22 - 1·07 ·92 ·78 ·64	s. -4·58 4·54 4·51 4·48 4·46	1·16 1·00 ·87 ·73	s. -4·60 4·56 4·53 4·50 4·47	1·25 1·10 ·96 ·82	s. -4·63 4·59 4·55 4·52 4·49	s. +1·50 - 1·34 1·19 1·05	s. -4·66 4·61 4·57 4·54 4·51
20 22 24 26 28	+ ·33 ·26 ·19 ·12 + ·05	4·43 4·42 4·42 4·41	+ ·42 ·35 ·28 ·22 ·15	4·43 4·43 4·42 4·42	+ ·51 ·44 ·37 ·31 ·24	4.44 4.43 4.43 4.42 4.42	+ ·60 ·53 ·47 ·40 ·33	4·45 4·45 4·43 4·43	+ ·69 ·62 ·56 ·49 ·43	4·47 4·46 4·45 4·44 4·43	+ ·78 ·71 ·65 ·59 ·52	4·48 4·47 4·46 4·45 4·45
30 32 34 36 38	- ·02 ·09 ·17 ·24 ·32	4.41 4.41 4.42 4.43	+ ·08 + ·01 - ·07 ·14 ·22	4·4I 4·4I 4·42 4·42	+ ·17 ·10 + ·03 - ·04 ·11	4.41 4.41 4.41 4.41	+ ·27 ·20 ·13 + ·06 - ·01	4·42 4·42 4·41 4·41	+ ·36 ·30 ·23 ·16 ·10	4·43 4·42 4·42 4·41	+ ·46 ·39 ·33 ·26 ·20	4·44 4·43 4·42 4·42
40 42 44 46 48	- ·41 ·49 ·59 ·68 ·78	4·43 4·44 4·45 4·47 4·48	- ·30 ·38 ·47 ·56 ·66	4·42 4·43 4·44 4·45 4·46	- ·19 ·27 ·35 ·44 ·53	4·42 4·43 4·43 4·45	- ·08 ·16 ·24 ·32 ·40	4·41 4·42 4·43 4·43	+ ·03 - ·05 ·12 ·20 ·28	4.41 4.41 4.42 4.42	+ ·13 + ·06 - ·01 ·08 ·16	4·4I 4·4I 4·4I 4·42
50 52 54 56 58	- ·90 1·02 1·15 1·29 1·44	4·50 4·53 4·56 4·60 4·65	- ·76 ·87 ·99 I·13 I·28	4·48 4·50 4·52 4·56 4·60	- ·63 ·73 ·84 ·97 ₁·10	4·46 4·47 4·49 4·52 4·55	- ·50 ·59 ·70 ·81 ·94	4·44 4·45 4·47 4·49 4·51	- ·37 ·46 ·55 ·66 ·77	4.43 4.44 4.45 4.46 4.48	- ·24 ·32 ·41 ·51 ·61	4·42 4·43 4·44 4·46

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 105 LATITUDE 25°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 34 51·5 5 48 32·9 5 39 24·9 5 30 19·0 5 21 15·0	s. +2.09 1.80 1.76 1.71 1.67	H. M. S. 6 36 57·5 5 50 21·2 5 41 10·3 5 32 1·6 5 22 55·1	S. +2·11 1·81 1·76 1·71 1·66	H. M. S. 6 39 5·2 5 52 10·0 5 42 55·9 5 33 44·2 5 24 34·9	s. +2·14 1·81 1·76 1·71 1·66	H. M. S. 6 41 14.7 5 53 59.2 5 44 41.7 5 35 26.8 5 26 14.4	1·77	H. M. S. 6 43 26·2 5 55 49·1 5 46 27·9 5 37 9·6 5 27 53·8	s. +2·21 1·84 1·77 1·71 1·66	H. M. S. 6 45 39.9 5 57 39.6 5 48 14.5 5 38 52.4 5 29 33.1	s. +2·24 1·85 1·78 1·71 1·65
18 20 22 24 26	5 12 12·9 5 3 12·3 4 54 13·2 4 45 15·6 4 36 19·1	+ 1.63 1.59 1.56 1.53	5 13 50·5 5 4 47·6 4 55 46·4 4 46 46·7 4 37 48·4	+ 1.62 1.58 1.54 1.51 1.47	5 15 27·6 5 6 22·2 4 57 18·6 4 48 16·6 4 39 16·2	+1.61 1.57 1.53 1.49 1.45	5 17 4·2 5 7 56·1 4 58 49·9 4 49 45·4 4 40 42·6	+ 1.61 1.56 1.51 1.47 1.42	5 9 29·3 5 0 20·3 4 51 13·1		5 11 2.0	+ 1.60 1.54 1.48 1.43 1.38
28 30 31 32 33	4 27 23.8 4 18 29.6 4 14 2.8 4 9 36.3 4 5 9.9	+ 1·47 1·45 1·43 1·42 1·41	4 28 51·3 4 19 55·5 4 15 28·0 4 11 0·7 4 6 33·6	1.40	4 30 17·2 4 21 19·5 4 16 51·0 4 12 22·9 4 7 55·0	+ 1.41 1.38 1.37 1.35 1.33	4 31 41·4 4 22 41·6 4 18 12·1 4 13 43·0 4 9 14·2	1.31	4 33 4.0 4 24 1.8 4 19 31.2 4 15 1.0 4 10 31.1	1·32 1·30 1·28	4 34 25·I 4 25 20·2 4 20 48·4 4 I6 17·0 4 II 45·9	+1.34 1.29 1.26 1.25 1.23
34 35 36 37 38	4 0 43·8 3 56 17·8 3 51 52·0 3 47 26·3 3 43 0·9	1.38	4 2 6·8 3 57 40·2 3 53 13·8 3 48 47·6 3 44 21·6	+1.36 1.35 1.34 1.33 1.32	3 50 6·I	+ 1·32 1·31 1·30 1·28 1·27	4 4 45.7 4 0 17.5 3 55 49.5 3 51 21.8 3 46 54.3	+1.28 1.27 1.25 1.24 1.22	4 I 32·3 3 57 3·3	1.19		+1·21 1·19 1·16 1·14 1·13
39 40 41 42 43	3 38 35·5 3 34 10·2 3 29 45·1 3 25 20·0 3 20 55·1	I·35	3 39 55.8 3 35 30.1 3 31 4.6 3 26 39.1 3 22 13.9	+1·31 1·30 1·29 1·29 1·28		+ 1.26 1.25 1.24 1.23 1.22	3 42 27·I 3 38 0·I 3 33 33·3 3 29 6·7 3 24 40·3	1.12	3 39 10·2 3 34 42·6	1·14 1·12 1·11	3 44 46·1 3 40 17·2 3 35 48·5 3 31 20·1 3 26 52·0	+1·11 1·10 1·08 1·06 1·04
44 45 46 47 48	3 16 30·1 3 12 5·3 3 7 40·4 3 3 15·7 2 58 50·9	1.34	3 17 48·7 3 13 23·6 3 8 58·6 3 4 33·7 3 0 8·8	+ 1·28 1·27 1·27 1·26 1·26	3 19 3·3 3 14 37·8 3 10 12·5 3 5 47·3 3 1 22·1	+ 1.21 1.20 1.20 1.19 1.18	3 20 14·1 3 15 48·0 3 11 22·1 3 6 56·4 3 2 30·8	+ 1·15 1·14 1·13 1·12 1·11	3 16 54·2 3 12 27·6 3 8 1·2	1.07	3 13 28·9 3 9 1·6	+ 1.02 1.01 .99 .97 .95
49 50 51 52 53	2 54 26·0 2 50 1·1 2 45 36·2 2 41 11·2 2 36 46·1	1.35	2 55 44.0 2 51 19.1 2 46 54.3 2 42 29.5 2 38 4.6	+1·26 1·26 1·26 1·26 1·26	2 56 57·1 2 52 32·1 2 48 7·2 2 43 42·3 2 39 17·5	+ 1·18 1·17 1·17 1·17 1·17	2 58 5·4 2 53 40·0 2 49 14·8 2 44 49·7 2 40 24·5	1.08	2 54 43.0 2 50 17.3 2 45 51.6 2 41 26.2	1.01 1.00 .99	2 55 41·0 2 51 14·5 2 46 48·2 2 42 22·1	+ ·94 ·93 ·91 ·90 ·89
54 55 56 57 58	2 32 20·9 2 27 55·4 2 23 29·8 2 19 4·0 2 14 38·0	1.40	2 33 39·7 2 29 14·7 2 24 49·7 2 20 24·5 2 15 59·2		2 34 52·7 2 30 27·9 2 26 3·0 2 21 38·2 2 17 13·2	+ 1·17 1·17 1·17 1·17 1·18		1.06	2 37 0.8 2 32 35.6 2 28 10.4 2 23 45.3 2 19 20.3	·96 ·95 ·95		+ ·87 ·86 ·85 ·84 ·83
		V	ARIATIO	ON TO	O 1' OF	LATI'	TUDE A	ND A	LTITUD	E.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α.	L. 22°	A.	L. 23°	Α.
0 4 8 12 16	s. +1.60 - 1.44 1.28 1.14 1.00	s. -4·70 4·64 4·60 4·56 4·52	s. +1.70 - 1.53 1.37 1.23 1.09	s. -4·73 4·67 4·62 4·58 4·55	s. +1.80 - 1.63 1.47 1.32 1.18	s. -4·76 4·70 4·65 4·61 4·57	s. +1·90 - 1·72 1·56 1·41 1·28	s. -4·80 4·74 4·68 4·63 4·59	s. +2·00 1·82 1·66 1·51 1·37	s. -4·85 4·78 4·71 4·66 4·62	s. +2·11 - 1·92 1·76 1·60 1·46	s. -4·89 4·82 4·75 4·69 4·65
20 22 24 26 28	+ ·87 ·80 ·74 ·68 ·62	4·50 4·49 4·48 4·47 4·46	+ ·96 ·90 ·83 ·77 ·71	4·52 4·50 4·49 4·48 4·47	+1.05 .99 .93 .86 .80	4.54 4.52 4.51 4.50 4.49	+1·15 1·08 1·02 ·96 ·90	4·56 4·54 4·53 4·52 4·50	+1.24 1.18 1.11 1.05 1.00	4·58 4·57 4·55 4·54 4·52	+1·33 1·27 1·21 1·15 1·09	4·61 4·59 4·57 4·56 4·55
30 32 34 36 38	+ ·55 ·49 ·43 ·37 ·30	4·45 4·44 4·43 4·43 4·42	+ ·65 ·59 ·53 ·47 ·41	4·46 4·45 4·44 4·44	+ '74 '69 '63 '57 '51	4·48 4·47 4·46 4·45 4·44	+ ·84 ·78 ·73 ·67 ·61	4·49 4·48 4·47 4·46 4·45	+ ·94 ·88 ·83 ·77 ·72	4·51 4·50 4·48 4·47	+1.04 .98 .93 .87 .82	4.54 4.52 4.51 4.50 4.49
40 42 44 46 48	+ ·24 ·17 ·10 + ·03 - ·04	4·42 4·41 4·41 4·41 4·41	+ ·34 ·28 ·22 ·15 ·08	4·43 4·42 4·42 4·42 4·41	+ ·45 ·39 ·33 ·27 ·20	4·44 4·43 4·42 4·42	+ ·56 ·50 ·44 ·38 ·32	4·45 4·44 4·43 4·42	+ ·66 ·61 ·55 ·50 ·44	4·46 4·45 4·45 4·44 4·43	+ ·77 ·72 ·66 ·61 ·56	4·48 4·47 4·46 4·46 4·45
50 52 54 56 58	- ·II ·I9 ·27 ·36 ·46	4·41 4·42 4·42 4·43 4·44	+ ·01 - ·06 ·14 ·22 ·30	4·41 4·42 4·42 4·43	+ ·14 + ·07 ·00 - ·07 ·15	4·42 4•41 4·41 4·41 4·41	+ ·26 ·20 ·14 + ·07 ·00	4·42 4·41 4·41 4·41	+ ·39 ·33 ·27 ·21 ·15	4.43 4.43 4.42 4.42 4.41	+ ·51 ·46 ·41 ·35 ·30	4·44 4·43 4·43 4·42

LATITUDE 26°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 15 26.5 5 6 30.0 4 57 32.6 4 48 33.8	s. +1.95 1.99 2.00 2.02 2.05	H. M. S. 6 I 57·I 5 I7 25·3 5 8 29·7 4 59 33·3 4 50 36·0	s. +1.95 1.97 1.98 2.00 2.02	H. M. S. 6 3 54·2 5 19 23·2 5 10 28·3 5 1 32·8 4 52 36·5	S. + 1·95 1·96 1·97 1·98 2·00	H. M. S. 6 5 51·5 5 21 20·1 5 12 25·8 5 3 31·0 4 54 35·6	s. + 1·96 1·94 1·95 1·96	5 23 16·4 5 14 22·2 5 5 27·9	s. + 1.96 1.93 1.93 1.94 1.95	H. M. S. 6 9 47.0 5 25 11.9 5 16 17.9 5 7 23.7 4 58 29.4	s. +1.97 1.92 1.92 1.92
18 20 22 24 26	4 39 33.7 4 30 32.0 4 21 28.3 4 12 22.4 4 3 14.0	+2.08 2.11 2.15 2.19 2.23	4 41 37·5 4 32 37·5 4 23 35·9 4 14 32·3 4 5 26·6	+2.04 2.07 2.11 2.14 2.18	4 43 39·3 4 34 40·9 4 25 41·1 4 16 39·6 4 7 36·2	+2.02 2.04 2.07 2.10 2.13	4 45 39.4 4 36 42.3 4 27 44.0 4 18 44.4 4 9 43.0	+ 1.99 2.01 2.03 2.06 2.09	4 38 41·8 4 29 44·8 4 20 46·7	+1.96 1.98 1.99 2.02 2.04	4 49 34·8 4 40 39·6 4 31 43·6 4 22 46·8 4 13 48·8	+ 1.93 1.95 1.96 1.98 2.00
27 28 29 30 31	3 58 38·7 3 54 2·6 3 49 25·7 3 44 47·9 3 40 9·1	+2·26 2·29 2·32 2·35 2·38	4 0 52·7 3 56 18·2 3 51 43·0 3 47 6·9 3 42 30·0	+2·21 2·23 2·26 2·29 2·31	3 53 56.8	+2·16 2·18 2·20 2·23 2·25	4 5 11.7 4 0 39.8 3 56 7.4 3 51 34.3 3 47 0.6	+2·12 2·13 2·15 2·17 2·19	3 58 14·8 3 53 43·9	+2.06 2.08 2.10 2.12 2.14	4 9 19·4 4 4 49·5 4 0 19·2 3 55 48·5 3 51 17·3	+2.01 2.03 2.05 2.06 2.08
32 33 34 35 36	3 35 29·3 3 30 48·4 3 26 6·2 3 21 22·8 3 16 38·0	+2.41 2.45 2.49 2.53 2.58	3 37 52·2 3 33 13·3 3 28 33·5 3 23 52·4 3 19 10·2	+2·35 2·38 2·41 2·45 2·50	3 30 56·3 3 26 17·5	+2·28 2·31 2·34 2·38 2·41	3 42 26·2 3 37 51·0 3 33 15·0 3 28 38·1 3 24 0·2	+2·22 2·25 2·27 2·31 2·34	3 44 37.6 3 40 4.0 3 35 29.6 3 30 54.5 3 26 18.5	+2·16 2·18 2·21 2·24 2·27	3 46 45·6 3 42 13·3 3 37 40·4 3 33 6·8 3 28 32·5	+2·10 2·12 2·15 2·17 2·20
37 38 39 40 41	3 11 51·7 3 7 3·7 3 2 14·0 2 57 22·4 2 52 28·6	+2.63 2.68 2.73 2.79 2.85	3 14 26.6 3 9 41.6 3 4 55.0 3 0 6.7 2 55 16.6	+2.54 2.58 2.63 2.69 2.74	3 12 14·0 3 7 30·3 3 2 45·0	+2.45 2.50 2.54 2.59 2.64	3 19 21·3 3 14 41·3 3 10 0·1 3 5 17·6 3 0 33·7	+2·37 2·41 2·45 2·50 2·54	3 17 3·7 3 12 24·8	+2·30 2·33 2·37 2·41 2·45	3 23 57·4 3 19 21·5 3 14 44·6 3 10 6·8 3 5 27·8	+2·23 2·26 2·29 2·32 2·36
42 43 44 45 46	2 47 32·6 2 42 34·1 2 37 32·9 2 32 28·6 2 27 21·0	+2·92 3·00 3·08 3·16 3·26	2 50 24:4 2 45 30:1 2 40 33:4 2 35 34:0 2 30 31:7	+2.81 2.87 2.94 3.02 3.11	2 48 19·0 2 43 26·3	+2.70 2.76 2.82 2.89 2.97	2 55 48·2 2 51 1·0 2 46 12·0 2 41 21·0 2 36 27·7	+2.59 2.65 2.70 2.77 2.84	2 53 36·7 2 48 50·9 2 44 3·5	+2·49 2·54 2·60 2·65 2·71	3 0 47.7 2 56 6.3 2 51 23.5 2 46 39.2 2 41 53.3	+2·40 2·45 2·49 2·54 2·60
47 48 49 50 51	2 22 9.7 2 16 54.3 2 11 34.2 2 6 8.8 2 0 37.6	+3·36 3·46 3·58 3·70 3·84	2 20 17·1 2 15 4·1 2 9 46·5	+3·20 3·41 3·53 3·66	2 23 30·0 2 18 23·2 2 13 12·4	+3.05 3.14 3.23 3.34 3.46	2 21 32·3 2 16 27·7		2 29 28·7 2 24 32·3 2 19 33·0	+2.78 2.85 2.93 3.01 3.10	2 27 23.5	+2.65 2.72 2.79 2.86 2.94

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
° 0 2 4 6 8	s. s.	S. S.	s. s.	s. s.	s. s.	s. s.
	- ·00 -4·45	+ ·09 -4·45	+ ·17 -4·45	+ ·26 -4·46	+ ·35 -4·46	+ '43 -4'47
	·08 4·45	+ ·01 4·45	·10 4·45	·18 4·45	·27 4·46	'36 4'46
	·15 4·45	- ·06 4·45	+ ·02 4·45	·11 4·45	·20 4·45	'28 4'46
	·22 4·46	·14 4·45	- ·06 4·45	+ ·03 4·45	·12 4·45	'21 4'45
	·31 4·46	·22 4·45	·13 4·45	- ·04 4·45	+ ·04 4·45	'13 4'45
10	- ·39 4·47	- '30 4'46	- ·20 4·45	- ·12 4·45	- ·03 4·45 ·11 4·45 ·19 4·45 ·26 4·46 ·34 4·46	+ ·06 4·45
12	·46 4·47	'37 4'46	·28 4·46	·20 4·45		- ·02 4·45
14	·54 4·48	'45 4'47	·36 4·46	·28 4·46		·10 4·45
16	·63 4·49	'54 4'48	·45 4·47	·35 4·46		·18 4·45
18	·72 4·51	'62 4'49	·53 4·48	·43 4·47		·25 4·46
20	- ·80 4·52 ·89 4·54 ·99 4·56 1·09 4·58 1·19 4·61	- ·71 4·51	- ·61 4·49	- ·52 4·48	- '43 4'47	- ·33 4·46
22		·79 4·52	·70 4·50	·60 4·49	'51 4'48	·41 4·47
24		·88 4·54	·79 4·52	·69 4·50	'60 44'9	·50 4·48
26		·98 4·56	·88 4·54	·78 4·52	'68 4'50	·58 4·49
28		1·09 4·58	·98 4·56	·88 4·54	'78 4'52	·67 4·50
30	-1·31 4·63	-1·19 4·60	-1.08 4.58	- · · · 98 4 · 55	- ·88 4·53	- ·77 4·51
32	1·42 4·67	1·30 4·64	1.19 4.61	1 · 08 4 · 58	·97 4·55	·86 4·53
34	1·55 4·71	1·42 4·67	1.31 4.64	1 · 19 4 · 61	I·08 4·58	·97 4·55
36	1·68 4·76	1·56 4·71	1.43 4.67	1 · 31 4 · 64	I·19 4·61	I·07 4·58
38	1·83 4·81	1·70 4·76	1.57 4.72	1 · 44 4 · 68	I·31 4·64	I·19 4·61
40	-1·99 4·88 2·17 4·95 2·38 5·05 2·61 5·16 2·87 5·30 3·18 5·47	-1·85 4·82	-1·71 4·77	-1.58 4.72	-1·44 4·68	-1·31 4·64
42		2·02 4·89	1·87 4·83	1.72 4.77	1·58 4·73	1·44 4·68
44		2·21 4·97	2·04 4·90	1.89 4.83	1·74 4·78	1·59 4·73
46		2·42 5·06	2·24 4·98	2.07 4.91	1·91 4·84	1·75 4·78
48		2·66 5·18	2·46 5·08	2.27 5.00	2·09 4·92	1·92 4·85
50		2·94 5·34	2·72 5·21	2.51 5.11	2·31 5·01	2·12 4·93

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 107 LATITUDE 26°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 II 45.2 5 27 6.8 5 18 12.6 5 9 18.5 5 0 24.4	s. +1·97 1·91 1·90 1·90	5 20 6.6 5 11 12.4	s. +1.98 1.90 1.89 1.89	H. M. S. 6 15 43·3 5 30 55·1 5 22 0·0 5 13 5·3 5 4 11·0	s. + 1.99 1.89 1.88 1.87	5 23 52·7 5 14 57·5	s. +2.00 1.89 1.88 1.86 1.85	H. M. S. 6 19 44·1 5 34 41·8 5 25 45·0 5 16 49·0 5 7 53·6	s. +2.02 1.88 1.87 1.85 1.84	H. M. S. 6 21 45.6 5 36 34.8 5 27 36.7 5 18 39.7 5 9 43.5	s. +2·03 1·88 1·86 1·84 1·82
18 20 22 24 26	4 51 30·2 4 42 35·6 4 33 40·5 4 24 44·7 4 15 48·0	+1.91 1.92 1.93 1.95 1.96		+ 1.89 1.89 1.90 1.91 1.92	4 37 28·7 4 28 34·2	+ 1.87 1.87 1.87 1.88 1.89	4 39 20·2 4 30 26·1	+1.85 1.85 1.85 1.85 1.85	4 58 58·8 4 50 4·4 4 41 10·2 4 32 16·2 4 23 22·0	1.82 1.82	5 0 48·0 4 51 53·1 4 42 58·6 4 34 4·4 4 25 10·4	+1.81 1.80 1.80 1.79 1.79
28 30 32 33 34	4 6 50·2 3 57 51·0 3 48 50·2 3 44 19·1 3 39 47·4	+1.99 2.01 2.05 2.07 2.08		+1.95 1.97 2.00 2.01 2.03	4 10 43·8 4 1 47·4 3 52 50·0 3 48 20·7 3 43 51·1	+ 1.91 1.91 1.94 1.96 1.97	4 3 41·5 3 54 45·2	+ 1.87 1.88 1.90 1.91 1.92	4 14 27.7 4 5 33.0 3 56 37.7 3 52 9.8 3 47 41.7	1.84 1.85	4 16 16·3 4 7 22·0 3 58 27·4 3 53 59·9 3 49 32·3	+1.78 1.80 1.81 1.81 1.82
35 36 37 38 39	3 35 15·3 3 30 42·4 3 26 9·0 3 21 34·7 3 16 59·7	+2·11 2·13 2·16 2·18 2·21	3 37 20·0 3 32 48·5 3 28 16·3 3 23 43·6 3 19 10·2	+2.05 2.07 2.09 2.11 2.14	3 39 21·2 3 34 50·7 3 30 19·9 3 25 48·4 3 21 16·5	+1.99 2.01 2.03 2.05 2.07	3 36 49·4 3 32 19·6 3 27 49·3	+1.93 1.95 1.96 1.98 2.00	3 43 13·3 3 38 44·6 3 34 15·6 3 29 46·3 3 25 16·5	1.90 1.92	3 45 4·4 3 40 36·4 3 36 8·1 3 31 39·5 3 27 10·7	+ 1.82 1.83 1.84 1.86 1.87
40 41 42 43 44	3 12 23.8 3 7 47.0 3 3 9.1 2 58 30.2 2 53 50.1	+2·24 2·28 2·31 2·35 2·39	3 14 36·1 3 10 1·1 3 5 25·3 3 0 48·5 2 56 10·8	+2·17 2·19 2·23 2·26 2·30	3 16 43.8 3 12 10.5 3 7 36.5 3 3 1.7 2 58 25.9	+2.09 2.12 2.15 2.18 2.21	3 18 47·2 3 14 15·4 3 9 42·9 3 5 9·7 3 0 35·8	+2.02 2.04 2.07 2.09 2.12	3 20 46·4 3 16 15·8 3 11 44·6 3 7 13·0 3 2 40·6		3 22 41·5 3 18 11·9 3 13 41·9 3 9 11·4 3 4 40·5	+ 1.88 1.90 1.92 1.94 1.96
45 46 47 48 49	2 49 8·6 2 44 25·7 2 39 41·1 2 34 54·9 2 30 6·8	+2.44 2.49 2.54 2.59 2.66	2 51 31·8 2 46 51·6 2 42 10·1 2 37 27·0 2 32 42·3	+2·34 2·38 2·43 2·48 2·53	2 39 52.3	+2·24 2·28 2·32 2·37 2·42	2 46 48·8 2 42 II·I	+2·15 2·19 2·22 2·26 2·30	2 58 7.6 2 53 33.8 2 48 59.2 2 44 23.7 2 39 47.2	+2.07 2.09 2.13 2.16 2.20	3 0 9·0 2 55 36·8 2 51 3·9 2 46 30·3 2 41 55·9	+1.98 2.01 2.03 2.06 2.09
50 51 52 53 54	2 25 16·5 2 20 23·9 2 15 28·7 2 10 30·6 2 5 29·0	+2.72 2.80 2.88 2.96 3.05	2 27 55·9 2 23 7·4 2 18 16·6 2 13 23·4 2 8 27·5	+2.59 2.66 2.73 2.81 2.89	2 30 27·6 2 25 42·7 2 20 55·9 2 16 7·3 2 11 15·9	+2.47 2.52 2.59 2.66 2.73	2 18 42.1	+2·35 2·40 2·45 2·51 2·58	2 35 9.6 2 30 30.7 2 25 50.5 2 21 8.9 2 16 25.5	+2·24 2·28 2·33 2·38 2·44		+2·13 2·17 2·21 2·25 2·31

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
0 2 4 6 8	s. s. + ·52 -4·48 ·44 4·47 ·37 4·46 ·29 4·46 ·22 4·45	s. s. + ·61 -4·49 ·53 4·48 ·46 4·47 ·38 4·47 ·31 4·46	s. s. + '70 -4·50 ·62 4·49 ·54 4·48 ·47 4·47 ·39 4·47	s. s. + ·79 -4·52 ·71 4·50 ·63 4·49 ·56 4·48 ·48 4·47	s. s. + ·88 -4·53 ·80 4·52 ·72 4·51 ·64 4·50 ·57 4·49	s. s. + '97 -4'55 '89 4'54 '81 4'52 '73 4'51 '66 4'50
10	+ ·14 4·45	+ ·23 4·46	+ ·32 4·46	+ '41 4'47 '33 4'46 '26 4'46 '18 4'45 '11 4'45	+ ·49 4·48	+ ·58 4·49
12	+ ·07 4·45	·16 4·45	·24 4·46		·42 4·47	·51 4·48
14	- ·01 4·45	·08 4·45	·17 4·45		·35 4·46	·43 4·47
16	·09 4·45	+ ·00 4·45	·10 4·45		·27 4·46	·36 4·46
18	·16 4·45	- ·07 4·45	+ ·02 4·45		·20 4·45	·29 4·46
20	- ·24 4·46	- ·15 4·45	06 4.45	+ ·03 4·45	+ ·13 4·45	+ ·21 4·45
22	·32 4·46	·23 4·46	.13 4.45	- ·04 4·45	+ ·05 4·45	·14 4·45
24	·40 4·47	·31 4·46	.21 4.45	·12 4·45	- ·03 4·45	+ ·07 4·45
26	·49 4·48	·39 4·47	.29 4.46	·20 4·45	·10 4·45	- ·01 4·45
28	·58 4·49	·47 4·47	.38 4.47	·28 4·46	·18 4·45	·08 4·45
30	66 4.50	- ·56 4·48	- ·46 4·47	- ·36 4·46	- ·26 4·46	- ·16 4·45
32	.76 4.51	·65 4·50	·55 4·48	·45 4·47	·34 4·46	·24 4·46
34	.86 4.53	·75 4·51	·64 4·49	·53 4·48	·43 4·47	·33 4·46
36	.95 4.55	·85 4·53	·74 4·51	·63 4·49	·52 4·48	·41 4·47
38	1.07 4.57	·95 4·55	·84 4·53	·72 4·51	·61 4·49	·50 4·48
40	-1·19 4·60	-1.06 4.57	- ·94 4·55	- ·82 4·52	- ·71 4·51	- ·59 4·49
42	1·31 4·64	1.18 4.60	1·06 4·57	·93 4·55	·81 4·52	·69 4·51
44	1·45 4·68	1.31 4.64	1·18 4·60	I·05 4·57	·92 4·54	·79 4·52
46	1·60 4·73	1.45 4.68	1·31 4·64	I·17 4·60	I·04 4·57	·91 4·54
48	1·76 4·79	1.61 4.73	1·45 4·68	I·31 4·64	I·16 4·60	I·03 4·57
50	-1.95 4.86	-1.77 4.79	-1.61 4.73	-1·45 4·68	-1·30 4·64	-1·15 4·60
52	2.15 4.94	1.97 4.87	1.79 4.79	1·62 4·73	1·45 4·67	1·30 4·63
54	2.40 5.05	2.19 4.94	1.99 4.87	1·80 4·79	1·62 4·72	1·45 4·67

108 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 26°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 23 48·2 5 38 27·6 5 29 28·2 5 20 29·9 5 11 32·7	s. + 2·05 1·88 1·85 1·83 1·81	H. M. S. 6 25 51·7 5 40 20·3 5 31 19·3 5 22 19·6 5 13 21·1	s. +2.07 1.88 1.85 1.82 1.80	H. M. S. 6 27 56·5 5 42 13·1 5 33 10·2 5 24 8·8 5 15 8·9	s. +2·09 1·88 1·85 1·82 1·79	H. M. S. 6 30 2·3 5 44 5·9 5 31 1·0 5 25 57·8 5 16 56·0	s. +2·11 1·88 1·85 1·81 1·78	H. M. S. 6 32 9.4 5 45 58.8 5 36 51.7 5 27 46.4 5 18 42.7	s. +2·13 1·88 1·84 1·80 1·77	H. M. S. 6 34 18·2 5 47 52·0 5 38 42·4 5 29 34·7 5 20 29·0	s. +2·16 1·89 1·84 1·80
18 20 22 24 26	5 2 36·3 4 53 40·7 4 44 45·6 4 35 51·0 4 26 56·8	+1.79 1.78 1.76 1.76 1.76	5 4 23.6 4 55 27.1 4 46 31.2 4 37 36.1 4 28 41.4	+1.78 1.76 1.75 1.73 1.73	5 6 10·1 4 57 12·4 4 48 15·5 4 39 19·5 4 30 24·2	+ 1·77 1·74 1·73 1·71 1·70	5 7 55.7 4 58 56.6 4 49 58.6 4 41 1.5 4 32 5:3	+ 1·75 1·73 1·71 1·69 1·67	5 9 40·6 5 0 39·9 4 51 40·5 4 42 42·1 4 33 44·7	+1.74 1.71 1.69 1.66 1.64	5 II 24.9 5 2 22.4 4 53 2I.2 4 44 2I.4 4 35 22.6	+ 1·73 1·70 1·67 1·64 1·62
28 30 31 32 33	4 18 2.7 4 9 8.6 4 4 41.6 4 0 14.4 3 55 47.2	+ 1·75 1·76 1·76 1·76 1·76		+ 1·72 1·72 1·71 1·72 1·72	4 21 29·3 4 12 35·0 4 8 7·8 4 3 40·7 3 59 13·7	+1.69 1.68 1.68 1.68 1.67	4 23 9.7 4 14 14.7 4 9 47.4 4 5 20.2 4 0 53.0	1.65	4 II 24.8 4 6 57.2	+1.62 1.61 1.60 1.60 1.59		+1.60 1.58 1.57 1.56 1.55
34 35 36 37 38	3 5I 20·0 3 46 52·5 3 42 25·0 3 37 57·2 3 33 29·3	+ 1.77 1.77 1.78 1.79 1.80	3 53 4·7 3 48 37·5 3 44 10·3 3 39 43·0 3 35 15·4	+ 1.72 1.73 1.73 1.74	3 54 46.7 3 50 19.6 3 45 52.6 3 41 25.5 3 36 58.3	+ 1.68 1.67 1.68 1.68 1.68	3 56 26·0 3 51 58·9 3 47 31·9 3 43 4·8 3 38 37·8	1.63	3 58 2·6 3 53 35·4 3 49 8·2 3 44 41·1 3 40 14·1	1.28	3 59 36·6 3 55 9·1 3 50 41·7 3 46 14·4 3 41 47·3	+ 1.55 1.54 1.53 1.53 1.52
39 40 41 42 43	3 29 1·1 3 24 32·7 3 20 4·0 3 15 34·8 3 11 5·4	+1.81 1.81 1.83 1.84 1.86	3 30 47·8 3 26 20·0 3 21 51·9 3 17 23·6 3 12 55·0	1.77	3 32 31·0 3 28 3·6 3 23 36·0 3 19 8·3 3 14 40·4	1.70	3 34 10·7 3 29 43·6 3 25 16·4 3 20 49·0 3 16 21·6	1.65			3 32 53.1	+1.52 1.52 1.52 1.52 1.52 1.52
44 45 46 47 48	3 6 35.6 3 2 5.3 2 57 34.5 2 53 3.2 2 48 31.2	+ 1.88 1.90 1.92 1.94 1.97	2 59 27.3	+ 1.80 1.82 1.84 1.86 1.88	3 5 43·8 3 1 15·1 2 56 46·0	+ 1·73 1·74 1·76 1·77 1·79	3 11 54.0 3 7 26.2 3 2 58.2 2 58 30.0 2 54 1.4	+ 1.66 1.67 1.68 1.69 1.70	3 9 4·2 3 4 36·7 3 0 9·0	+ 1.59 1.60 1.60 1.61 1.62	3 10 37.8	+1.52 1.53 1.53 1.53 1.54
49 50 51 52 53	2 43 58·5 2 39 25·1 2 34 50·9 2 30 15·7 2 25 39·5	2·03 2·06	2 45 55.4 2 41 23.7 2 36 51.2 2 32 18.1 2 27 44.0	1.98 1.98	2 47 46·7 2 43 16·3 2 38 45·4 2 34 13·9 2 29 41·7	+ 1.81 1.83 1.85 1.88 1.91	2 49 32·5 2 45 3·3 2 40 33·6 2 36 3·6 2 31 32·9	+ 1·72 1·74 1·76 1·78 1·80	2 46 44·8 2 42 16·1	1.65 1.66 1.68	2 43 53.0 2 39 24.8	+1.55 1.56 1.57 1.58 1.59
54 55 56 57 58	2 21 2·2 2 16 23·5 2 11 43·5 2 7 1·5 2 2 18·4	+2·18 2·23 2·28 2·36 2·42		+2.05 2.10 2.14 2.19 2.24	2 20 35·I 2 I6 0·4 2 II 24·7		2 17 57·2 2 13 23·8	1.89	2 28 47·9 2 24 17·6 2 19 46·7 2 15 15·2 2 10 43·0		2 16 59.1	1.63 1.65 1.67
		7	ARIATI	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUI	Œ.	 	· · · · · · · · · · · · · · · · · · ·
Alt.	L. 12°	A.	L. 13	A.	L. 14	° A.	L. 15	° A.	L. 16	° A.	L. 17	° A.
0 4 8 12 16	·90 ·75 ·60 ·45	s. -4·57 4·54 4·51 4·49 4·47	·99 ·83 ·69 ·54	s. -4.60 4.56 4.53 4.50 4.48	1.08 .92 .77 .63	s. -4.62 4.58 4.54 4.52 4.49	1·17 1·01 ·87 ·72	s. -4.65 4.60 4.56 4.53 4.51	s. +1·43 1·26 1·11 ·96 ·81	5. -4.67 4.63 4.58 4.55 4.55	1·36 1·20 1·05 ·90	s. -4·70 4·65 4·60 4·57 4·54
20 22 24 26 28	+ ·31 ·23 ·16 ·09 + ·01	4·46 4·45 4·45 4·45 4·45	+ ·40 ·33 ·25 ·18 ·11	4·47 4·46 4·46 4·45 4·45	+ ·49 ·42 ·35 ·28 ·20	4·48 4·47 4·46 4·46 4·45	+ ·58 ·51 ·44 ·37 ·30	4·49 4·48 4·47 4·46 4·46	+ ·67 ·60 ·53 ·46 ·39	4·50 4·49 4·48 4·47 4·47	+ ·76 ·69 ·62 ·56 ·49	4·51 4·50 4·49 4·48 4·48
30 32 34 36 38	- ·06 ·14 ·22 ·30 ·39	4·45 4·46 4·46 4·47	+ ·03 - ·04 ·12 ·20 ·28	4·45 4·45 4·45 4·46	+ ·13 + ·06 - ·02 ·10 ·18	4·45 4·45 4·45 4·45	+ ·23 ·16 ·08 + ·01 - ·07	4·46 4·45 4·45 4·45 4·45	+ ·32 ·25 ·18 ·11 + 04	4·46 4·46 4·45 4·45 4·45	+ ·42 ·35 ·28 ·21 ·14	4·47 4·46 4·46 4·45 4·45
40 42 44 46 48	- ·48 ·57 ·67 ·78 ·89	4:47 4:48 4:50 4:52 4:54	- '37 '46 '55 '65 '76	4·46 4·47 4·48 4·50 4·51	- ·26 ·34 ·43 ·53 ·63	4·46 4·46 4·47 4·48 4·49	- ·15 ·23 ·32 ·40 ·50	4·45 4·46 4·46 4·47 4·48	- ·04 ·12 ·20 ·28 ·37	4.45 4.45 4.46 4.47	+ ·07 - ·01 ·08 ·16 ·25	4·45 4·45 4·45 4·45 4·46
50 52 54 56 58	-1:01 1:14 1:29 1:45 1:63	4·56 4·59 4·63 4·68 4·74	- 87 ·99 I·13 I·28 I·44	4·53 4·56 4·59 4·63 4·68	- ·73 ·85 ·97 I·II I·26	4·51 4·53 4·55 4·59 4·63	- ·60 ·71 ·82 ·95 I·09	4·49 4·51 4·55 4·60	- '47 '57 '67 '79 '92	4·47 4·49 4·50 4·52 4·54	- '34 '43 '53 '64 '75	4·46 4·47 4·48 4·50 4·52

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 109 LATITUDE 26°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 36 28·4 5 49 45·5 5 40 33·1 5 31 23·0 5 22 14·9	s. +2·18 1·89 1·85 1·80	H. M. S. 6 38 40·3 5 51 39·4 5 42 24·1 5 33 11·2 5 24 0·4	s. +2·21 1·90	5 44 15·3 5 34 59·3	s. +2·24 1·91 1·85 1·80	H. M. s. 6 43 9.8 5 55 28.8 5 46 6.8 5 36 47.5 5 27 30.9	s. +2·28 1·92 1·86 1·80	H. M. S. 6 45 27·5 5 57 24·4 5 47 58·7 5 38 35·9 5 29 16·0	s. +2·32 1·93 1·87 1·81	H. M. S. 6 47 47.6 5 59 20.7 5 49 51.0 5 40 24.6 5 31 1.0	s. +2·35 1·88 1·81 1·75
18 20 22 24 26	5 13 8.6 5 4 4.0 4 55 1.0 4 45 59.3 4 36 59.0	+1.72 1.68 1.65 1.62	5 14 51·7 5 5 44·8 4 56 39·6 4 47 36·1 4 38 33·9	+ 1.71 1.67 1.63 1.60	5 1 6 34·3	+1.71 1.66 1.62 1.58	5 18 16·6 5 9 4·5 4 59 54·3 4 50 46·1 4 41 39·5	+1.70 1.65 1.60 1.56	5 19 58·5 5 10 43·3	+1.69 1.64 1.59 1.55 1.50	5 21 40·I 5 12 21·7	+1.69 1.63 1.57 1.53 1.48
28 30 31 32 33	4 27 59·9 4 19 1·7 4 14 33·0 4 10 4·5 4 5 36·3	1.53	4 29 33·I 4 20 33·4 4 I6 4·0 4 II 34·8 4 7 5·9		4 3I 4.6 4 22 3.2 4 17 32.9 4 13 3.0 4 8 33.2		4 32 34·6 4 23 31·1 4 18 59·9 4 14 29·0 4 9 58·3	1.41	4 34 3.0 4 24 57.2 4 20 24.9 4 15 52.9 4 11 21.2	+1.46 1.42 1.40 1.38 1.36	4 35 29·9 4 26 21·5 4 21 48·0 4 17 14·8 4 12 42·0	+1.43 1.39 1.37 1.35 1.33
34 35 36 37 38	4 I 8·I 3 56 40·2 3 52 I2·4 3 47 44·8 3 43 I7·3	1.48	4 2 37·2 3 58 8·7 3 53 40·4 3 49 12·3 3 44 44·4	I·44 I·43 I·42	3 59 34·6 3 55 5·6 3 50 37·0 3 46 8·4	1.37	4 5 28·0 4 0 58·0 3 56 28·3 3 51 58·8 3 47 29·5	1.34	4 2 19.0 3 57 48.3 3 53 17.8 3 48 47.7	+1.34 1.33 1.31 1.29 1.28	4 8 9·5 4 3 37·4 3 59 5·7 3 54 34·2 3 50 3·1	+1·30 1·29 1·27 1·25 1·23
39 40 41 42 43	3 34 22·7 3 29 55·5 3 25 28·3 3 21 1·3	1·46 1·46 1·46	3 40 16·6 3 35 49·0 3 31 21·4 3 26 54·0 3 22 26·8	1.41 1.40 1.39	3 4I 40·I 3 37 II·9 3 32 44·0 3 28 I6·I 3 23 48·5	I·33 I·33	3 43 0·5 3 38 31·7 3 34 3·1 3 29 34·7 3 25 6·5	1.28	3 39 48·3 3 35 18·9 3 30 49·7 3 26 20·9	I·21	3 27 31.6	+1.21 1.20 1.18 1.16 1.15
44 45 46 47 48	3 16 34·3 3 12 7·2 3 7 40·2 3 3 13·1 2 58 46·0	+1.45 1.45 1.46 1.46 1.46	3 17 59·5 3 13 32·4 3 9 5·4 3 4 38·3 3 0 11·3	1.38 1.38 1.38	3 19 21·0 3 14 53·5 3 10 26·2 3 5 59·0 3 1 31·8	1·32 1·31 1·30	3 2 47.8	+ 1·26 1·25 1·24 1·23 1·29	3 12 55·3 3 8 27·1 3 3 59·2	+1·20 1·18 1·17 1·16 1·15	3 23 2·0 3 18 32·7 3 14 3·6 3 9 34·7 3 5 6·0	+ 1·13 1·12 1·10 1·09 1·07
49 50 51 52 53	2 54 18·9 2 49 51·6 2 45 24·2 2 40 56·7 2 36 29·0	1·48 1·49	2 55 44.2 2 51 17.2 2 46 50.1 2 42 23.0 2 37 55.7	1.39 1.40	2 57 4.8 2 52 37.7 2 48 10.7 2 43 43.6 2 39 16.6	1.30 1.30		+ 1·22 1·22 1·21 1·21 1·21	2 50 36·I 2 46 8·6 2 4I 4I·3	į .	2 47 13.0 2 42 45.1	+ 1.06 1.05 1.04 1.03 1.02
54 55 56 57 58	2 32 1·1 2 27 33·0 2 23 4·5 2 18 35·7 2 14 6·6	1.52 1.53 1.55	2 33 28·4 2 29 0·8 2 24 33·1 2 20 5·3 2 15 37·1	1·41 1·42 1·43	2 34 49·5 2 30 22·4 2 25 55·2 2 21 27·9 2 17 0·4	+1·30 1·31 1·32 1·33	2 31 37·7 2 27 10·7 2 22 43·6	+ 1·20 1·20 1·21 1·21	2 37 14·0 2 32 46·8 2 28 19·7 2 23 52·7 2 19 25·6	1.09 1.10 1.10	2 38 17·4 2 33 49·8 2 29 22·4 2 24 55·0 2 20 27·7	+ 1.01 1.00 .99 .98
	T 100				O I' OF				1			
Alt.	L. 18°		L. 19°		L. 20°		L. 21°		L. 22°		L. 23°	
0 4 8 12 16	1.45	s. -4·74 4·68 4·63 . 4·59 4·56	s. +1.73 - 1.55 1.39 1.23 1.09	s. -4·76 4·71 4·66 4·62 4·58	s. +1.83 - 1.65 1.48 1.32 1.18	s. -4·81 4·74 4·69 4·64 4·60	s. +1·94 - 1·75 1·58 1·42 1·27	s. -4·85 4·78 4·72 4·67 4·63	s. +2·04 - 1·85 1·68 1·52 1·37	s. -4·89 4·82 4·75 4·70 4·66	s. +2·15 - 1·95 1·77 1·61 1·46	s. -4.94 4.86 4.79 4.73 4.68
20 22 24 26 28	+ ·85 ·78 ·72 ·65 ·58	4·53 4·51 4·50 4·49	+ ·95 ·88 ·81 ·74 ·68	4·55 4·53 4·52 4·51 4·50	+1.04 -97 -91 -84 -78	4·57 4·55 4·54 4·53 4·52	+1·13 1·07 1·00 ·93 ·87	4·59 4·57 4·56 4·55 4·53	+1·23 1·16 1·10 1·03 ·97	4.62 4.60 4.58 4.57 4.55	+1·32 1·26 1·19 1·13 1·07	4.64 4.62 4.61 4.59 4.57
30 32 34 36 38	+ ·52 ·45 ·38 ·31 ·25	4·48 4·47 4·47 4·46 4·46	+ ·61 ·55 ·48 ·42 ·35	4·50 4·48 4·48 4·47 4·46	+ ·71 ·65 ·58 ·52 ·45	4·51 4·50 4·49 4·48 4·47	+ ·81 ·75 ·68 ·62 ·56	4·52 4·51 4·50 4·49 4·48	+ ·91 ·85 ·78 ·72 ·66	4·54 4·53 4·52 4·51 4·50	+1·00 ·94 ·89 ·83 ·77	4·56 4·55 4·54 4·53 4·52
40 42 44 46 48	+ ·18 ·10 + ·03 - ·04 ·12	4·45 4·45 4·45 4·45	+ ·28 ·21 ·15 + ·07 ·00	4·46 4·45 4·45 4·45	+ ·39 ·32 ·26 ·19 ·12	4:47 4:46 4:46 4:45 4:45	+ ·50 ·43 ·37 ·31 ·24	4·48 4·47 4·47 4·46 4·46	+ ·60 ·54 ·48 ·42 ·36	4·49 4·48 4·48 4·47 4·46	+ ·71 ·65 ·60 ·54 ·48	4·51 4·49 4·48 4·48
50 52 54 56 58	- ·21 ·29 ·38 ·48 ·59	4·46 4·46 4·47 4·48 4·49	- ·08 ·16 ·25 ·34 ·43	4·45 4·45 4·46 4·46 4·47	+ ·05 - ·03 ·11 ·19 ·28	4·45 4·45 4·45 4·46	+ ·17 ·10 + ·03 - ·04 ·13	4:45 4:45 4:45 4:45 4:45	+ ·30 ·23 ·17 ·10 ·03	4·46 4·45 4·45 4·45	+ ·42 ·36 ·30 ·24 ·18	4·47 4·46 4·46 4·46

LATITUDE 27°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 15 2.8 5 6 1.4 4 56 58.9 4 47 55.1	s. +2.04 2.08 2.09 2.12 2.14	H. M. S. 6 2 2·3 5 17 7·0 5 8 6·5 4 59 5·3 4 50 2·8	s. +2.04 2.06 2.07 2.09 2.11	5 19 10·2 5 10 10·5	s. +2·04 2·04 2·06 2·07 2·09	H. M. S. 6 6 7·2 5 21 12·5 5 12 13·4 5 3 13·7 4 54 13·5	s. +2.04 2.03 2.04 2.05 2.06	5 23 14·0 5 14 15·2 5 5 16·1	s. +2·05 2·02 2·02 2·03 2·04		s. +2.06 2.01 2.01 2.01 2.02
18 20 22 24 26	4 38 49·7 4 29 42·5 4 20 33·2 4 II 21·4 4 2 6·8	+2·17 2·21 2·24 2·29 2·34	4 40 59·1 4 31 53·8 4 22 46·7 4 13 37·4 4 4 25·7	+2·14 2·17 2·20 2·24 2·29	4 34 3.0 4 24 57.8 4 15 50.7	+2·11 2·13 2·16 2·20 2·24	4 45 12·3 4 36 10·1 4 27 6·5 4 18 1·5 4 8 54·5	+2.08 2.10 2.13 2.16 2.19	4 38 15·3 4 29 13·2 4 20 9·7	+2.05 2.07 2.09 2.12 2.15	4 40 18.6	+2.03 2.04 2.06 2.08 2.10
27 28 29 30 31	3 57 28·3 3 52 48·9 3 48 8·6 3 43 27·3 3 38 44·9	+2·37 2·40 2·43 2·46 2·50	3 59 48.7 3 55 11.0 3 50 32.5 3 45 53.1 3 41 12.7	+2·31 2·34 2·37 2·40 2·43	3 57 29.8 3 52 52.9 3 48 15.2 3 43 36.6	+2.26 2.29 2.31 2.34 2.37	3 55 9·9 3 50 33·7	+2·21 2·23 2·26 2·28 2·30	3 52 48.8	+2·17 2·18 2·20 2·22 2·25	4 8 40·1 4 4 7·5 3 59 34·4 3 55 0·7 3 50 26·5	+2·12 2·13 2·15 2·17 2·19
32 33 34 35 36	3 34 1.4 3 29 16.6 3 24 30.5 3 19 42.9 3 14 53.7	+2.53 2.57 2.62 2.66 2.71	3 36 31·3 3 31 48·8 3 27 5·2 3 22 20·2 3 17 33·8	+2·46 2·50 2·54 2·58 2·62	3 29 35.3		3 41 19·1 3 36 40·5 3 32 1·0 3 27 20·5 3 22 39·0	+2·33 2·36 2·39 2·43 2·46	3 43 37·2 3 39 0·3 3 34 22·6 3 29 44·0 3 25 4·5	2·33 2·36	3 45 51·7 3 41 16·3 3 36 40·2 3 32 3·3 3 27 25·6	+2·21 2·24 2·26 2·29 2·32
37 38 39 40 41	3 10 2·9 3 5 10·3 3 0 15·6 2 55 18·8 2 50 19·6	+2.76 2.82 2.88 2.94 3.01	3 12 46·0 3 7 56·5 3 3 5·3 2 58 12·1 2 53 16·8	+2.67 2.72 2.78 2.83 2.90	3 10 37·0 3 5 48·9	+2.58 2.63 2.68 2.73 2.79	3 17 56·2 3 13 12·2 3 8 26·8 3 3 40·0 2 58 51·5	+2·50 2·54 2·59 2·63 2·68	3 6 15.2	+2.42 2.46 2.50 2.54 2.59	3 22 47.0 3 18 7.5 3 13 26.9 3 8 45.1 3 4 2.1	+2·35 2·38 2·42 2·45 2·50
42 43 44 45 46	2 45 17·8 2 40 13·2 2 35 5·5 2 29 54·3 2 24 39·3	+3.09 3.17 3.26 3.35 3.46	2 48 19·3 2 43 19·3 2 38 16·6 2 33 10·8 2 28 1·7	+2.96 3.04 3.12 3.20 3.29	2 41 19·5 2 36 18·6	+2.85 2.91 2.99 3.06 3.15	2 54 I·3 2 49 9·I 2 44 I4·9 2 39 I8·3 2 34 I9·2	+2.74 2.80 2.86 2.93 3.01	2 56 42.5 2 51 53.7 2 47 3.1 2 42 10.4 2 37 15.6	2·75 2·81	2 59 17·8 2 54 32·0 2 49 44·6 2 44 55·4 2 40 4·4	+2.54 2.59 2.64 2.69 2.75
47 48 49 50 51	2 19 20·0 2 13 55·9 2 8 26·4 2 2 50·7 1 57 8·0	+3.57 3.69 3.82 3.97 4.12	2 22 48·8 2 17 31·8 2 12 10·2 2 6 43·3 2 1 10·5	3.21	2 26 7·7 2 20 57·0 2 15 42·4 2 10 23·2 2 4 59·0	+3·24 3·34 3·45 3·57 3·70	2 29 17·3 2 24 12·3 2 19 3·8 2 13 51·5 2 8 34·8	3·18 3·27 3·38	2 32 18·3 2 27 18·3 2 22 15·3 2 17 9·0 2 11 59·0	+2.95 3.03 3.11 3.21 3.31	2 35 11·2 2 30 15·7 2 25 17·6 2 20 16·6 2 15 12·5	+2.82 2.89 2.97 3.05 3.14

Alt.	L. 0° A.	L. 1 ° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
0 2 4 6 8	s. s. 00 -4.49 .08 4.49 .16 4.49 .24 4.49 .32 4.50	s. s. + ·09 -4·49 + ·01 4·49 - ·07 4·49 ·15 4·49 ·23 4·49	s. s. + ·17 -4·49 ·09 4·49 + ·02 4·49 - ·06 4·49 ·14 4·49	S. S. + '26 -4'49 '18 4'49 '10 4'49 + '02 4'49 - '05 4'49	s. s. + ·35 -4·50 ·27 4·50 ·19 4·49 ·11 4·49 + ·03 4·49	s. s. + '44 -4'51 '36 4'50 '28 4'50 '20 4'49 '12 4'49
10	- '40 4'51	- ·31 4·50	- ·22 4·49	- ·13 4·49	- ·05 4·49	+ ·04 4·49
12	'49 4'51	·40 4·50	·31 4·50	·22 4·49	·13 4·49	- ·04 4·49
14	'57 4'52	·48 4·51	·39 4·50	·30 4·50	·21 4·49	·12 4·49
16	'66 4'54	·57 4·52	·47 4·51	·38 4·50	·29 4·50	·20 4·49
18	'75 4'55	·66 4·54	·56 4·52	·47 4·51	·37 4·50	·28 4·50
20	- ·85 4·57	- ·75 4·55	·65 4·53	- ·55 4·52	- ·46 4·51	- ·37 4·50
22	·94 4·59	·84 4·57	·74 4·55	·65 4·53	·55 4·52	·45 4·51
24	I·05 4·61	·94 4·59	·84 4·57	·74 4·55	·64 4·53	·54 4·52
26	I·15 4·63	I·04 4·6I	·94 4·59	·83 4·57	·73 4·55	·63 4·53
28	I·26 4·66	I·15 4·63	I·04 4·6I	·94 4·59	·83 4·56	·73 4·55
30	-1·38 4·69	-1·27 4·66	-1·15 4·63	-1.04 4.61	- ·93 4·58	- ·83 4·56
32	1·51 4·73	1·39 4·70	1·27 4·66	1.15 4.63	1·04 4·61	·93 4·58
34	1·64 4·78	1·52 4·74	1·39 4·70	1.27 4.66	1·15 · 4·63	I·04 4·6I
36	1·79 4·83	1·66 4·78	1·53 4·74	1.40 4.70	1·28 4·67	I·15 4·63
38	1·95 4·89	1·81 4·84	1·67 4·79	1.53 4.74	1·40 4·70	I·28 4·67
40	-2·12 4·96	-1.97 4.90	-1.82 4.84	-1.68 4.79 1.84 4.85 2.02 4.92 2.22 5.01 2.45 5.11 2.71 5.24	-1.54 4.75	-1·41 4·71
42	2·32 5·05	2.15 4.98	1.99 4.91		1.69 4.80	1·55 4·75
44	2·54 5·16	2.36 5.07	2.19 4.99		1.86 4.86	1·71 4·80
46	2·79 5·29	2.59 5.18	2.40 5.09		2.05 4.93	1·88 4·87
48	3·08 5·45	2.86 5.32	2.65 5.21		2.26 5.02	2·08 4·95
50	3·43 5·65	3.17 5.50	2.93 5.36		2.50 5.14	2·30 5·04

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 111 LATITUDE 27°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 12 16·8 5 27 15·0 5 18 16·2 5 9 17·5 5 0 18·7	s. +2.06 2.00 1.99 1.99 2.00	5 29 14·7 5 20 15·5 5 11 16·6	s. +2·07 1·99 1·98 1·98	H. M. S. 6 16 25.5 5 31 13.9 5 22 14.2 5 13 15.0 5 4 16.1	s. +2·08 1·98 1·97 1·96	H. M. S. 6 18 30.9 5 33 12.7 5 24 12.3 5 15 12.5 5 6 13.2	s. +2·10 1·98 1·96 1·95	H. M. s. 6 20 37·2 5 35 11·3 5 26 9·8 5 17 9·3 5 8 9·4	s. +2·11 1·97 1·95 1·94 1·93	H. M. S. 6 22 44·1 5 37 9·5 5 28 7·0 5 19 5·4 5 10 4·7	s. +2·12 1·97 1·95 1·93
18 20 22 24 26	4 51 19·7 4 42 20·2 4 33 20·2 4 24 19·3 4 15 17·4	+2.00 · 2.01 2.02 2.04 2.06	4 35 20·8 4 26 20·9	+1.98 1.98 1.99 2.01 2.02	4 55 17·3 4 46 18·6 4 37 19·6 4 28 20·3 4 19 20·5	+1.96 1.96 1.97 1.97 1.99	4 39 16·8 4 30 17·9		4 59 10·1 4 50 11·1 4 41 12·3 4 32 13·6 4 23 14·7	+1·92 1·91 1·91 1·91 1·92	5 I 4.7 4 52 5.3 4 43 6.3 4 34 7.5 4 25 8.7	+1.90 1.89 1.89 1.88 1.88
28 30 32 33 34	4 6 14·2 3 57 9·5 3 48 2·9 3 43 28·7 3 38 54·0	+2.09 2.12 2.16 2.18 2.20	3 59 15·2 3 50 10·6 3 45 37·6	+2.05 2.07 2.10 2.12 2.14	3 52 15·3 3 47 43·2	+2.00 2.02 2.05 2.06 2.08	4 12 18·8 4 3 18·3 3 54 16·8 3 49 45·6 3 45 14·1	+1.96 1.98 2.00 2.01 2.03	4 14 15·5 4 5 15·9 3 56 15·5 3 51 44·9 3 47 14·1	+1.92 1.94 1.95 1.96 1.97	4 16 10·0 4 7 10·8 3 58 11·2 3 53 41·2 3 49 11·0	+ 1.89 1.89 1.91 1.91 1.92
35 36 37 38 39	3 34 18·6 3 29 42·5 3 25 5·7 3 20 28·0 3 15 49·4	+2·22 2·25 2·27 2·30 2·34	3 27 20.1	+2·16 2·18 2·21 2·23 2·26	3 24 55.9	+2·10 2·12 2·14 2·16 2·19	3 40 42·1 3 36 9·8 3 31 37·0 3 27 3·6 3 22 29·8	+2.04 2.06 2.08 2.10 2.12	3 42 43.0 3 38 11.5 3 33 39.7 3 29 7.4 3 24 34.7		3 44 40·5 3 40 9·8 3 35 38·7 3 31 7·4 3 26 35·7	+ 1.93 1.94 1.95 1.97 1.98
40 41 42 43 44	3 II 9.8 3 6 29.2 3 I 47.3 2 57 4.2 2 52 19.7	+2·37 2·41 2·45 2·49 2·53	2 59 30.7	+2·29 2·32 2·36 2·40 2·44		+2·21 2·24 2·27 2·31 2·34	3 17 55·3 3 13 20·1 3 8 44·2 3 4 7·5 2 59 29·9	+2·14 2·16 2·19 2·22 2·25	3 20 1.5 3 15 27.7 3 10 53.4 3 6 18.3 3 1 42.5	+2.07 2.09 2.11 2.14 2.17	3 22 3·5 3 17 31·0 3 12 57·9 3 8 24·2 3 3 49·9	+2.00 2.02 2.04 2.06 2.08
45 46 47 48 49	2 47 33.7 2 42 46.0 2 37 56.5 2 33 5.0 2 28 II.3		2 45 20·9 2 40 34·7 2 35 46·7	+2·48 2·53 2·58 2·64 2·70	2 52 31·3 2 47 49·4 2 43 6·1 2 38 21·3 2 33 34·8	+2·38 2·42 2·47 2·52 2·57	2 54 51·3 2 50 11·8 2 45 31·1 2 40 49·0 2 36 5·6	+2·29 2·32 2·36 2·41 2·46	2 57 5.9 2 52 28.4 2 47 49.9 2 43 10.3 2 38 29.6	+2·20 2·23 2·26 2·30 2·34	2 59 15·0 2 54 39·3 2 50 2·8 2 45 25·4 2 40 47·0	+2·II 2·I4 2·I7 2·20 2·24
50 51 52 53 54	2 23 15·1 2 18 16·1 2 13 14·1 2 8 8·7 2 2 59·4		2 21 10·5 2 16 13·6 2 11 13·7	+2.76 2.83 2.91 3.00 3.10	2 I9 3.9 2 I4 8.9	+2.63 2.70 2.77 2.84 2.93	2 21 45·5 2 16 54·8		2 33 47.6 2 29 4.1 2 24 19.0 2 19 32.1 2 14 43.3	+2·39 2·44 2·49 2·55 2·62	2 36 7·5 2 31 26·8 2 26 44·7 2 22 1·2 2 17 16·0	+2·28 2·32 2·37 2·42 2·48

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
0 2 4 6 8	s. s. + ·53 -4·52 ·45 4·51 ·37 4·50 ·29 4·50 ·21 4·49	s. s. + .62 -4.53 .54 4.52 .46 4.51 .38 4.50 .30 4.50	s. s. + ·71 -4·54 ·63 4·53 ·55 4·52 ·46 4·51 ·39 4·50	s. s. + ·80 -4·56 ·72 4·55 ·64 4·53 ·55 4·52 ·48 4·51	s. s. + ·89 -4·58 ·81 4·56 ·72 4·55 ·64 4·53 ·56 4·52	s. s. + ·98 -4·59 ·90 4·58 ·82 4·56 ·73 4·55 ·66 4·54
10	+ ·13 4·49	+ ·22 4·49	+ ·31 4·50	+ '40 4'51	+ '49 4'51	+ ·58 4·53
12	+ ·05 4·49	·14 4·49	·23 4·49	'32 4'50	'41 4'51	·50 4·52
14	- ·03 4·49	+ ·06 4·49	·15 4·49	'24 4'49	'33 4'50	·42 4·51
16	·11 4·49	- ·02 4·49	+ ·07 4·49	'16 4'49	'25 4'50	·34 4·50
18	·19 4·49	·10 4·49	- ·01 4·49	+ '08 4'49	'18 4'49	·27 4·50
20	- ·27 4·50	- ·18 4·49	- ·09 4·49	- 00 4·49 07 4·49 15 4·49 24 4·49 32 4·50	+ ·10 4·49	+ ·19 4·49
22	·36 4·50	·26 4·50	·17 4·49		+ ·02 4·49	·11 4·49
24	·44 4·51	·35 4·50	·25 4·49		- ·06 4·49	+ ·03 4·49
26	·53 4·52	·43 4·51	·34 4·50		·14 4·49	- ·05 4·49
28	·62 4·53	·52 4·52	·42 4·51		·23 4·49	·13 4·49
30	- ·72 4·54	- ·62 4·53	- ·51 4·52	- ·41 4·51	- ·31 4·50	- ·2I 4·49
32	·82 4·56	·71 4·54	·61 4·53	·50 4·52	·40 4·51	·30 4·50
34	·93 4·58	·81 4·56	·70 4·54	·60 4·53	·49 4·51	·38 4·50
36	I·04 4·61	·92 4·58	·81 4·56	·69 4·54	·58 4·53	·48 4·5I
38	I·15 4·63	I·03 4·61	·92 4·58	·80 4·56	·68 4·54	·57 4·52
40	-1·28 4·67	-1·15 4·63	-1.03 4.60	- ·91 4·58	- ·79 4·56	- ·67 4·54
42	1·42 4·71	1·28 4·67	1.15 4.63	1·02 4·60	·90 4·58	·78 4·56
44	1·56 4·75	1·42 4·71	1.28 4.67	1·15 4·63	I·02 4·60	·89 4·58
46	1·73 4·81	1·57 4·76	1.43 4.71	1·28 4·67	I·15 4·63	I·0I 4·60
48	1·91 4·88	1·74 4·81	1.58 4.76	1·43 4·71	I·28 4·67	I·14 4·63
50	-2·11 4·96	-1.93 4.89	-1.76 4.82	-1·59 4·76	-1:43 4:71	-1·28 4·67
52	2·34 5·06	2.14 4.97	1.95 4.89	1·77 4·83	1:60 4:77	1·44 4·71
54	2·61 5·19	2.38 5.07	2.17 4.98	1·98 4·90	1:79 4:83	1·61 4·77

112 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 27° .

			DECLIN	IATIC	N—SAM	$E N_{\lambda}$	AME AS	LA	TITUDE.			
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 24 52·2 5 39 7·8 5 30 3·8 5 21 1·0 5 11 59·3	s. +2·14 1·97 1·94 1·92 1·90	H. M. S. 6 27 1·3 5 41 5·8 5 32 0·3 5 22 56·0 5 13 53·1	s. +2·16 1·97 1·94 1·91 1·89	H. M. S. 6 29 11·6 5 43 4·0 5 33 56·6 5 24 50·7 5 15 46·3	s. +2·18 1·97 1·94 1·91 1·88	H. M. S. 6 31 23·3 5 45 2·3 5 35 52·8 5 26 45·1 5 17 38·9	s. +2·20 1·97 1·93 1·90 1·87	H. M. S. 6 33 36·3 5 47 0·7 5 37 48·9 5 28 39·1 5 19 31·1	s. +2·23 1·98 1·94 1·90 1·87	H. M. S. 6 35 50.9 5 48 59.5 5 39 45.2 5 30 33.0 5 21 22.9	s. +2·26 1·98 1·94 1·90 1·86
18 20 22 24 26	5 2 58·4 4 53 58·4 4 44 58·8 4 35 59·7 4 27 0·9	1.86 1.86 1.85	5 4 51·2 4 55 50·2 4 46 50·0 4 37 50·3 4 28 51·1	1.84 1.83 1.82	5 6 43·1 4 57 41·0 4 48 39·8 4 39 39·4 4 30 39·6	1.82 1.80 1.79	5 8 34·2 4 59 30·8 4 50 28·4 4 4I 27·0 4 32 26·4	+1.85 1.82 1.80 1.78 1.76	5 10 24.6 5 1 19.6 4 52 15.8 4 43 13.2 4 34 11.5	+ 1.83 1.81 1.78 1.76 1.74	5 12 14·4 5 3 7·5 4 54 2·2 4 44 58·1 4 35 55·1	+ 1.82 1.79 1.76 1.74 1.71
28 30 31 32 33	4 18 2·2 4 9 3·4 4 4 33·9 4 0 4·3 3 55 34·7 3 51 4·9	1.86 1.86 1.87	4 19 52·3 4 10 53·5 4 6 24·2 4 1 54·8 3 57 25·3 3 52 55·8	1.82	4 2I 40.4 4 I2 4I.4 4 8 I2.I 4 3 42.7 3 59 I3.3 3 54 44.0	+1.78 1.78 1.78 1.78 1.78 +1.78	4 23 26·5 4 14 27·1 4 9 57·6 4 5 28·1 4 0 58·7 3 56 29·3	+ 1.75 1.74 1.74 1.74 1.74 + 1.74	4 25 10·7 4 16 10·7 4 11 40·8 4 7 11·1 4 2 41·5 3 58 12·0	+ 1·72 1·71 1·70 1·70 1·69 + 1·69	4 26 53·2 4 17 52·1 4 13 21·9 4 8 51·8 4 4 21·9 3 59 52·1	1.67 1.67 1.66 1.65 +1.65
35 36 37 38 39	3 46 34·9 3 42 4·7 3 37 34·4 3 33 3·7 3 28 32·8	1.88 1.89 1.90 1.91 +1.92	3 48 26·2 3 43 56·5 3 39 26·6 3 34 56·5 3 30 26·2	1.83 1.83 1.84 1.85 +1.86	3 50 14·5 3 45 45·0 3 41 15·5 3 36 45·8 3 32 16·0	1·78 1·78 1·79 1·79 +1·80	3 52 0.0 3 47 30.6 3 43 1.2 3 38 31.7 3 34 2.2	1.73 1.73 1.73 1.74 +1.74	3 53 42.6 3 49 13.2 3 44 43.8 3 40 14.4 3 35 45.1	1.69 1.68 1.68 1.68	3 55 22·5 3 50 52·9 3 46 23·4 3 41 54·0 3 37 24·6	1.64 1.63 1.63 +1.63
40 41 42 43 44 45	3 24 1.6 3 19 30.0 3 14 58.0 3 10 25.5 3 5 52.5 3 1 19.0	1.95 1.96 1.98 +2.00 2.03	3 25 55.6 3 21 24.9 3 16 53.7 3 12 22.3 3 7 50.4 3 3 18.1	1.89 1.91 +1.93 1.94	3 18 45.4 3 14 14.7 3 9 43.8 3 5 12.4	1.83 1.84 +1.85 1.87	3 16 2·9 3 11 32·6 3 7 2·1	1.75 1.75 1.76 1.77 +1.78 1.79	3 31 15.7 3 26 46.2 3 22 16.6 3 17 47.0 3 13 17.2 3 8 47.2	1.69 1.69 1.70 +1.71 1.72	3 23 56·5 3 19 27·1 3 14 57·6 3 10 28·0	1.63 1.63 1.63 1.63 +1.64
46 47 48 49 50	2 56 44·9 2 52 10·1 2 47 34·6 2 42 58·2 2 38 20·9 2 33 42·6	2.08	2 58 45·3 2 54 12·0 2 49 38·0 2 45 3·4 2 40 28·0	1.96 1.99 2.01 +2.04 2.07	3 0 40·7 2 56 8·6 2 51 36·0 2 47 2·8 2 42 29·0 2 37 54·6		3 2 31·3 2 58 0·1 2 53 28·6 2 48 56·6 2 44 24·2	1.80 1.82 1.83 +1.85 1.87	3 4 17·1 2 59 46·7 2 55 16·0 2 50 45·0 2 46 13·7 2 41 42·0	1·72 1·74 1·75 +1·76 1·78	3 5 58·3 3 1 28·4 2 56 58·4 2 52 28·2 2 47 57·7 2 43 26·9	1.65 1.66 1.67 +1.68 1.69 1.70
52 53 54 55 56	2 29 3·2 2 24 22·6 2 19 40·6 2 14 56·9 2 10 11·7	2·25 2·29 +2·34 2·40	2 3I 14·7 2 26 36·5	2·14 2·17 +2·22 2·26	2 37 54.0 2 33 19.5 2 28 43.4 2 24 6.5 2 19 28.5 2 14 49.4	2.02 2.06 +2.09 2.13	2 35 17·7 2 30 43·6	1.92 1.95 +1.98 2.01 2.05	2 37 9.8 2 32 37·1 2 28 3·8	1.82 1.84 + 1.86 1.89	2 38 55·8 2 34 24·3 2 29 52·4	1.72 1.73 +1.76 1.78 1.80
57 58	2 5 24·5 2 0 35·I	2·52 2·59	2 7 51·2 2 3 5·8	2·37 2·43	2 10 9·0 2 5 27·2 O 1' OF	2·23 2·28	2 12 18·5 2 7 39·6	2·09 2·13	2 14 19·8 2 9 43·4	1·96 2·00	2 16 13.4	1.83 1.86
Alt.	L. 12°		L. 13°		L. 14°		L. 15°		L. 16°		L. 17°	Α.
° 0 4 8 12 16	·91 ·75 ·59 ·43	s. -4.62 4.58 4.55 4.53 4.51	1.00 .84 .68 .53	s. -4·64 4·60 4·57 4·54 4·52	s. +1·26 - 1·09 ·93 ·77 ·62	s. -4.66 4.62 4.58 4.55 4.53	1·19 1·02 ·86 ·71	s. -4·69 4·64 4·60 4·57 4·54	1·28 1·11 ·95 ·80	s. -4·72 4·67 4·62 4·59 4·56	1·38 1·21 1·05 ·89	s. -4·75 4·69 4·65 4·61 4·58
20 22 24 26 28	+ ·28 ·20 ·13 + ·05 - ·03	4·50 4·49 4·49 4·49	+ ·37 ·30 ·22 ·14 ·07	4·50 4·50 4·49 4·49	+ ·47 ·39 ·32 ·24 ·16	4·51 4·50 4·49 4·49	+ ·56 ·48 ·41 ·33 ·26	4·52 4·51 4·50 4·50	+ ·65 ·58 ·50 ·43 ·36	4·54 4·53 4·52 4·51 4·50	+ ·74 ·67 ·60 ·52 ·45	4.55 4.54 4.53 4.52 4.51
30 32 34 36 38	- ·11 ·19 ·28 ·37 ·46 - ·56	4·49 4·49 4·50 4·51 4·52	+ ·01 - ·09 ·17 ·26 ·35 - ·44	4·49 4·49 4·50 4·50 4·51	+ ·08 + ·01 - ·07 ·15 ·24 - ·33	4·49 4·49 4·49 4·50 4·50	+ ·18 ·11 + ·03 - ·05 ·13 - ·22	4·49 4·49 4·49 4·49 4·49	+ ·28 ·21 ·13 + ·05 - ·02 - ·11	4·50 4·49 4·49 4·49 4·49	+ ·38 ·31 ·23 ·16 + ·08 - ·00	4·50 4·50 4·49 4·49 4·49
42 44 46 48 50	.66 .76 .88 1.00	4.53 4.55 4.57 4.60 4.63	·54 ·64 ·75 ·86 — ·99	4·52 4·53 4·55 4·57 4·60	·42 ·52 ·62 ·73 - ·84	4.51 4.51 4.53 4.55 4.57	·30 ·40 ·49 ·60	4.50 4.51 4.52 4.53 4.54	·19 ·28 ·37 ·47 — ·57	4.49 4.50 4.51 4.51 4.52	·08 ·16 ·25 ·34	4·49 4·49 4·50 4·50
52 54 56 58	1.28 1.43 1.61 1.82	4.67 4.71 4.77 4.85	1·12 1·27 1·43 1·62	4.63 4.66 4.71 4.77	·97 I·II I·26 I·43	4.57 4.59 4.62 4.66 4.71	·82 ·95 I·09 I·25	4·56 4·59 4·62 4·66	•68 •80 •93 ••07	4·54 4·56 4·58 4·62	•54 •65 •77 •90	4·52 4·54 4·55 4·58

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 113 LATITUDE 27°.

DECLINATION—SAME NAME AS—LATITUDE. True 190 Decl. 190 Decl. 910 Decl. 920 Decl. 930 Decl.												
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 38 7·1 5 50 58·6 5 41 41·5 5 32 26·8 5 23 14·3	s. +2·28 1·99 1·94 1·90	H. M. S. 6 40 25·I 5 52 58·I 5 43 38·0 5 34 20·6 5 25 5·4	s. +2·31 2·00 1·94 1·90 1·85	H. M. S. 6 42 45.0 5 54 58.2 5 45 34.9 5 36 14.4 5 26 56.3	s. +2·35 2·01 1·95 1·90 1·85	5 38 8.3	s. +2·38 2·02 1·96 1·90 1·85	H. M. S. 6 47 31·2 5 59 0·4 5 49 29·9 5 40 2·4 5 30 38·0	s. +2·42 2·03 1·96 1·90 1·85		s. +2·46 2·04 1·97 1·91 1·85
18 20 22 24 26	5 14 3.6 5 4 54.7 4 55 47.5 4 46 41.7 4 37 37.2	1.69	5 15 52·3 5 6 41·2 4 57 31·8 4 48 24·1 4 39 17·8	+ 1.81 1.77 1.73 1.70 1.66	5 17 40·6 5 8 27·0 4 59 15·2 4 50 5·3 4 40 57·0	+1.80 1.76 1.72 1.68 1.64	5 0 57·8 4 51 45·5 4 42 34·9	+1.79 1.75 1.70 1.66 1.62	5 21 16·1 5 11 56·7 5 2 39·6 4 53 24·6 4 44 11·6	l .	5 4 20·7 4 55 2·8 4 45 47·0	+1.79 1.73 1.68 1.63 1.58
28 30 31 32 33	4 28 33.9 4 19 31.6 4 15 0.9 4 10 30.3 4 5 59.9	1.61	4 16 37·7 4 12 6·5 4 7 35·6	1.58	4 31 50·4 4 22 44·8 4 18 12·5 4 13 40·6 4 9 8·9	I·55 I·54	4 33 26·0 4 24 18·6 4 19 45·4 4 15 12·6 4 10 40·0	+1.58 1.55 1.53 1.51 1.50	4 35 0·3 4 25 50·7 4 21 16·4 4 16 42·5 4 12 9·0	I·48 I·46	4 22 45.5 4 18 10.5 4 13 35.8	+ 1·53 1·49 1·47 1·45 1·43
34 35 36 37 38	4 I 29.7 3 56 59.7 3 52 29.8 3 48 0.0 3 43 30.4	1.60 1.59 1.59 1.58	4 3 4·8 3 58 34·3 3 54 3·9 3 49 33·7 3 45 3·7	+1.56 1.55 1.55 1.54 1.53	4 4 37·5 4 0 6·3 3 55 35·4 3 51 4·6 3 46 34·1	1.51 1.50 1.49 1.48	3 52 32·7 3 48 I·5	+ 1·48 1·47 1·46 1·44 1·43	3 53 58·1 3 49 26·1		4 9 1.5 4 4 27.6 3 59 54.0 3 55 20.7 3 50 47.8 3 46 15.1	1·39 1·37 1·35 1·34 +1·32
39 40 41 42 43 44	3 39 0.8 3 34 31.3 3 30 1.9 3 25 32.5 3 21 3.2 3 16 33.9	+ 1.58 1.57 1.57 1.57 1.57 + 1.57	3 40 33.9 3 36 4.1 3 31 34.5 3 27 5.0 3 22 35.5 3 18 6.1	1.21	3 42 3.8 3 37 33.6 3 33 3.6 3 28 33.7 3 24 4.0 3 19 34.3	1.45	3 43 30·6 3 38 59·8 3 34 29·3 3 29 58·9 3 25 28·7 3 20 58·7	I·40	3 44 54·3 3 40 22·9 3 35 51·6 3 31 20·6 3 26 49·8 3 22 19·2	1.33	3 41 42·8 3 37 10·7 3 32 38·8 3 28 7·2	1·32 1·30 1·29 1·27 1·26
45 46 47 48 49	3 12 4·5 3 7 35·0 3 3 5·5 2 58 35·9 2 54 6·2	1.57 1.58 1.58 1.58	3 13 36·7 3 9 7·4 3 4 38·0 3 0 8·6 2 55 39·1	1.50 1.50 1.50 1.50	3 19 34·3 3 15 4·9 3 10 35·3 3 6 5·9 3 1 36·5 2 57 7·1	1.43 1.43 1.43 1.43 1.43	3 16 28.8	1·37 1·36 1·35 1·35	3 17 48.8 3 13 18.5 3 8 48.4 3 4 18.5	1·30 1·29 1·28 1·27	3 19 4.8	1·23 1·22 1·21 1·20
50 51 52 53	2 49 36·3 2 45 6·2 2 40 35·9 2 36 5·3 2 31 34·6	1.60 1.61 1.62 1.63		1.51	2 52 37·8 2 48 8·4 2 43 39·0 2 39 9·4 2 34 39·8	1·43 1·43 1·43 1·44	2 54 0·9 2 49 31·5 2 45 2·1	1·34 1·34 1·34 1·34	2 55 18·9 2 50 49·3 2 46 19·8 2 41 50·4	1·26 1·25 1·25 1·25	2 56 32·0 2 52 2·0 2 47 32·1 2 43 2·3	1·18 1·17 1·16 1·15
55 56 57 58	2 27 3·2 2 22 31·6 2 17 59·5 2 13 26·9	1.67 1.69 1.71 1.73	2 28 39·9 2 24 9·3 2 19 38·4 2 15 7·0	1·56 1·57 1·59 1·61	2 30 10·1 2 25 40·2 2 21 10·1 2 16 39·7	1·45 1·46 1·47 1·48	2 31 34·0 2 27 4·5 2 22 34·9 2 18 5·2	1·35 1·36 1·36	2 32 51·6 2 28 22·2 2 23 52·9 2 19 23·5	I·24 I·24 I·24 I·25	2 34 3.0	I·14 I·14
Alt.	L. 18		/ARIATI		O 1' OF		L. 21°		LTITUL		L. 23	А.
° 0 4 8 12 16	s. +1.66 1.47 1.30 1.14	5. -4·78 4·72 4·67 4·63 4·60	s. +1.76 1.57 1.40 1.23 1.08	s. -4·82 4·75 4·70 4·65 4·62	s. +1.87 1.67 1.49 1.33 1.17	s. -4·86 4·79 4·73 4·68 4·64	S. +1.97 1.77 1.59 1.43 1.27	s. -4·90 4·83 4·76 4·71 4·66	1.88 1.69 1.52 1.37	s. -4.94 4.86 4.80 4.74 4.69	S. +2·19 1·98 1·79 1·62 1·46	s. -5.00 4.91 4.83 4.77 4.72
20 22 24 26 28	+ ·84 ·76 ·69 ·62 ·55	4·57 4·55 4·54 4·53 4·52	+ ·93 ·86 ·79 ·72 ·65	4·58 4·57 4·56 4·54 4·53	+1.03 .95 .88 .81	4.60 4.59 4.57 4.56 4.55	+1·12 1·05 ·98 ·91 ·84	4.63 4.61 4.59 4.58 4.57	+ 1·22 1·15 1·08 1·01 ·94	4.65 4.63 4.62 4.60 4.59	+1·31 1·24 1·17 1·11 1·04	4.68 4.66 4.64 4.62 4.61
30 32 34 36 38	+ ·48 ·41 ·33 ·26 ·19	4·51 4·50 4·50 4·49	+ ·58 ·51 ·44 ·37 ·29	4.53 4.52 4.51 4.51 4.50	+ ·68 ·61 ·54 ·47 ·40	4.54 4.53 4.52 4.51 4.51	+ ·77 ·71 ·64 ·57 ·51	4·55 4·54 4·53 4·52 4·52	+ ·87 ·81 ·74 ·68 ·61	4·57 4·56 4·55 4·54 4·53	+ ·97 ·91 ·85 ·78 ·72	4·59 4·58 4·57 4·56 4·54
40 42 44 46 48 50	+ ·II + ·03 - ·04 ·I3 ·21 - ·30	4·49 4·49 4·49 4·49	+ ·22 ·15 + ·07 - ·01 ·09	4·49 4·49 4·49 4·49	+ ·33 ·26 ·19 ·11 + ·03	4·50 4·50 4·49 4·49	+ ·44 ·37 ·30 ·23 ·16 + ·08	4·51 4·50 4·49 4·49	+ ·55 ·48 ·42 ·35 ·28	4·52 4·51 4·50 4·50	+ ·66 ·59 ·53 ·47 ·40	4.54 4.53 4.52 4.51 4.51
52 54 56 58	- '30 '40 '50 '61 '73	4·50 4·51 4·52 4·53 4·55	- ·17 ·26 ·36 ·46 ·57	4.49 4.50 4.51 4.53	- ·05 ·13 ·22 ·31 ·42	4·49 4·49 4·50 4·51	+ ·08 ·00 - ·08 ·16 ·25	4·49 4·49 4·49 4·50	+ ·21 ·14 + ·06 - ·02 ·10	4·49 4·49 4·49 4·49	+ ·34 ·27 ·20 •13 ·05	4·50 4·50 4·49 4·49 4·49

LATITUDE 28°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 14 37.9 5 5 31.3 4 56 23.5 4 47 14.3	s. +2·13 2·17 2·19 2·21 2·24	H. M. S. 6 2 7.6 5 16 47.5 5 7 42.0 4 58 35.4 4 49 27.7	S. +2·13 2·15 2·17 2·19 2·21	H. M. S. 6 4 15·3 5 18 56·2 5 9 51·4 5 0 45·9 4 51 39·4	s. +2·13 2·14 2·15 2·16 2·18	H. M. S. 6 6 23·3 5 21 3·9 5 11 59·7 5 2 55·0 4 53 49·6	S. +2·13 2·12 2·13 2·14 2·15	H. M. S. 6 8 31·4 5 23 10·7 5 14 7·0 5 5 2·9 4 55 58·2	S. +2·I4 2·II 2·II 2·I2 2·I3	H. M. S. 6 10 39.9 5 25 17.0 5 16 13.4 5 7 9.6 4 58 5.5	S. +2·14 2·10 2·10 2·10 2·11
18 20 22 24 25	4 38 3·3 4 28 50·3 4 19 35·0 4 10 16·9 4 5 36·8	+2·27 2·31 2·35 2·40 2·42	4 40 18.5 4 31 7.5 4 21 54.6 4 12 39.2 4 8 0.5	+2·24 2·27 2·30 2·35 2·37	4 42 31·8 4 33 22·6 4 24 11·7 4 14 58·7 4 10 21·4	+2·20 2·23 2·26 2·30 2·32	4 44 43 ² 4 35 35 ⁶ 4 26 26 ⁴ 4 17 15 ⁶ 4 12 39 ⁴	+2·17 2·20 2·23 2·26 2·28		+2·15 2·17 2·19 2·22 2·23	4 49 0.9 4 39 55.6 4 30 49.3 4 21 41.8 4 17 7.5	+2·12 2·14 2·15 2·18 2·19
26 27 28 29 30	4 0 55.7 3 56 13.8 3 51 31.0 3 46 47.0 3 42 2.0	+2·45 2·48 2·51 2·55 2·58	4 3 21·1 3 58 40·9 3 53 59·8 3 49 17·8 3 44 34·8	+2·40 2·42 2·45 2·48 2·51	4 5 43.4 4 I 4.7 3 56 25.2 3 51 45.0 3 47 3.8	+2·35 2·37 2·39 2·42 2·45	4 8 2·7 4 3 25·3 3 58 47·3 3 54 8·6 3 49 29·0	+2·30 2·32 2·34 2·36 2·39	4 5 42·8 4 1 6·2 3 56 28·8 3 51 50·8	+2·25 2·27 2·29 2·31 2·33	3 58 46·0 3 54 9·2	+2·21 2·22 2·24 2·26 2·28
31 32 33 34 35	3 37 15·8 3 32 28·3 3 27 39·4 3 22 49·0 3 17 57·0		3 39 50·8 3 35 5·6 3 30 19·2 3 25 31·4 3 20 42·2	+2.55 2.58 2.62 2.67 2.71	3 23 22.4	+2·48 2·51 2·55 2·59 2·63	3 25 57.8	+2·42 2·45 2·48 2·51 2·55	3 28 28.6	+2·36 2·38 2·41 2·44 2·48	3 30 55.1	+2·30 2·32 2·35 2·38 2·41
36 37 38 39 40	3 13 3·2 3 8 7·5 3 3 9·8 2 58 9·8 2 53 7·4	+2.85 2.91 2.97 3.03 3.10	3 15 51·4 3 10 59·0 3 6 4·7 3 1 8·5 2 56 10·0	+2.76 2.81 2.86 2.92 2.99	3 13 44·8 3 8 53·7	+2.67 2.72 2.77 2.82 2.88	3 II 37.0 3 6 47.2	+2·59 2·63 2·6 2·72 2·78	3 19 0·8 3 14 15·0 3 9 27·9 3 4 39·3		3 12 3.3	+2·44 2·47 2·51 2·55 2·59
41 42 43 44 45	2 48 2·3 2 42 54·3 2 37 43·0 2 32 28·1 2 27 9·3	+3·18 3·26 3·35 3·45 3·55	2 51 9·3 2 46 5·9 2 40 59·6 2 35 50·3 2 30 37·5	+3.06 3.13 3.21 3.30 3.39	2 49 10·0 2 44 8·3 2 39 3·9 2 33 56·5	+2·94 3·01 3·08 3·16 3·24	2 57 2·3 2 52 6·9 2 47 9·3 2 42 9·4 2 37 6·7		2 54 57·1 2 50 3·3 2 45 7·3 2 40 9·0	+2·73 2·78 2·84 2·91 2·97	2 57 41·1 2 52 50·5 2 47 58·1 2 43 3·7	+2.63 2.68 2.73 2.79 2.85
46 47 48 49 50	2 21 46·1 2 16 17·9 2 10 44·1 2 5 4·0 1 59 16·6	+3.67 3.79 3.93 4.08 4.24		+3.50 3.61 3.74 3.88 4.03		+3·34 3·44 3·55 3·67 3·81	2 21 40 2	3·28 3·38 3·49	2 35 8·2 2 30 4·6 2 24 57·8 2 19 47·6 2 14 33·5	+3.05 3.13 3.31 3.42	2 33 8·0 2 28 6·3 2 23 1·6	+2·92 2·99 3·07 3·16 3·25

1						
Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5 ° A.
0 2 4 6 8	s. s. - '00 -4.53 ·08 4.53 ·17 4.53 ·25 4.54 ·34 4.54	s. s. + ·09 -4·53 ·00 4·53 - ·08 4·53 ·16 4·53 ·25 4·54	s. s. + ·18 -4·53 ·09 4·53 + ·01 4·53 - ·07 4·53 ·16 4·53	s. s. + '27 -4.54 '18 4.53 '10 4.53 + '02 4.53 - '07 4.53	s. s. + '36 -4.54 ·27 4.54 ·19 4.53 ·11 4.53 + '02 4.53	s. s. + '45 -4'55 ·36 4'54 ·28 4'54 ·20 4'53 ·11 4'53
10	- '43 4.55	- ·33 4·54	- ·24 4·54	- ·15 4·53	06 4.53	+ ·03 4·53
12	·51 4.56	·42 4·55	·33 4·54	·24 4·54	.15 4.53	- ·05 4·53
14	·60 4.57	·51 4·56	·42 4·55	·32 4·54	.23 4.53	·14 4·53
16	·70 4.58	·60 4·57	·51 4·56	·41 4·55	.32 4.54	·22 4·53
18	·79 4.60	·70 4·58	·60 4·57	·50 4·56	.41 4.55	·31 4·54
20	- ·89 4·62	- ·79 4·60	- ·69 4·58	- ·60 4·57	·50 4·56	- ·40 4·55
22	1·00 4·64	·89 4·62	·79 4·60	·69 4·58	·59 4·57	·49 4·56
24	1·10 4·66	I·00 4·64	·89 4·62	·79 4·60	·69 4·58	·59 4·57
26	1·22 4·69	I·11 4·66	I·00 4·64	·89 4·62	·79 4·60	·68 4·58
28	1·33 4·72	I·22 4·69	I·II 4·66	I·00 4·64	·89 4·62	·79 4·60
30	-1·46 4·76	-1·34 4·72	-1·23 4·69	1·11 4·66	-1.00 4.64	- ·89 4·62
32	1·60 4·80	1·47 4·76	1·35 4·73	1·23 4·69	1.11 4.66	1·00 4·64
34	1·74 4·85	1·61 4·81	1·48 4·77	1·36 4·73	1.24 4.69	1·12 4·66
36	1·90 4·91	1·76 4·86	1·62 4·81	1·49 4·77	1.37 4.73	1·24 4·70
38	2·07 4·98	1·92 4·92	1·78 4·87	1·64 4·82	1.50 4.77	1·37 4·73
40	-2·26 5·06	-2·10 4·99 2·30 5·08 2·52 5·18 2·78 5·31 3·07 5·47 3·43 5·68	-1.94 4.93	-1·80 4·87	-1.65 4.82	-1·52 4·78
42	2·47 5·16		2.13 5.01	1·97 4·94	1.82 4.88	1·67 4·83
44	2·71 5·28		2.34 5.10	2·16 5·02	2.00 4.95	1·84 4·89
46	2·99 5·43		2.57 5.21	2·38 5·12	2.20 5.04	2·03 4·96
48	3·32 5·62		2.84 5.36	2·63 5·24	2.43 5.14	2·24 5·05
50	3·72 5·84		3.16 5.53	2·91 5·39	2.69 5.27	2·48 5·17

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 115 LATITUDE 28°.

True Alt.	6°	Decl. Var.	7° De Va		Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 12 48.9 5 27 22.6 5 18 18.9 5 9 15.2. 5 0 11.5	s. +2·15 2·09 2·08 2·08 2·09	6 14 58·4 +2· 5 29 27·6 2·	08 5 31 32·2 07 5 22 27·7 07 5 13 23·6	2.07	H. M. S. 6 19 19:4 5 33 36:4 5 24 31:2 5 15 26:6 5 6 22:5	s. +2·19 2·07 2·05 2·04 2·03	5 17 28.8	s. +2·20 2·06 2·04 2·03 2·02	H. M. S. 6 23 43.8 5 37 44.1 5 28 36.7 5 19 30.4 5 10 25.0	S. +2·22 2·06 2·04 2·02 2·01
18 20 22 24 26	4 51 7·4 4 42 2·9 4 32 57·6 4 23 51·3 4 14 43·9	+2·10 2·11 2·12 2·14 2·16	4 53 12·5 +2· 4 44 8·5 2· 4 35 4·0 2· 4 25 58·7 2· 4 16 52·6 2·	08 4 46 12·5 09 4 37 8·5 0 4 28 4·1	2.05	4 57 18·7 4 48 15·0 4 39 11·4 4 30 7·4 4 21 3·0	+2.03 2.03 2.03 2.04 2.05			5 I 20·2 4 52 I6·0 4 43 I2·I 4 34 8·5 4 25 4·8	+ 1.99 1.98 1.98 1.98
28 30 32 33 34	4 5 35.0 3 56 24.3 3 47 II.5 3 42 34.2 3 37 56.2	+2·19 2·23 2·27 2·29 2·31	4 7 45·3 +2· 3 58 36·4 2· 3 49 25·8 2· 3 44 49·7 2· 3 40 13·1 2·	8 4 0 45.6 1 3 51 36.9 3 3 47 1.9	+2·10 2·13 2·16 2·17 2·19	4 11 57·9 4 2 52·0 3 53 44·8 3 49 10·7 3 44 36·2	+2.06 2.08 2.11 2.12 2.14		+2.02 2.04 2.06 2.07 2.08	4 16 1.0 4 6 56.7 3 57 51.8 3 53 19.1 3 48 46.1	+ 1.99 2.00 2.01 2.02 2.03
35 36 37 38 39	3 33 17·4 3 28 37·9 3 23 57·4 3 19 16·0 3 14 33·6	+2·34 2·37 2·40 2·43 2·46	3 35 35·8 +2· 3 30 57·8 2· 3 26 19·0 2· 3 21 39·5 2· 3 16 59·0 2·	0 3 33 13·7 2 3 28 36·5 5 3 23 58·5	+2·21 2·23 2·26 2·28 2·31	3 40 1·3 3 35 25·9 3 30 49·9 3 26 13·3 3 21 36·1	+2·15 2·17 2·19 2·21 2·24	3 28 24.1	+2.09 2.11 2.13 2.15 2.17	3 44 12·8 3 39 39·2 3 35 5·2 3 30 30·9 3 25 56·1	+2.04 2.05 2.07 2.08 2.10
40 41 42 43 44	3 9 50·0 3 5 5·2 3 0 19·0 2 55 31·5 2 50 42·3	+2.50 2.54 2.58 2.63 2.68	3 7 35.0 2.	5 3 9 59·7 9 3 5 18·2 3 3 0 35·6	+2·34 2·37 2·40 2·44 2·48	3 16 58·1 3 12 19·4 3 7 39·8 3 2 59·3 2 58 17·8	+2·26 2·29 2·32 2·35 2·39		+2·19 2·21 2·24 2·27 2·30	3 21 20·8 3 16 45·0 3 12 8·6 3 7 31·5 3 2 53·6	+2·12 2·14 2·16 2·19 2·21
45 46 47 48 49	2 45 51·3 2 40 58·4 2 36 3·5 2 31 6·2 2 26 6·3		2 48 32·2 +2· 2 43 42·7 2· 2 38 51·3 2· 2 33 58·0 2· 2 29 2·4 2·	8 2 46 20·2 4 2 41 32·1 0 2 36 42·3	+2.52 2.57 2.62 2.68 2.74	2 53 35·2 2 48 51·3 2 44 6·1 2 39 19·4 2 34 31·0	+2·43 2·47 2·51 2·56 2·61	2 55 57.9 2 51 16.3 2 46 33.6 2 41 49.7 2 37 4.3		2 58 15.0 2 53 35.6 2 48 55.1 2 44 13.6 2 39 30.8	+2·24 2·27 2·31 2·35 2·39
50 51 52 53 54	2 21 3.5 2 15 57.6 2 10 48.1 2 5 34.5 2 0 16.3		2 24 4.4 +2. 2 19 3.6 3. 2 13 59.8 3. 2 8 52.5 3. 2 3 41.4 3.	2 2 22 0·5 1 2 17 1·6 1 2 12 0·0	2·95 3·04	2 29 40·8 2 24 48·7 2 19 54·4 2 14 57·5 2 9 57·8	+2.67 2.73 2.81 2.88 2.97	2 32 17·5 2 27 28·7 2 22 38·4 2 17 45·8 2 12 50·9		2 34 46·8 2 30 1·4 2 25 14·3 2 20 25·3 2 15 34·7	+2·43 2·48 2·53 2·59 2·66
		v	ARIATION	ro 1' of	LATI'	rude A	ND A	LTITUD	E.		
Alt.	L. 6°	A.	L. 7° A.	L. 8°	A.	L. 9°	A.	L. 10°	Α.	L. 11°	Α.

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
0 2 4 6 8	s. s. + ·54 -4·56 ·45 4·55 ·37 4·54 ·29 4·54 ·20 4·53	s. s. + ·63 -4·57 ·54 4·56 ·46 4·55 ·38 4·54 ·29 4·54	s. s. + ·72 -4·59 ·64 4·57 ·55 4·56 ·47 4·55 ·38 4·55	s. s. + ·8i4·60 ·73 4·59 ·64 4·57 ·56 4·56 ·47 4·55	s. s. + '91 -4.62 ·82 4.60 ·73 4.59 ·65 4.58 ·56 4.56	s. s. +1.00 -4.64 .91 4.62 .83 4.60 .74 4.59 .66 4.58
10	+ ·12 4·53	+ ·2I 4·53	+ ·30 4·54	+ ·39 4·55	+ '48 4'55 '40 4'55 '32 4'54 '24 4'54 '15 4*53	+ ·57 4·57
12	+ ·03 4·53	·13 4·53	·22 4·53	·31 4·54		·49 4·56
14	- ·05 4·53	+ ·04 4·53	·13 4·53	·23 4·53		·41 4·55
16	·13 4·53	- ·04 4·53	+ ·05 4·53	·14 4·53		·33 4·54
18	·22 4·53	·12 4·53	- ·03 4·53	+ ·06 4·53		·25 4·54
20	- '31 4'54	- ·21 4·53	- ·12 4·53	- ·02 4·53	+ ·07 4·53	+ ·16 4·53
22	'40 4'55	·30 4·54	·20 4·53	·11 4·53	- ·01 4·53	+ ·08 4·53
24	'49 4'56	·39 4·55	·29 4·54	·19 4·53	·10 4·53	- ·00 4·53
26	'58 4'57	·48 4·55	·38 4·54	·28 4·54	·18 4·53	- ·08 4·53
28	'68 4'58	·58 4·56	·47 4·55	·37 4·54	·27 4·54	- ·17 4·53
30	- ·78 4·60	- ·68 4·58	- ·57 4·56	- '47 4'55	- ·36 4·54	- ·26 4·54
32	·89 4·61	·78 4·60	·67 4·58	'56 4'56	·46 4·55	·35 4·54
34	I·00 4·64	·89 4·61	·77 4·59	'66 4'58	·55 4·56	·45 4·55
36	I·12 4·67	I·00 4·64	·88 4·61	'77 4'59	·65 4·58	·54 4·56
38	I·25 4·70	I·12 4·67	I·00 4·64	'88 4'61	·76 4·59	·65 4·57
40	-1·38 4·74	-1·25 4·70 1·39 4·74 1·54 4·78 1·70 4·84 1·89 4·91	-1·12 4·67	-1.00 4.64	- ·87 4·61	- ·75 4·59
42	1·53 4·78		1·25 4·70	1.12 4.67	·99 4·64	·87 4·61
44	1·69 4·83		1·40 4·74	1.26 4.70	I·12 4·67	·99 4·64
46	1·86 4·90		1·55 4·79	1.40 4.74	I·26 4·70	I·12 4·67
48	2·06 4·98		1·72 4·85	1.56 4.79	I·41 4·74	I·26 4·70
50	-2·28 5·07	-2.09 4.99	-1.91 4.92	-1.74 4.85	-1.57 4.80	-1·41 4·74
52	2·54 5·19	2.33 5.09	2.13 5.00	1.94 4.93	1.76 4.86	1·58 4·80
54	2·84 5·34	2.60 5.22	2.37 5.10	2.15 5.01	1.96 4.93	1·78 4·87

116 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 28°.

			DECLIN	ATIC	N—SAM	E N	AME AS	S—LA	TITUDE	•		
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 25 57.5 5 39 47.7 5 30 39.0 5 21 31.4 5 12 25.0	s. +2·24 2·06 2·03 2·01 1·99	H. M. S. 6 28 12·3 5 41 51·3 5 32 40·9 5 23 32·0 5 14 24·3	s. +2·26 2·06 2·03 2·01 1·98		s. +2·28 2·06 2·03 2·00 1·97	H. M. S. 6 32 45.8 5 45 58.8 5 36 44.5 5 27 32.0 5 18 21.2	s. +2·30 2·06 2·03 1·99 1·96	5 29 31.6	s. +2·33 2·07 2·03 1·99 1·96	H. M. S. 6 37 25·3 5 50 7·2 5 40 48·1 5 31 31·1 5 22 16·2	s. +2·36 2·07 2·03 1·99 1·95
18 20 22 24 26	5 3 19·4 4 54 14·6 4 45 10·3 4 36 6·4 4 27 2·7	+1.98 1.97 1.96 1.95 1.95		+1.96 1.95 1.94 1.93 1.92	4 58 8·4 4 49 2·6 4 39 57·5	1.80	5 9 11.8 5 0 .8 4 50 56 8 4 41 50.8 4 32 45.6	1.86	5 I 58·2 4 52 49·9 4 43 42·7 4 34 36·5	+ 1.93 1.90 1.87 1.85 1.83	4 45 33.3	+1.92 1.89 1.86 1.83 1.81
28 30 31 32 33	4 17 59·I 4 8 55·3 4 4 23·2 3 59 51·I 3 55 18·8	+ 1.95 1.96 1.96 1.96 1.97	4 6 19·6 4 1 47·7 3 57 15·7		4 12 45·3 4 8 13·5 4 3 41·7 3 59 9·8	+1.88 1.88 1.88 1.88	4 23 41·0 4 14 37·0 4 10 5·1 4 5 33·2 4 1 1·3	1.84	4 16 26·4 4 11 54·3 4 7 22·3 4 2 50·3	+ 1.82 1.81 1.80 1.80	4 18 13·9 4 13 41·4 4 9 9·0 4 4 36·8	+ 1·79 1·77 1·76 1·75
34 35 36 37 38	3 50 46·3 3 46 13·6 3 41 40·7 3 37 7·5 3 32 34·0	1.98 1.99 2.00 2.01 2.02	3 43 38·9 3 39 6·3 3 34 33·4	1.95	3 50 6·0 3 45 33·9 3 41 1·7 3 36 29·4	١.	3 42 53·9 3 38 21·9	1.84	3 53 46·6 3 49 14·8 3 44 43·0 3 40 11·1	1·79 1·79	3 55 32.7 3 51 0.8 3 46 28.9 3 41 57.1	1·75 1·74 1·74 1·74
39 40 41 42 43	3 28 0·I 3 23 25·9 3 18 51·2 3 14 16·0 3 9 40·3	2·05 2·07 2·09 2·11	3 16 19·0 3 11 44·4	+1.97 1.98 2.00 2.01 2.03 +2.05	3 13 44·I	1.91 1.92 1.93 1.94 1.96	3 20 12·3 3 15 39·4	+ 1.85 1.86 1.87 1.88 1.89 + 1.90	3 31 7·2 3 26 35·2	+ 1.79 1.80 1.81 1.82 + 1.83	3 28 21·6 3 23 49·6 3 19 17·6	
44 45 46 47 48	3 5 3.9 3 0 27.0 2 55 49.2 2 51 10.7 2 46 31.2 2 41 50.9	+2·13 2·16 2·18 2·21 2·24 +2·28	3 7 9·3 3 2 33·7 2 57 57·5 2 53 20·6 2 48 43·0 2 44 4·6	2·07 2·09 2·12 2·15 +2·18	3 4 35·6 3 0 0·6	1.99 2.01 2.03 2.06 +2.08	3 11 6·2 3 6 32·7 3 1 58·8 2 57 24·5 2 52 49·7 2 48 14·4	1.91	3 8 25.2	1.84 1.85 1.86 1.88	3 10 13·2 3 5 40·8 3 1 8·1 2 56 35·2	1·76 1·77 1·78 1·79
50 51 52 53	2 41 50 9 2 37 9·3 2 32 26·6 2 27 42·6 2 22 57·0 2 18 9·8	2·32 2·36 2·41 2·46 +2·52	2 39 25·3 2 34 45·0	2·21 2·25 2·29 2·33 +2·38	2 41 34·9 2 36 56·6 2 32 17·4 2 27 37·2	2·11 2·14 2·18 2·21 +2·26	2 43 38·5 2 39 2·0 2 34 24·7 2 29 46·5 2 25 7·5		2 45 36·3 2 41 1·2 2 36 25·5	1.92	2 47 28·4 2 42 54·4 2 38 20·0 2 33 45·2	1.82 1.84 1.86 1.88
55 56 57 58	2 13 20·8 2 8 29·7 2 3 36·3 1 58 40·2	2·58 2·64 2·71 2·79	2 15 51·2 2 11 3·9 2 6 14·6 2 1 23·2	2·44 2·50 2·56 2·63	2 18 13·3 2 13 29·3 2 8 43·7 2 3 56·3	2·30 2·35 2·41 2·47	2 20 27·5 2 15 46·3 2 11 3·8 2 6 19·8	2·17 2·22 2·26 2·32	2 22 34·2 2 17 55·4 2 13 15·5 2 8 34·5	2·05 2·09 2·13 2·17	2 24 33.6 2 19 56.8 2 15 19.2	1.93 1.96 2.00 2.03
474	7 70				O 1' OF						T 199	
Alt.	L. 12°	A.	L. 13	A.	L. 14°	A.	L. 15°		L. 16		L. 17°	
0 4 8 12 16	s. +1·10 ·92 ·75 ·58 ·42	s. -4.66 4.62 4.59 4.57 4.55	s. +1·19 1·01 ·84 ·67 ·51	s. -4.68 4.64 4.61 4.58 4.56	s. +1·29 1·11 ·93 ·77 ·60	s. -4·71 4·66 4·62 4·59 4·57	1.39 1.20 1.03 .86	s. -4·74 4·69 4·64 4·61 4·58	s. +1·49 1·30 1·12 ·95 ·79	s. -4·77 4·71 4·67 4·63 4·60	S. +1·59 1·40 1·22 1·05 •88	s. -4·80 4·74 4·69 4·65 4·61
20 22 24 26 28	+ ·26 ·18 ·09 + ·01 - ·07	4·54 4·53 4·53 4·53 4·53	+ ·35 ·27 ·19 ·11 + ·02	4·54 4·54 4·53 4·53 4·53	+ '44 '37 '29 '20 '12	4·55 4·54 4·53 4·53	+ '54 '46 '38 '30 '22	4·56 4·55 4·54 4·54	+ ·63 ·56 ·48 ·40 ·32	4·57 4·56 4·55 4·55 4·54	+ ·73 ·65 ·57 ·50 ·42	4·59 4·58 4·57 4·56 4·55
30 32 34 36 38	- ·16 ·25 ·34 ·43 ·53	4·53 4·54 4·54 4·55 4·56	- •06 •14 •23 •32 •42	4·53 4·54 4·54 4·55	+ ·04 - ·04 ·13 ·21 ·31	4·53 4·53 4·53 4·54	+ ·14 + ·06 - ·02 ·11 ·20	4.53 4.53 4.53 4.53 4.53	+ ·24 ·16 + ·08 ·00 - ·09	4.54 4.53 4.53 4.53 4.53	+ ·34 ·26 ·18 ·10 + ·02 - ·06	4·54 4·53 4·53 4·53
40 42 44 46 48	- ·63 ·74 ·86 ·98 ·1·11	4·57 4·59 4·61 4·64 4·66	- ·52 ·62 ·73 ·85 •97	4·56 4·57 4·59 4·61 4·63	- ·40 ·50 ·61 ·72 ·83	4·55 4·56 4·57 4·59 4·61	- ·29 ·38 ·48 ·59 ·70 - ·82	4.54 4.55 4.56 4.57 4.58	- ·17 ·26 ·36 ·46 ·57 - ·68	4.53 4.54 4.55 4.56	·15 ·24 ·34 ·44	4·53 4·54 4·54 4·55 4·56
50 52 54 56 58	-1.26 1.42 1.59 1.79 2.01	4·70 4·75 4·80 4·87 4·94	-1·11 1·25 1·42 1·60 1·81	4·66 4·70 4·75 4·80 4·87	- ·96 1·10 1·25 1·42 1·61	4.63 4.66 4.70 4.75 4.80	- ·82 ·95 I·09 I·24 I·4I	4.60 4.63 4.66 4.70 4.75	08 .80 .93 1.07 1.23	4·58 4·60 4·62 4·66 4·70	- ·54 ·65 ·78 ·91 I·05	4·58 4·60 4·62 4·65

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 117 LATITUDE 28°.

True Alt.	18°	Decl. Var.		Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 39 47.6 5 52 12.0 5 42 50.1 5 33 30.5 5 24 13.3	s. +2·39 2·08 2·03 1·99 1·95	H. M. S. 6 42 11·8 - 5 54 17·3 5 44 52·3 5 35 30·0 5 26 10·1	s. +2:42 2:09 2:04 1:99	H. M. S. 6 44 38·1 5 56 23·2 5 46 54·9 5 37 29·5 5 28 6·7	s. +2·45 2·10 2·05 1·99 1·94	H. M. S. 6 47 6.5 5 58 29.8 5 48 58.0 5 39 29.3 5 30 3.3	s. +2·49 2·12 2·05 2·00 1·94	H. M. S. 6 49 37·2 6 0 37·2 5 51 1·6 5 41 29·3 5 32 0·0	s. +2.53 2.13 2.06 2.00 1.94	H. M. S. 6 52 10·5 6 2 45·6 5 53 5·9 5 43 29·6 5 33 56·7	s. +2·58 2·15 2·07 2·01 1·95
18 20 22 24 26	5 14 58·0 5 5 44·6 4 56 32·9 4 47 22·6 4 38 13·7	1.81	5 16 52·4 5 7 36·7 4 58 22·9 4 49 10·8 4 40 0·1	+ 1.90 1.86 1.83 1.79 1.76	5 18 46·4 5 9 28·2 5 0 12·1 4 50 57·8 4 41 45·2		5 20 40·1 5 11 19·1 5 2 0·4 4 52 43·8 4 43 28·9		5 22 33.5 5 13 9.6 5 3 48.0 4 54 28.7 4 45 11.4		5 24 26.8 5 14 59.6 5 5 35.0 4 56 12.8 4 46 52.7	+1.89 1.83 1.78 1.73 1.68
28 30 31 32 33	4 29 6.0 4 19 59.3 4 15 26.3 4 10 53.5 4 6 20.9	1.73 1.71	4 21 42·8 4 17 9·2 4 12 35·8 4 8 2·6	+ 1·73 1·71 1·70 1·69 1·68	4 32 34·I 4 23 24·4 4 18 50·0 4 14 15·9 4 9 42·I	1·65 1·64	4 34 15·8 4 25 4·1 4 20 28·9 4 15 54·0 4 11 19·3	1.60	4 12 54·4	1.50 1.57	4 37 34.7 4 28 18.5 4 23 41.1 4 19 4.0 4 14 27.4	+1.63 1.59 1.57 1.55 1.53
34 35 36 37 38	4 I 48·5 3 57 I6·2 3 52 44·0 3 48 II·9 3 43 40·0	1.69	3 58 57.0 3 54 24.4 3 49 52.0 3 45 19.7	1·64 1·64	3 46 56.5	1.59	3 57 37·2 3 53 3·7 3 48 30·4	1.24	4 8 19·2 4 3 44·3 3 59 9·7 3 54 35·4 3 50 1·4	1.49	3 56 4·4 3 51 29·5	+ 1.51 1.49 1.48 1.46 1.44
39 40 41 42 43	3 39 8·1 3 34 36·2 3 30 4·4 3 25 32·6 3 21 0·7	1.69	3 36 15·6 3 31 43·6 3 27 11·7 3 22 39·9	1.63 1.62 1.62 1.62	3 42 24·0 3 37 51·6 3 33 19·4 3 28 47·3 3 24 15·3	1·57 1·56 1·56	3 43 57·3 3 39 24·4 3 34 51·7 3 30 19·3 3 25 46·9	1.50	3 36 20·8 3 31 47·7 3 27 14·8	I·45 I·44 I·43	3 42 20·5 3 37 46·5 3 33 12·6 3 28 39·1	+ I·43 I·41 I·40 I·39 I·37
44 45 46 47 48	3 16 28·9 3 11 56·9 3 7 24·8 3 2 52·6 2 58 20·3	1.70 1.71	3 13 36·3 3 9 4·4 3 4 32·5 3 0 0·5	1.62 1.63 1.63	3 I 36·0	1.55 1.55 1.55	3 21 14·6 3 16 42·6 3 12 10·5 3 7 38·6 3 3 6·8	+ 1·49 1·48 1·48 1·47	3 I3 37·2 3 9 5·0 3 4 32·8	1.41 1.40 1.40	3 19 32·6 3 14 59·7 3 10 27·0 3 5 54·3	1.32
49 50 51 52 53	2 53 47·8 2 49 15·0 2 44 42·0 2 40 8·6 2 35 34·8	1.74 1.76 1.78	2 50 56·2 2 46 23·8 2 41 51·2 2 37 18·4	1.65 1.66 1.68	2 57 4·I 2 52 32·2 2 48 0·2 2 43 28·I 2 38 55·9	1·57 1·58		I.47 I.48	2 50 57·0 2 46 25·1 2 41 53·3	1·38 1·38	3 I 21·9 2 56 49·6 2 52 I7·5 2 47 45·4 2 43 I3·4	I·29 I·29 I·28
54 55 56 57 58	2 3I 0·7 2 26 26·1 2 2I 50·9 2 I7 I5·I 2 I2 38·6	+ 1.80 1.82 1.84 1.87 1.90	2 32 45·2 2 28 11·7 2 23 37·8 2 19 3·5 2 14 28·6	+ 1.69 1.70 1.72 1.75 1.77	2 34 23·5 2 29 50·7 2 25 17·8 2 20 44·6 2 16 11·0	1.61 1.63	2 35 55.4 2 31 23.4 2 26 51.1 2 22 18.7 2 17 46.0	1.49 1.50 1.51		1.39		I·27 I·27
		V	ARIATIC	N T	O I' OF	LATI	TUDE A	ND A	LTITUE	E.	,	
Alt.	L. 18°	A.	L. 19°	Α.	L. 20°	Α.	L. 21°	A.	L. 22°	A.	L. 23	° A.
° 4 8 12 16	s. +1.69 1.50 1.31 1.14 .98	s. -4·83 4·77 4·72 4·67 4·63	s. +1.80 - 1.60 1.41 1.24 1.07	s. -4·87 4·80 4·74 4·69 4·66	s. +1.90 - 1.70 1.51 1.34 1.17	s. -4·91 4·84 4·77 4·72 4·68	s. +2.01 1.80 1.61 1.43 1.27	s. -4·96 4·87 4·81 4·75 4·70	s. +2·12 1·91 1·71 1·53 1·37	s. -5.00 4.92 4.84 4.78 4.73	s. +2·24 2·01 1·82 1·63 1·46	s. -5.05 4.96 4.88 4.81 4.76
20 22 24 26 28	+ ·82 ·75 ·67 ·59 ·52	4.60 4.59 4.58 4.57 4.56	+ ·92 ·84 ·77 ·69 ·62	4.62 4.61 4.59 4.58 4.57	+1.01 .94 .86 .79 .71	4.64 4.62 4.61 4.60 4.58	+ 1·11 1·04 ·96 ·89 ·81	4.66 4.63 4.62 4.60	+1·21 1·13 1·06 •98 •91	4.69 4.67 4.65 4.63 4.62	+1·31 1·23 1·16 1·08 1·01	4·71 4·69 4·67 4·66 4·64
30 32 34 36 38	+ '44 ·36 ·29 ·21 ·13	4·55 4·54 4·53 4·53	+ ·54 ·46 ·39 ·31 ·24	4·56 4·55 4·54 4·54	+ •64 •57 •49 •42 •34	4.57 4.56 4.56 4.55 4.55	+ ·74 ·67 ·60 ·52 ·45	4.59 4.58 4.57 4.56 4.55	+ ·84 ·77 ·70 ·63 ·56	4.61 4.59 4.58 4.57 4.56	+ ·94 ·87 ·80 ·74 ·67	4.63 4.61 4.60 4.59 4.58
40 42 44 46 48	+ ·05 - ·03 ·12 ·21 ·31	4·53 4·53 4·54 4·54	+ ·16 + ·08 - ·01 ·10	4·53 4·53 4·53 4·53	+ ·27 ·19 ·11 + ·03 - ·05	4·54 4·53 4·53 4·53	+ ·38 ·30 ·23 ·15 + ·07	4.54 4.54 4.53 4.53	+ ·49 ·42 ·35 ·27 ·20	4·56 4·55 4·54 4·54 4·53	+ ·60 ·53 ·46 ·39 ·32	4.57 4.56 4.55 4.55 4.54
50 52 54 56 58	- ·41 ·51 ·63 ·75 ·88	4·55 4·56 4·57 4·59 4·61	- ·27 ·37 ·48 ·59 ·71	4·54 4·55 4·57 4·59	- ·14 ·23 ·33 ·44 ·55	4.53 4.54 4.55 4.56	- ·01 ·10 ·19 ·28 ·39	4·53 4·53 4·54 4·55	+ ·12 + ·04 - ·05 ·13 ·23	4.53 4.53 4.53 4.54	+ ·25 ·17 ·09 + ·01 - ·07	4·53 4·53 4·53 4·53

LATITUDE 29°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1° Decl Var	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 14 11.5 5 4 59.6 4 55 46.2 4 46 31.2	s. +2·22 2·26 2·28 2·31 2·34	H. M. S. S. +2.2 5 16 26.8 2.2 5 7 15.9 2.2 4 58 3.8 2.2 4 48 50.5 2.3	5 18 41.0 5 9 30.9 5 0 20.0	s. +2·22 2·23 2·24 2·26 2·28	H. M. S. 6 6 39.5 5 20 54.3 5 11 44.8 5 2 34.8 4 53 23.9	S. +2·22 2·21 2·22 2·23 2·25		S. +2·23 2·20 2·21 2·21 2·23	5 16 9·5 5 7 0·5	S. +2·24 2·19 2·19 2·20 2·20
18 20 22 24 25	4 37 14·3 4 27 55·2 4 18 33·5 4 9 8·9 4 4 25·3	+2·37 2·41 2·45 2·50 2·53	4 39 35.5 4 30 18.6 4 20 59.4 4 11 37.6 4 6 55.6 2.4	4 32 39·6 4 23 22·7 4 14 3·5	+2·30 2·33 2·37 2·41 2·43	4 25 43·5 4 16 26·6	+2.27 2.30 2.33 2.36 2.38	4 28 2·1 4 18 47·1	+2·24 2·26 2·29 2·32 2·34	4 30 18.4	+2·22 2·23 2·25 2·28 2·29
26 27 28 29 30	3 59 40·7 3 54 55·2 3 50 8·6 3 45 20·8 3 40 31·9	+2.56 2.59 2.63 2.66 2.70	4 2 12.8 +2.5 3 57 29.1 2.5 3 52 44.4 2.5 3 47 58.7 2.6 3 43 11.9 2.6	3 59 59·5 3 55 16·6 3 50 32·7	+2.45 2.48 2.51 2.54 2.57	4 7 7·3 4 2 26·7 3 57 45·3 3 53 3·2 3 48 20·1	+2·40 2·43 2·45 2·48 2·50	4 9 30·1 4 4 50·7 4 0 10·8 3 55 30·1 3 50 48·6	+2·36 2·38 2·40 2·42 2·45	4 11 50·1 4 7 11·9 4 2 33·1 3 57 53·7 3 53 13·7	+2·31 2·33 2·35 2·37 2·39
31 32 33 34 35	3 35 41·5 3 30 49·8 3 25 56·5 3 21 1·5 3 16 4·7	2·83 2·88	3 38 23.9 +2.6 3 33 34.7 3 28 44.0 3 23 51.9 3 18 58.2 2.8	3 36 15·1 3 31 26·9	+ 2.60 2.64 2.68 2.72 2.76	3 43 36·2 3 38 51·2 3 34 5·2 3 29 18·0 3 24 29·5		3 46 6·4 3 41 23·3 3 36 39·2 3 31 54·1 3 27 7·9	2.57	3 48 33·0 3 43 51·5 3 39 9·2 3 34 26·0 3 29 41·8	+2.41 2.44 2.47 2.50 2.53
36 37 38 39 40	3 11 6·0 3 6 5·1 3 1 1·8 2 55 56·1 2 50 47·6	+2.99 3.06 3.12 3.19 3.27	3 14 2·7 +2·90 3 9 5·3 2·9 3 4 5·9 3·0 2 59 4·2 3·0 2 54 0·1 3·1	3 11 59·6 3 7 3·6 3 2 5·6	+2.81 2.86 2.91 2.97 3.03	3 19 39.7 3 14 48.4 3 9 55.4 3 5 0.8 3 0 4.2	+2.72 2.77 2.82 2.87 2.92	3 22 20·5 3 17 31·8 3 12 41·6 3 7 50·0 3 2 56·6	2·72 2·77	3 24 56·6 3 20 10·2 3 15 22·5 3 10 33·6 3 5 43·1	+2.56 2.60 2.64 2.68 2.73
41 42 43 44 45	2 45 36·1 2 40 21·2 2 35 2·7 2 29 40·0 2 24 12·7	3·44 3·54	2 48 53·3 +3·22 2 43 43·5 3·30 2 38 30·5 3·39 2 33 14·0 3·44 2 27 53·5 3·66	2 46 57·8 2 41 49·9 2 36 38·8	+3·10 3·17 3·25 3·34 3·44	2 55 5.5 2 50 4.6 2 45 1.1 2 39 55.0 2 34 45.8	+2·99 3·05 3·12 3·20 3·29	2 58 1·4 2 53 4·2 2 48 4·9 2 43 3·1 2 37 58·6	+2.88 2.94 3.00 3.07 3.15	3 0 51·0 2 55 57·2 2 51 1·5 2 46 3·7 2 41 3·6	+2.78 2.83 2.89 2.95 3.02
46 47 48 49 50	2 18 40·4 2 13 2·3 2 7 17·6 2 1 25·5 1 55 24·7	4.04 4.21 4.39	2 22 28·5 +3·7: 2 16 58·6 3·82 2 11 23·0 3·98 2 5 41·1 4·12 1 59 52·0 4·32	2 20 43·1 2 15 15·6 2 9 42·7	+3.54 3.65 3.78 3.92 4.07	2 29 33·2 2 24 16·9 2 18 56·5 2 13 31·3 2 8 0·9	+3·38 3·48 3·59 3·71 3·85	2 32 51·3 2 27 40·7 2 22 26·6 2 17 8·4 2 11 45·7	+3·23 3·32 3·42 3·53 3·65	2 36 0·9 2 30 55·4 2 25 46·8 2 20 34·8 2 15 18·8	+3·09 3·17 3·26 3·36 3·46

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Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
0 2 4 6 8	s. s. - '00 -4.57 '09 4.57 '18 4.58 '27 4.58 '36 4.59	s. s. + ·og -4·57 ·oo 4·57 - ·o8 4·57 ·17 4·58 ·26 4·58	s. s. + ·18 -4·58 + ·09 4·57 - ·08 4·57 - ·17 4·58	s. s. + ·27 -4·58 ·18 4·58 ·10 4·57 + ·01 4·57 - ·08 4·57	s. s. + '36 -4'59 -28 4'58 -19 4'58 -10 4'57 + '01 4'57	s. s. + '46 -4'59 '37 4'59 '28 4'58 '19 4'58 '10 4'57
10	- '45 4'59	- ·36 4·59	- ·26 4·58	- ·17 4·57	- ·07 4·57	+ ·01 4·57
12	'54 4'60	·45 4·59	·35 4·59	·26 4·58	·16 4·58	- ·07 4·57
14	'64 4'62	·54 4·60	·44 4·59	·35 4·59	·26 4·58	·16 4·58
16	'74 4'63	·64 4·62	·54 4·60	·44 4·59	·35 4·58	·25 4·58
18	'84 4'65	·74 4·63	·64 4·62	·54 4·60	·44 4·59	·34 4·58
20	- '94 4·67	- ·84 4·65	- ·74 4·63	- ·64 4·62	- ·54 4·60	- '44 4'59
22	1·05 4·69	·94 4·67	·84 4·65	·74 4·63	·64 4·62	'54 4'60
24	1·16 4·72	I·05 4·69	·95 4·67	·84 4·65	·74 4·63	'64 4'62
26	1·28 4·75	I·17 4·72	I·06 4·69	·95 4·67	·84 4·65	'74 4'63
28	1·41 4·78	I·29 4·75	I·18 4·72	I·07 4·69	·95 4·67	'84 4'65
30	-1·54 4·82	-1·42 4·79	-1·30 4·75 1·43 4·79 1·58 4·84 1·73 4·89 1·89 4·95	-1·18 4·72	-1.07 4.70	- ·96 4·67
32	1·69 4·87	1·56 4·83		1·31 4·76	1.19 4.73	1·07 4·70
34	1·84 4·93	1·71 4·88		1·45 4·80	1.32 4.76	1·20 4·73
36	2·01 5·00	1·87 4·94		1·59 4·84	1.46 4.80	1·33 4·76
38	2·20 5·07	2·04 5·01		1·75 4·90	1.61 4.85	1·47 4·80
40	-2·40 5·17	-2·24 5·09 2·45 5·19 2·70 5·31 2·98 5·46 3·31 5·65 3·71 5·89	-2.07 5.02	-1.92 4.96	-1.77 4.90	-1.63 4.85
42	2·64 5·28		2.28 5.11	2.11 5.03	1.95 4.97	1.79 4.91
44	2·90 5·42		2.50 5.21	2.32 5.13	2.15 5.05	1.98 4.98
46	3·21 5·59		2.76 5.34	2.56 5.24	2.37 5.15	2.18 5.07
48	3·58 5·81		3.06 5.50	2.83 5.38	2.62 5.27	2.42 5.17
50	4·03 6·08		3.42 5.71	3.16 5.56	2.91 5.42	2.68 5.30

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 119 LATITUDE 29°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 6 13 21·6 5 27 29·4 5 18 20·6 5 9 11·7 5 0 2·7	S. +2·24 2·18 2·18 2·18 2·18	H. M. S. 6 15 36·6 5 29 40·0 5 20 30·8 5 11 22·0 5 2 13·1		H. M. S. 6 17 52·3 5 31 50·0 5 22 40·4 5 13 31·2 5 4 22·3	s. +2·27 2·16 2·15 2·15 2·14	H. M. S. 6 20 8.8 5 33 59.7 5 24 49.4 5 15 39.7 5 6 30.5	s. +2·28 2·16 2·14 2·13 2·13	H. M. S. 6 22 26·2 5 36 9·2 5 26 57·9 5 17 47·5 5 8 37·8	s. +2·30 2·15 2·14 2·12 2·11	5 29 6·0 5 19 54·6	s. +2·31 2·15 2·13 2·11 2·10
18 20 22 24 26	4 50 53.4 4 41 43.4 4 32 32.6 4 23 20.7 4 14 7.4	+2·19 2·20 2·22 2·24 2·27	4 53 4·I 4 43 54·8 4 34 44·9 4 25 34·I 4 16 22·2	2.19	4 55 13·5 4 46 4·6 4 36 55·2 4 27 45·4 4 18 34·6	+2·14 2·15 2·16 2·17 2·19	4 57 21.6 4 48 12.8 4 39 3.9 4 29 54.6 4 20 44.7	+2·12 2·13 2·14 2·15	4 59 28·5 4 50 19·6 4 41 10·8 4 32 1·9 4 22 52·7	+2·11 2·10 2·10 2·11 2·11	5 I 34·4 4 52 25·I 4 43 I6·2 4 34 7·4 4 24 58·5	+2.09 2.08 2.08 2.08 2.08
28 30 32 33 34	4 4 52·5 3 55 35·5 3 46 16·1 3 41 35·3 3 36 53·8	+2·30 2·34 2·38 2·40 2·43	4 7 9.0 3 57 54.1 3 48 37.1 3 43 57.7 3 39 17.7	+2.25 2.28 2.32 2.34 2.37	4 9 22.8 4 0 9.6 3 50 54.7 3 46 16.5 3 41 37.8	+2·21 2·23 2·27 2·28 2·30	4 II 34·I 4 2 22·3 3 53 9·2 3 48 32·0 3 43 54·4	+2·17 2·19 2·21 2·23 2·25	4 13 42·9 4 4 32·3 3 55 20·6 3 50 44·3 3 46 7·6	+2·13 2·14 2·16 2·18 2·19	3 57 29.0 3 52 53.4 3 48 17.4	+2.09 2.10 2.12 2.13 2.14
39	3 32 11·4 3 27 28·1 3 22 43·8 3 17 58·4 3 13 11·8	+2.46 2.49 2.52 2.56 2.59	3 29 55·3 3 25 12·8 3 20 29·4 3 15 45·0	2·48 2·51	3 36 58·4 3 32 18·3 3 27 37·5 3 22 56·0 3 18 13·4	2.43	3 39 16·2 3 34 37·5 3 29 58·1 3 25 18·0 3 20 37·2	+2·27 2·29 2·31 2·33 2·36	3 41 30·4 3 36 52·8 3 32 14·7 3 27 36·0 3 22 56·6	+2.21 2.22 2.24 2.26 2.29	3 43 41·2 3 39 4·5 3 34 27·4 3 29 49·8 3 25 11·8	+2·15 2·16 2·18 2·20 2·22
41 42 43 44	3 8 24·0 3 3 34·7 2 58 44·0 2 53 51·5 2 48 57·2	+2.64 2.68 2.73 2.78 2.84	3 6 12·8 3 1 24·7 2 56 35·2 2 51 44·1	2·59 2·63 2·68 2·73	3 13 30·0 3 8 45·4 3 3 59·8 2 59 12·9 2 54 24·6	2·50 2·54 2·58 2·62	3 15 55.6 3 11 13.1 3 6 29.5 3 1 44.9 2 56 59.1	+2·39 2·42 2·45 2·49 2·53	3 18 16·6 3 13 35·7 3 8 54·1 3 4 11·6 2 59 27·9	+2·31 2·34 2·37 2·40 2·43	3 20 33·1 3 15 53·8 3 11 13·8 3 6 33·0 3 1 51·3	+2.24 2.26 2.29 2.32 2.35
46 47 48 49	2 44 0·9 2 39 2·4 2 34 1·5 2 28 57·8 2 23 51·2	3·11 3·20	2 41 56·4 2 36 59·5 2 32 0·3 2 26 58·5	2·84 2·90 2·97	2 49 34·8 2 44 43·3 2 39 50·0 2 34 54·7 2 29 57·2	2.84	2 52 12·0 2 47 23·5 2 42 33·4 2 37 41·6 2 32 47·9	+2.57 2.62 2.67 2.72 2.78	2 54 43·3 2 49 57·3 2 45 10·1 2 40 21·3 2 35 31·0	+2.47 2.51 2.56 2.61 2.66	2 38 6.9	+2·38 2·41 2·45 2·50 2·54
51 52 53	2 18 41·2 2 13 27·5 2 8 9·6 2 2 46·9 1 57 18·8	3·40 3·51 3·64	2 21 53·8 2 16 46·0 2 11 34·5 2 6 19·0 2 0 58·8	3·22 3·33 3·44	2 24 57·2 2 19 54·5 2 14 48·7 2 9 39·4 2 4 26·3	3·07 3·15	2 27 52·0 2 22 53·9 2 17 53·1 2 12 49·3 2 7 42·3		2 30 38·8 2 25 44·6 2 20 48·3 2 15 49·4 2 10 47·7	+2.72 2.78 2.85 2.92 3.01	2 28 27·3 2 23 34·8 2 18 40·2	+2·59 2·65 2·71 2·77 2·85

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
0 2 4 6 8	s. s. + ·55 -4·60 ·46 4·59 ·37 4·59 ·28 4·58 ·19 4·58	s. s. + ·64 -4·62 ·55 4·61 ·46 4·60 ·37 4·59 ·29 4·58	s. s. + ·74 -4·63 ·64 4·62 ·56 4·61 ·47 4·60 ·38 4·59	s. s. + ·83 -4·65 ·74 4·63 ·65 4·62 ·56 4·61 ·47 4·60	s. s. + ·93 -4·66 ·83 4·65 ·74 4·63 ·65 4·62 ·56 4·61	s. s. +1·02 -4·68 ·93 4·67 ·84 4·65 ·75 4·63 ·66 4·62
10	+ ·II 4·57	+ ·20 4·58	+ ·29 4·58	+ ·38 4·59	+ '48 4'60	+ ·57 4·61
12	+ ·02 4·57	·11 4·57	·20 4·58	·30 4·58	'39 4'59	·48 4·60
14	- ·07 4·57	+ ·02 4·57	·12 4·57	·21 4·58	'30 4'58	·40 4·59
16	·16 4·58	- ·06 4·57	+ ·03 4·57	·12 4·57	'22 4'58	·31 4·58
18	·25 4·58	·15 4·58	- ·06 4·57	+ ·03 4·57	'13 4'57	·22 4·58
20	- ·34 4·58	- ·24 4·58	- ·15 4·57	05 4.57	+ ·04 4·57	+ ·14 4·57
22	·44 4·59	·34 4·58	·24 4·58	-14 4.57	- ·04 4·57	+ ·05 4·57
24	·53 4·60	·43 4·59	·33 4·58	-23 4.58	·13 4·57	- ·04 4·57
26	·63 4·62	·53 4·60	·43 4·59	-33 4.58	·23 4·58	·12 4·57
28	·74 4·63	·63 4·62	·53 4·60	-42 4.59	·32 4·58	·22 4·58
30	- ·85 4·65	- ·74 4·63	- ·63 4·62	- ·52 4·60	- '42 4.59	- ·31 4·58
32	·96 4·67	·85 4·65	·73 4·63	·62 4·62	·52 4.60	·41 4·59
34	I·08 4·70	·96 4·67	·85 4·65	·73 4·63	·62 4.61	·51 4·60
36	I·2I 4·73	I·08 4·70	·96 4·67	·84 4·65	·73 4.63	·61 4·61
38	I·34 4·76	I·2I 4·73	I·09 4·70	·96 4·67	·84 4.65	·72 4·63
40	-1·49 4·81	-1·35 4·77	-1·22 4·73	-1.09 4.70	- ·96 4·67	- ·84 4·65
42	1·64 4·86	1·50 4·81	1·36 4·77	1.22 4.74	1·09 4·70	·96 4·67
44	1·82 4·92	1·66 4·87	1·51 4·82	1.37 4.77	1·23 4·74	I·09 4·70
46	2·01 4·99	1·84 4·93	1·68 4·87	1.53 4.82	1·38 4·78	I·23 4·74
48	2·22 5·09	2·04 5·01	1·87 4·94	1.70 4.88	1·54 4·83	I·38 4·78
50	-2·47 5·20	-2·27 5·10	-2.08 5.02	-1.89 4.95	-1.72 4.89	-1.55 4.83
52	2·75 5·34	2·53 5·22	2.32 5.13	2.11 5.04	1.92 4.96	1.74 4.89
54	3·09 5·52	2·83 5·38	2.59 5.26	2.36 5.15	2.15 5.05	1.95 4.96

120 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 29°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 6 27 4.0 5 40 27.6 5 31 13.8 5 22 1.2 5 12 49.8	s. +2·33 2·15 2·13 2·11 2·09	H. M. S. 6 29 24·6 5 42 36·8 5 33 21·3 5 24 7·4 5 14 54·7	2·12	5 44 46·I 5 35 28·7 5 26 I3·I	s. +2·38 2·15 2·12 2·09 2·07	H.M. S. 6 34 10·0 5 46 55·5 5 37 36·1 5 28 18·6 5 19 2·8	S. +2·40 2·16 2·12 2·09 2·06	5 49 5·2 5 39 43·5 5 30 23·9	s. +2·43 2·16 2·12 2·09 2·05	H.M. S. 6 39 1.7 5 51 15.4 5 41 51.1 5 32 29.1 5 23 9.2	s. +2.46 2.17 2.13 2.08 2.05
18 20 22 24 26	5 3 39·3 4 54 29·4 4 45 20·1 4 36 11·2 4 27 2·3	+2.07 2.06 2.05 2.05 2.05	5 5 43·1 4 56 32·5 4 47 22·6 4 38 13·3 4 29 4·2	+2.06 2.04 2.03 2.02 2.02	4 49 23.8		5 9 48.5 5 0 35.6 4 51 23.8 4 42 12.9 4 33 2.8	1.97			5 4 35.0 4 55 20.2 4 46 7.0	+2.01 1.98 1.95 1.93 1.91
28 30 31 32 33	4 17 53.4 4 8 44.3 4 4 9.5 3 59 34.6 3 54 59.5	+2.05 2.06 2.06 2.07 2.08	4 19 55:4 4 10 46:5 4 6 12:0 4 1 37:4 3 57 2:7	2·02	4 12 46·5 4 8 12·1	+1.98 1.98 1.98 1.98	4 14 44·2 4 10 9·8 4 5 35·4		4 16 39·8 4 12 5·1 4 7 30·6		4 9 23.5	+ 1.89 1.87 1.87 1.86 1.86
34 35 36 37 38	3 50 24·2 3 45 48·6 3 41 12·7 3 36 36·5 3 31 59·9	+2.09 2.10 2.11 2.12 2.14	3 52 27·9 3 47 52·8 3 43 17·5 3 38 42·0 3 34 6·2	2.06	3 54 28.6 3 49 53.9 3 45 19.1 3 40 44.1 3 36 8.8	2.00	3 51 52.1	+1.94 1.94 1.95 1.95 1.96	3 53 47·3 3 49 12·9 3 44 38·5	1.90		+ 1.85 1.85 1.85 1.85 1.85
39 40 41 42 43	3 27 22.8 3 22 45.3 3 18 7.3 3 13 28.7 3 8 49.5	+2·15 2·17 2·19 2·21 2·23	3 29 30·0 3 24 53·5 3 20 16·5 3 15 39·1 3 11 1·2	2.14	3 31 33.4 3 26 57.7 3 22 21.6 3 17 45.1 3 13 8.3	+2.03 2.04 2.05 2.06 2.08	3 33 33·1 3 28 58·0 3 24 22·6 3 19 46·9 3 15 11·0	+ 1.97 1.97 1.98 2.00 2.01	3 26 19·7 3 21 44·6	+ 1.91 1.91 1.92 1.93 1.94	3 32 47·6 3 28 13·1	+ 1.85 1.85 1.86 1.86 1.87
44 45 46 47 48	3 4 9.5 2 59 28.7 2 54 47.1 2 50 4.5 2 45 20.9		3 6 22.6 3 I 43.5 2 57 3.5 2 52 22.9 2 47 41.3	+2·18 2·20 2·23 2·26 2·29	2 59 14·7 2 54 35·6	+2·10 2·12 2·14 2·17 2·19	3 10 34·6 3 5 57·9 3 1 20·6 2 56 43·0 2 52 4·6		3 7 58.0	+1.95 1.96 1.98 1.99 2.01	3 9 53.4 3 5 18.0 3 0 42.2	+1.88 1.89 1.90 1.91 1.92
49 50 51 52 53	2 40 36·I 2 35 50·0 2 3I 2·4 2 26 I3·3 2 2I 22·4	+2·43 2·48 2·52 2·58 2·63	2 42 58·7 2 38 15·1 2 33 30·3 2 28 44·1 2 23 56·4		2 40 33·6 2 35 51·2 2 31 7·6		2 47 25.7 2 42 46.0 2 38 5.5 2 33 24.1 2 28 41.7	2.15	2 40 13·4 2 35 33·9	+2·03 2·06 2·08 2·11 2·14	2 46 52·7 2 42 15·3 2 37 37·3	+1.94 1.96 1.98 2.00 2.03
54 55 56 57 58	2 16 29·5 2 11 34·4 2 6 36·8 2 1 36·4 1 56 32·8	+2.70 2.77 2.85 2.93 3.03	2 19 7·1 2 14 16·0 2 9 22·8 2 4 27·2 1 59 29·0	+2.56 2.62 2.69 2.76 2.85	2 II 59·3 2 7 8·0	2.48	2 14 27·1 2 9 39·4	+2·30 2·34 2·39 2·45 2·51	2 16 46·6 2 12 1·9	+2·18 2·21 2·26 2·30 2·36	2 23 39·2 2 18 58·1 2 14 16·0	+2.06 2.09 2.13 2.17 2.21
		V	'ARIATI	ON TO	O 1' OF	LATI	TUDE A	ND A	LTITUD	E.	•	•
Alt.	L. 12°	Α.	L. 13°	A.	L. 14°	A.	L. 15°	A.	L. 16°	Α.	L. 17°	A.
° 0 4 8 12 16	s. +1·12 - ·93 ·75 ·58 ·40	s. -4.71 4.67 4.63 4.61 4.59	s. +1·22 - 1·03 ·84 ·67 ·50	s. -4.73 4.69 4.65 4.62 4.60	s. +1·32 - 1·12 - '94 - '76 - '59	s. -4·76 4·71 4·67 4·64 4·61	s. +1·42 - 1·22 1·03 ·86 ·69	s. -4·78 4·73 4·69 4·65 4·62	s. +1·52 1·32 1·13 ·95 ·78.	s. -4·82 4·76 4·71 4·67 4·64	s. +1.62 1.42 1.23 1.05 .88	s. -4·85 4·79 4·73 4·69 4·66
20 22 24 26 28	+ ·23 ·15 + ·06 - ·03 ·12	4·58 4·57 4·57 4·57 4·57	+ ·33 ·24 ·16 + ·07 - ·01	4·58 4·58 4·58 4·57 4·57	+ ·42 ·34 ·26 ·17 ·08	4·59 4·59 4·58 4·57 4·57	+ ·52 ·44 ·35 ·27 ·18	4·60 4·59 4·59 4·58 4·57	+ ·62 ·53 ·45 ·37 ·28	4.61 4.60 4.59 4.59 4.58	+ ·71 ·63 ·55 ·47 ·38	4.63 4.62 4.60 4.60 4.59
30 32 34 36 38	- ·21 ·30 ·40 ·50 ·61	4·58 4·58 4·59 4·60 4·61	- ·10 ·20 ·29 ·39 ·49	4·57 4·58 4·58 4·59 4·60	+ ·00 - ·09 ·18 ·28 ·38	4·57 4·57 4·58 4·58 4·59	+ ·10 + ·01 - ·08 ·17 ·26	4·57 4·57 4·57 4·58 4·58	+ ·20 •11 + ·03 - ·06 •15	4·58 4·57 4·57 4·57 4·57	+ ·30 ·22 ·13 + ·05 - ·04	4·58 4·57 4·57 4·57 4·57
40 42 44 46 48	- ·72 ·83 ·96 I·09 I·23	4·63 4·65 4·67 4·70 4·74	- ·60 ·71 ·83 ·95 1·09	4.61 4.63 4.65 4.67 4.70	- ·48 ·58 ·70 ·82 ·95	4.60 4.61 4.63 4.65 4.67	- ·36 ·46 ·57 ·68 ·81	4·59 4·60 4·61 4·62 4·64	- ·24 ·34 ·45 ·55 ·67	4.58 4.58 4.59 4.61 4.62	- ·13 ·22 ·32 ·43 ·53	4·57 4·58 4·58 4·59 4·60
50 52 54 56 58	-1·39 1·56 1·76 1·98 2·23	4·78 4·83 4·90 4·97 5·08	-1·23 1·40 1·58 1·78 2·01	4·74 4·78 4·84 4·91 4·99	-1.08 1.23 1.40 1.59 1.80	4·70 4·74 4·78 4·84 4·91	- ·93 1·08 1·23 1·40 1·59	4·67 4·70 4·73 4·78 4·84	- ·79 ·92 I·07 I·22 I·40	4.64 4.66 4.70 4.73 4.78	- ·65 ·77 ·91 I·05 I·21	4·62 4·64 4·66 4·69 4·73

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 121 LATITUDE 29°.

True	DECLINATION—SAME NAME AS—LATITUDE.							Decl.				
Alt.	18°	Var.	19°	Var.	20°	Var.	21°	Var.	22°	Var.	23°	Var.
0 10 12 14 16	H. M. S. 6 41 30·3 5 53 26·0 5 43 58·8 5 34 34·2 5 25 12·0	s. +2·49 2·18 2·13 2·08 2·04	5 55 37·1 5 46 6·9 5 36 39·4 5 27 14·5	s. +2·53 2·19 2·14 2·09 2·04	5 29 17.0	s. +2·56 2·20 2·14 2·09 2·04	5 40 50·4 5 31 19·5	l I	H. M. S. 6 51 46·0 6 2 15·1 5 52 34·0 5 42 56·4 5 33 22·0	2·23 2·17 2·10 2·04	5 54 44.3 5 45 2.8 5 35 24.7	S. +2.69 2.25 2.18 2.11 2.04
18 20 22 24 26	5 15 51·9 5 6 33·6 4 57 17·1 4 48 2·2 4 38 48·5	1.88	4 59 13·0 4 49 56·1 4 40 40·8	+2.00 1.96 1.92 1.89 1.86	5 I 8·0 4 5I 49·0 4 42 3I·8	1·91 1·87 1·84	5 12 25.6 5 3 2.2 4 53 40.8 4 44 21.4	1·99 1·94 1·90 1·86 1·82	5 4 55.7 4 55 31.8 4 46 9.9	1.89 1.84 1.80	4 57 21·8 4 47 57·2	+1.98 1.93 1.88 1.83 1.78
28 30 32 34 35	4 29 36·I 4 20 24·7 4 II I4·2 4 2 4·3 3 57 29·6	1.82	4 3I 26·9 4 22 I4·2 4 I3 2·4 4 3 5I·8 3 59 I6·7		4 33 16·1 4 24 1·8 4 14 48·8 4 5 36·9 4 1 1·3	+1.81 1.78 1.75 1.73 1.72	4 35 3.8 4 25 47.7 4 16 33.0 4 7 19.6 4 2 43.3	+ 1.78 1.75 1.72 1.69 1.68	4 36 50·0 4 27 31·8 4 18 15·2 4 9 0·0 4 4 23·0		4 29 14·2 4 19 55·4 4 10 38·2	+1.73 1.69 1.65 1.62 1.60
36 37 38 39 40	3 52 55.0 3 48 20.4 3 43 46.0 3 39 11.6 3 34 37.2	1.80 1.80	3 54 41.7 3 50 7.0 3 45 32.3 3 40 57.7 3 36 23.2	1·75 1·75	3 56 25·9 3 51 50·6 3 47 15·6 3 42 40·7 3 38 6·0		3 58 7·3 3 53 31·5 3 48 56·0 3 44 20·6 3 39 45·5	1.64	3 59 46·2 3 55 9·7 3 50 33·5 3 45 57·5 3 41 21·7	1.60 1.59	3 56 45.2	+ 1.59 1.57 1.55 1.54 1.52
41 42 43 44 45	3 30 2.7 3 25 28.3 3 20 53.8 3 16 19.1 3 11 44.4	1.80	3 3I 48·8 3 27 I4·4 3 22 40·0 3 I8 5·5 3 I3 3I·I	+ 1.74 1.74 1.74 1.74 1.74	3 33 31·3 3 28 56·8 3 24 22·3 3 19 47·9 3 15 13·5	+ 1.68 1.68 1.67 1.67 1.67	3 26 0.9	+ 1.62 1.62 1.61 1.61 1.60	3 36 46·2 3 32 10·9 3 27 35·8 3 23 0·8 3 18 26·0	+1.57 1.56 1.55 1.54 1.54	3 33 42.7 3 29 7.0 3 24 31.5	+ 1·51 1·50 1·49 1·48 1·47
46 47 48 49 50	3 7 9·2 3 2 34·4 2 57 59·0 2 53 23·5 2 48 47·5	1.85	3 4 21·9 2 59 47·1 2 55 12·1 2 50 36·8	1.78	3 10 39·1 3 6 4·7 3 1 30·1 2 56 55·6 2 52 20·9	+ 1.67 1.67 1.68 1.68 1.69	3 12 17·3 3 7 42·9 3 3 8·5 2 58 34·1 2 53 59•6	+ 1.60 1.60 1.60 1.60		+ 1.53 1.53 1.52 1.52 1.52	3 10 46·0 3 6 11·1	+ 1.46 1.46 1.45 1.44 1.44
51 52 53 54 55	2 44 II·2 2 39 34·5 2 34 57·3 2 30 I9·5 2 25 4I·I	1·92 1·95 1·97	2 4I 25.7 2 36 49.3 2 32 I3.0 2 27 36.0	1.80 1.82 1.84 1.86	2 47 46·0 2 43 II·0 2 38 35·6 2 34 0·I 2 29 24·2	+ 1.70 1.71 1.72 1.73 1.75	2 44 50·5 2 40 15·7 2 35 40·8	+ 1.61 1.61 1.62 1.63 1.64	2 50 58·8 2 46 24·4 2 41 50·0 2 37 15·4 2 32 40·8	+1.52 1.52 1.52 1.53 1.53	2 47 52·8 2 43 18·4 2 38 44·0	+ 1.43 1.43 1.43 1.43 1.43
56 57 58 59 60	2 21 2.0 2 16 22.1 2 11 41.3 2 6 59.4 2 2 16.4	2.04		1·91	2 20 11·2 2 15 34·0 2 10 56·2	1.81	2 21 54.7 2 17 18.7 2 12 42.3	+ 1.65 1.67 1.68 1.70 1.73	2 23 31·1 2 18 56·0 2 14 20·6	+ 1.54 1.55 1.56 1.57 1.59	2 25 0.6 2 20 26.0 2 15 51.3	+ 1.43 1.44 1.45 1.46
		V	ARIATIO	ON T	O 1' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20° A. L. 21° A.		L. 22° A.		L. 23°	Α.		
0 4 8 12 16	1·52 1·33 1·15 ·97	s. -4·89 4·82 4·76 4·71 4·67	s. + 1·83 - 1·62 1·43 1·24 1·07	s. -4·93 4·85 4·79 4·74 4·70	s. + 1.94 - 1.73 1.53 1.34 1.17	s. -4·97 4·89 4·82 4·77 4·72	s. +2.05 - 1.83 1.63 1.44 1.27	s. -5.01 4.93 4.85 4.79 4.74	s. +2·17 - 1·94 1·73 1·54 1·37	s. -5.06 4.97 4.89 4.83 4.77	s. +2·28 - 2·05 1·84 1·65 1·47	s. -5·11 5·01 4·93 4·86 4·80
20 24 26 28 30	+ ·81 ·65 ·56 ·48 ·40	4.64 4.62 4.61 4.60 4.59	+ ·90 ·74 ·66 ·58 ·50	4.66 4.63 4.62 4.61 4.60	+ 1.00 .84 .76 .68 .61	4.68 4.65 4.63 4.62 4.61	+1·10 ·94 ·86 ·78 ·71	4·70 4·67 4·65 4·64 4·63	+1·20 1·04 ·96 ·89 ·81	4·73 4·69 4·67 4·66 4·64	+1·30 1·14 1·06 ·99 ·91	4·75 4·71 4·69 4·68 4·66
32 34 36 38 40	+ ·32 ·24 ·15 + ·07 - ·02	4·58 4·58 4·57 4·57	+ ·42 ·34 ·26 ·18 ·09	4·59 4·58 4·58 4·57	+ ·53 ·45 ·37 ·29 ·21	4.60 4.59 4.59 4.58 4.58	+ ·63 ·55 ·48 ·40 ·32	4.62 4.61 4.60 4.59 4.58	+ ·73 ·66 ·58 ·51 ·43	4.63 4.61 4.60 4.59	+ ·84 ·76 ·69 ·62 ·54	4.65 4.64 4.62 4.61 4.60
42 44 46 48 50	- ·11 ·20 ·30 ·40 ·51	4·57 4·58 4·59 4·60	+ ·oi - ·o8 ·i7 ·27 ·37	4·57 4·58 4·58 4·59	+ ·12 + ·04 - ·05 ·14 ·24	4·57 4·57 4·58 4·58	+ ·24 ·16 + ·07 - ·02 ·11	4·58 4·57 4·57 4·57	+ ·35 ·27 ·19 ·11 + ·03	4·59 4·58 4·58 4·58 4·57	+ '47 '39 '32 '24 '16	4.59 4.58 4.58 4.58
52 54 56 58 60	- ·63 ·75 ·89 I·04 I·21	4.62 4.63 4.66 4.69 4.73	- ·48 ·60 ·72 ·86 I·01	4.61 4.63 4.65 4.67	- ·34 ·45 ·56 ·69 ·83	4·59 4·59 4·61 4·62 4·64	- ·20 ·30 ·41 ·52 ·65	4·58 4·59 4·60 4·61	- ·06 ·16 ·26 ·36 ·47	4·57 4·58 4·58 4·58 4·59	+ ·07 - ·01 ·10 ·20 ·31	4·57 4·57 4·58 4·58

LATITUDE 30°.

DECLINATION—SAME NAME AS—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 0 0 0 0 5 13 44 0 5 4 26 1 4 55 6 9 4 45 45 9	s. +2·31 2·36 2·38 2·40 2·43	H. M. S. 6 2 18·5 5 16 4·7 5 6 48·2 4 57 30·4 4 48 11·1	s. +2·31 2·34 2·36 2·38 2·40	H. M. S. 6 4 37·2 5 18 24·6 5 9 9·0 4 59 52·3 4 50 34·5	s. +2·31 2·32 2·34 2·35 2·38	H. M. S. 6 6 56·1 5 20 43·5 5 11 28·6 5 2 12·9 4 52 56·3	S. +2·32 2·31 2·32 2·33 2·35	5 13 47·0 5 4 32·1	s. +2·32 2·29 2·30 2·31 2·32	H. M. S. 6 II 34.9 5 25 18.9 5 16 4.6 5 6 50.0 4 57 35.1	s. +2·33 2·28 2·28 2·29 2·30
18 20 22 24 25	4 36 22.8 4 26 57.2 4 17 28.8 4 7 57.1 4 3 9.8	+2·47 2·51 2·56 2·62 2·65	4 38 50.0 4 29 26.8 4 20 1.1 4 10 32.5 4 5 46.9	+2·43 2·47 2·51 2·56 2·59	4 41 15·2 4 31 54·0 4 22 30·7 4 13 4·8 4 8 20·8	+2·40 2·43 2·47 2·51 2·54	4 15 34·3 4 10 51·7	+2·37 2·40 2·43 2·47 2·49	4 18 1·2 4 13 19·7	+2·34 2·36 2·39 2·42 2·44	4 48 19·4 4 39 2·8 4 29 44·9 4 20 25·4 4 15 45·0	+2·31 2·33 2·35 2·38 2·40
26 27 28 29 30	3 58 21·5 3 53 32·2 3 48 41·6 3 43 49·8 3 38 56·5	+2.68 2.71 2.75 2.79 2.83	4 I 0.5 3 56 I3.0 3 51 24.5 3 46 34.9 3 4I 44.I	+ 2.62 2.65 2.68 2.72 2.76	4 3 36·0 3 58 50·3 3 54 3·7 3 49 16·1 3 44 27·4	+2.56 2.59 2.62 2.65 2.69	4 6 8·4 4 I 24·2 3 56 39·3 3 5I 53·5 3 47 6·7	+2·51 2·54 2·56 2·59 2·62	3 54 27·3 3 49 42·2	+2.46 2.49 2.51 2.53 2.56	4 II 4·I 4 6 22·6 4 I 40·5 3 56 57·7 3 52 I4·2	+2·42 2·44 2·46 2·48 2·50
31 32 33 34 35	3 34 1.8 3 29 5.5 3 24 7.5 3 19 7.6 3 14 5.7	+2.87 2.92 2.97 3.02 3.08	3 36 51·9 3 31 58·3 3 27 3·2 3 22 6·3 3 17 7·7	+2.80 2.84 2.89 2.93 2.99	3 39 37·5 3 34 46·3 3 29 53·8 3 24 59·8 3 20 4·2	+2·72 2·76 2·80 2·85 2·90	3 27 48·4 3 22 55·5	+2.66 2.69 2.73 2.77 2.81	3 40 9·3 3 35 2I·3 3 30 32·I 3 25 4I·7	+2.59 2.62 2.66 2.69 2.73	3 47 29·9 3 42 44·7 3 37 58·6 3 33 11·5 3 28 23·2	+2·53 2·56 2·59 2·62 2·65
36 37 38 39 40	3 9 1.6 3 3 55.1 2 58 46.0 2 53 34.0 2 48 18.8	+3·14 3·21 3·28 3·36 3·45	3 12 7·2 3 7 4·5 3 1 59·5 2 56 52·0 2 51 41·6	+3.04 3.10 3.17 3.24 3.32	3 15 6·9 3 10 7·7 3 5 6·4 3 0 2·9 2 54 56·9	+2.95 3.00 3.06 3.13 3.19	3 18 1.0 3 13 5.0 3 8 7.1 3 3 7.2 2 58 5.1	+2.86 2.91 2.96 3.02 3.08	3 15 56·7 3 11 1·8 3 6 5·2 3 1 6·7	+2.77 2.82 2.86 2.92 2.97	3 23 33.9 3 18 43.1 3 13 51.0 3 8 57.4 3 4 2.0	+2.69 2.73 2.78 2.82 2.87
41 42 43 44 45	2 43 0·3 2 37 37·9 2 32 11·3 2 26 40·0 2 21 3·5	+3.54 3.64 3.74 3.86 4.00	2 46 28·3 2 41 11·6 2 35 51·2 2 30 26·8 2 24 57·7	+3·40 3·49 3·59 3·70 3·81	2 49 48·3 2 44 36·7 2 39 21·9 2 34 3·5 2 28 41·1	+3·27 3·35 3·44 3·53 3·64	2 53 0·7 2 47 53·8 2 42 43·9 2 37 31·0 2 32 14·5	+3·15 3·22 3·30 3·39 3·48	2 51 3.3	+3.03 3.10 3.17 3.25 3.33	2 59 4·9 2 54 5·8 2 49 4·4 2 44 0·7 2 38 54·3	+2·93 2·98 3·05 3·12 3·19
46 47 48 49 50	2 15 21·0 2 9 31·7 2 3 34·8 1 57 29·0 1 51 12·8	+4·14 4·31 4·50 4·71 4·95	2 19 23·5 2 13 43·5 2 7 57·0 2 2 3·0 1 56 0·3	+3.94 4.09 4.25 4.43 4.64	2 23 14·3 2 17 42·5 2 12 5·0 2 6 21·2 2 0 30·1	+3.76 3.88 4.03 4.19 4.37	2 26 54·2 2 21 29·6 2 16 0·2 2 10 25·3 2 4 44·2	+3.58 3.70 3.82 3.96 4.12	2 25 6·0 2 19 43·7 2 14 16·6	+3·42 3·52 3·63 3·76 3·89	2 33 45·1 2 28 32·5 2 23 16·4 2 17 56·2 2 12 31·4	+3·27 3·37 3·46 3·57 3·69

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
	- ·00 -4·62	+ ·09 -4·62	+ ·18 - 4·62	+ ·28 -4·62	+ ·37 -4·63	+ '46 -4.64
	·09 4·62	·00 4·62	+ ·09 4·62	·18 4·62	·28 4·63	'37 4.63
	·19 4·62	- ·09 4·62	- ·00 4·62	+ ·09 4·62	·18 4·62	'28 4.63
	·28 4·62	·19 4·62	- ·09 4·62	·00 4·62	+ ·09 4·62	'19 4.62
	·37 4·63	·28 4·63	- ·19 4·62	- ·09 4·62	·00 4·62	+ '09 4.62
10	- ·47 4·64	- ·38 4·63	- ·28 4·63	- ·19 4·62	- ·09 4·62	00 4.62
12	·57 4·65	·47 4·64	·38 4·63	·28 4·63	·19 4·62	- 09 4.62
14	·67 4·67	·57 4·65	·47 4·64	·38 4·63	·28 4·63	-18 4.62
16	·78 4·68	·67 4·67	·57 4·65	·47 4·64	·38 4·63	-28 4.63
18	·88 4·70	·78 4·68	·68 4·67	·58 4·65	·48 4·64	-38 4.63
20	- '99 4'72	- ·89 4·70	- ·78 4·68	- ·68 4·67	- ·58 4·65	- ·48 4·64
22	1'11 4'75	1·00 4·72	·89 4·70	·79 4·68	·68 4·67	·58 4·65
24	1'23 4'78	1·11 4·75	I·00 4·73	·90 4·70	·79 4·68	·69 4·67
26	1'36 4'81	1·24 4·78	I·12 4·75	I·0I 4·73	·90 4·70	·79 4·69
28	1'49 4'85	1·37 4·82	I·25 4·78	I·13 4·75	I·02 4·73	·91 4·71
30	-1.63 4.90	-1.50 4.86	-1·38 4·82	-1·26 4·79	-1·14 4·76	-1.03 4.73
32	1.79 4.95	1.65 4.90	1·42 4·86	1·40 4·83	1·27 4·79	1.15 4.76
34	1.95 5.01	1.81 4.96	1·67 4·91	1·54 4·87	1·41 4·83	1.28 4.79
36	2.13 5.09	1.98 5.03	1·84 4·97	1·70 4·92	1·56 4·87	1.43 4.83
38	2.33 5.17	2.17 5.10	2·01 5·04	1·86 4·98	1·72 4·93	1.58 4.88
40	-2·56 5·28	-2·38 5·20	-2·21 5·12	-2.05 5.05	-1·89 4·99 2·09 5·06 2·30 5·16 2·54 5·27 2·82 5·41 3·15 5·59	-1.74 4.94
42	2·81 5·41	2·62 5·31	2·43 5·22	2.25 5.14		1.92 5.00
44	3·11 5·56	2·88 5·45	2·68 5·34	2.49 5.24		2.12 5.08
46	3·45 5·76	3·20 5·62	2·96 5·49	2.75 5.37		2.35 5.18
48	3·86 6·02	3·57 5·84	3·30 5·68	3.05 5.54		2.60 5.30
50	4·38 6·35	4·02 6·13	3·71 5·92	3.41 5.74		2.91 5.45

LATITUDE 30°.

DECLINATION—SAME NAME AS—LATITUDE.

					N-SAM		AME AS	True 6° Decl. 7° Decl. 8° Decl. 9° Decl. 10° Decl. 11° Decl.										
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.						
0 10 12 14 16	H. M. S. 6 13 54·9 5 27 35·5 5 18 21·3 5 9 7·0 4 59 52·4	s. +2·34 2·27 2·27 2·27 2·28	H. M. S. 6 16 15.6 5 29 51.6 5 20 37.1 5 11 22.8 5 2 8.5	s. +2·35 2·26 2·26 2·26 2·26	H. M. S. 6 18 37.0 5 32 7.3 5 22 52.3 5 13 37.8 5 4 23.4	s. +2·36 2·26 2·25 2·24 2·24	H. M. S. 6 20 59·2 5 34 22·6 5 25 7·0 5 15 51·9 5 6 37·3	s. +2·38 2·25 2·24 2·23 2·22	H. M. S. 6 23 22·3 5 36 37·7 5 27 21·0 5 18 5·3 5 8 50·3	s. +2·39 2·25 2·23 2·22 2·21	H. M. S. 6 25 46.4 5 38 52.6 5 29 34.8 5 20 18.1 5 11 2.3	s. +2·41 2·25 2·23 2·21 2·19						
18 20 22 24 26	4 50 37.5 4 41 21.8 4 32 5.1 4 22 47.2 4 13 27.8	+2·29 2·30 2·32 2·34 2·37	4 52 54.0 4 43 39.1 4 34 23.4 4 25 6.7 4 15 48.8	+2·26 2·27 2·29 2·31 2·33	4 55 9·2 4 45 54·6 4 36 39·7 4 27 24·1 4 18 7·4	+2·24 2·25 2·26 2·27 2·29	4 57 23.0 4 48 8.8 4 38 54.3 4 29 39.3 4 20 23.7	+2·22 2·22 2·23 2·24 2·25	4 59 35.7 4 50 21.4 4 41 7.1 4 31 52.6 4 22 37.7	+2·20 2·20 2·20 2·20 2·22	5 I 47·2 4 52 32·7 4 43 I8·4 4 34 4·I 4 24 49·6	+2·18 2·17 2·17 2·18 2·18						
28 30 32 33 34	4 4 6·4 3 54 42·7 3 45 16·2 3 40 31·8 3 35 46·6	+2.41 2.45 2.49 2.52 2.55	4 6 29·4 3 57 7·9 3 47 44·2 3 43 I·3 3 38 I7·6	+2·36 2·39 2·43 2·46 2·48	4 8 49.5 3 59 30.1 3 50 8.6 3 45 27.0 3 40 44.8	+2·31 2·34 2·38 2·40 2·42	4 II 7·I 4 I 49·2 3 52 29·7 3 47 49·3 3 43 8·3	2·34 2·36	4 13 22·2 4 4 5·6 3 54 47·7 3 50 8·2 3 45 28·3	+2·23 2·25 2·27 2·29 2·30	4 15 34·7 4 6 19·2 3 57 2·6 3 52 24·0 3 47 44·9	+2·19 2·20 2·22 2·23 2·25						
35 36 37 38 39	3 31 0·3 3 26 13·0 3 21 24·6 3 16 35·0 3 11 44·0	+2.58 2.61 2.65 2.69 2.73	3 33 33·1 3 28 47·7 3 24 1·3 3 19 13·9 3 14 25·2	2·54 2·57	3 36 1.8 3 31 18.1 3 26 33.5 3 21 48.0 3 17 1.5	+2.45 2.47 2.50 2.53 2.56	3 38 26·7 3 33 44·4 3 29 1·4 3 24 17·6 3 19 33·0	+2·38 2·40 2·43 2·46 2·49	3 40 47.8 3 36 6.8 3 31 25.2 3 26 42.9 3 21 59.9	+2·32 2·34 2·36 2·39 2·41	3 43 5·4 3 38 25·5 3 33 45·0 3 29 4·0 3 24 22·4	+2·26 2·28 2·30 2·32 2·34						
40 41 42 43 44	3 6 51·5 3 1 57·4 2 57 1·6 2 52 3·9 2 47 4·1	+2.78 2.83 2.88 2.94 3.00	3 9 35·3 3 4 44·0 2 59 51·2 2 54 56·7 2 50 0·4	2.83	3 12 13·9 3 7 25·0 3 2 34·9 2 57 43·3 2 52 50·1	+2.60 2.64 2.68 2.73 2.78	3 I4 47.4 3 I0 0.7 3 5 I2.9 3 0 23.9 2 55 33.5	+2.52 2.55 2.59 2.63 2.67	3 17 16·0 3 12 31·3 3 7 45·6 3 2 58·8 2 58 10·9	+2.44 2.47 2.50 2.54 2.58	3 19 40·1 3 14 57·1 3 10 13·2 3 5 28·4 3 0 42·6	+2·36 2·39 2·42 2·45 2·48						
48	2 42 2·0 2 36 57·3 2 31 49·9 2 26 39·3 2 21 25·2	+3.06 3.14 3.22 3.30 3.40	2 45 2·1 2 40 1·6 2 34 58·6 2 29 53·0 2 24 44·3	3.16	2 47 55·2 2 42 58·3 2 37 59·4 2 32 58·1 2 27 54·3	+2.83 2.89 2.95 3.02 3.09	2 50 41·6 2 45 48·0 2 40 52·6 2 35 55·3 2 30 55·7	+2·72 2·77 2·83 2·89 2·96	2 53 21·7 2 48 31·0 2 43 38·8 2 38 44·8 2 33 49·0	+2.62 2.66 2.71 2.77 2.83	2 55 55.8 2 51 7.7 2 46 18.3 2 41 27.4 2 36 34.8	+2.52 2.56 2.60 2.65 2.70						
51 52	2 16 7·3 2 10 45·0 2 5 17·6 1 59 44·7 1 54 5·2	3.62	2 14 16·6 2 8 56·6 2 3 31·8	3.68	2 22 47·5 2 17 37·6 2 12 24·0 2 7 6·4 2 1 44·2		2 25 53.6 2 20 48.8 2 15 40.8 2 10 29.5 2 5 14.3	+3.03 3.11 3.20 3.30 3.40	2 28 51·1 2 23 50·8 2 18 47·9 2 13 42·0 2 8 32·8	+2.89 -2.96 3.04 3.13 3.22	2 31 40·5 2 26 44·2 2 21 45·7 2 16 44·6 2 11 40·8	+2.76 2.82 2.89 2.97 3.05						
•		V	ARIATIO	ON TO	O 1' OF	LATI'	TUDE A	ND A	LTITUD	E.								
Alt.	L. 6°	A.	L. 7°	A.	L. 8°	A.	L. 9°	Α.	L. 10°	A.	L. 11°	A.						

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
	+ ·56 -4·65	+ ·65 -4·66	+ ·75 -4·68	+ ·85 -4·69	+ '94 -4'71	+1.04 -4.73
	·46 4·64	·56 4·65	·65 4·66	·75 4·68	·85 4'70	.94 4.71
	·37 4·63	·46 4·64	·56 4·65	·65 4·66	·75 4.68	.85 4.70
	·28 4·63	·37 4·63	·47 4·64	·56 4·65	·65 4.66	.75 4.68
	·19 4·62	·28 4·63	·37 4·63	·47 4·64	·56 4.65	.66 4.66
10	+ ·09 4·62	+ ·19 4·62	+ ·28 4·63	+ ·38 4·63	+ '47 4'64	+ ·56 4·65
12	·00 4·62	+ ·10 4·62	·19 4·62	·28 4·63	-38 4'63	·47 4·64
14	- ·09 4·62	·00 4·62	·10 4·62	·19 4·62	-29 4'63	·38 4·63
16	·18 4·62	- ·09 4·62	+ ·01 4·62	·10 4·62	-20 4'62	·29 4·63
18	·28 4·62	·18 4·62	- ·08 4·62	+ ·01 4·62	-11 4'62	·20 4·62
20	- ·38 4·63	- ·28 4·63	- ·18 4·62	- ·08 4·62	+ ·01 4·62	+ ·II 4·62
22	·48 4·64	·38 4·63	·28 4·63	·18 4·62	- ·08 4·62	+ ·02 4·62
24	·58 4·65	·48 4·64	·37 4·63	·27 4·63	·17 4·62	- ·07 4·62
26	·69 4·67	·58 4·65	·48 4·64	·37 4·63	·27 4·62	·17 4·62
28	·80 4·69	·69 4·67	·58 4·65	·47 4·64	·37 4·63	·26 4·62
30	- ·91 4·71	- ·80 4·69	- · · 69	- ·58 4·65	- ·47 4·64	- ·36 4·63
32	1·03 4·73	·92 4·71		·69 4·67	·58 4·65	·47 4·64
34	1·16 4·76	I·04 4·73		·80 4·69	·69 4·67	·57 4·65
36	1·30 4·80	I·17 4·76		·92 4·71	·80 4·69	·69 4·67
38	1·44 4·84	I·31 4·80		I·05 4·74	·93 4·71	·80 4·69
40	-1.60 4.89	-1.46 4.84	-1·32 4·80	-1·19 4·77	-1.06 4.74	- ·93 4·71
42	1.77 4.94	1.62 4.90	1·47 4·85	1·33 4·80	1.19 4.77	1·06 4·74
44	1.96 5.02	1.80 4.95	1·64 4·90	1·49 4·85	1.34 4.81	1·20 4·77
46	2.17 5.10	1.99 5.03	1·81 4·96	1·66 4·91	1.50 4.86	1·35 4·81
48	2.40 5.21	2.20 5.12	2·01 5·04	1·85 4·97	1.68 4.91	1·52 4·86
50 52 54	2.99 5.50 3.37 5.71	-2:45 5:23 2:74 5:37 3:19 5:55	-2:34 5:14 2:61 5:26 2:91 5:41	-2.06 5.06 2.30 5.16 2.57 5.30	-1.88 4.98 2.10 5.07 2.35 5.18	-1.70 4.92 1.90 5.00 2.13 5.09

124 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 30°.

DECLINATION—SAME NAME AS—LATITUDE.

True	100	Decl.		Decl.	N—SAM	Decl.		Decl.	TITUDE	Decl.		Decl.
Alt.	12°	Var.	13°	Var.	14°	Var.	15°	Var.	16°	Var.	17°	Var.
0 10 12 14 16	H. M. S. 6 28 11.8 5 41 7.4 5 31 48.2 5 22 30.4 5 13 13.6	s. +2·43 2·25 2·22 2·20 2·18	H. M. S. 6 30 38·4 5 43 22·2 5 34 1·5 5 24 42·2 5 15 24·3	s. +2·45 2·25 2·22 2·19 2·17	H. M. S. 6 33 6.4 5 45 37.2 5 36 14.5 5 26 53.6 5 17 34.3	s. +2·48 2·25 2·22 2·19 2·16	H. M. S. 6 35 35.9 5 47 52.5 5 38 27.6 5 29 4.8 5 19 43.8	s. + 2·50 2·25 2·22 2·18 2·15	H. M. S. 6 38 7.0 5 50 7.9 5 40 40.8 5 31 15.9 5 21 52.9	s. +2·53 2·26 2·22 2·18 2·15	H. M. S. 6 40 40.0 5 52 23.9 5 42 54.2 5 33 26.9 5 24 1.7	s. +2·57 2·27 2·22 2·18 2·14
18 20 22 24 26	4 54 42.7 4 45 28.1 4 36 13.8 4 26 59.5	+2·17 2·16 2·15 2·15 2·15	5 6 7.5 4 56 51.6 4 47 36.5 4 38 21.8 4 29 7.4	2.12	4 49 43.5 4 40 28.3 4 31 13.5	+2·14 2·12 2·11 2·09 2·09	5 IO 24·3 5 I 6·2 4 5I 49·3 4 42 33·2 4 33 I8·0	+2·13 2·11 2·09 2·07 2·06	5 12 31·8 5 3 12·2 4 53 53·9 4 44 36·8 4 35 20·7	+2·12 2·09 2·07 2·05 2·03	4 46 39·I 4 37 21·9	+2·II 2·08 2·05 2·03 2·01
28 30 31 32 33	4 8 30·2 4 3 52·6 3 59 14·7 3 54 36·6	+2·15 2·16 2·17 2·18 2·19	4 19 53.2 4 10 38.8 4 6 1.4 4 1 24.0 3 56 46.3	+2·12 2·13 2·13 2·14	4 21 59·2 4 12 44·9 4 8 7·8 4 3 30·6 3 58 53·2	+2.08 2.08 2.08 2.09 2.09	4 24 3.2 4 14 48.8 4 10 11.7 4 5 34.6 4 0 57.4	+2.05 2.05 2.04 2.04 2.05	4 7 36·1 4 2 59·0	+2.02 2.01 2.01 2.00 2.00	4 28 5.6 4 18 50.2 4 14 12.6 4 9 35.3 4 4 58.0	+1.99 1.98 1.97 1.97 1.96
34 35 36 37 38	3 45 19·6 3 40 40·5 3 36 1·1 3 31 21·2	+ 2·20 2·21 2·22 2·24 2·25	3 52 8·5 3 47 30·5 3 42 52·1 3 38 13·5 3 33 34·5	+2·14 2·15 2·16 2·18 2·19	3 35 44.1	2.13	3 56 20·2 3 51 42·9 3 47 5·5 3 42 28·0 3 37 50·2	2.07	3 53 44.7 3 49 7.5 3 44 30.2 3 39 52.9	2.02	3 55 43.6 3 51 6.5 3 46 29.4 3 41 52.2	1.96 1.96 1.96
39 40 41 42 43	3 21 59·8 3 17 18·2 3 12 35·9 3 7 52·9	+ 2·27 2·29 2·31 2·34 2·37	3 28 55·1 3 24 15·2 3 19 34·9 3 14 54·0 3 10 12·4	+2·20 2·22 2·24 2·26 2·28	3 31 5.5 3 26 26.6 3 21 47.2 3 17 7.4 3 12 27.1	2.10	3 33 12·2 3 28 34·0 3 23 55·5 3 19 16·6 3 14 37·3	2.13	3 35 15·3 3 30 37·7 3 25 59·7 3 21 21·6 3 16 43·1	2·05 2·06	3 28 0·1 3 23 22·5 3 18 44·7	+ 1.96 1.97 1.97 1.98 1.99
44 45 46 47 48	2 58 24·2 2 53 38·3 2 48 51·3 2 44 3·1	+ 2·40 2·43 2·46 2·50 2·54	3 5 30·1 3 0 47·1 2 56 3·2 2 51 18·3 2 46 32·5	+2·31 2·34 2·37 2·40 2·44	3 7 46·3 3 3 4·8 2 58 22·5 2 53 39·5 2 48 55·6	2.34	3 9 57·6 3 5 17·4 3 0 36·6 2 55 55·1 2 51 13·0	+2·15 2·17 2·19 2·22 2·24	2 53 24.7	+ 2·07 2·09 2·11 2·13 2·15	3 4 49.6 3 0 10.5 2 55 31.0	+2.00 2.01 2.03 2.04 2.06
49 50 51 52 53	2 39 13·5 2 34 22·4 2 29 29·5 2 24 34·8 2 19 38·0	2·75 2·82	2 4I 45·4 2 36 57·I 2 32 7·3 2 27 I6·0 2 22 22·8	+2·48 2·52 2·57 2·62 2·68	2 44 10·8 2 39 24·9 2 34 37·8 2 29 49·4 2 24 59·5	2·45 2·50 2·55	2 46 30·I 2 4I 46·3 2 37 I·4 2 32 I5·5 2 27 28·4	2·34 2·38 2·42	2 48 43.4 2 44 1.3 2 39 18.5 2 34 34.7 2 29 50.0	2·23 2·26 2·30	2 50 51·0 2 46 10·4 2 41 29·2 2 36 47·3 2 32 4·5	+2.08 2.10 2.13 2.16 2.19
54 55 56 57 58	2 14 38·9 2 9 37·0 2 4 32·2 1 59 24·1 1 54 12·0	+2.89 2.97 3.05 3.15 3.25	2 17 27·7 2 12 30·4 2 7 30·6 2 2 28·0 1 57 22·2	+2.74 2.81 2.89 2.98 3.07		+ 2.60 2.66 2.73 2.80 2.89	2 22 40·0 2 17 49·9 2 12 58·2 2 8 4·5 2 3 8·7	2·52 2·58 2·64	2 20 17·0 2 15 28·5 2 10 38·4	+ 2·34 2·39 2·44 2·49 2·55	2 22 36·3 2 17 50·5 2 13 3·5	+2·22 2·26 2·30 2·35 2·40
	,	V	ARIATIO	ON TO	o r' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 12°	Α.	L. 13°	Α.	L. 14°	A.	L. 15°	A.	L. 16°	Α.	L. 17°	Α.
0 4 8 12 16	*94 *75 *57 *39	s. -4.75 4.71 4.68 4.65 4.63	1.04 ·85 ·66 ·48	s. -4·78 4·73 4·70 4·66 4·64	1·14 ·94 ·76 ·58	s. -4·81 4·76 4·71 4·68 4·65	1·24 1·04 ·86 ·68	s. -4·84 4·78 4·73 4·70 4·67	1·34 1·14 ·95 ·77	s. -4·87 4·81 4·76 4·72 4·68	S. + 1.65 - 1.44 1.24 1.05 -87	s. -4·90 4·84 4·78 4·74 4·70
20 22 24 26 28	+ ·21 ·12 + ·03 - ·06 ·16	4.62 4.62 4.62 4.62 4.62	+ ·31 ·22 ·13 + ·03 - ·06	4.62 4.62 4.62 4.62	+ ·40 ·31 ·22 ·13 + ·04	4.63 4.62 4.62 4.62	+ ·50 ·41 ·32 ·23 ·14	4.64 4.63 4.62 4.62	+ ·60 ·51 ·42 ·33 ·25	4.65 4.64 4.63 4.62	+ ·69 ·61 ·52 ·44 ·35	4.67 4.66 4.65 4.64 4.63
30 32 34 36 38	- ·26 ·36 ·46 ·57 ·68	4.62 4.63 4.64 4.65 4.67	- ·15 ·25 ·35 ·46 ·56 - ·68	4·62 4·63 4·64 4·65	- ·05 ·14 ·24 ·34 ·45	4.62 4.62 4.63 4.64	+ ·05 - ·04 ·13 ·23 ·33	4.62 4.62 4.62 4.63	+ ·16 + ·07 - ·02 ·12 ·22	4.62 4.62 4.62 4.62	+ ·26 ·17 + ·08 - ·01 ·10	4.62 4.62 4.62 4.62 4.62 4.62
40 42 44 46 48	- ·80 ·93 I·06 I·21 I·36	4·69 4·71 4·74 4·77 4·81	·80 ·93 I·06 I·21	4·67 4·69 4·71 4·74 4·77	- ·56 ·67 ·79 ·92 I·06	4.65 4.67 4.69 4.71 4.74	- ·44 ·55 ·66 ·78 ·92	4.64 4.65 4.67 4.69 4.71	- ·32 ·42 ·53 ·65 ·77	4.63 4.64 4.65 4.66 4.68	- ·20 ·30 ·41 ·52 ·64	4.62 4.64 4.65 4.66
50 52 54 56 58	-1.53 1.72 1.92 2.18 2.46	4·87 4·93 5·01 5·11 5·23	-1·37 1·54 1·74 1·97 2·22	4·82 4·87 4·94 5·02 5·12	-1·21 1·37 1·56 1·76 2·00	4.77 4.82 4.87 4.94 5.03	-1.06 1.21 1.38 1.57 1.78	4·74 4·77 4·82 4·88 4·95	- ·91 1·05 1·21 1·38 1·58	4·71 4·74 4·77 4·82 4·88	- ·76 ·89 I·04 I·20 I·39	4·68 4·71 4·73 4·77 4·82

DECLINATION—SAME NAME AS—LATITUDE.

			DECLIN	ATIO	N-SAM	$E N_{Z}$	AME AS	—LA	TITUDE.			
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 6 43 15.0 5 54 40.4 5 45 7.8 5 35 37.8 5 26 10.3	s. +2.60 2.28 2.23 2.18 2.14	H. M. S. 6 45 52.0 5 56 57.5 5 47 21.8 5 37 48.9 5 28 18.7	s. +2.63 2.29 2.24 2.18 2.14	H. M. S. 6 48 31·3 5 59 15·4 5 49 36·2 5 40 0·2 5 30 27·2	s. +2.67 2.30 2.24 2.19 2.14	H. M. S. 6 51 13.0 6 1 34.1 5 51 51.3 5 42 11.8 5 32 35.6		H. M. S. 6 53 57.4 6 3 53.8 5 54 7.0 5 44 23.9 5 34 44.2	s. +2·76 2·34 2·27 2·20 2·14	H. M. S. 6 56 44.6 6 6 14.7 5 56 23.6 5 46 36.5 5 36 53.0	S. +2·81 2·36 2·28 2·21 2·15
18 20 22 24 26	5 16 45.0 5 7 21.7 4 58 0.1 4 48 40.2 4 39 21.6			2.02	5 20 56.7 5 11 28.7 5 2 2.8 4 52 38.9 4 43 16.8	+2.09 2.05 2.01 1.97 1.94	5 23 2·2 5 13 31·4 5 4 3·0 4 54 36·8 4 45 12·5	+2.09 2.04 2.00 1.96 1.92	5 25 7.5 5 15 33.7 5 6 2.5 4 56 33.7 4 47 7.0	I.99	5 27 12·9 5 17 35·8 5 8 1·5 4 58 29·8 4 49 0·5	+ 2.09 2.03 1.98 1.93 1.88
28 30 32 34 35	4 30 4·I 4 20 47·7 4 II 32·I 4 2 17·2 3 57 39·8	1.93	4 32 I·0 4 22 43·4 4 I3 26·8 4 4 II·0 3 59 33·4	1.01		+ 1.91 1.88 1.86 1.84 1.83	4 35 50·0 4 26 29·2 4 17 9·7 4 7 51·5 4 3 12·8	+ 1.88 1.85 1.82 1.80 1.79		1.82	4 39 33.3 4 30 8.1 4 20 44.7 4 11 22.9 4 6 42.5	+ 1.84 1.80 1.76 1.72 1.71
36 37 38 39 40	3 53 2.6 3 48 25.4 3 43 48.3 3 39 11.2 3 34 34.0	1.01 1.01	3 54 55.9 3 50 18.6 3 45 41.3 3 41 4.1 3 36 27.0	1.85 1.85	3 52 8·8 3 47 31·2 3 42 53·8 3 38 16·5	1.81 1.81	3 58 34·4 3 53 56·2 3 49 18·2 3 44 40·4 3 40 2·8	1·76 1·75	4 0 19·8 3 55 40·9 3 51 2·3 3 46 24·0 3 41 45·8	1.41	4 2 2.6 3 57 22.9 3 52 43.6 3 48 4.5 3 43 25.7	+ 1.69 1.68 1.66 1.65 1.64
41 42 43 44 45	3 29 56.8 3 25 19.5 3 20 42.1 3 16 4.6 3 11 26.8	1·92 1·93 1·94	3 31 49.8 3 27 12.7 3 22 35.5 3 17 58.3 3 13 20.7	1.85 1.86 1.86 1.87	3 33 39·3 3 29 2·1 3 24 25·0 3 19 47·9 3 15 10·8	1·79 1·79 1·80	3 16 56.3	1.73		1.67 1.67 1.66	3 38 47·2 3 34 8·9 3 29 30·8 3 24 53·0 3 20 15·2	+1.63 1.61 1.61 1.59
46 47 48 49 50	3 6 48·8 3 2 10·5 2 57 32·0 2 52 53·0 2 48 13·6	1.99	3 8 43.4 3 4 5.8 2 59 27.9 2 54 49.7 2 50 11.3	1.89 1.90	3 10 33·5 3 5 56·1 3 1 18·8 2 56 41·2 2 52 3·5		3 7 42.0	+ 1·72 1·73 1·73 1·74	3 9 23·4 3 4 46·2	1.65	3 II 0·2 3 6 22·9	1.57
51 52 53 54 55	2 43 33·8 2 38 53·4 2 34 12·3 2 29 30·6 2 24 48·0	2·05 2·08 2·10	2 45 32·5 2 40 53·2 2 36 13·6 2 31 33·4 2 26 52·5	1.95 1.97	2 47 25·5 2 42 47·1 2 38 8·5 2 33 29·5 2 28 50·0	1.85 1.86 1.88	2 49 12·8 2 44 35·2 2 39 57·3 2 35 19·2 2 30 40·8	1.78		1.66 1.66 1.67	2 52 31·4 2 47 54·2 2 43 17·1 2 38 39·8 2 34 2·6	1.57 1.57
56 57 58 59 60	2 20 4·6 2 15 20·1 2 10 34·4 2 5 47·5 2 0 59·1	2.21		2.08	2 24 10·0 2 19 29·4 2 14 48·1 2 10 6·1 2 5 23·1	1.95 1.98	2 21 22·7 2 16 43·0 2 12 2·7	1.83	2 23 8·7 2 18 30·2 2 13 51·2	1·71 1·72 1·74	2 29 25·2 2 24 47·7 2 20 9·9 2 15 31·9 2 10 53·6	1.60 1.60
		V	ARIATIO	ON T	0 1' OF	LATI	TUDE A	ND A	LTITUD	E.		
Alt.	L. 18°	Α.	L. 19°	A.	L. 20°	A.	L. 21°	Α.	L. 22°	A.	L. 23	A.
0 4 8 12 16	1·54 1·34 1·15 •97	s. -4·94 4·87 4·81 4·76 4·72	1·65 1·44 1·25 1·07	s. -4.98 4.90 4.84 4.78 4.74	1·75 1·55 1·35 1·17	s. -5·02 4·94 4·87 4·81 4·76	1.86 1.65 1.45 1.27	s. -5.07 4.98 4.90 4.84 4.79	1·98 1·76 1·56 1·37	s. -5·12 5·02 4·94 4·87 4·82	2·09 1·86 1·66 1·47	s. -5·17 5·07 4·98 4·91 4·85
20 24 26 28 30	+ ·79 ·62 ·54 ·45 ·36	4.69 4.66 4.65 4.64 4.63	+ ·89 ·72 ·63 ·55 ·47	4·70 4·67 4·66 4·65 4·64	+ ·99 ·82 ·73 ·65 ·57	4.69 4.68 4.66 4.65	+1.09 .92 .84 .75 .67	4·75 4·71 4·69 4·68 4·67	+1·19 1·02 ·94 ·86 ·78	4·77 4·73 4·71 4·70 4·68	+1·29 1·13 1·04 ·96 ·88	4·80 4·75 4·73 4·72 4·70
32 34 36 38 40	+ ·28 ·19 ·10 + ·01 - ·08	4·63 4·62 4·62 4·62 4·62	+ ·38 ·29 ·21 ·12 + ·03	4·63 4·62 4·62 4·62	+ '49 '40 '32 '23 '14	4.64 4.63 4.63 4.62 4.62	+ ·59 ·51 ·43 ·34 ·26	4.66 4.65 4.64 4.63 4.62	+ ·70 ·62 ·53 ·45 ·37	4.67 4.66 4.65 4.64 4.63	+ ·80 ·72 ·64 ·56 ·48	4.69 4.67 4.66 4.65 4.64
42 44 46 48 50	- ·18 ·28 ·39 ·50 ·62	4·62 4·63 4·64 4·65 4·66	- ·07 ·16 ·26 ·37 ·47	4·62 4·62 4·63 4·64	+ ·05 - ·04 ·14 ·24 ·34	4·62 4·62 4·62 4·63	+ ·17 + ·08 - ·01 ·11 ·21	4.62 4.62 4.62 4.62 4.62	+ ·29 ·20 ·11 + ·02 - ·07	4.63 4.62 4.62 4.62 4.62	+ ·40 ·32 ·24 ·15 + ·06	4.64 4.63 4.62 4.62 4.62
52 54 56 58 60	- ·75 ·88 I·03 I·20 I·39	4·68 4·70 4·73 4·77 4·82	- ·60 ·72 ·86 I·02 I·24	4.66 4.68 4.70 4.73 4.77	- '45 '57 '70 '84 '99	4.64 4.65 4.67 4.69 4.72	- ·31 ·42 ·54 ·67 ·80	4·63 4·64 4·65 4·67 4·69	- ·17 ·27 ·38 ·50 ·62	4.62 4.63 4.63 4.65 4.66	- ·03 ·13 ·23 ·34 ·45	4·62 4·62 4·63 4·65

126 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 1° .

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 59.6 5 11 59.6 5 3 59.5 4 55 59.4	s. - ·07 ·07 ·07 ·07	H. M. S. 5 59 55.8 5 19 55.0 5 11 54.8 5 3 54.6 4 55 54.4	s. - ·07 ·08 ·09 ·09 ·09	H. M. S. 5 59 51·6 5 19 49·7 5 11 49·2 5 3 48·8 4 55 48·3	.10		·12	5 19 36·6 5 11 35·2	s. - ·07 ·12 ·13 ·14 ·15	H. M. S. 5 59 39.0 5 19 29.0 5 11 26.9 5 3 24.7 4 55 22.5	s. - ·07 ·13 ·15 ·16 ·17
18 20 22 24 26	4 47 59·3 4 39 59·2 4 31 59·1 4 23 59·0 4 15 59·0	·07 ·07 ·07 ·08 ·08	4 39 54.0 4 31 53.8 4 23 53.5	.10 .10	4 47 47·8 4 39 47·3 4 31 46·7 4 23 46·1 4 15 45·6	·12 ·13 ·14	4 47 40·0 4 39 39·0 4 31 38·0 4 23 36·9 4 15 35·8	·15	4 47 30·7 4 39 29·1 4 31 27·5 4 23 25·7 4 15 23·9	·16 ·18 19 ·20 ·22	4 47 20·2 4 39 17·7 4 31 15·2 4 23 12·7 4 15 9·9	·19 ·20 ·22 ·23 ·25
28 30 32 33 34	4 7 58·9 3 59 58·8 3 51 58·7 3 47 58·6 3 43 58·6	.08 .08 .08 .08	3 59 52·7 3 51 52·4	·13	4 7 44·9 3 59 44·3 3 51 43·6 3 47 43·2 3 43 42·8	·17	3 59 33.4	·20 ·21 ·22	4 7 22·0 3 59 20·0 3 51 17·9 3 47 16·7 3 43 15·6	·23 ·24 ·26 ·27 ·27	4 7 7·1 3 59 4·2 3 51 1·0 3 46 59·4 3 42 57·7	·27 ·28 ·30 ·31 ·32
35 36 37 38 39	3 39 58·5 3 35 58·5 3 31 58·4 3 27 58·4 3 23 58·3	•09 •09		·14 ·14 ·15	3 39 42·4 3 35 42·0 3 31 41·6 3 27 41·2 3 23 40·7	·19 ·19 ·20	3 39 29·9 3 35 29·2 3 31 28·4 3 27 27·6 3 23 26·8	·24 ·25 ·25	3 39 14·5 3 35 13·3 3 31 12·0 3 27 10·7 3 23 9·4	.31	3 38 56·0 3 34 54·2 3 30 52·4 3 26 50·5 3 22 48·6	·33 ·34 ·35 ·36 ·38
40 41 42 43 44	3 19 58·2 3 15 58·2 3 11 58·1 3 7 58·0 3 3 58·0	•09	3 11 50·6 3 7 50·4	·15 ·16 ·16	3 19 40·2 3 15 39·8 3 11 39·3 3 7 38·8 3 3 38·2	·21 ·21 ·22 ·23 ·23	3 15 25·I 3 II 24·2	·27 ·28 ·28 ·29 ·30	3 II 5·2 3 7 3·7	•34 •35 •36	3 18 46.6 3 14 44.5 3 10 42.4 3 6 40.1 3 2 37.8	·39 ·40 ·41 ·43 ·44
45 46 47 48 4 9	2 59 57·9 2 55 57·8 2 51 57·7 2 47 57·7 2 43 57·6	•10	2 55 49·6 2 51 49·3 2 47 49·1	•17 •18 •18	2 59 37·6 2 55 37·0 2 51 36·5 2 47 35·8 2 43 35·1	.25	2 59 21·2 2 55 20·1 2 51 19·0 2 47 17·8 2 43 16·6	·32 ·33 ·34	2 59 0·4 2 54 58·7 2 50 56·9 2 46 55·1 2 42 53·2	·41 ·42	2 58 35·4 2 54 32·9 2 50 30·3 2 46 27·6 2 42 24·8	·45 ·47 ·48 ·50 ·52
50 51 52 53 54	2 39 57·5 2 35 57·4 2 31 57·3 2 27 57·2 2 23 57·1	·11	2 39 48·5 2 35 48·1 2 31 47·8 2 27 47·5 2 23 47·1	*20 *20 *21	2 39 34·4 2 35 33·7 2 31 32·9 2 27 32·1 2 23 31·3	·28 ·29 ·30	2 39 15·3 2 35 14·0 2 31 12·6 2 27 11·2 2 23 9·6	•37 •38 •40	2 38 51·2 2 34 49·0 2 30 46·8 2 26 44·5 2 22 42·0	·48 ·49	2 38 21·8 2 34 18·7 2 30 15·5 2 26 12·0 2 22 8·5	•53 •55 •57 •59 •61

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
°	s. s. - ·00 -4·00	s. s. - ·07 -4·00	s. s. - ·14 -4·00	s. s. - ·21 -4·01	s. s. - ·28 -4·01	s. s. - ·35 -4·02
4	·00 4·00	•07 4.00	.14 4.00	·22 4·0I	.29 4.01	·36 4·02
8	·01 4·00	.08 4.00	.15 4.00	·22 4·0I	.29 4.01	.37 4.02
12	·01 4·00	.00 4.00	•16 4.00	·23 4·0I	.30 4.01	.37 4.02
14	·02 4·00	•09 4.00	·16 4·00	·23 4·0I	.31 4.01	·38 4·02
16	·02 4·00	109 4.00	·17 4·00	·24 4·0I	·31 4·01	·39 4·02
18	·02 4·00	·10 4·00	·17 4·00	·24 4·0I	·32 4·0I	·39 4·02
20	·02 4·00	10 4.00	·17 4·00	·25 4·0I	·32 4·0I	·40 4·02
22	.03 4.00	·10 4·00	·18 4·00	·25 4·0I	·33 4·01	·4I 4·02
24	.03 4.00	.11 4.00	·18 4·00	·26 4·01	·34 4·01	·4I 4·02
26	·03 4·00	·II 4·00	·19 4·01	·27 4·0I	·35 4·02	.42 4.02
28	.04 4.00	12 4.00	·20 4·0I	·27 4·0I	•35 4.02	·43 4·02
30	'04 4'00	12 4.00	·20 4·01	·28 4·0I	•36 4.02	.45 4.03
32	.04 4.00	·13 4·00	·21 4·01	·29 4·0I	·37 4·02	•46 4.03
34	.02 4.00	.13 4.00	·2I 4·0I	·30 4·01	·38 4·02	·47 4·03
36	.05 4.00	•14 4.00	·22 4·0I	·31 4·01	·40 4·02	·49 4·03
38	05 4.00	14 4.00	·23 4·0I	·32 4·0I	·4I 4·02	·50 4·03
40	.06 4.00	15 4.00	·24 4·0I	·33 4·01	42 4.02	•52 4.03
42	.06 4.00	•16 4.00	·25 4·01	·35 4·01	•44 4.02	•54 4.04
44	•07 4.00	•16 4.00	•26 4.01	•36 4.02	•46 4.03	·56 4·04
46	•07 4.00	17 4.00	·27 4·0I	·38 4·02	·48 4·03	·58 4·04
48	.08 4.00	·18 4·00	·29 4·0I	•39 4.02	•50 4.03	·61 4·05
50	•08 4.00	10 4.00	30 4.01	·4I 4·02	52 4.03	·63 4·05
52	.00 4.00	20 4.00	·32 4·0I	•43 4.02	.55 4.04	·66 4·06
54	·10 4·00	•22 4.00	·33 4·0I	•46 4.03	•58 4.04	·70 4·06
34	1 400	22 400	1 33 401	1 40 403	J J 7 4 04	, , , ,

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 127 LATITUDE 1°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True	6°	Decl.	70	Decl.	8°	Decl.	9°	Decl.	100	Decl.		Decl.
Alt.	6,	Var.	7	Var.	8	Var.	9-	Var.	10°	Var.	11°	Var.
0 10 12 14 16	H. M. S. 5 59 34.8 5 19 20.6 5 11 17.6 5 3 14.6 4 55 11.4	s. - ·07 ·15 ·16 ·18 ·19	H. M. S. 5 59 30.6 5 19 11.5 5 11 7.4 5 3 3.3 4 54 59.1	s. 07 .16 .18 .20 .22	H. M. S. 5 59 26·3 5 19 1·5 5 10 56·3 5 2 50·9 4 54 45·5	s. - ·07 ·17 ·19 ·21 ·24	H. M. S. 5 59 22.0 5 18 50.8 5 10 44.2 5 2 37.5 4 54 30.6	S. 07 .19 .21 .23	H. M. S. 5 59 17.7 5 18 39.2 5 10 31.1 5 2 22.9 4 54 14.4	s. - ·07 ·20 ·23 ·25 ·28	H. M. S. 5 59 13.4 5 18 26.8 5 10 17.0 5 2 7.1 4 53 56.8	S. 07 .21 .24 .27 .30
18 20 22 24 26	4 47 8·2 4 39 4·8 4 31 1·3 4 22 57·7 4 14 53·9	.27	4 46 54·7 4 38 50·2 4 30 45·5 4 22 40·7 4 14 35·7	·24 ·26 ·28 ·30 ·32	4 46 39·8 4 38 34·0 4 30 28·0 4 22 21·8 4 14 15·3	·26 ·28 ·31 ·33 ·36	4 46 23·5 4 38 16·2 4 30 8·7 4 22 0·9 4 13 52·8	·28 ·31 ·34 ·36 ·39	4 46 5.7 4 37 56.8 4 29 47.5 4 21 38.0 4 13 28.0	•31 •34 •37 •40 •43	4 45 46·4 4 37 35·6 4 29 24·4 4 21 12·9 4 13 0·9	·33 ·37 ·40 ·43 ·47
28 30 32 33 34	4 6 49·9 3 58 45·8 3 50 41·5 3 46 39·2 3 42 36·9		4 6 30·4 3 58 24·9 3 50 19·2 3 46 16·2 3 42 13·1	·34 ·37 ·39 ·41 ·42	4 6 8·5 3 58 I·5 3 49 54·I 3 45 50·2 3 4I 46·3	'44	4 5 44·3 3 57 35·5 3 49 26·2 3 45 21·4 3 41 16·4	·42 ·46 ·49 ·51 ·52	4 5 17.6 3 57 6.8 3 48 55.4 3 44 49.5 3 40 43.5	*47 *50 *54 *56 *58	4 4 48.4 3 56 35.4 3 48 21.7 3 44 14.6 3 40 7.3	•51 •55 •59 •61 •63
35 36 37 38 39	3 38 34·5 3 34 32·1 3 30 29·5 3 26 26·9 3 22 24·2	·38 ·40 ·41 ·42 ·44	3 38 9.9 3 34 6.7 3 30 3.3 3 25 59.8 3 21 56.3	·44 ·45 ·46 ·48 ·50	3 37 42·2 3 33 38·0 3 29 33·7 3 25 29·3 3 21 24·7	.49 .50 .52 .54 .56	3 37 11·4 3 33 6·1 3 29 0·7 3 24 55·2 3 20 49·5	•54 •56 •58 •60 •62	3 36 37·3 3 32 30·8 3 28 24·3 3 24 17·5 3 20 10·5		3 35 59·8 3 31 52·1 3 27 44·2 3 23 36·0 3 19 27·6	·65 ·67 ·70 ·72 ·75
40 41 42 43 44	3 18 21·4 3 14 18·6 3 10 15·6 3 6 12·5 3 2 9·3	·45 ·46 ·48 ·49 ·51	3 17 52.6 3 13 48.8 3 9 44.8 3 5 40.8 3 1 36.5	•51 •53 •55 •56 •58	3 17 20·0 3 13 15·1 3 9 10·1 3 5 4·8 3 0 59·4	·57 ·59 ·61 ·63 ·66	3 16 43.6 3 12 37.5 3 8 31.2 3 4 24.6 3 0 17.8	·64 ·66 ·68 ·71 ·73	3 16 3·2 3 11 55·8 3 7 48·0 3 3 40·0 2 59 31·7	·71 ·73 ·75 ·78 ·81	3 15 18·9 3 11 9·9 3 7 0·6 3 2 50·9 2 58 40·9	.77 .80 .83 .86 .89
45 46 47 48 49	2 58 6·0 2 54 2·5 2 49 58·9 2 45 55·2 2 41 51·3	·54 ·56 ·58	2 57 32·I 2 53 27·5 2 49 22·8 2 45 17·8 2 41 12·7	·62 ·64	2 56 53.8 2 52 47.9 2 48 41.8 2 44 35.4 2 40 28.8	·68 ·70 ·72 ·75 ·78	2 56 10·8 2 52 3·4 2 47 55·8 2 43 47·9 2 39 39·6	•76 •78 •81 •84 •87	2 55 23·I 2 5I I4·I 2 47 4·8 2 42 55·0 2 38 44·8	·89	2 54 30·5 2 50 19·7 2 46 8·4 2 41 56·7 2 37 44·4	·92 ·95 ·98 I·02 I·06
50 51 52 53 54	2 37 47·2 2 33 42·9 2 29 38·4 2 25 33·7 2 21 28·8	·67 ·69	2 37 7·3 2 33 1·6 2 28 55·6 2 24 49·4 2 20 42·9	·71 ·74 ·76 ·79 ·82	2 36 21·9 2 32 14·6 2 28 7·0 2 23 58·9 2 19 50·6	-83 -86	2 35 30·9 2 31 21·8 2 27 12·3 2 23 2·2 2 18 51·7		2 34 34·2 2 30 23·0 2 26 11·3 2 21 59·0 2 17 46·1	1·07	2 33 31·5 2 29 18·1 2 25 3·9 2 20 49·1 2 16 33·4	1.09 1.14 1.18 1.22 1.27

Alt.	L. 6°	Α.	L. 7°	A.	L. 8°	. A.	L. 9°	A.	L. 10	° A.	L. 11	° A.
	s.	s.	s.	s.	s.	s.	S.	s.	s.	s.	s.	s.
0	− ·42	-4.02	 ⋅49	-4.03	- ⋅56	-4.04	- ⋅63	-4.05	 70	-4.06	− ·78	-4.08
4	.43	4.02	•50	4.03	.58	4.04	•64	4.05	•71	4.06	•79	4.08
8	.44	4.02	•51	4.03	•58	4.04	•65	4.05	.73	4.07	·8o	4.08
12	•44	4.02	.52	4.03	•59	4.04	∙66	4.06	.74	4.07	-81	4.08
14	.45	4.03	.52	4.03	•60	4.05	•67	4.06	.75	4.07	- 82	4.08
16	•46	4.03	.53	4.04	·61	4.05	-68	4.06	•76	4.07	.83	4.09
18	.47	4.03	•54	4.04	.62	4.05	·6g	4.06	•77	4.07	•84	4.09
20	.47	4.03	.55	4.04	.63	4.05	.70	4.06	.78	4.08	-86	4.09
22	•48	4.03	.56	4.04	.64	4.05	•71	4.06	•79	4.08	-87	4.09
24	•49	4.03	.57	4.04	.65	4.05	•73	4.07	-81	4.08	·89	4.10
26	.50	4.03	·58	4.04	-66	4.05	•74	4.07	.82	4.08	.91	4.10
28	·51	4.03	-60	4.04	-68	4.06	•76	4.07	-84	4.09	.93	4.11
30	•53	4.03	-61	4.05	.69	4.06	•78	4.07	-86	4.09	•95	4.11
32	•54	4.04	.63	4.05	.71	4.06	·8o	4.08	-88	4.10	•97	4.12
34	.56	4.04	•64	4.05	.73	4.07	.82	4.08	•91	4.10	1.00	4.12
36	.57	4.04	-66	4.05	.75	4.07	.84	4.09	•93	4.11	1.03	4.13
38	•59	4.04	∙68	4.06	.78	4.07	-87	4.09	.96	4.11	1.06	4.14
40	.61	4.05	.71	4.06	·8o	4.08	•90	4.10	.99	4.12	1.00	4.15
42	.63	4.05	•73	4.07	.83	4.09	•93	4.11	1.03	4.13	1.13	4.16
44	∙66	4.05	•76	4.07	-86	4.09	-96	4.12	1.07	4.14	1.18	4.17
46	•68	4.06	-80	4.08	•90	4.10	1.00	4.13	1.11	4.15	1.22	4.18
48	.71	4.06	.82	4.08	•94	4.11	1.05	4.14	1.16	4.17	1.28	4.50
50	.75	4.07	-86	4.00	.98	4.13	1.10	4.12	1.22	4.18	1.34	4.22
52	.78	4.08	.90	4.10	1.03	4.13	1.12	4.16	1.58	4.50	1.41	4.24
54	.82	4.08	.95	4.11	1.08	4.14	1.31	4.18	1.35	4.22	I.49	4:27

LATITUDE 1°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 5 59 9.0 5 18 13.6 5 10 2.0 5 1 50.1 4 53 38.0	s. - ·07 ·23 ·26 ·29 ·33	H. M. S. 5 59 4·5 5 17 59·5 5 9 45·9 5 1 31·9 4 53 17·7	s. - ·07 ·24 ·28 ·31 ·35	H. M. S. 5 59 0·2 5 17 44·5 5 9 28·7 5 1 12·6 4 52 56·1	s. - ·07 ·26 ·30 ·33 ·37	H. M. S. 5 58 55.7 5 17 28.6 5 9 10.4 5 0 51.9 4 52 32.9	s. 07 .27 .31 .36 .40	H. M. S. 5 58 51·2 5 17 11·8 5 8 51·1 5 0 29·9 4 52 8·3	s. 08 .29 .33 .38 .42	H. M. S. 5 58 46.6 5 16 54.1 5 8 30.6 5 0 6.6 4 51 42.2	s. - ·08 ·30 ·35 ·40 ·45
18 20 22 24 26	4 45 25.6 4 37 12.8 4 28 59.5 4 20 45.8 4 12 31.6	·43	4 45 3·I 4 36 48·I 4 28 32·6 4 20 16·5 4 II 59·8	*39 *43 *46 *51 *55	4 44 39·1 4 36 21·7 4 28 3·7 4 19 45·0 4 11 25·7		4 44 13.4 4 35 53.4 4 27 32.7 4 19 11.3 4 10 49.0	*44 *49 *53 *58 *63	4 43 46·1 4 35 23·2 4 26 59·6 4 18 35·2 4 10 9·9	·47 ·52 ·57 ·62 ·67	4 26 24·4 4 17 56·8	·50 ·55 ·60 ·66 ·72
28 29 30 31 32	4 4 16.8 4 0 9.1 3 56 1.3 3 51 53.3 3 47 45.0		4 3 42·5 3 59 33·5 3 55 24·3 3 51 14·9 3 47 5·3	•64	4 3 5.6 3 58 55.1 3 54 44.5 3 50 33.6 3 46 22.4	•69	4 2 25.9 3 58 13.9 3 54 1.7 3 49 49.1 3 45 36.3	·68 ·71 ·74 ·77 ·80	3 53 15.8	·79 ·82	3 56 42·7 3 52 26·9 3 48 10·6	•78 •81 •84 •88
33 34 35 36 37	3 43 36·6 3 39 28·0 3 35 19·1 3 31 9·9 3 27 0·5	·66 ·68 ·71 ·73 ·76	3 42 55·4 3 38 45·3 3 34 34·8 3 30 24·1 3 26 13·1	·71 ·74 ·77 ·79 ·82	3 42 10·9 3 37 59·2 3 33 47·1 3 29 34·6 3 25 21·8	.77 .80 .83 .86	3 32 55·6 3 28 41·3		3 40 31.8 3 36 16.3 3 32 0.5 3 27 44.1 3 23 27.3		3 31 1·4 3 26 42·9	·94 ·98 1·02 1·06 1·10
38 39 40 41 42	3 22 50·8 3 18 40·8 3 14 30·5 3 10 19·8 3 6 8·7	·79 ·81 ·84 ·87 ·90	3 22 1.7 3 17 50.0 3 13 37.8 3 9 25.3 3 5 12.3	•85 •88 •91 •95 •98	3 12 40 9	•95	3 20 11·4 3 15 55·7 3 11 39·4 3 7 22·6 3 3 5·2	1.09		I·10	3 5 0.7	1.18
43 44 45 46 47	3 I 57·3 2 57 45·4 2 53 33·0 2 49 20·1 2 45 6·7	1.00	2 56 44·9 2 52 30·4 2 48 15·2	1.05	2 51 22·4 2 47 4·8	I·14 I·18	2 58 47·2 2 54 28·4 2 50 8·9 2 45 48·6 2 41 27·4	1·23 1·32	2 57 33.6 2 53 12.1 2 48 49.7 2 44 26.4 2 40 2.1	1·32 1·37	2 56 14·5 2 51 50·1 2 47 24·6 2 42 58·0 2 38 30·2	
48 49 50 51 52	2 40 52·7 2 36 38·1 2 32 22·8 2 28 6·7 2 23 49·9	1·15 1·20 1·24	2 39 43.0 2 35 25.8 2 31 7.8 2 26 48.8 2 22 28.9	1.31	2 38 27·2 2 34 7·1 2 29 46·1 2 25 24·0 2 21 0·7	1·37 1·42 1·47	2 37 5·2 2 32 41·9 2 28 17·6 2 23 51·9 2 19 25·0	1.48 1.54 1.60	2 35 36.6 2 31 9.9 2 26 41.8 2 22 12.4 2 17 41.3	1.59 1.66 1.73	2 34 1·2 2 29 30·7 2 24 58·6 2 20 24·8 2 15 49·1	1·72 1·79 1·86
		V.	ARIATIC	N TO	ı' OF	LAT	TUDE .	AND	ALTITU	DE.	·	
Alt.	L. 12	° A.	L. 13	° A.	L. 14	A.	L. 15	° A.	L. 16	° A.	L. 17	A.
0 4 8 10 12	s. 85 .86 .87 .88 .89	s. -4.09 4.09 4.10 4.10	s. '92 '94 '95 '95 '96	S. -4·10 4·11 4·11 4·11	S. -1.00 1.01 1.02 1.03 1.04	s. -4·12 4·13 4·13 4·13	s. -1.07 1.09 1.10 1.10	s. -4·14 4·15 4·15 4·15	s. -1·15 1·16 1·18 1·18	s. -4·16 4·17 4·17 4·17	S. -1·22 1·24 1·25 1·26 1·27	S. -4·18 4·19 4·19 4·19 4·20
14 16 18 20 22	•90 •91 •92 •93 •95	4.10 4.10 4.10 4.10	*97 *98 1*00 1*01 1*03	4·12 4·12 4·13 4·13	1.05 1.06 1.08 1.09 1.11	4·14 4·14 4·15 4·15	1·13 1·14 1·16 1·17 1·19	4·16 4·16 4·17 4·17	1·20 1·22 1·24 1·26 1·28	4·18 4·19 4·19 4·20	1·28 1·30 1·32 1·34 1·36	4·20 4·21 4·21 4·22 4·23
24 26 28 30 32	.97 .99 1.01 1.03 1.06	4·12 4·12 4·13 4·14	1.05 1.07 1.09 1.12 1.15	4·14 4·14 4·15 4·15 4·16	1·13 1·16 1·18 1·21 1·24	4·16 4·17 4·18 4·19	1·21 1·24 1·27 1·30 1·33	4·18 4·19 4·20 4·21 4·22	1·30 1·33 1·36 1·39 1·43	4·21 4·21 4·22 4·23 4·25	1·39 1·42 1·45 1·48 1·52	4·23 4·24 4·25 4·27 4·28
34 36 38 40 42	1·09 1·12 1·16 1·19 1·24	4·15 4·15 4·16 4·17 4·19	1·18 1;23 1·25 1·30 1·34	4·17 4·18 4·19 4·21 4·22	1·27 1·31 1·35 1·40 1·45	4·20 4·21 4·22 4·24 4·26	1·37 1·41 1·46 1·51 1·56	4·23 4·24 4·26 4·28 4·29	1.47 1.51 1.56 1.62 1.68	4·26 4·28 4·29 4·31 4·33	1·57 1·61 1·67 1·73 1·79	4·30 4·31 4·36 4·38
44 46 48 50 52	1·29 1·34 1·40 1·47 1·54	4·20 4·22 4·24 4·26 4·29	1·40 1·46 1·52 1·60 1·68	4·24 4·26 4·28 4·31 4·34	1·51 1·58 1·65 1·73 1·83	4·28 4·30 4·33 4·36 4·40	1.63 1.70 1.78 1.87 1.97	4·32 4·35 4·38 4·42 4·46	1·75 1·82 1·91 2·01 2·12	4·37 4·40 4·43 4·47 4·53	1·87 1·96 2·05 2·16 2·29	4·42 4·45 4·50 4·55 4·61

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 129 LATITUDE 1°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 5 58 42.0 5 16 35.4 5 8 9.0 4 59 42.0 4 51 14.5	s. - ·08 ·32 ·37 ·42 ·48	H. M. S. 5 58 37.3 5 16 15.6 5 7 46.1 4 59 15.9 4 50 45.1	s. - ·08 ·34 ·39 ·45 ·50	H. M. S. 5 58 32.6 5 15 54.9 5 7 22.0 4 58 48.4 4 50 14.1	s. - ·08 ·35 ·41 ·47 ·53	H. M. S. 5 58 27.9 5 15 33.0 5 6 56.6 4 58 19.5 4 49 41.4	s. - ·08 ·37 ·43 ·50 ·56	H. M. S. 5 58 23.0 5 15 10.1 5 6 29.9 4 57 48.9 4 49 6.9	s. - ·08 ·39 ·46 ·52 ·59	H. M. S. 5 58 18·1 5 14 46·1 5 6 1·9 4 57 16·8 4 48 30·6	s. - ·08 ·41 ·48 ·55 ·62
18 20 22 24 25	4 42 46·2 4 34 17·0 4 25 47·0 4 17 15·9 4 12 59·9	•64	4 16 32.4	·56 ·62 ·68 ·75 ·78	4 41 38·9 4 33 2·6 4 24 25·2 4 15 46·4 4 11 26·5	•79	4 4I 2·4 4 32 22·2 4 23 40·7 4 I4 57·6 4 IO 35·5	·62 ·69 ·76 ·84 ·87	4 40 23.9 4 31 39.5 4 22 53.6 4 14 6.1 4 9 41.6	·66 ·73 ·81 ·88 ·92	4 39 43·2 4 30 54·4 4 22 4·0 4 13 11·7 4 8 44·8	·69 ·77 ·85 ·93 ·97
26 27 28 29 30	4 8 43.6 4 4 26.9 4 0 9.9 3 55 52.5 3 51 34.6	·76 ·80 ·83 ·86 ·90	4 7 56·3 4 3 37·6 3 59 18·5 3 54 59·0 3 50 39·1	·81 ·85 ·88 ·92 ·96	4 7 6·1 4 2 45·3 3 58 24·1 3 54 2·3 3 49 39·9	·86 ·90 ·93 ·97 I·01	4 6 12·9 4 1 49·9 3 57 26·3 3 53 2·1 3 48 37·4		4 5 16·7 4 0 51·2 3 56 25·1 3 51 58·4 3 47 31·1		3 59 49.2 3 55 20.4 3 50 51.0	1.02 1.06 1.11 1.16 1.20
31 32 33 34 35	3 47 16·4 3 42 57·6 3 38 38·4 3 34 18·6 3 29 58·3	·93 ·97 I·01 I·05 I·09	3 41 57·6 3 7 36·0 3 33 13·9	·99 1·03 1·07 1·11 1·16	3 36 29.7	1.05 1.10 1.14 1.18 1.23		1·12 1·16 1·21 1·26 1·31	3 43 3.0 3 38 34.2 3 34 4.6 3 29 34.1 3 25 2.7	1.28	3 37 18·1 3 22 45·4 3 28 11·7	1·25 1·31 1·36 1·41 1·47
36 37 38 39 40	3 25 37.4 3 21 15.8 3 16 53.5 3 12 30.5 3 8 6.7	1·13 1·17 1·21 1·26 1·31	3 24 27.6 3 20 3.4 3 15 38.4 3 11 12.5 3 6 45.7	1·20 1·25 1·29 1·34 1·39	3 23 13·3 3 18 46·2 3 14 18·2 3 9 49·3 3 5 19·3			1·36 1·41 1·47 1·52 1·58	3 20 30·3 3 15 56·9 3 11 22·3 3 6 46·4 3 2 9·3	1·44 1·50 1·56 1·62 1·68	3 14 24·3 3 9 46·0 3 5 6·3	1·53 1·59 1·65 1·72 1·79
41 42 43 44 45	3 3 42·0 2 59 16·4 2 54 49·8 2 50 22·1 2 45 53·3	1·36 1·41 1·46 1·52 1·58		1·45 1·50 1·56 1·62 1·69	3 0 48·2 2 56 15·9 2 51 42·3 2 47 7·2 2 42 30·7	1.73	2 54 36·5 2 49 58·9 2 45 19·7	1.65 1.71 1.78 1.85 1.93	2 57 30·7 2 52 50·5 2 48 8·6 2 43 24·9 2 38 39·2	1.82	2 46 11·1 2 41 22·5	1.86 1.94 2.02 2.11 2.20
46 47 48 49 50	2 41 23·1 2 36 51·6 2 32 18·5 2 27 43·8 2 23 7·4	1·70 1·77 1·85	2 39 41·3 2 35 5·7 2 30 28·4 2 25 49·1 2 21 7·7	1.83 1.83	2 37 52·4 2 33 12·3 2 28 30·2 2 23 45·9 2 18 59·1	2.04	2 35 55.9 2 31 10.9 2 26 23.5 2 21 33.6 2 16 40.9	2·09 2·19 2·28	2 33 51·2 2 29 0·9 2 24 7·8 2 19 11·8 2 14 12·5		2 31 38·1 2 26 41·8 2 21 42·5 2 16 39·7 2 11 33·0	2·30 2·40 2·50 2·62 2·74

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
°	s. s. -1·30 -4·21	s. s. -1·38 -4·23	s. s. -1·46 -4·26	s. s. -1.54 -4.28	s. s. -1.62 -4.31	s. s. -1·70 +4·35
4	1.31 4.21	1.39 4.23	1.47 4.26	1.55 4.59	1.63 4.32	I·7I 4·35
6	1.32 4.21	1.40 4.54	1.48 4.26	1.56 4.29	1.64 4.32	I·72 4·35
8	1.33 4.21	1.41 4.24	1.49 4.27	1.57 4.30	1.65 4.33	1.73 4.36
IO	1.34 4.22	I·42 4·24	1.50 4.27	1.58 4.30	1.66 4.33	1.74 4.37
12	1.35 4.22	1.43 4.25	1.51 4.28	1.59 4.31	1.68 4.34	1.76 4.37
14	1.36 4.23	1.45 4.55	1.53 4.28	1.61 4.31	1.70 4.35	1.78 4.38
16	1.38 4.23	1.46 4.26	1.22 4.39	1.63 4.32	1.72 4.35	1.81 4.39
18	1.40 4.24	1.48 4.27	1.24 4.30	1.66 4.33	1.74 4.36	1.83 4.40
20	1.42 4.25	1.51 4.28	1.59 4.31	1.68 4.34	1.77 4.38	1.86 4.41
22	1.45 4.25	1.53 4.29	1.62 4.32	1.71 4.35	1.80 4.39	I·90 4·43
24	1.48 4.26	1.56 4.30	1.65 4.33	1.75 4.36	1.84 4.40	1.94 4.44
26	1.21 4.27	1.60 4.31	1.69 4.34	1.78 4.38	1.88 4.42	1.98 4.46
28	1.24 4.39	1.63 4.32	1.73 4.36	1.83 4.40	1.93 4.44	2.03 4.48
30	1.58 4.30	1.67 4.34	1.77 4.37	1.87 4.42	1.98 4.46	2.08 4.21
32	1.62 4.32	1.72 4.35	1.82 4.40	1.92 4.44	2.03 4.49	2.14 4.24
34	1.67 4.33	1.77 4.37	1.88 4.42	1.98 4.46	2.09 4.52	2.21 4.22
36	1.72 4.35	1.83 4.40	1.94 4.44	2.02 4.49	2.16 4.55	2.28 4.61
38	1.78 4.38	1.89 4.42	2.00 4.47	2.13 4.23	2.24 4.29	2.37 4.65
40	1.84 4.40	1.96 4.45	2.08 4.51	2.20 4.57	2.33 4.63	2.47 4.70
42	1.91 4.43	2.04 4.49	2.17 4.55	2.30 4.61	2.44 4.68	2.58 4.76
44	2.00 4.47	2.13 4.23	2.26 4.60	2.41 4.67	2.55 4.74	2.71 4.83
46	2.09 4.51	2.23 4.58	2.38 4.65	2.53 4.73	2.69 4.82	2.86 4.91
48	2.20 4.56	2.35 4.64	2.51 4.72	2.67 4.81	2.84 4.91	3.03 5.02
50	2.32 4.62	2.48 4.71	2.65 4.80	2.84 4.90	3.03 5.01	3.23 5.15

LATITUDE 2°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 0 0.0 5 19 58.5 5 11 58.2 4 3 57.9 4 55 57.6	S. - '14 '14 '14 '14	H. M. S. 5 59 51.6 5 19 49.7 5 11 49.2 5 3 48.8 4 55 48.3	S. - ·14 ·15 ·16 ·16 ·17	5 11 39·3 5 3 38·5	s. - ·14 ·17 ·17 ·18 ·19	5 11 28·5 5 3 27·3	s. - ·14 ·18 ·19 ·20 ·21	H. M. S. 5 59 26·4 5 19 18·5 5 11 16·7 5 3 14·9 4 55 13·0	S. - ·14 ·19 ·20 ·21 ·23	H. M. S. 5 59 18.0 5 19 6.6 5 11 4.1 5 3 1.5 4 54 58.8	S. - '14 '20 '22 '23 '25
18 20 22 24 26	4 47 57·3 4 39 57·0 4 31 56·6 4 23 56·3 4 15 55·9	•15	4 47 47·8 4 39 47·3 4 31 46·7 4 23 46·1 4 15 45·6	.18	4 39 36.1	·19 ·20 ·21 ·21 ·22	4 47 24.7 4 39 23.3 4 31 21.8 4 23 20.3 4 15 18.7					·26 ·28 ·29 ·31 ·33
28 30 32 33 34	4 7 55.6 3 59 55.2 3 51 54.8 3 47 54.6 3 43 54.3		4 7 44.9 3 59 44.3 3 51 43.6 3 47 43.2 3 43 42.8		3 59 31·0 3 51 29·7	•26	3 59 15·2 3 51 13·2 3 47 12·2	.28	3 58 56·9 3 50 54·I	·31 ·32 ·34 ·35 ·36	3 58 36·2 3 50 32·2 3 46 30·1	*35 *37 *39 *40 *41
35 36 37 38 39	3 39 54·I 3 35 53·9 3 3I 53·7 3 27 53·5 3 23 53·2	•17 •17 •17 •18 •18	3 31 41.6 3 27 41.2	•22 •22 •23 •23 •24	3 35 27·1 3 31 26·3 3 27 25·6	•27 •27 •28 •29 •29	3 35 9.0 3 31 7.9 3 27 6.7	'33 '34	3 38 49.5 3 34 47.8 3 30 46.2 3 26 44.4 3 22 42.6		3 38 25.8 3 34 23.5 3 30 21.2 3 26 18.8 3 22 16.3	·42 ·43 ·44 ·46 ·47
40 41 42 43 44	3 19 53.0 3 15 52.7 3 11 52.4 3 7 52.2 3 3 51.9	·18 ·19 ·19 ·19	3 19 40·2 3 15 39·8 3 11 39·3 3 7 38·8 3 3 38·2	•24 •25 •25 •26 •26	3 15 23·2 3 11 22·3 3 7 21·4	·30 ·31 ·31 ·32 ·33	3 15 2·7 3 11 1·5 3 7 0·1	·37 ·38 ·39	3 6 34.7		3 14 11·0 3 10 8·2 3 6 5·3	·50 ·51 ·52
45 46 47 48 49	2 59 51·6 2 55 51·3 2 51 51·0 2 47 50·7 2 43 50·3	.20	2 59 37.6 2 55 37.0 2 51 36.5 2 47 35.8 2 43 35.1			*34 *35 *36 *37 *37	2 54 55.4 2 50 53.7 2 46 51.9		2 54 27.9	.50	2 57 59·I 2 53 55·8 2 49 52·3 2 45 48·8 2 41 45·I	•56 •57 •59 •61 •63
50 51 52 53 54	2 39 50·0 2 35 49·6 2 31 49·3 2 27 48·9 2 23 48·5	·23 ·23	2 39 34·4 2 35 33·7 2 31 32·9 2 27 32·1 2 23 31·3	·31 ·32	2 39 13.8 2 35 12.5 2 31 11.2 2 27 9.7 2 23 8.3	·41	2 34 46·I 2 30 44·0	·50	2 30 11.2	·61	2 37 41·2 2 33 37·1 2 29 32·7 2 25 28·2 2 21 23·4	·65 ·67 ·69 ·71 ·73

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
° 0 4 8 12 14	S. S. - *00 -4*00 *01 4*00 *02 4*00 *03 4*00 *03 4*00	S. S. 07 4.00 08 4.00 09 4.00 10 4.00 11 4.00	S. S. - ·14 -4·00 ·15 4·01 ·16 4·01 ·17 4·01 ·18 4·01	S. S. - '21 -4'01 '22 4'01 '23 4'01 '24 4'01 '25 4'01	s. s. - ·28 -4·01 ·29 4·01 ·30 4·01 ·32 4·01 ·32 4·02	s. s. - ·35 - 4·02 ·36 4·02 ·37 4·02 ·39 4·02 ·39 4·02
16	*04 4.00	·II 4·00	*19 4.01	·26 4·01	*33 4*02	.40 4.02
18	*04 4.00	·I2 4·00	*19 4.01	·27 4·01	*34 4*02	.41 4.02
20	*05 4.00	·I2 4·00	*20 4.01	·27 4·01	*35 4*02	.42 4.02
22	*05 4.00	·I3 4·00	*21 4.01	·28 4·01	*36 4*02	.43 4.03
24	*06 4.00	·I4 4·00	*21 4.01	·29 4·01	*37 4*02	.45 4.03
26	•07 4.00	*15 4.01	*22 4.01	*30 4.01	*38 4.02	·46 4·03
28	•07 4.00	*15 4.01	*23 4.01	*31 4.01	*39 4.02	·47 4·03
30	•08 4.00	*16 4.01	*24 4.01	*32 4.02	*41 4.02	·49 4·03
32	•09 4.00	*17 4.01	*25 4.01	*33 4.02	*42 4.02	·50 4·03
34	•09 4.00	*18 4.01	*26 4.01	*35 4.02	*43 4.03	·52 4·04
36	·10 4·00	·19 4·01	·27 4·01	*36 4.02	*45 4.03	•54 4·04
38	·11 4·00	·20 4·01	·29 4·01	*38 4.02	*47 4.03	•56 4·04
40	·12 4·00	·21 4·01	·30 4·01	*39 4.02	*49 4.03	•58 4·04
42	·12 4·00	·22 4·01	·31 4·01	*41 4.02	*51 4.03	•60 4·05
44	·14 4·00	·23 4·01	·33 4·02	*43 4.03	*53 4.04	•63 4·05
46	•14 4.00	*25 4.01	35 4.02	*45 4.03	*55 4.04	•66 4·06
48	•16 4.00	*26 4.01	37 4.02	*47 4.03	•58 4.04	•69 4·06
50	•17 4.01	*28 4.01	39 4.02	*50 4.03	•61 4.05	•72 4·07
52	•18 4.01	*29 4.01	41 4.02	*52 4.04	•64 4.05	•76 4·07
54	•19 4.01	*31 4.01	43 4.02	*55 4.04	•68 4.06	•80 4·08

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 131 LATITUDE 2°.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 5 59 9.6 5 18 53.9 5 10 50.5 5 2 47.0 4 54 43.3	.25	5 18 40·4 5 10 36·0	.27	H. M. S. 5 58 52.5 5 18 26.1 5 10 20.4 5 2 14.5 4 54 8.5	s ·14 ·24 ·27 ·29 ·31	5 18 11.0 5 10 3.9 5 1 56.6	s. - ·14 ·26 ·28 ·31 ·33	H. M. S. 5 58 35.4 5 17 55.1 5 9 46.4 5 1 37.6 4 53 28.4	s. - ·14 ·27 ·30 ·33 ·36	5 17 38·2 5 9 27·9	s. - ·15 ·29 ·32 ·35 ·38
18 20 22 24 26	4 46 39·5 4 38 35·6 4 30 31·5 4 22 27·1 4 14 22·7	·31	4 46 21.6 4 38 16.4 4 30 11.1 4 22 5.5 4 13 59.7	·33	4 46 2·2 4 37 55·7 4 29 49·0 4 21 41·9 4 13 34·5	·33 ·36 ·38 ·41 ·44	4 37 33·3 4 29 25·0 4 21 16·2		4 45 19·0 4 37 9·2 4 28 59·1 4 20 48·5 4 12 37·5	·39 ·42 ·45 ·48 ·51	4 36 43.4 4 28 31.2 4 20 18.6	·41 ·44 ·48 ·52 ·55
28 30 32 33 34	4 6 17·9 3 58 12·9 3 50 7·6 3 46 4·8 3 42 2·0	'45	4 5 53.5 3 57 47.0 3 49 40.2 3 45 36.6 3 41 33.0	·48 ·49	4 5 26·8 3 57 18·6 3 49 10·0 3 45 5·5 3 41 1·0	.54		·51 ·54 ·57 ·59 ·61	4 4 25.9 3 56 13.7 3 48 1.0 3 43 54.3 3 39 47.5	•55 •59 •62 •64 •67	3 55 37.2	·59 ·63 ·67 ·70 •72
35 36 37 38 39	3 37 59·1 3 33 56·1 3 29 53·0 3 25 49·7 3 21 46·4	·47 ·48 ·50 ·51 ·53	3 29 21·3 3 25 17·1	.54	3 28 46.2	·58 ·59 ·61 ·63 ·65	3 32 14·0 3 28 7·7 3 24 1·3	·65	3 35 40·4 3 31 33·2 3 27 25·7 3 23 17·9 3 19 9·9	·71	3 34 57·5 3 30 48·8 3 26 39·9 3 22 30·7 3 18 21·1	·74 ·77 ·79 ·82 ·85
40 41 42 43 44	3 17 42·9 3 13 39·3 3 9 35·6 3 5 31·8 3 1 27·7	·54 ·56 ·58 ·59 ·61	3 13 3·8 3 8 59·0 3 4 54·0	•61 •62 •64 •66 •68	3 12 24·3 3 8 18·3 3 4 12·0	·67 ·69 ·71 ·74 ·76	3 II 40·7 3 7 33·3	•74 •76 •78 •81 •83	3 6 44·I 3 2 34·8	·83 ·86 ·89	3 5 50.5	·87 ·90 ·93 ·96 ·99
45 46 47 48 49	2 57 23·5 2 53 19·2 2 49 14·7 2 45 10·0 2 41 5·0	·65 ·67	2 56 43·5 2 52 37·9 2 48 32·1 2 44 25·9 2 40 19·6	•71 •73 •75 •78 •80	2 55 58·8 2 51 51·8 2 47 44·5 2 43 36·8 2 39 28·8	•78 •81 •84 •86 •89	2 51 0·8 2 46 51·8 2 42 42·4	•86 •89 •92 •95 •98	2 50 4.8	1.01	2 49 3·7 2 44 50·7 2 40 37·2	1.03 1.06 1.10 1.14 1.18
50 51 52 53 54	2 36 59·7 2 32 54·3 2 28 48·6 2 24 42·6 2 20 36·2	-81	2 36 12·9 2 32 5·9 2 27 58·5 2 23 50·8 2 19 42·6	·85 ·88 ·92		.95 .99 1.02	2 34 22·3 2 30 11·5 2 26 0·1 2 21 48·2 2 17 35·6	1.05 1.09	2 24 51.5	1·16 1·20 1·24	2 32 8·1 2 27 52·5 2 23 36·1 2 19 18·8 2 15 0·5	1·22 1·27 1·31 1·36 1·42
	VARIATION TO 1' OF LATITUDE AND ALTITUDE.											

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
° O	s. s. - '42 -4'02	s. s. - ·49 -4·03	s. s. - ·56 -4·04	s. s. - ·63 -4·05	s. s. s ·71 -4·07	s. s. - '78" - 4'08
8	.43 4.03	·51 4·03	.58 4.04	.65 4.05	.72 4.07	·79 4·08
	.45 4.03	.52 4.04	.59 4.05	·66 4·06	•74 4.07	·81 4·08
12	·46 4·03	.53 4.04	·61 4·05		•75 4.07	·83 4·09
14	·47 4·03	.24 4.04	·62 4·05	·69 4·06	•76 4.07	·84 4·09
16	·48 4·03	.55 4.04	·63 4·05	·70 4·06	·78 4·08	·85 4·09
18	49 4.03	.56 4.04	.64 4.05	·71 4·07	·79 4·08	·87 4·10
20	.50 4.03	.58 4.04	.65 4.05	.73 4.07	·81 4·08	·88 4·10
22	.51 4.04	1 .59 4.05	.67 4.06	•74 4.07	·82 4·09	.90 4.10
24	•53 4.04	·60 4·05	.68 4.06	74 407	.84 4.09	90 410
	33 404	403	00 400	/0 40/	04 409	92 411
26	•54 4•04	•62 4.05	·70 4·06	·78 4·08	·86 4·09	·94 4·11
28	.55 4.04	-63 4-05	•72 4.07	·80 4·08	-88 4.10	.07 4.12
30	.57 4.04	.65 4.06	•74 4.07	-82 4.00	.01 4.10	99 4.12
32	.59 4.05	·67 4·06	.76 4.07	·84 4·09	.93 4.11	1.02 4.13
34	·61 4·05	·69 4·06	·78 4·08	.87 4.10	•96 4-12	1.05 4.14
٠. ا	1.5	, , , , , ,	,, ,,	, , , , , , , , , , , , , , , , , , , ,	, , , , , ,	""
36	•63 4.05	•72 4.07	·81 4·08	.00 4.10	·99 4·12	1.08 4.15
38	·65 4·05	.74 4.07	·83 4·09	93 4.11	1.02 4.13	1.12 4.16
40	·67 4·06	•77 4.07	.86 4.00	.96 4.12	1.06 4.14	1.16 4.17
42	•70 4.06	·80 4·08	.90 4.10	1.00 4.12	1.10 4.15	1.21 4.18
44	•73 4•07	·83 4÷09	·93 4·II	1.04 4.13	1.15 4.16	1.26 4.19
46	•76 4.07	·87 4·09	.97 4.12	1.08 4.12	1.20 4.18	1.31 4.21
48	·80 4·08	.01 4.10	1.02 4.13	1.13 4.16	1.25 4.19	1.37 4.23
50	·84 4·09	.95 4.11	1.07 4.14	1.10 4.18	1.31 4.21	1.44 4.25
52	·88 4·10	1.00 4.13	1.13 4.16	1.25 4.19	1.38 4.23	1.52 4.28
54	.03 4.11	1.06 4.14	1.10 4.18	1.33 4.21	1.47 4.26	1.61 4.31

LATITUDE 2°. DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 5 58 17·9 5 17 20·5 5 9 8·3 5 0 55·8 4 52 42·9	s. - ·15 ·30 ·33 ·37 ·40	H. M. S. 5 58 9·2 5 17 1·9 5 8 47·7 5 0 33·0 4 52 18·0	s. - ·15 ·32 ·35 ·39 ·43	H. M. S. 5 58 0·3 5 16 42·4 5 8 26·0 5 0 9·0 4 51 51·6	s. - ·15 ·33 ·37 ·41 ·45	H. M. S. 5 57 51·3 5 16 22·0 5 8 3·1 4 59 43·7 4 51 23·7		H. M. S. 5 57 42·3 5 16 0·5 5 7 39·0 4 59 17·0 4 50 54·4	·36 ·41 ·46	H. M. S. 5 57 33.2 5 15 38.2 5 7 13.9 4 58 49.0 4 50 23.4	s. - ·15 ·38 ·43 ·48 ·53
18 20 22 24 26	4 44 29·5 4 36 15·8 4 28 1·5 4 19 46·6 4 11 31·1	·44 ·47 ·51 ·55 ·59	4 44 2·4 4 35 46·4 4 27 29·7 4 19 12·4 4 10 54·4	·55 ·59	4 43 33.7 4 35 15.1 4 26 55.9 4 18 36.0 4 10 15.1	•58	4 34 42·0 4 26 20·0 4 17 57·2	·57 ·62 ·67	4 42 31·0 4 34 6·9 4 25 41·9 4 17 16·0 4 8 48·9	·60 ·65	4 41 57·1 4 33 29·8 4 25 1·6 4 16 32·3 4 8 1·8	·58 ·63 ·69 ·75 ·81
28 29 30 31 32	4 3 15·0 3 59 6·5 3 54 57·9 3 50 49·1 3 46 40·0	·63 ·66 ·68 ·70 ·73	4 2 35.5 3 58 25.7 3 54 15.7 3 50 5.4 3 45 54.8	·68 ·70 ·73 ·75 ·78	4 I 53·3 3 57 42·1 3 53 30·5 3 49 I8·6 3 45 6·4	·73 ·75 ·78 ·81 ·83	3 56 55·5 3 52 42·3 3 48 28·7	·80 ·83 ·86	4 0 20.6 3 56 6.0 3 51 50.9 3 47 35.5 3 43 19.6	·85 ·88 ·91	3 59 29·9 3 55 13·3 3 50 56·3 3 46 38·9 3 42 21·0	·87 ·90 ·94 ·97 ·•01
33 34 35 36 37	3 42 30·6 3 38 21·1 3 34 11·2 3 30 1·0 3 25 50·4	.75 .78 .80 .83 .86	3 41 44·0 3 37 32·8 3 33 21·3 3 29 9·4 3 24 57·2	·86 ·89	3 40 53·9 3 36 41·0 3 32 27·7 3 28 14·1 3 24 0·0	·89 ·92 ·95	3 40 0.4 3 35 45.6 3 31 30.5 3 27 14.8 3 22 58.6	·95 ·99 I·02	3 39 3.4 3 34 46.6 3 30 29.3 3 26 11.5 3 21 53.1	1.05	3 38 2.6 3 33 43.7 3 29 24.2 3 25 4.1 3 20 43.3	1·04 1·08 1·12 1·16 1·20
38 39 40 41 42	3 21 39.6 3 17 28.4 3 13 16.8 3 9 4.8 3 4 52.3	·88 ·91 ·94 ·97 I·01	3 20 44·5 3 16 31·5 3 12 18·0 3 8 4·0 3 3 49·4	•98		1.02 1.06 1.09 1.13 1.17	3 5 48.3		3 4 33·I	1·21 1·25 1·30		1·24 1·29 1·34 1·38 1·43
43 44 45 46 47	3 0 39·3 2 56 25·9 2 52 11·9 2 47 57·2 2 43 42·0	1·04 1·08 1·11 1·15 1·19	2 59 34·3 2 55 18·6 2 51 2·3 2 46 45·2 2 42 27·4	1·21 1·25	2 58 24·3 2 54 6·1 2 49 47·2 2 45 27·5 2 41 6·9	1·25 1·30 1·34	2 57 9·0 2 52 48·2 2 48 26·5 2 44 3·8 2 39 40·1	1·35 1·40 1·45	2 55 48·4 2 51 24·6 2 46 59·8 2 42 34·0 2 38 6·9	I·44 I·50 I·55	2 54 22·0 2 49 55·1 2 45 27·0 2 40 57·6 2 36 26·9	1·49 1·54 1·60 1·66
48 49 50 51 52	2 39 26·0 2 35 9·3 2 30 51·7 2 26 33·3 2 22 13·9	1·24 1·28 1·33 1·38 1·43	2 38 8·7 2 33 49·2 2 29 28·7 2 25 7·2 2 20 44·6	1.44 1.49	2 36 45·3 2 32 22·7 2 27 58·9 2 23 33·9 2 19 7·5	1·50 1·56 1·62	2 35 15·3 2 30 49·3 2 26 21·9 2 21 53·1 2 17 22·6	1.62 1.68 1.75	2 24 37.4	1.74 1.81 1.88	2 3I 54·7 2 27 20·7 2 22 45·0 2 18 7·3 2 13 27·4	1·79 1·87 1·94 2·03 2·11

Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.
	S. S.	s. s.	S. S.	s. s.	s. s.	S. S.
0	- ⋅85 -4⋅09	92 -4.11	-I·00 -4·I3	-1.07 -4.14	-1.15 -4.17	-1.22 -4.19
4	·87 4·09	.94 4.11	1.02 4.13	1.00 4.12	1.17 4.17	1.24 4.19
8	·89 4·10	96 4.11	1.04 4.13	1.11 4.12	1.10 4.12	1.27 4.20
10	·89 4·10	97 4.13	1.04 4.14	1.15 4.19	1.30 4.18	1.27 4.20
12	·90 4·10	•98 4.12	1.05 4.14	1.13 4.16	1.21 4.18	1.29 4.20
14	·92 4·11	•99 4•12	1.07 4.14	1.15 4.16	1.23 4.19	1.31 . 4.21
16	·93 4·11	1.01 4.13	1.00 4.12	1.16 4.17	1.24 4.19	1.33 4.22
18	·95 4·II	1.02 4.13	1.10 4.12	1.18 4.12	1.26 4.20	1.35 4.22
20	-96 4-12	1.04 4.14	1.12 4.16	1.20 4.18	1.29 4.20	1.37 4.23
22	.98 4.12	1.06 4.14	1.12 4.16	1.23 4.19	1.31 4.21	1.40 4.24
24	1.00 4.13	1.09 4.15	1.17 4.17	1.25 4.19	1.34 4.22	1.43 4.25
26	1.03 4.13	1.11 4.12	1.20 4.18	1.28 4.20	1.37 4.23	1.46 4.26
28	1.05 4.14	1.14 4.16	1.23 4.19	1.31 4.21	1.40 4.24	1.49 4.27
30	1.08 4.14	1.17 4.17	1.26 4.20	1.35 4.22	1.44 4.25	1.23 4.29
32	1.11 4.12	1.20 4.18	1.50 4.51	1.39 4.24	1.48 4.27	1.58 4.30
34	1.14 4.16	1.24 4.19	1.33 4.22	1.43 4.25	1.53 4.28	1.63 4.32
36	1.18 4.17	1.27 4.20	1.37 4.23	1.47 4.27	1.58 4.30	1.68 4.34
38	1.22 4.18	1.32 4.21	1.42 4.25	1.52 4.28	1.63 4.32	1.74 4.36
40	1.26 4.20	1.37 4.23	1.47 4.26	1.58 4.30	1.69 4.34	1.81 4.39
42	1.31 4.21	1.42 4.25	1.53 4.28	1.64 4.33	1.76 4.37	1.88 4.42
44	1.37 4.23	1.48 4.27	1.60 4.31	1.71 4.35	1.84 4.40	1.96 4.46
46	1.43 4.25	1.55 4.29	1.67 4.34	1.79 4.39	1.92 4.44	2.06 4.50
48	1.49 4.27	1.62 4.32	1.75 4.37	1.88 4.42	2.02 4.49	2.17 4.55
50	1.57 4.30	1.71 4.35	1.84 4.41	1.99 4.47	2.14 4.23	2.29 4.61
52	1.66 4.33	1.80 4.39	1.95 4.45	2.10 4.21	2.27 4.58	2.43 4.69

LATITUDE 2°.

DECLINATION—CONTRARY NAME 10—LATITUDE.												
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.		Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 5 57 24.0 5 15 14.7 5 6 47.4 4 58 19.5 4 49 50.8	s. - ·15 ·40 ·45 ·50 ·56	H. M. S. 5 57 14·7 5 14 50·2 5 6 19·7 4 57 48·6 4 49 16·5	s. - ·16 ·42 ·47 ·53 ·59	H. M. S. 5 57 5.2 5 14 24.6 5 5 50.7 4 57 16.1 4 48 40.5	s. - ·16 ·44 ·49 ·55 ·61	H. M. S. 5 56 55.7 5 13 57.8 5 5 20.4 4 56 42.1 4 48 2.7	.52	5 13 30.0	- ·16 ·47 ·54 ·61	H. M. S. 5 56 36·2 5 13 0·9 5 4 15·5 4 55 29·1 4 46 41·4	s. - ·16 ·50 ·56 ·64 ·71
18 20 22 24 25	4 4I 2I·2 4 32 50·7 4 24 19·1 4 15 46·2 4 II 29·2	·61 ·67 ·73 ·79 ·82	4 40 43.5 4 32 9.4 4 23 34.1 4 14 57.4 4 10 38.5	.77	4 40 3.8 4 31 26.0 4 22 46.7 4 14 5.9 4 9 44.8	·68 ·74 ·81 ·88 ·92	4 39 22·1 4 30 40·2 4 21 56·8 4 13 11·6 4 8 48·3	1 .85	4 29 52·I 4 2I 4·2 4 I2 I4·4	·82 ·90 ·98 I·02		·78 ·86 ·94 I·03 I·07
26 27 28 29 30	4 7 11·9 4 2 54·2 3 58 36·0 3 54 17·5 3 49 58·4	·86 ·89 ·92 ·96 ·99	4 6 19·1 4 1 59·3 3 57 39·1 3 53 18·3 3 48 57·0	1.01	4 5 23.4 4 1 1.4 3 56 38.8 3 52 15.7 3 47 52.1	·95 ·99 I·03 I·07	4 4 24·5 4 0 0·2 3 55 35·2 3 51 9·6 3 46 43·4	1.03	3 58 55·5 3 54 28·0	1.12	4 2 17·1 3 57 47·5 3 53 17·2 3 48 46·2 3 44 14·2	1·12 1·16 1·21 1·26 1·31
31 32 33 34 35	3 45 38·8 3 41 18·8 3 36 58·1 3 32 36·8 3 28 14·9		3 44 35.2 3 40 12.7 3 35 49.6 3 31 25.8 3 27 1.3	I·17	3 43 27.7 3 39 2.7 3 34 37.1 3 30 10.5 3 25 43.2	1·16 1·20 1·24 1·29 1·34	3 42 16·4 3 37 48·7 3 33 20·2 3 28 50·8 3 24 20·5	1·27 1·32 1·37	3 41 1·1 3 36 30·4 3 31 58·9 3 27 26·4 3 22 52·8	I·34 I·39 I·45	3 35 7·7 3 30 33·0 3 25 57·1	1·36 1·42 1·47 1·53 1·59
36 37 38 39 40	3 23 52·3 3 19 28·9 3 15 4·8 3 10 39·7 3 6 13·8	1·23 1·28 1·32 1·37 1·42	3 18 9·8 3 13 42·8	1.36		1·39 1·44 1·50 1·55 1·61	3 19 49·2 3 15 16·8 3 10 43·2 3 6 8·4 3 1 32·3	1·47 1·53 1·59 1·65 1·71	3 13 42·3 3 9 5·2 3 4 26·6	1·68	3 7 21.2	1·65 1·72 1·78 1·86 1·93
41 42 43 44 45	3 I 46·9 2 57 I9·0 2 52 49·8 2 48 I9·4 2 43 47·7	1·48 1·53 1·59 1·65 1·71		1.63 1.69 1.76	2 58 38·2 2 54 3·1 2 49 26·5 2 44 48·3 2 40 8·3	1.74 1.80	2 56 54·8 2 52 15·6 2 47 34·8 2 42 52·1 2 38 7·4		2 50 21·3 2 45 35·9 2 40 48·4	1.96 2.04 2.13	2 53 8·0 2 48 19·8 2 43 29·4 2 38 36·5 2 33 41·1	2·01 2·09 2·18 2·27 2·37
46 47 48 49 50	2 39 14·5 2 34 39·7 2 30 3·2 2 25 24·7 2 20 44·2	2.00	2 37 24·2 2 32 45·0 2 28 3·8 2 23 20·4 2 18 34·5	1.98 2.06 2.15	2 35 26·4 2 30 42·4 2 25 56·0 2 21 7·1 2 16 15·3	2.30	2 33 20·5 2 28 31·2 2 23 39·2 2 18 44·2 2 13 46·0	2·26 2·36 2·47	2 21 12.8	2·42 2·53		2·47 2·58 2·70 2·83 2·98
		VA	ARIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITUD	E.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	A.	L. 21°	A.	L. 22°	Α.	L. 23°	A.
		_		_	_			_				_

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
° 0 4 6 8 10	S. S.					
	-1:30 -4:21	-1·38 -4·23	-1:46 -4:26	-1.54 -4.29	-1.62 -4.32	-1.70 -4.35
	1:32 4:21	1·39 4·24	1:47 4:26	1.55 4.29	1.63 4.32	1.71 4.35
	1:33 4:22	1·40 4·24	1:48 4:27	1.56 4.30	1.65 4.33	1.73 4.36
	1:35 4:22	1·42 4·25	1:50 4:27	1.58 4.30	1.66 4.34	1.74 4.37
	1:35 4:22	1·43 4·25	1:51 4:28	1.59 4.31	1.68 4.34	1.76 4.37
12	1·37 4·23	1·45 4·26	1·53 4·28	1.61 4.32	1·70 4·35	1.78 4.38
14	1·39 4·24	1·47 4·26	1·55 4·29	1.64 4.32	1·72 4·36	1.81 4.39
16	1·41 4·24	1·49 4·27	1·57 4·30	1.66 4.33	1·75 4·37	1.83 4.40
18	1·43 4·25	1·51 4·28	1·60 4·31	1.69 4.34	1·78 4·38	1.86 4.42
20	1·45 4·26	1·54 4·29	1·63 4·32	1.72 4.35	1·81 4·39	1.90 4.43
22	1.48 4.27	1.57 4.30	1.66 4.33	1·75 4·37	1.84 4.41	1.94 4.45
24	1.51 4.28	1.60 4.31	1.70 4.35	1·79 4·38	1.88 4.42	1.98 4.47
26	1.55 4.29	1.64 4.33	1.74 4.36	1·83 4·40	1.93 4.44	2.03 4.49
28	1.59 4.31	1.68 4.34	1.78 4.38	1·88 4·42	1.98 4.46	2.08 4.51
30	1.63 4.32	1.73 4.36	1.83 4.40	1·93 4·44	2.03 4.49	2.14 4.54
32	1.68 4.34	1·78 4·38	1.88 4.42	1·99 4·47	2·10 4·52	2·21 4·57
34	1.73 4.36	1·83 4·40	1.94 4.45	2·05 4·50	2·16 4·55	2·28 4·61
36	1.79 4.38	1·90 4·43	2.01 4.48	2·12 4·53	2·24 4·59	2·37 4·65
38	1.85 4.41	1·97 4·46	2.08 4.51	2·20 4·57	2·33 4·63	2·46 4·70
40	1.92 4.44	2·04 4·49	2.17 4.55	2·30 4·61	2·43 4·68	2·57 4·75
42	2·00 4·48	2·13 4·53	2·26 4·60	2·40 4·67	2·54 4·74	2·69 4·82
44	2·09 4·52	2·23 4·58	2·37 4·65	2·52 4·73	2·67 4·81	2·83 4·90
46	2·20 4·57	2·34 4·64	2·49 4·72	2·65 4·80	2·82 4·90	3·00 5·00
48	2·32 4·62	2·47 4·71	2·64 4·79	2·81 4·89	2·99 5·00	3·19 5·12
50	2·46 4·69	2·62 4·79	2·80 4·89	3·00 5·00	3·20 5·13	3·41 5·27

LATITUDE 3°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 56.7 5 11 56.0 5 3 55.3 4 55 54.6	S ·2I ·2I ·2I ·22 ·22	H. M. S. 5 59 47.4 5 19 43.5 5 11 42.7 5 3 41.8 4 55 40.9	s. - ·21 ·23 ·23 ·23 ·24		S. - ·2I ·24 ·24 ·25 ·26	H. M. S. 5 59 22·3 5 19 15·0 5 11 13·4 5 3 11·6 4 55 9·9	S. - ·21 ·25 ·26 ·27 ·28	5 10 57.3	s. - ·21 ·26 ·28 ·29 ·30	5 10 40·3 5 2 37·2	s. - ·21 ·28 ·29 ·31 ·32
18 20 22 24 26	4 47 53.9 4 39 53.1 4 31 52.4 4 23 51.6 4 15 50.8	·22 ·22 ·23 ·23 ·23	4 47 40·0 4 39 39·0 4 31 38·0 4 23 36·9 4 15 35·8	·24 ·25 ·25 ·26 ·27	4 39 23·3 4 31 21·8 4 23 20·3	·27 ·27 ·28 ·29 ·30	4 47 8.0 4 39 6.0 4 31 4.0 4 23 1.8 4 14 59.5	·30 ·31	4 46 49·9 4 38 47·2 4 30 44·4 4 22 41·4 4 14 38·2	•36	4 46 30·4 4 38 26·8 4 30 23·0 4 22 19·0 4 14 14·8	·34 ·35 ·37 ·39 ·41
28 30 32 33 34	4 7 50·0 3 59 49·1 3 51 48·2 3 47 47·7 3 43 47·3	·24 ·24 ·25 ·25 ·25	4 7 34.6 3 59 33.4 3 51 32.0 3 47 31.4 3 43 30.7	·27 ·28 ·29 ·30 ·30	3 51 13·2 3 47 12·2	·31 ·32 ·33 ·34 ·35	4 6 57·I 3 58 54·5 3 50 5I·8 3 46 50·3 3 42 48·9	*35 *37 *38 *39 *40	3 58 31·3 3 50 27·6 3 46 25·6	·39 ·41 ·43 ·43 ·45	4 6 10.4 3 58 5.7 3 50 0.7 3 45 58.1 3 41 55.4	*43 *45 *47 *48 *49
35 36 37 38 39	3 39 46.8 3 35 46.3 3 31 45.8 3 27 45.3 3 23 44.7	·26 ·26 ·26 ·27 ·27	3 39 29·9 3 35 29·2 3 31 28·4 3 27 27·6 3 23 26·8	·31 ·32 ·32 ·33	3 39 10·1 3 35 9·0 3 31 7·9 3 27 6·7 3 23 5·4	*35 *36 *37 *38 *38	3 38 47·3 3 34 45·7 3 30 44·1 3 26 42·4 3 22 40·6	·40 ·41 ·42 ·43 ·44	3 34 19·3 3 30 17·1 3 26 14·7	·46 ·47 ·48 ·49 ·50	3 37 52.6 3 33 49.7 3 29 46.7 3 25 43.6 3 21 40.4	·51 ·52 ·53 ·55 ·56
40 41 42 43 44	3 19 44·2 3 15 43·6 3 11 43·0 3 7 42·4 3 3 41·8	·27 ·28 ·28 ·29 ·29	3 19 25·9 3 15 25·1 3 11 24·2 3 7 23·2 3 3 22·2	·33 ·34 ·35 ·35 ·36	3 15 2·7 3 11 1·5 3 7 0·1	'39 '40 '41 '42 '43		·45 ·46 ·47 ·49 ·50	3 10 4·6 3 6 1·7	·51 ·53 ·54 ·55 ·57	3 17 37·1 3 13 33·6 3 9 30·1 3 5 26·4 3 1 22·5	·61 ·62
45 46 47 48 49	2 59 41·1 2 55 40·5 2 51 39·7 2 47 39·0 2 43 38·3	·30 ·31 ·31 ·32	2 59 21·2 2 55 20·1 2 51 19·0 2 47 17·8 2 43 16·6	·38 ·38 ·39	2 58 57·0 2 54 55·4 2 50 53·7 2 46 51·9 2 42 50·1	'45	2 58 28·5 2 54 26·2 2 50 23·8 2 46 21·2 2 42 18·6	·51 ·52 ·54 ·55 ·57	2 53 52·5 2 49 49·I 2 45 45·7	·58 ·60 ·62 ·63 ·65	2 57 18·3 2 53 14·2 2 49 9·8 2 45 5·2 2 41 0·3	·66 ·68 ·70 ·72 ·74
50 51 52 53 54	2 39 37·5 2 35 36·7 2 31 35·8 2 27 34·9 2 23 34·0	·34 ·35	2 39 15·3 2 35 14·0 2 31 12·6 2 27 11·2 2 23 9·6	·42 ·43 ·44	2 38 48·I 2 34 46·I 2 30 44·0 2 26 4I·7 2 22 39·3	•54	2 34 12·8 2 30 9·8 2 26 6·5	·60 ·62 ·64	2 37 38·2 2 33 34·1 2 29 29·9 2 25 25·4 2 21 20·7	·69 ·71 ·73	2 36 55·3 2 32 50·0 2 28 44·3 2 24 38·4 2 20 32·2	·81 ·83

Alt.	L. 0° A.	L. 1 ° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5 ° A.
° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	S. S. - '00 -4'01 '01 4'01 '03 4'11 '04 4'01 '05 4'01	S. S. 07 -4.01 .09 4.01 .10 4.01 .12 4.01 .12 4.01	S. S '14 - 4'01 '16 4'01 '17 4'01 '19 4'01 '20 4'01	S. S. - ·21 -4·01 ·23 4·01 ·24 4·01 ·26 4·01 ·27 4·01	s. s. - ·28 -4·02 ·30 4·02 ·31 4·02 ·33 4·02 ·34 4·02	s. s. - '35 -4'02 '37 4'02 '39 4'02 '40 4'03 '41 4'03
16	·06 4·01	13 4.01	·2I 4·0I	·28 4·02	35 4.02	.43 4.03
18	·07 4·01	14 4.01	·22 4·0I	·29 4·02	36 4.02	.44 4.03
20	·08 4·01	15 4.01	·23 4·0I	·30 - 4·02	38 4.02	.45 4.03
22	·09 4·01	16 4.01	·24 4·0I	·31 4·02	39 4.02	.46 4.03
24	·10 4·01	17 4.01	·25 4·0I	·32 4·02	40 4.03	.48 4.03
26	·10 4·01	·18 4·01	·26 4·01	'34 4.02	.42 4.03	·50 4·04
28	·11 4·01	·19 4·01	·27 4·01	'35 4.02	.43 4.03	·51 4·04
30	·12 4·01	·20 4·01	·28 4·02	'37 4.02	.45 4.03	·53 4·04
32	·13 4·01	·21 4·01	·30 4·02	'38 4.02	.46 4.03	·55 4·04
34	·14 4·01	·23 4·01	·31 4·02	'40 4.02	.48 4.03	·57 4·05
36	·15 4·01	·24 4·01	*33 4.02	*41 4.03	*50 4.04	.59 4.05
38	·16 4·01	·25 4·01	*34 4.02	*43 4.03	*52 4.04	.61 4.05
40	·18 4·01	·27 4·01	*36 4.02	*45 4.03	*55 4.04	.64 4.06
42	·19 4·01	·28 4·01	*38 4.02	*47 4.03	*57 4.05	.67 4.06
44	·20 4·01	·30 4·02	*40 4.03	*50 4.04	*60 4.05	.70 4.07
46	·22 4·0I	32 4·02	·42 4·03	·52 4·04	·63 4·05	.73 4.07
48	·23 4·0I	34 4·02	·44 4·03	·55 4·04	·66 4·06	.77 4.08
50	·25 4·0I	36 4·02	·47 4·03	·58 4·05	·70 4·07	.81 4.09
52	·27 4·0I	38 4·02	·50 4·04	·62 4·05	·74 4·07	.85 4.10
54	·29 4·02	41 4·03	·53 4·04	·66 4·05	·78 4·08	.91 4.10

LATITUDE 3°.

		10.	CCLINA	. 1011-	-CONTR	лиі	NAME	10-	LATITUI	DE.		
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 5 58 44.3 5 18 26.4 5 10 22.4 5 2 18.3 4 54 14.0	•29	H. M. S. 5 58 31.5 5 18 8.5 5 10 3.4 5 1 58.2 4 53 52.7	s. - ·21 - ·30 ·32 ·34 ·36	H. M. S. 5 58 18·7 5 17 49·9 5 9 43·5 5 1 37·0 4 53 30·2	s. - ·21 ·32 ·34 ·36 ·39	H. M. S. 5 58 5.9 5 17 30.4 5 9 22.6 5 1 14.6 4 53 6.3	·33	H. M. S. 5 57 53.0 5 17 10.0 5 9 0.7 5 0 51.1 4 52 41.1	s. - ·22 ·35 ·37 ·40 ·43	H. M. s. 5 57 39.9 5 16 48.7 5 8 37.7 5 0 26.3 4 52 14.4	s. - ·22 ·36 ·39 ·42 ·46
18 20 22 24 26	4 46 9.4 4 38 4.7 4 29 59.8 4 21 54.7 4 13 49.2	•36 •38 •40 •42 •44	4 45 47.0 4 37 41.1 4 29 34.8 4 21 28.3 4 13 21.5		4 45 23·I 4 37 I5·7 4 29 8·0 4 2I 0·0 4 I2 5I·5	·41 ·44 ·46 ·49 ·52	4 44 57.7 4 36 48.7 4 28 39.3 4 20 29.5 4 12 19.2	.44 .46 .49 .52	4 44 30·7 4 36 20·0 4 28 8·7 4 19 57·0 4 11 44·7	·53	4 44 2·I 4 35 49·4 4 27 36·I 4 19 22·2 4 II 7·7	·49 ·52 ·56 ·60 ·64
28 30 32 33 34	4 5 43.5 3 57 37.4 3 49 31.0 3 45 27.6 3 41 24.2	•53	4 5 14·2 3 57 6·6 3 48 58·5 3 44 54·3 3 40 49·9	•54 •56	4 4 42.5 3 56 33.1 3 48 23.2 3 44 17.9 3 40 12.6	•55 •58 •61 •63 •65	4 4 8·4 3 55 57·0 3 47 44·9 3 43 38·6 3 39 32·1	·62 ·66	4 3 31.7 3 55 18.1 3 47 3.6 3 42 56.1 3 38 48.3	·63 ·67 ·71 ·73 •76	4 2 52·4 3 54 36·3 3 46 19·3 3 42 10·4 3 38 1·3	·68 ·72 ·76 ·79 ·81
35 36 37 38 39	3 37 20.6 3 33 16.8 3 29 13.0 3 25 9.0 3 21 4.9	.57 .59 .61	3 36 45.4 3 32 40.7 3 28 35.9 3 24 30.9 3 20 25.8	·61 ·63 ·65 ·66 ·68	3 36 7.0 3 32 1.3 3 27 55.3 3 23 49.2 3 19 42.9	·67 ·69 ·71 ·73 75	3 35 25·3 3 31 18·4 3 27 11·2 3 23 3·8 3 18 56·1	•72 •74 •76 •79 •81	3 34 40·3 3 30 32·0 3 26 23·5 3 22 14·6 3 18 5·5	•78 •80 •83 •85 •88	3 33 51.8 3 29 42.1 3 25 32.0 3 21 21.6 3 17 10.8	·84 ·86 ·89 ·92 ·95
40 41 42 43 44	3 17 0.7 3 12 56.2 3 8 51.6 3 4 46.9 3 0 41.8	·64 ·66 ·67 ·69	3 12 14·8 3 8 9·1 3 4 3·1	·70 ·72 ·74 ·77 ·79	3 15 36·3 3 11 29·4 3 7 22·3 3 3 15·0 2 59 7·3		3 14 48·1 3 10 39·9 3 6 31·3 3 2 22·4 2 58 13·1	·84 ·86 ·89 ·91	3 5 35.9	·90 ·93 ·96 ·99 I·02	3 4 35.9	·97 I·01 I·04 I·07 I·II
45 46 47 48 49	2 56 36.6 2 52 31.2 2 48 25.6 2 44 19.6 2 40 13.4	·76 ·78 ·80	2 55 50·3 2 51 43·5 2 47 36·4 2 43 29·0 2 39 21·2	.89	2 46 42.2	•95 •98	2 54 3.4 2 49 53.3 2 45 42.8 2 41 31.7 2 37 20.1	·97 I·00 I·03 I·07 I·10	2 40 24.8	1.19 1.13	2 51 56.7 2 47 42.5 2 43 27.6 2 39 12.1 2 34 55.8	1·14 1·18 1·22 1·26
50 51 52 53 54	2 36 6·9 2 32 0·1 2 27 52·9 2 23 45·3 2 19 37·3	·85 ·88 ·91 ·94 ·97	2 31 4·5 2 26 55·4 2 31 4·5	I.01	2 34 13·4 2 30 2·9 2 25 51·8 2 21 40·1 2 17 27·7	1·15 1·11	2 33 8 0 2 28 55 2 2 24 41 7 2 20 27 6 2 16 12 6		2 31 56·4 2 27 41·2 2 23 25·1 2 19 8·1 2 14 50·2	1·33 1·38	2 30 38·6 2 26 20·6 2 22 1·6 2 17 41·5 2 13 20·3	1·35 1·40 1·45 1·51 1·56
		V.	ARIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITU	DE.	•	
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	A.	L. 9°	A.	L. 10°	Α.	L. 11°	A.
0 4 8 12 14	s. - ·42 - ·44 ·46 ·48 ·49	s. -4.03 4.03 4.03 4.03 4.03	s. - '49 - '51 '53 '55 '56	s. -4.03 4.04 4.04 4.04 4.04	s. 56 .58 .60 .62 .64	s. -4.04 4.05 4.05 4.05 4.06	s. 64 .66 .68 .70 .71	s. -4.06 4.06 4.06 4.07 4.07	s. - ·71 - ·73 ·75 ·77 ·78	s. -4.07 4.07 4.07 4.08 4.08	s. 78 .80 .82 .85 .86	s. -4.08 4.08 4.09 4.09 4.10
16 18 20 22 24	·50 ·51 ·53 ·54 ·56	4·04 4·04 4·04 4·04	·57 ·59 ·60 ·62 ·64	4.05 4.05 4.05 4.05 4.06	·65 ·66 ·68 ·70 ·72	4.06 4.06 4.07 4.07	·72 ·74 ·76 ·78 ·80	4.07 4.08 4.08 4.08	·80 ·82 ·84 ·86 ·88	4.08 4.09 4.10 4.10	·88 ·89 ·91 ·93 ·96	4·I0 4·II 4·II 4·II
26 28 30 32 34	·57 ·59 ·61 ·63 ·66	4.05 4.05 4.06 4.06	·66 ·68 ·70 ·72 ·74	4·06 4·06 4·07 4·07	.74 .76 .78 .80 .83	4.07 4.08 4.08 4.09 4.09	·82 ·84 ·87 ·89 ·92	4.09 4.10 4.10 4.11	·90 ·92 ·95 ·98 I·01	4·II 4·II 4·I2 4·I2 4·I3	·98 1·01 1·04 1·07 1·10	4·12 4·13 4·14 4·15 4·16
36 38 40 42 44	·68 ·71 ·74 ·77 ·80	4·06 4·07 4·07 4·08 4·09	·77 ·80 ·83 ·87 ·91	4.08 4.09 4.10 4.11	·86 ·89 ·93 ·97 ••••	4·I0 4·I1 4·I2 4·I3	·95 ·99 1·03 1·07 1·12	4·12 4·13 4·15 4·16	1.05 1.09 1.13 1.17 1.22	4·14 4·15 4·16 4·17 4·19	1·14 1·18 1·23 1·28 1·34	4·17 4·18 4·19 4·20 4·22
46 48 50 52 54	·84 ·88 ·93 ·98 I·04	4·09 4·10 4·11 4·12 4·14	·95 ·99 1·05 1·10 1·17	4·12 4·13 4·14 4·15 4·17	1.06 1.11 1.17 1.23 1.30	4·14 4·16 4·17 4·19 4·21	1·17 1·22 1·29 1·36 1·44	4·17 4·19 4·21 4·23 4·25	1·28 1·34 1·41 1·49 1·59	4·21 4·23 4·25 4·28 4·31	1·40 1·47 1·54 1·63 1·73	4·24 4·26 4·29 4·33 4·36

LATITUDE 3°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	′14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 10 12 14 16	H. M. S. 5 57 26.8 5 16 26.6 5 8 13.6 5 0 0.2 4 51 46.4	s. - ·22 ·38 ·41 ·45 ·48	H. M. S. 5 57 13.6 5 16 3.5 5 7 48.4 4 59 32.8 4 51 16.8	s. - ·22 ·39 ·43 ·47 ·51	H. M. S. 5 57 0·3 5 15 39·4 5 7 22·1 4 59 4·2 4 50 45·7	s. ·22 ·41 ·45 ·49 ·53	H. M. S. 5 56 46·9 5 15 14·4 5 6 54·6 4 58 34·2 4 50 13·1	s. ·22 ·43 ·47 ·51 ·56	H. M. S. 5 56 33·3 5 14 48·3 5 6 25·8 4 58 2·8 4 49 39·0	s. - ·23 ·44 ·49 ·53 ·58	H. M. S. 5 56 19.7 5 14 21.3 5 5 56.0 4 57 30.0 4 49 3.1	s. ·23 ·46 ·51 ·56 ·61
18 20 22 24 26	4 43 32·0 4 35 17·1 4 27 1·6 4 18 45·3 4 10 28·4		4 43 0·2 4 34 42·9 4 26 25·0 4 18 6·1 4 9 46·5	•63	4 42 26.6 4 34 6.8 4 25 46.2 4 17 24.7 4 9 2.1	·57 ·62 ·66 ·71 ·76	4 41 51.4 4 33 28.8 4 25 5.3 4 16 40.8 4 8 15.1	·60 ·65 ·70 ·75 ·81	4 41 14·3 4 32 48·7 4 24 22·1 4 15 54·4 4 7 25·4	.74	4 40 35·4 4 32 6·6 4 23 36·8 4 15 5·6 4 6 33·0	·66 ·72 ·78 ·84 ·90
28 29 30 31 32	4 2 10·5 3 58 1·3 3 53 51·7 3 49 42·0 3 45 31·9	·72 ·74 ·77 ·79 ·82	4 I 25.9 3 57 I5.2 3 53 4.2 3 48 52.9 3 44 41.2	·77 ·79 ·82 ·84 ·87	4 0 38·5 3 56 26·2 3 52 13·6 3 48 0·6 3 43 47·3	·81 ·84 ·87 ·90	3 59 48·2 3 55 34·2 3 51 19·9 3 47 5·1 3 42 50·0	·86 ·90 ·92 ·95 ·98	3 58 55·0 3 54 39·2 3 50 23·0 3 46 6·3 3 41 49·1	·91 ·94 ·98 1·01 1·04		·96 1·00 1·03 1·07 1·11
33 34 35 36 37	3 41 21·5 3 37 10·9 3 32 59·8 3 28 48·5 3 24 36·7	·84 ·87 ·90 ·92 ·95	3 40 29·3 3 36 17·0 3 32 4·2 3 27 51·1 3 23 37·5	·90 ·93 ·96 ·99 1·02		·96 ·99 I·02 I·05 I·09	3 38 34·3 3 34 18·2 3 30 1·6 3 25 44·5 3 21 26·7	1·02 1·05 1·09 1·12 1·16	3 37 31·5 3 33 13·2 3 28 54·4 3 24 35·0 3 20 14·9		3 36 24·7 3 32 4·3 3 27 43·1 3 23 21·2 3 18 58·7	1·14 1·18 1·22 1·27 1·31
38 39 40 41 42	3 20 24·5 3 16 12·0 3 11 59·0 3 7 45·4 3 3 31·3	·98 1·02 1·05 1·08 1·12		1·05 1·09 1·12 1·16 1·20	3 9 44.1	1·12 1·16 1·20 1·24 1·28		1·20 1·24 1·28 1·33 1·37		1·28 1·32 1·37 1·41 1·46	3 5 45·8 3 1 19·6	1·36 1·40 1·45 1·50 1·56
43 44 45 46 47	2 59 16.7 2 55 1.5 2 50 45.5 2 46 29.0 2 42 11.6	1.19		1·24 1·28 1·32 1·37 1·42	2 56 48·1 2 52 27·8 2 48 6·6 2 43 44·6 2 39 21·4	1·33 1·37 1·42 1·47 1·52	2 51 2·6 2 46 38·5	1·42 1·47 1·52 1·58 1·63	2 53 57·8 2 49 31·6 2 45 4·2 2 40 35·5 2 36 5·4	1.57	2 52 24.0 2 47 54.4 2 43 23.4 2 38 51.0 2 34 16.9	1.61 1.67 1.74 1.80 1.87
48 49 50 51 52	2 37 53.4 2 33 34.3 2 29 14.3 2 24 53.2 2 20 31.0	1·46 1·52	2 36 28·5 2 32 6·4 2 27 43·1 2 23 18·6 2 18 52·7		2 26 4·9 2 21 36·6	1·58 1·64 1·70 1·77 1·84	2 33 19·1 2 28 49·8 2 24 19·1 2 19 46·7 2 15 12·3	1.90	2 31 33.8 2 27 0.6 2 22 25.5 2 17 48.4 2 13 9.2	1·89 1·96 2·04	2 29 41·1 2 25 3·4 2 20 23·6 2 15 41·4 2 10 56·7	2.19
		V	ARIATIC	N TO	ı' OF	LAT	TUDE A	AND	ALTITU	DE.	,	
Alt.	L. 12	° A.	L. 13°	A.	L. 14	A.	L. 15°	Α.	L. 16	A.	L. 17	° A.
0 4 8 10 12	s. ·85 ·87 ·90 ·91 ·92	S. 4.09 4.10 4.11 4.11	s. 93 .95 .97 .98 1.00	S. -4·11 4·12 4·12 4·13	S. 1.00 1.02 1.05 1.06 1.07	s. -4·13 4·14 4·14 4·15	S. -1.07 · 1.10 1.12 1.13 1.15	s. -4·15 4·16 4·16 4·17	S. -1·15 1·18 1·20 1·21 1·23	s. -4·17 4·17 4·18 4·18 4·19	S. 1·23 1·25 1·28 1·29 1·31	S. 4·19 4·20 4·21 4·21
14 16 18 20 22	·94 ·95 ·97 ·99	4·11 4·12 4·13 4·13	1·01 1·03 1·05 1·07 1·10	4·13 4·14 4·15 4·15	1.09 1.11 1.13 1.15 1.18	4·15 4·16 4·16 4·17 4·17	1·17 1·19 1·21 1·24 1·26	4·17 4·18 4·18 4·19 4·20	1·25 1·27 1·29 1·32 1·35	4·19 4·20 4·21 4·22 4·23	1·33 1·35 1·38 1·40 1·43	4·22 4·23 4·24 4·24 4·25
24 26 28 30 32	1.04 1.07 1.10 1.13 1.16	4·14 4·15 4·16 4·17	1·12 1·15 1·18 1·22 1·25	4·16 4·17 4·18 4·19 4·20	1·21 1·24 1·27 1·31	4·18 4·19 4·20 4·21 4·22	1·29 1·32 1·36 1·40	4·21 4·22 4·23 4·24 4·26	1·38 1·41 1·45 1·49 1·54	4·24 4·25 4·26 4·27 4·29	1·47 1·50 1·54 1·59 1·64	4·27 4·28 4·29 4·31 4·33
34 36 38 40 42	1·20 1·24 1·28 1·33 1·39	4·18 4·19 4·21 4·22 4·24	1·29 1·34 1·38 1·44 1·50	4·21 4·22 4·24 4·26 4·28	1·39 1·44 1·49 1·55 1·61	4·24 4·26 4·27 4·29 4·32	1·49 1·54 1·59 1·66	4·27 4·29 4·31 4·33 4·36	1·59 1·64 1·70 1·77 1·85	4·31 4·33 4·35 4·38 4·41	1·69 1·75 1·81 1·89 1·97	4·35 4·37 4·40 4·43 4·46
44 46 48 50 52	1.45 1.52 1.59 1.68 1.78	4·26 4·28 4·31 4·34 4·38	1·56 1·64 1·72 1·82 1·93	4·30 4·33 4·36 4·40 4·44	1.68 1.76 1.86 1.96 2.08	4·34 4·38 4·41 4·46 4·51	1·81 1·89 1·99 2·11 2·24	4·39 4·43 4·47 4·53 4·59	1·93 2·03 2·14 2·26 2·41	4·45 4·49 4·54 4·60 4·67	2·06 2·17 2·29 2·43 2·59	4·50 4·55 4·61 4·68 4·77

LATITUDE 3°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 5 56 5.9 5 13 53.1 5 5 24.7 4 56 55.6 4 48 25.6	s. - ·23 ·48 ·53 ·58 ·64	H. M. S. 5 55 51·9 5 13 23·8 5 4 52·2 4 56 19·8 4 47 46·3	·55 ·61	H. M. S. 5 55 37.7 5 12 53.3 5 4 18.3 4 55 42.3 4 47 5.2	s. - ·24 ·52 ·58 ·64 ·70	H. M. S. 5 55 23.3 5 12 21.6 5 3 42.9 4 55 3.2 4 46 22.2	s. - ·24 ·54 ·60 ·67 ·73	H. M. S. 5 55 8.8 5 11 48.7 5 3 6.1 4 54 22.4 4 45 37.4	s. - ·24 ·56 ·63 ·69 ·76	H. M. S. 5 54 54·1 5 11 14·5 5 2 27·8 4 53 39·8 4 44 50·4	s. - ·25 ·58 ·65 ·72 ·80
18 20 22 24 25	4 39 54·6 4 31 22·4 4 22 48·9 4 14 14·1 4 9 56·0	.82	4 39 11·7 4 30 35·9 4 21 58·7 4 13 19·9 4 8 59·8	·73 ·79 ·86 ·93 ·96	4 38 26·9 4 29 47·2 4 21 5·9 4 12 22·9 4 8 0·6	·83	4 37 39.9 4 28 56.1 4 20 10.5 4 11 23.0 4 6 58.4	·80 ·87 ·95 I·02 I·06	4 36 50·8 4 28 2·6 4 19 12·4 4 10 20·0 4 5 53·0	·84 ·91 ·99 1·07 1·12	4 27 6·5 4 18 11·4 4 9 14·0	·88 ·96 I·04 I·13 I·17
26 27 28 29 30	4 5 37.6 4 1 18.7 3 56 59.3 3 52 39.4 3 48 19.0	1.05	4 4 39.2 4 0 18.2 3 55 56.6 3 51 34.5 3 47 11.7	1.07	4 3 37·8 3 59 14·5 3 54 50·5 3 50 26·0 3 46 0·7	1.13	4 2 33·2 3 58 7·4 3 53 41·0 3 49 13·8 3 44 45·8	1·10 1·15 1·19 1·24 1·28	3 56 56·8 3 52 27·7 3 47 57·7	1.30	4 0 13·9 3 55 42·6 3 51 10·6 3 46 37·7 3 42 3·9	1·22 1·27 1·32 1·37 1·42
31 32 33 34 35	3 43 58·0 3 39 36·4 3 35 14·1 3 30 51·2 3 26 27·5	1·17 1·21 1·25	3 42 48·3 3 38 24·2 3 33 59·4 3 29 33·8 3 25 7·4	1.24	3 41 34·7 3 37 8·0 3 32 40·4 3 28 12·0 3 23 42·6	1·31 1·35 1·40	3 40 17·1 3 35 47·5 3 31 17·1 3 26 45·6 3 22 13·1	1·38 1·43 1·48	3 38 55·3 3 34 22·7 3 29 49·1 3 25 14·3 3 20 38·4	1·45 1·51 1·56	3 37 29·1 3 32 53·2 3 28 16·2 3 23 38·0 3 18 58·4	1·47 1·53 1·59 1·65 1·71
36 37 38 39 40	3 22 3.0 3 17 37.7 3 13 11.4 3 8 44.2 3 4 16.0	1.39			3 14 40·9 3 10 8·3 3 5 34·4	1·56 1·62 1·68		1.71	3 16 1·3 3 11 22·7 3 6 42·7 3 2 1·2 2 57 17·9	1.75 1.81 1.88	3 4 50.9	1·78 1·85 1·92 1·99 2·07
41 42 43 44 45	2 59 46·6 2 55 16·0 2 50 44·1 2 46 10·8 2 41 35·9	1.66 1.72 1.78	2 58 7·7 2 53 33·4 2 48 57·7 2 44 20·3 2 39 41·2	1.83	2 56 22·6 2 51 44·4 2 47 4·5 2 42 22·7 2 37 39·0	1.87		1.99		2·11 2·20 2·29	2 50 27·2 2 45 35·0 2 40 40·3 2 35 42·8 2 30 42·4	2.34
46 47 48 49 50	2 36 59·3 2 32 20·9 2 27 40·5 2 22 57·8 2 18 12·7	2·00 2·08 2·17	2 35 0·1 2 30 17·0 2 25 31·5 2 20 43·4 2 15 52·5	2·05 2·14 2·22 2·32 2·42			2 25 43.3	2·43 2·54 2·66	2 28 12·8 2 23 12·4 2 18 8·4 2 13 0·4 2 7 47·9	2.60 2.72 2.85	2 25 38·6 2 20 31·2 2 15 19·6 2 10 3·4 2 4 42·0	2·91 3·06
		VA	RIATIO	N TC	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α.	L. 22°	A.	L. 23°	° А.
0 4 6 8 10	s. -1·30 - 1·33 1·34 1·36 1·37	s. -4·21 4·22 4·22 4·23 4·23	s. -1·38 ·41 ·42 ·44 ·44	s. -4·23 4·24 4·25 4·25 4·26	s. -1.46 - 1.48 1.49 1.51 1.53	s. -4·26 4·27 4·28 4·28 4·29	s. -1.54 1.56 1.57 1.59 1.61	s. -4·29 4·30 4·30 4·31 4·32	s. -1.62 1.64 1.66 1.68 1.70	s. -4·32 4·33 4·33 4·34 4·35	s. -1.70 1.72 1.74 1.76 1.78	s. -4·35 4·36 4·37 4·38 4·38
12 14 16 18 20	1·39 1·41 1·43 1·46 1·49	4·24 4·25 4·25 4·26 4·27	1·47 1·49 1·52 1·55 1·58	4·27 4·27 4·28 4·29 4·30	1·55 1·58 1·60 1·63 1·66	4·30 4·31 4·32 4·34	1.64 1.66 1.69 1.72 1.75	4·33 4·34 4·35 4·36 4·37	1.72 1.75 1.78 1.81 1.84	4·36 4·37 4·38 4·39 4·41	1.81 1.83 1.86 1.90 1.94	4·39 4·41 4·42 4·43 4·45
22 24 26 28 30	1·52 1·56 1·59 1·64 1·68	4·28 4·30 4·31 4·33 4·35	1.61 1.65 1.69 1.73 1.78	4·32 4·33 4·35 4·36 4·38	1·70 1·74 1·78 1·83 1·88	4·35 4·37 4·38 4·40 4·43	1.79 1.83 1.88 1.93 1.99	4·39 4·40 4·42 4·45 4·47	1.88 1.93 1.98 2.03 2.09	4·43 4·45 4·47 4·49 4·52	1.98 2.03 2.08 2.14 2.20	4·47 4·49 4·51 4·54 4·57
32 34 36 38 40	1·74 1·79 1·86 1·93 2·01	4·37 4·39 4·41 4·45 4·48	1.84 1.90 1.97 2.05 2.13	4·4I 4·43 4·46 4·50 4·54	1·94 2·01 2·08 2·17 2·26	4·45 4·48 4·51 4·55 4·60	2·05 2·12 2·20 2·29 2·39	4·50 4·53 4·57 4·61 4·66	2·16 2·24 2·32 2·42 2·53	4·55 4·59 4·63 4·68 4·74	2·28 2·36 2·45 2·55 2·67	4·61 4·65 4·69 4·75 4·81
42 44 46 48 50	2·10 2·20 2·31 2·44 2·60	4·52 4·57 4·62 4·69 4·77	2·23 2·34 2·46 2·61 2·78	4·58 4·64 4·70 4·78 4·87	2·36 2·48 2·62 2·78 2·98	4·65 4·71 4·79 4·88 4·99	2·50 2·63 2·79 2·96 3·17	4·72 4·79 4·88 4·98 5·11	2·65 2·80 2·96 3·16 3·39	4·80 4·88 4·98 5·10 5·25	2·81 2·96 3·15 3·36 3·62	4·89 4·98 5·09 5·23 5·40

LATITUDE 4°.

			LODINI	-	-CONTR		NAME		LAIIIU	<i>D.</i>		
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 54.1 5 11 52.8 5 3 51.6 4 55 50.4	s. - ·28 ·28 ·28 ·29 ·29	5 11 35·2 5 3 33·8	s. - ·28 ·30 ·30 ·31 ·31	H. M. S. 5 59 26·4 5 19 18·5 5 11 16·7 5 3 14·9 4 55 13·0	s. - ·28 ·31 ·32 ·32 ·33	H. M. S. 5 59 9.6 5 18 59.6 5 10 57.3 5 2 55.0 4 54 52.5	s. - ·28 ·32 ·33 ·34 ·35	H. M. S. 5 58 52.8 5 18 39.8 5 10 37.0 5 2 33.9 4 54 30.7	s. - ·28 ·34 ·35 ·36 ·37	H. M. s. 5 58 35.9 5 18 19.3 5 10 15.6 5 2 11.7 4 54 7.6	s - ·28 ·35 ·36 ·38 ·39
18 20 22 24 26	4 47 49·I 4 39 47·8 4 3I 46·5 4 23 45·0 4 I5 43·6		4 39 29·1 4 31 27·5 4 23 25·7	·32 ·32 ·33 ·34 ·35	4 47 11.0 4 39 9.0 4 31 6.8 4 23 4.5 4 15 2.1		4 46 49·9 4 38 47·2 4 30 44·4 4 22 41·4 4 14 38·2	·36 ·38 ·39 ·40 ·42	4 38 23.8 4 30 20.1 4 22 16.3	.42	4 46 3·4 4 37 58·9 4 29 54·2 4 21 49·2 4 13 44·0	•41 •43 •45 •47 •49
28 30 32 33 34	4 7 42·I 3 59 40·6 3 5I 39·0 3 47 38·2 3 43 37·3	.33		·35 ·36 ·37 ·38 ·38	4 6 59·6 3 58 56·9 3 50 54·1 3 46 52·6 3 42 51·1	'43	4 6 34·9 3 58 31·3 3 59 27·6 3 46 25·6 3 42 23·6	.43 .45 .46 .47	3 58 3.3	.52	4 5 38·5 3 57 32·6 3 49 26·4 3 45 23·1 3 41 19·8	•51 •53 •56 •57 •58
35 36 37 38 39	3 39 36·5 3 35 35·6 3 31 34·7 3 27 33·7 3 23 32·8	·35 ·35 ·36	3 39 14·5 3 35 13·3 3 31 12·0 3 27 10·7 3 23 9·4		3 38 49·5 3 34 47·8 3 30 46·2 3 26 44·4 3 22 42·6	*44 *45 *46 *47 *48	3 38 21·5 3 34 19·3 3 30 17·1 3 26 14·7 3 22 12·3	.49 .50 .51 .52	3 33 47·6 3 29 44·6	·57 ·58	3 37 16·3 3 33 12·6 3 29 8·9 3 25 5·0 3 21 1·0	·60 ·61 ·62 ·64 ·65
40 41 42 43 44	3 19 31.8 3 15 30.8 3 11 29.7 3 7 28.6 3 3 27.5	·37 ·37 ·38 ·38 ·39	3 11 5.2	.44	3 18 40·8 3 14 38·8 3 10 36·8 3 6 34·7 3 2 32·5	.21	3 18 9.8 3 14 7.2 3 10 4.6 3 6 1.7 3 1 58.7	*55 *56 *57 *58 •60	3 5 24.5	·64 ·65	3 16 56.8 3 12 52.4 3 8 48.0 3 4 43.3 3 0 38.3	·67 ·69 ·70 ·72 ·74
45 46 47 48 49	2 59 26·4 2 55 25·2 2 51 23·9 2 47 22·6 2 43 21·3	·40 ·41 ·42	2 59 0.4 2 54 58.7 2 50 56.9 2 46 55.1 2 42 53.2	•48	2 58 30·2 2 54 27·9 2 50 25·4 2 46 22·8 2 42 20·1	.58	2 57 55·7 2 53 52·5 2 49 49·1 2 45 45·7 2 41 42·0	·63 ·64 ·66	2 49 8.1	·70 ·72 ·74	2 56 33·2 2 52 27·9 2 48 22·3 2 44 16·5 2 40 10·3	•76 •78 •80 •83 •85
50 51 52 53 54	2 39 19·9 2 35 18·5 2 31 16·9 2 27 15·3 2 23 13·7	·45 ·46 ·47	2 38 51·2 2 34 49·0 2 30 46·8 2 26 44·5 2 22 42·0	•52 •53 •55 •56 •58	2 38 17·3 2 34 14·3 2 30 11·2 2 26 7·9 2 22 4·4	·62 ·64 ·66	2 37 38·2 2 33 34·1 2 29 29·9 2 25 25·4 2 21 20·7	·72 ·74 ·76	2 36 53·7 2 32 48·5 2 28 42·9 2 24 37·1 2 20 30·9	·78 ·81 ·83 ·86 ·88	2 36 4·0 2 31 57·2 2 27 50·1 2 23 42·6 2 19 34·7	·88 ·90 ·93 ·96 ·99
		V.	ARIATIC	N TO	ı' OF	LATI	TUDE A	AND	ALTITU]	DE.		
4.4.	1		T .				1					

Alt.	L. 0° A.	L. 1 ° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
	s. s.	, s. s.	S. S.	S. S.	s. s.	S. S.
0	— ·00 —4·01	- ·07 -4·0I	— ·14 —4·01	- ·2I -4·02	— ·28 —4·02	— ·35 —4·03 I
4	·02 4·01	·09 4·01	·16 4·01	·23 4·02 ·	·30 4·02	·37 4·03
8	·04 4·0I	·II 4·0I	·18 4·01	.25 4.02	·32 4·02	•40 4•03
12	·06 4·01	·I3 4·0I	·20 4·0I	•28 4.02	.35 4.02	·42 4·03
14	·07 4·01	·14 4·01	·2I 4·02	•29 4•02	•36 4.03	·43 4·03
16	·08 4·01	·15 4·01	·23 4·02	·30 4·02	·37 4·03	·45 4·03
18	·09 4·01	16 4.01	•24 4.02	·3I 4·02	.39 4.03	•46 4•04
20	·10 4·01	·18 4·01	•25 4.02	•33 4.02	·40 4·03	48 4.04
22	·II 4·0I	·19 4·01	·26 4·02	·34 4·02	'42 4'03	·49 4·04
24	·12 4·0I	·20 4·01	·28 4·02	·36 4·03	·43 4·03	·51 4·04
26	•14 4•01	·2I 4·02	·29 4·02	·37 4·03	·45 4·03	·53 4·04
28	·15 4·01	.23 4.02	·31 4 02	•39 4.03	•47 4•04	•55 4.05
30	·16 4·01	.24 4.03	·32 4·02	·4I 4·03	·49 4·04	•57 4.05
32	·17 4·01	·26 4·02	.34 4.05	·43 4·03	·51 4·04	•59 4.05
34	·19 4·01	·27 4·02	·36 4·03	·45 4·03	·53 4·04	·62 4·06
36	·20 4·01	·29 4·02	·38 4·03	·47 4·04	·56 4·05	·64 4·06
38	•22 4.02	·31 4·02	·40 4·03	•49 4.04	.58 4.05	67 4.07
40	·23 4·02	.33 4.02	·42 4·03	·5I 4·04	·61 4·06	·70 4·07
42	•25 4.02	.35 4.02	•44 4.03	.54 4.05	•64 4•06	·74 4·08
44	•27 4.02	·37 4·03	·47 4·04	·57 4·05	·67 4·06	·77 4·08
46	•29 4.02	·39 4·03	·50 4·04	·60 4·05	·70 4·07	·81 4·09
48	·31 4·02	.42 4.03	•53 4.04	·63 4·06	•74 4.08	·85 4·10
50	•33 4.02	.45 4.03	·56 4·05	.67 4.07	·78 4·09	·90 4·11
52	•36 4.03	.48 4.04	.59 4.05	·71 4°07	.83 4.09	.95 4.12
54	·39 4·03	·51 4·04	·63 4·06	·76 4·08	·88 4·10	1.01 4.13

LATITUDE 4°.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 5 58 18·9 5 17 58·0 5 9 53·3 5 1 48·4 4 53 43·3	s. - ·28 ·36 ·38 ·40 ·42	H. M. S. 5 58 2·0 5 17 35·8 5 9 30·0 5 1 23·9 4 53 17·6	s. - ·28 ·38 ·40 ·42 ·44		s. - ·29 ·39 ·41 ·44 ·46	H. M. S. 5 57 27.7 5 16 48.9 5 8 40.3 5 0 31.4 4 52 22.1	·43 ·46	H. M. S. 5 57 10·4 5 16 24·1 5 8 13·9 5 0 3·4 4 51 52·4	s. - ·29 ·42 ·45 ·48 ·51	H. M. S. 5 56 53·1 5 15 58·4 5 7 46·4 4 59 34·0 4 51 21·1	s. - ·29 ·44 ·47 ·50 ·53
18 20 22 24 26	4 45 37·9 4 37 32·3 4 29 26·4 4 21 20·2 4 13 13·7	•44 •46 •48 •50	4 45 II·0 4 37 4·0 4 28 56·8 4 20 49·I 4 I2 4I·0	.21	4 44 42.5 4 36 34.1 4 28 25.3 4 20 16.0 4 12 6.2	·49 ·51 ·54 ·57 ·60	4 44 12·4 4 36 2·4 4 27 51·8 4 19 40·7 4 11 29·0	·57	4 43 40·9 4 35 29·0 4 27 16·5 4 19 3·3 4 10 49·5	·54 ·57 ·61 ·64 ·68	4 43 7.7 4 34 53.7 4 26 39.0 4 18 23.7 4 10 7.6	·57 ·60 ·64 ·68 ·72
28 30 32 33 34	4 5 6·7 3 56 59·4 3 48 51·6 3 44 47·5 3 40 43·3	.62	4 4 32·5 3 56 23·5 3 48 13·9 3 44 8·9 3 40 3·7		4 3 55.9 3 55 45.0 3 47 33.4 3 43 27.3 3 39 21.0	·63 ·67 ·70 ·72 ·74	4 3 16·7 3 55 3·6 3 46 49·8 3 42 42·6 3 38 35·1	·67 ·71 ·75 ·77 ·79	4 2 35·0 3 54 19·6 3 46 3·3 3 41 54·7 3 37 45·9	.82	4 I 50·6 3 53 32·6 3 45 I3·6 3 4I 3·6 3 36 53·3	.76 .81 .85 .88
35 36 37 38 39	3 36 38·9 3 32 34·4 3 28 29·7 3 24 24·8 3 20 19·8	·65 ·66 ·68 ·70 ·72	3 35 58·3 3 31 52·8 3 27 47·1 3 23 41·1 3 19 35·0	·70 •72 •74 •76 •78		·76 ·78 ·80 ·82 ·84	3 34 27·4 3 30 19·4 3 26 11·1 3 22 2·5 3 17 53·7	·81 ·84 ·86 ·88 ·91	3 33 36.8 3 29 27.4 3 25 17.7 3 21 7.6 3 16 57.1		3 32 42·7 3 28 31·7 3 24 20·4 3 20 8·6 3 15 56·4	.93 .96 .99 1.02 1.05
40 41 42 43 44	3 16 14·6 3 12 9·2 3 8 3·6 3 3 57·7 2 59 51·5	.73 .75 .77 .80	3 15 28·6 3 11 21·9 3 7 15·0 3 3 7·8 2 59 0·3	·84 ·87	3 14 38·5 3 10 30·5 3 6 22·2 3 2 13·5 2 58 4·4	·87 ·89 ·92 ·94 ·97	3 13 44·4 3 9 34·9 3 5 24·9 3 1 14·5 2 57 3·8	.93 .96 .99 1.02 1.05	3 12 46·3 3 8 35·0 3 4 23·2 3 0 11·0 2 55 58·3	1.01 1.04 1.07 1.10 1.13	3 3 16.9	1.08 1.11 1.15 1.18 1.22
45 46 47 48 49	2 55 45·2 2 51 38·5 2 47 31·5 2 43 24·3 2 39 16·6	·84 ·86 ·89 ·91	2 54 52·5 2 50 44·3 2 46 35·7 2 42 26·8 2 38 17·4	·92 ·94 ·97 I·00 I·03	2 45 34·7 2 41 23·9	1.00 1.03 1.06 1.09	2 52 52·5 2 48 40:7 2 44 28·4 2 40 15·4 2 36 1·9	1.08 1.12 1.15 1.19 1.23	2 47 31·1 2 43 16·6 2 39 1·3	I·24 I·28	2 50 32·2 2 46 16·0 2 41 59·0 2 37 41·2 2 33 22·4	1·26 1·30 1·34 1·39 1·43
50 51 52 53 54	2 35 8.6 2 31 0.1 2 26 51.2 2 22 41.8 2 18 31.9	I·03	2 34 7.5 2 29 57.1 2 25 46.2 2 21 34.7 2 17 22.5	1·07 1·10 1·14 1·17	2 33 0.6 2 28 48.0 2 24 34.8 2 20 20.9 2 16 6.1	1:17 1:20 1:24 1:29 1:33	2 23 16.8	1.40	2 30 28·5 2 26 10·7 2 21 52·1 2 17 32·3 2 13 11·4	1.53	2 29 2.8 2 24 42.0 2 20 20.1 2 15 56.9 2 11 32.3	1·48 1·54 1·59 1·65
		VA	ARIATIC	N TO	ı' OF	LAT	TUDE A	AND	ALTITU.	DE.		
Alt.	L. 6°	Α.	L. 7°	Α	L. 8°	Α.	L. 9°	Α.	L. 10°	A.	L. 11°	Α.
0 4 8 12 14	s. - '42 - '44 '47 '49 '51	s. -4·03 4·03 4·04 4·04 4·04	s. - '49 - ·51 ·54 ·57 ·58	s. -4·04 4·04 4·05 4·05 4·05	s. ·56 ·59 ·61 ·64 ·65	s. -4·05 4·05 4·06 4·06 4·06	s. 64 - .66 .68 .71 .73	s. -4·06 4·06 4·07 4·07 4·08	s. - ·7ī - ·73 ·76 ·79 ·81	s. -4.07 4.08 4.08 4.09 4.09	s. - ·78 - ·80 ·83 ·86 ·88	s. -4.08 4.09 4.09 4.10 4.10
16 18 20 22 24	*52 *54 *55 *57 *59	4·04 4·05 4·05 4·05 4·05	·60 ·61 ·63 ·65 ·67	4.05 4.06 4.06 4.06 4.07	·67 ·69 ·71 ·73 ·75	4·07 4·07 4·07 4·08	•75 •77 •79 •81 •83	4·08 4·08 4·09 4·09	·82 ·84 ·86 ·89 ·91	4.09 4.10 4.11 4.11	•90 •92 •94 •97 •99	4·II 4·II 4·I2 4·I3
26 28 30 32 34	·61 ·63 ·66 ·68 ·71	4·06 4·06 4·07 4·07	•69 •72 •74 •77 •79	4.07 4.07 4.08 4.08 4.09	.77 .80 .82 .85 .88	4.08 4.09 4.10 4.11	·85 ·88 ·91 ·94 ·98	4·10 4·11 4·11 4·12 4·13	·94 ·97 I·00 I·03 I·07	4·12 4·13 4·14 4·15	1.02 1.05 1.08 1.12 1.16	4·14 4·15 4·16 4·17
36 38 40 42 44	•74 •77 •80 •84 •87	4.08 4.08 4.09 4.10 4.10	·83 ·86 ·90 ·94 ·98	4.09 4.10 4.11 4.12 4.13	·92 ·95 I·00 I·04 I·09	4·11 4·12 4·13 4·14 4·15	1·01 1·05 1·09 1·14 1·19	4·14 4·15 4·16 4·17 4·18	I·II I·I5 I·20 I·25 I·31	4·16 4·17 4·18 4·20 4·22	1·20 1·25 1·30 1·36 1·42	4·19 4·20 4·21 4·23 4·25
46 48 50 52 54	·92 ·97 1·02 1·08 1·15	4·II 4·I2 4·I4 4·I5 4·I7	1·03 1·08 1·14 1·20 1·28	4·14 4·15 4·17 4·19 4·21	1·14 1·20 1·26 1·34 1·42	4·17 4·18 4·20 4·23 4·25	1·25 1·32 1·39 1·47 1·56	4·20 4·22 4·24 4·27 4·30	1·37 1·44 1·52 1·61 1·71	4:24 4:26 4:29 4:32 4:36	1·49 1·57 1·65 1·75 1·87	4·28 4·30 4·34 4·38 4·41

$140\,$ Hour-angles and variations to 1' of lat., decl., and alt.

LATITUDE 4°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 5 56 35.6 5 15 31.8 5 7 17.8 4 59 3.4 4 50 48.4	s. - ·29 ·45 ·49 ·52 ·56	5 15 4·I 5 6 48·I	s. ·29 ·47 ·51 ·54 ·58	H. M. S. 5 56 0·2 5 14 35·5 5 6 17·1 4 57 58·1 4 49 38·4	s. ·30 ·49 ·53 ·57 ·61	H. M. s. 5 55 42·3 5 14 5·8 5 5 45·0 4 57 23·4 4 49 1·0	.55	4 56 47.2	s. ·30 ·52 ·57 ·62 ·66	H. M. S. 5 55 6.0 5 13 3.3 5 4 36.8 4 56 9.5 4 47 41.2	s. ·30 ·54 ·59 ·64 ·69
18 20 22 24 26	4 42 32·8 4 34 16·6 4 25 59·6 4 17 41·9 4 9 23·2	·63	4 41 56·2 4 33 37·6 4 25 18·1 4 16 57·7 4 8 36·2	·62 ·67 ·71 ·76 ·80	4 41 17·9 4 32 56·6 4 24 34·4 4 16 11·1 4 7 46·6	·70	4 40 37·8 4 32 13·6 4 23 48·4 4 15 22·0 4 6 54·4	1 ·73 ·78	4 39 55·8 4 31 28·6 4 23 0·2 4 14 30·5 4 5 59·3	·72 ·77 ·82 ·88 ·94	4 39 11·9 4 30 41·4 4 22 9·6 4 13 36·3 4 5 1·4	.75 .80 .86 .92
28 29 30 31 32	4 I 3·5 3 56 53·3 3 52 42·7 3 48 3I·9 3 44 20·7	·81 ·83 ·86 ·88	3 56 1.9 3 51 49.8 3 47 37.3	·85 ·88 ·91 ·94 ·96	3 59 20·9 3 55 7·5 3 50 53·7 3 46 39·5 3 42 25·0	·90 ·93 ·96 ·99 I·02	3 58 25·2 3 54 10·1 3 49 54·5 3 45 38·4 3 41 21·9	·95 ·98 1·01 1·05 1·08	3 53 9.4 3 48 51.9 3 44 33.8	1.00 1.04 1.07 1.11 1.14		1.06 1.09 1.13 1.17 1.21
33 34 35 36 37	3 40 9·2 3 35 57·3 3 31 45·0 3 27 32·3 3 23 19·1	·96	3 39 11·3 3 34 57·6 3 30 43·6 3 26 29·0 3 22 13·9	1.02 1.06 1.09 1.12	3 38 9.9 3 33 54.3 3 29 38.3 3 25 21.6 3 21 4.5	1·05 1·09 1·12 1·16 1·19	3 37 4·8 3 32 47·2 3 28 29·0 3 24 10·2 3 19 50·7	1·15 1·19 1·23	3 35 56·0 3 31 36·1 3 27 15·7 3 22 54·4 3 18 32·5	1·18 1·22 1·26 1·30 1·34	3 30 21·0 3 25 58·0 3 21 34·3	1·25 1·29 1·33 1·37 1·42
38 39 40 41 42	3 19 5.5 3 14 51.4 3 10 36.8 3 6 21.6 3 2 5.7	1·09 1·12 1·15 1·19 1·23	3 13 42·1 3 9 25·3 3 5 7·8	1·16 1·19 1·23 1·27 1·31		1.31		1·35 1·39 1·44	3 5 21 6	I·43 I·48 I·53	3 12 44·I 3 8 17·6 3 3 50·I 2 59 21·4 2 54 51·5	1·47 1·52 1·57 1·63 1·68
43 44 45 46 47	2 57 49·2 2 53 32·0 2 49 14·0 2 44 55·2 2 40 35·5	1.31	2 56 30·6 2 52 10·9 2 47 50·2 2 43 28·6 2 39 5·9	1·35 1·40 1·45 1·49 1·55	2 55 6·7 2 50 44·1 2 46 20·5 2 41 55·9 2 37 29·8	1·45 1·49 1·55 1·60 1·66	2 53 37·1 2 49 11·5 2 44 44·7 2 40 16·5 2 35 47·0	1·59 1·65	2 52 1.8 2 47 32.8 2 43 2.4 2 38 30.6 2 33 57.2	1·76 1·82	2 50 20·3 2 45 47·6 2 41 13·5 2 36 37·6 2 31 59·9	1·74 1·81 1·87 1·95 2·02
48 49 50 51 52	2 36 14·8 2 31 53·1 2 27 30·3 2 23 6·2 2 18 40·7	1·54 1·60 1·66	2 34 42·I 2 30 17·I 2 25 50·7 2 21 22·9 2 16 53·5	1·60 1·66 1·72 1·79 1·86	2 33 2·6 2 28 33·9 2 24 3·7 2 19 31·8 2 14 57·9		2 31 16·0 2 26 43·3 2 22 8·9 2 17 32·4 2 12 53·7	1·91 1·98 2·06	2 29 22.0 2 24 44.9 2 20 5.8 2 15 24.2 2 10 40.1	2.13	2 22 38·2 2 17 53·8 2 13 6·7	2·10 2·18 2·28 2·37 2·48

Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.
	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
0	- ⋅85 -4⋅10	03 -4.11	-1.00 -4.13	-1.08 -4.15	-1·15 -4·17	-1·23 -4·19
4	·88 4·10	.95 4.12	1.03 4.14	1.10 4.16	1.18 4.18	1.25 4.20
8	.01 4.11	.98 4.13	1.06 4.15	1.13 4.17	1.21 4.19	1.29 4.21
10	·92 4·11	1.00 4.13	1.07 4.12	1.15 4.17	1.23 4.19	1.31 4.22
12	.94 4.12	1.02 4.14	1.09 4.16	1.17 4.18	1.25 4.20	1.33 4.22
14	·96 4·12	1.03 4.14	1.11 4.16	1.19 4.18	1.27 4.21	1.35 4.23
16	·98 4·13	1.06 4.15	1.13 4.17	1.21 4.19	1.30 4.21	1.38 4.24
18	1.00 4.13	1.08 4.12	1.16 4.17	1.24 4.20	1.32 4.22	1.41 4.25
20	1.02 4.14	1.10 4.16	1.19 4.18	1.27 4.21	1.35 4.23	1.44 4.26
22	1.05 4.14	1.13 4.17	1.21 4.19	1.30 4.21	1.38 4.24	1.47 4.27
24	1.08 4.15	1.16 4.17	1.25 4.20	1.33 4.22	1.42 4.25	1.51 4.28
26	1.11 4.16	1.10 4.18	1.28 4.21	1.37 4.24	1.46 4.27	1.55 4.30
28	1.14 4.17	1.23 4.19	1.32 4.22	1.41 4.25	1.50 4.28	1.59 4.31
30	1.17 4.18	1.26 4.20	1.36 4.23	1.45 4.26	1.54 4.30	1.64 4.33
32	1.21 4.19	1.30 4.22	1.40 4.25	1.52 4.28	1.59 4.32	1.70 4.35
34	1.55 4.20	1.35 4.23	1.45 4.26	1.55 4.30	1.65 4.34	1.75 4.38
36	1.30 4.22	1.40 4.25	1.50 4.28	1.60 4.32	1.71 4.36	1.82 4.40
38	1.35 4.23	1.45 4.26	1.56 4.30	1.67 4.34	1.78 4.39	1.89 4.43
40	1.41 4.25	1.51 4.29	1.62 4.33	1.74 4.37	1.85 4.42	1.97 4.47
42	1.47 4.27	1.58 4.31	1.70 4.35	1.81 4.40	1.94 4.45	2.06 4.21
44	1.53 4.29	1.65 4.34	1.77 4.38	1.90 4.44	2.03 4.49	2.16 4.56
46	1.61 4.32	1.73 4.37	1.86 4.42	2.00 4.48	2.14 4.24	2.28 4.61
48	1.69 4.35	1.83 4.41	1.97 4.47	2.11 4.23	2.26 4.60	2.41 4.68
50	1.79 4.39	1.93 4.45	2.08 4.52	2.24 4.59	2.40 4.67	2.57 4.76
52	1.90 4.44	2.05 4.50	2.22 4.58	2.39 4.67	2.56 4.76	2.76 4.86

LATITUDE 4°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

			CLINAI	1011	001,110		NAME		LAIIIU	· · ·		
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 10 12 14 16	H. M. S. 5 54 47.6 5 12 30.4 5 4 0.8 4 55 30.3 4 46 58.8	s. - ·31 ·56 ·61 ·67 ·72	H. M. S. 5 54 28.9 5 11 56.2 5 3 23.4 4 54 49.5 4 46 14.4	s. - ·31 ·58 ·64 ·69 ·75	H. M. S. 5 54 10·0 5 11 20·9 5 2 44·5 4 54 7·0 4 45 28·2	s. - ·32 ·60 ·66 ·72 ·79	5 10 44.2	s. - ·32 ·62 ·69 ·75 ·82	5 10 6.2	s. - ·32 ·64 ·71 ·78 ·85		s. - ·33 ·67 ·74 ·81 ·89
18 20 22 24 25	4 38 26·0 4 29 52·0 4 21 16·6 4 12 39·5 4 8 20·2	·78 ·84 ·90 ·97 I·01	4 37 38·I 4 29 0·3 4 20 2I·0 4 II 39·8 4 7 I8·4	.95	4 36 48·0 4 28 6·3 4 19 22·7 4 10 37·2 4 6 13·6	.92			4 26 10·7 4 17 18·0 4 8 22·9	·93 I·01 I·09 I·17 I·22	4 7 10.9	·97 1·05 1·14 1·23 1·28
26 27 28 29 30	4 4 0.5 3 59 40.3 3 55 19.6 3 50 58.2 3 46 36.3	1.04 1.08 1.11 1.15 1.19	4 2 56·5 3 58 34·1 3 54 11·1 3 49 47·4 3 45 23·0	I·13 I·17 I·21	4 I 49.4 3 57 24.5 3 52 59.0 3 48 32.8 3 44 5.9	I·23	4 0 38·9 3 56 11·5 3 51 43·4 3 47 14·5 3 42 44·7	1·25 1·29 1·34	3 59 25·0 3 54 54·8 3 50 24·0 3 45 52·1 3 41 19·4	1.41	3 53 34·4 3 49 0·5	1·32 1·37 1·43 1·48 1·53
31 32 33 34 35	3 42 13·7 3 37 50·4 3 33 26·4 3 29 1·6 3 24 36·0	1.36	3 40 57·9 3 36 32·0 3 32 5·3 3 27 37·8 3 23 9·2	I·34 I·44	3 39 38·1 3 35 9·4 3 30 39·8 3 26 9·3 3 21 37·7	I·46 I·51	3 38 14·1 3 33 42·4 3 29 9·8 3 24 36·0 3 20 1·1	1.49 1.54 1.60	3 36 45.6 3 32 10.8 3 27 34.9 3 22 57.7 3 18 19.2	1.62 1.68	3 35 12·7 3 30 34·5 3 25 55·0 3 21 14·1 3 16 31·8	1.59 1.65 1.71 1.77 1.84
36 37 38 39 40	3 20 9.4 3 15 41.9 3 11 13.4 3 6 43.8 3 2 12.9	1.45 1.50 1.56 1.61 1.67		1·59 1·65 1·71	3 17 5.0 3 12 31.0 3 7 55.8 3 3 19.1 2 58 40.9	1.68 1.74 1.80	3 15 24·9 3 10 47·3 3 6 8·3 3 1 27·7 2 56 45·4	1.71 1.78 1.84 1.91 1.98	3 8 57·8 3 4 14·8 2 59 29·9	1.81 1.88 1.95 2.02 2.10	3 2 14·7 2 57 25·2	1.91 1.98 2.06 2.14 2.22
41 42 43 44 45	2 57 40·8 2 53 7·4 2 48 32·4 2 43 55·8 2 39 17·4	1.92	2 55 54·2 2 51 16·8 2 46 37·7 2 41 56·8 2 37 13·8	1.97 2.05	2 54 I·I 2 49 I9·5 2 44 36·0 2 39 50·3 2 35 2·4	2·09 2·17	2 52 1·2 2 47 15·0 2 42 26·7 2 37 35·9 2 32 42·4	2·06 2·14 2·22 2·31 2·41	2 45 3.0 2 40 9.4 2 35 12.9	2.46	2 47 39·5 2 42 42·9 2 37 43·5 2 32 41·0 2 27 34·9	2·31 2·41 2·51 2·61 2·73
46 47 48 49 50	2 34 37·I 2 29 54·7 2 25 9·9 2 20 22·7 2 15 32·5	2·24 2·34	2 32 28·7 2 27 41·1 2 22 50·9 2 17 57·6 2 13 1·1	2·30 2·40 2·50	2 30 11·9 2 25 18·6 2 20 22·3 2 15 22·5 2 10 19·0	2·45 2·56 2·68	2 27 46·I 2 22 46·6 2 17 43·6 2 12 36·5 2 7 25·I	2·51 2·62 2·74 2·86 3·00	2 20 4·4 2 14 53·9 2 9 38·8		2 17 11·1 2 11 52·3 2 6 28·1	2·85 2·99 3·13 3·30 3·47
	•	V.	ARIATIO	N TC	ı' OF	LATI	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 18°	A.	L. 19°	Α.	L. 20°	A.	L. 21°	Α.	L. 22°	Α.	L. 23°	A.
0 4 6 8 10	s. -1·31 1·33 1·35 1·37 1·39	S. -4·22 4·23 4·23 4·24 4·24	s. -1·38 - 1·41 1·43 1·45 1·47	s. -4·24 4·25 4·26 4·26 4·27	s. -1·46 - 1·49 1·51 1·53 1·55	s. -4·27 4·28 4·28 4·29 4·30	s. -1.54 - 1.56 1.59 1.61 1.63	s. -4·29 4·31 4·31 4·32 4·33	s. - 1.62 - 1.65 1.67 1.69 1.72	s. -4·32 4·34 4·34 4·35 4·36	s. -1.71 - 1.73 1.75 1.78 1.80	s. -4·36 4·37 4·38 4·39 4·40
12 14 16 18 20	1·41 1·43 1·46 1·49 1·52	4·25 4·26 4·27 4·28 4·29	1·49 1·52 1·54 1·58 1·61	4·28 4·29 4·30 4·31 4·32	1·57 1·60 1·63 1·66 1·70	4·31 4·33 4·34 4·36	1.66 1.69 1.72 1.75 1.79	4·34 4·35 4·36 4·38 4·39	1·74 1·77 1·81 1·84 1·88	4·37 4·38 4·40 4·41 4·43	1.83 1.86 1.90 1.93 1.98	4·4I 4·42 4·43 4·45 4·47
22 24 26 28 30	1·56 1·60 1·64 1·69 1·74	4·30 4·32 4·33 4·35 4·37	1.65 1.69 1.73 1.79 1.84	4·33 4·35 4·37 4·39 4·41	1·74 1·78 1·83 1·88 1·94	4·38 4·39 4·41 4·43 4·46	1.83 1.88 1.93 1.99 2.05	4·41 4·43 4·45 4·47 4·50	1·93 1·98 2·03 2·09 2·16	4·45 4·47 4·50 4·52 4·55	2·02 2·08 2·14 2·20 2·27	4·49 4·52 4·54 4·57 4·61
32 34 36 38 40	1.80 1.86 1.93 2.01 2.10	4·39 4·42 4·45 4·48 4·52	1·90 1·97 2·04 2·13 2·22	4:44 4:47 4:50 4:54 4:58	2·01 2·08 2·16 2·25 2·35	4·49 4·52 4·56 4·60 4·65	2·12 2·20 2·28 2·38 2·49	4·54 4·57 4·61 4·66 4·72	2·23 2·32 2·41 2·51 2·63	4·59 4·63 4·68 4·73 4·80	2·35 2·44 2·54 2·65 2·78	4·65 4·69 4·75 4·81 4·88

2.19

2.30

2·43 2·58

2.75

4·57 4·62

4·69 4·77 4·86

42

44

48

50

2·33 2·45

2·59 2·75

2.94

4.64

4·70 4·77 4·86

4.97

2·47 2·60 2·75

2.93

3.14

4·71 4·78 4·86

4.97

5.09

2.62

2.76

2.93

3.13

3.36

4·79 4·87 4·96

5.08

5.23

4·87 4·97 5·08

5.21

5.39

2.77

2.93

3.33

3.59

4·97 5·07 5·20 5·36 5·56

2·93 3·10

3·3I 3·55 3·84

142 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 5°.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 50.7 5 11 48.9 5 3 46.9 4 55 45.0	s. - ·35 ·36 ·36 ·36 ·36		s. - ·35 ·37 ·37 ·38 ·38	5 19 6·6 5 11 4·1	.39	H. M. S. 5 58 57·0 5 18 43·4 5 10 40·3 5 2 37·2 4 54 33·9	s. - '35 '39 '40 '41 '43	5 18 19·3 5 10 15·6	s. - '35 ·41 ·42 ·43 ·45		s ·35 ·42 ·44 ·45 ·47
18 20 22 24 26	4 47 42·9 4 39 40·9 4 31 38·8 4 23 36·6 4 15 34·4	•38	4 47 20·2 4 39 17·7 4 31 15·2 4 23 12·7 4 15 9·9	·4I ·4I	4 46 56·0 4 38 53·1 4 30 50·0 4 22 46·8 4 14 43·5	·42 ·43 ·45	4 46 30·4 4 38 26·8 4 30 23·0 4 22 19·0 4 14 14·8	•48	4 46 3·4 4 37 58·9 4 29 54·2 4 21 49·2 4 13 44·0	·49 ·51	4 45 34.9 4 37 29.4 4 29 23.6 4 21 17.5 4 13 11.1	·49 ·51 ·53 ·55 ·57
28 30 32 33 34	4 7 32·1 3 59 29·7 3 51 27·1 3 47 25·9 3 43 24·6	.42		•46		·50 ·51	4 6 10·4 3 58 5·7 3 50 0·7 3 45 58·1 3 41 55·4	•56	4 5 38·5 3 57 32·6 3 49 26·4 3 45 23·1 3 41 19·8	·59	4 5 4·2 3 56 57·0 3 48 49·3 3 44 45·3 3 40 41·1	59 .62 .64 .66 .67
35 36 37 38 39	3 39 23·2 3 35 21·8 3 31 20·4 3 27 18·9 3 23 17·4	°44	3 38 56·0 3 34 54·2 3 30 52·4 3 26 50·5 3 22 48·6	·49 ·49 ·50	3 38 25.8 3 34 23.5 3 30 21.2 3 26 18.8 3 22 16.3	•54 •55 •56	3 37 52·6 3 33 49·7 3 29 46·7 3 25 43·6 3 21 40·4	·59 ·60 ·61	3 37 16·3 3 33 12·6 3 29 8·9 3 25 5·0 3 21 I·0	·64 ·66 ·67	3 36 36·8 3 32 32·3 3 28 27·7 3 24 22·8 3 20 17·9	·68 ·70 ·72 ·73 ·75
40 41 42 43 44	3 19 15·9 3 15 14·3 3 11 12·6 3 7 10·9 3 3 9·2			·53	3 18 13.7 3 14 11.0 3 10 8.2 3 6 5.3 3 2 2.2	·58 ·59 ·60 ·61 •63	3 13 33·6 3 9 30·1 3 5 26·4	·64 ·66 ·67 ·68 • 7 0	3 4 43.3	·70 ·72 ·74 ·75 ·77	3 16 12·7 3 12 7·3 3 8 1·7 3 3 55·9 2 59 49·8	·77 ·78 ·81 ·83 ·85
45 46 47 48 49	2 59 7.4 2 55 5.5 2 51 3.5 2 47 1.5 2 42 59.4	·51	2 50 30·3 2 46 27·6	·58 ·59 ·61	2 57 59·I 2 53 55·8 2 49 52·3 2 45 48·8 2 41 45·I	·66	2 57 18·3 2 53 14·2 2 49 9·8 2 45 5·2 2 41 0·3	·73 ·75	2 56 33·2 2 52 27·9 2 48 22·3 2 44 16·5 2 40 10·3	·83	2 55 43·5 2 51 36·9 2 47 29·9 2 43 22·7 2 39 15·1	·87 ·89 ·91 ·94 ·97
50 51 52 53 54	2 38 57·2 2 34 54·9 2 30 52·6 2 26 50·1 2 22 47·4	·57	2 38 21·8 2 34 18·7 2 30 15·5 2 26 12·0 2 22 8·5	·65 ·67 ·68	2 37 41·2 2 33 37·1 2 29 32·7 2 25 28·2 2 21 23·4	.78	2 36 55·3 2 32 50·0 2 28 44·3 2 24 38·4 2 20 32·2	∙88	2 36 4·0 2 31 57·2 2 27 50·1 2 23 42·6 2 19 34·7	.98	2 35 7·1 2 30 58·7 2 26 49·8 2 22 40·5 2 18 30·6	·99 1·02 1·06 1·09 1·12
		V	ARIATIC	N TO	ı' OF	LAT	TUDE A	AND	ALTITU	DE.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	Α.	L. 3°	Α.	L. 4°	Α.	L. 5°	Α.
0 4 8 12 14	s. '00 '02 '05 '08 '09	S. -4·01 4·02 4·02 4·02	s. ·07 · ·09 ·12 ·15 ·16	S. -4·02 4·02 4·02 4·02 4·02	s. - ·14 - ·17 ·19 ·22 ·23	s. -4.02 4.02 4.02 4.02 4.02	s. ·21 - ·24 ·26 ·29 ·31	s. -4·02 4·02 4·03 4·03	s. - ·28 ·31 ·33 ·36 ·38	s. -4·03 4·03 4·03 4·03 4·03	s. - ·35 ·38 ·41 ·44 ·45	S. -4·03 4·03 4·04 4·04
16 18 20 22 24	·10 ·11 ·13 ·14 ·15	4·02 4·02 4·02 4·02 4·02	·17 ·19 ·20 ·22 ·23	4·02 4·02 4·02 4·02 4·02	·25 ·26 ·28 ·29 ·31	4·02 4·02 4·03 4·03	·32 ·34 ·35 ·37 ·39	4.03 4.03 4.03 4.03 4.03	·39 ·41 ·43 ·45 ·47	4:03 4:04 4:04 4:04	.47 .49 .51 .53	4·04 4·04 4·05 4·05 4·05
26 28 30 32 34	·17 ·19 ·20 ·22 ·24	4·02 4·02 4·02 4·02 4·02	·25 ·27 ·28 ·30 ·32	4·02 4·03 4·03 4·03	*33 *35 *37 *39 *41	4.03 4.03 4.03 4.04	·41 ·43 ·45 ·47 ·49	4:04 4:04 4:04 4:05	.49 .51 .53 .56 .58	4.04 4.05 4.05 4.05 4.06	·57 ·59 ·62 ·64 ·67	4·05 4·06 4·06 4·07 4·07
36 38 40 42 44	·25 ·27 ·30 ·32 ·34	4.02 4.03 4.03 4.03	*34 *36 *39 *41 *44	4.03 4.03 4.04 4.04	.43 .4 6 .48 .51	4·04 4·04 4·05 4·05	.52 .55 .58 .61 .64	4.05 4.06 4.06 4.06	·61 ·64 ·67 ·70 ·74	4.06 4.07 4.07 4.08 4.08	·70 ·73 ·77 ·81 ·85	4·08 4·09 4·09 4·10
46 48 50 52 54	*37 *39 *42 *45 *49	4.03 4.04 4.04 4.04	.47 .50 .53 .57 .61	4.04 4.05 4.05 4.06 4.06	·57 ·61 ·65 ·69 ·73	4.06 4.07 4.07 4.07 4.08	·68 ·72 ·76 ·81 ·86	4.07 4.08 4.09 4.10 4.10	.78 .83 .88 .93	4.09 4.10 4.11 4.12 4.13	·89 ·94 ·99 I·06 I·12	4·11 4·12 4·14 4·15 4·17

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 143 LATITUDE 5°.

DECLINATION—CONTRARY NAME TO-LATITUDE

		DI	ECLINAT	ION-	<i>-CONTR</i>	ARY	NAME	<i>TO</i> —	LATITU.	DE.		
True Alt.	6° .	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 5 57 53 6 5 17 28 8 5 9 23 2 5 1 17 4 4 53 11 3	s. - :35 :43 :45 :47 :49	H. M. S. 5 57 32·3 5 17 2·3 5 8 55·5 5 0 48·5 4 52 41·1	s. - ·36 ·45 ·47 ·49 ·51	H. M. S. 5 57 10·9 5 16 34·9 5 8 26·8 5 0 18·4 4 52 9·6	s. - ·36 ·46 ·49 ·51	H. M. S. 5 56 49.4 5 16 6.5 5 7 57.0 4 59 47.0 4 51 36.6	s. - ·36 ·48 ·51 ·53 ·56	H. M. S. 5 56 27.9 5 15 37.3 5 7 26.1 4 59 14.4 4 51 2.3	s. - ·36 ·49 ·52 ·55 ·58	H. M. S. 5 56 6·2 5 15 7·2 5 6 54·1 4 58 40·5 4 50 26·4	s. - ·36 ·51 ·54 ·58 ·61
18 20 22 24 26	4 45 4·9 4 36 58·2 4 28 51·1 4 20 43·7 4 12 35·9	·51 ·56 ·58 ·61	4 44 33.4 4 36 25.3 4 28 16.8 4 20 7.9 4 11 58.4	.54 .56 .59 .61 .64	4 44 0·4 4 35 50·7 4 27 40·6 4 19 29·9 4 11 18·7	·56 ·59 ·62 ·65 ·68	4 43 25.8 4 35 14.4 4 27 2.4 4 18 49.8 4 10 36.6	·59 ·62 ·65 ·69 ·72	4 42 49·5 4 34 36·2 4 26 22·2 4 18 7·6 4 9 52·1	·62 ·65 ·69 ·72 ·76	4 42 11·6 4 33 56·2 4 25 40·0 4 17 23·0 4 9 5·1	·65 ·68 ·72 ·76 ·80
28 30 31 32 33	4 4 27.6 3 56 18.7 3 52 14.1 3 48 9.4 3 44 4.4	·63 ·66 ·67 ·69 ·71	4 3 48·4 3 55 37·8 3 51 32·3 3 47 26·5 3 43 20·6	·67 ·70 ·72 ·74 ·76	4 3 6·8 3 54 54·1 3 50 47·5 3 46 40·7 3 42 33·6	·72 ·75 ·77 ·79 ·81	4 2 22.5 3 54 7.7 3 49 59.9 3 45 51.8 3 41 43.5	·76 ·80 ·82 ·84 ·86	4 I 35.7 3 53 I8.4 3 49 9.3 3 44 59.9 3 40 50.2	·80 ·85 ·87 ·89 ·92	3 44 4.8	·85 ·90 ·92 ·95 ·97
34 35 36 37 38	3 39 59·3 3 35 54·1 3 31 48·6 3 27 43·0 3 23 37·1	·72 ·74 ·76 ·77 ·79	3 39 14·5 3 35 8·1 3 31 1·6 3 26 54·8 3 22 47·7	.77 .79 .81 .83	3 38 26·4 3 34 18·8 3 30 11·0 3 26 3·0 3 21 54·6	·83 ·85 ·87 ·89 ·92	3 37 35·0 3 33 26·1 3 29 17·0 3 25 7·4 3 20 57·6	·88 ·91 ·93 ·96 ·98	3 36 40·2 3 32 29·9 3 28 19·2 3 24 8·2 3 19 56·6	*94 *97 *99 1.02 1.05	3 35 42·0 3 31 30·1 3 27 17·7 3 23 4·9 3 18 51·7	1.00 1.03 1.06 1.09 1.12
39 40 41 42 43	3 19 31·0 3 15 24·7 3 11 18·2 3 7 11·3 3 3 4·2	·81 ·83 ·85 ·87 ·90		•88 •90 •92 •95 •97	3 17 45·9 3 13 36·8 3 9 27·5 3 5 17·7 3 1 7·5	·94 ·97 ·99 I·02 I·05	3 12 36·7 3 8 25·7 3 4 14·2	1.01 1.04 1.07 1.10	3 15 44·8 3 11 32·4 3 7 19·5 3 3 6·1 2 58 52·1	1.08 1.11 1.14 1.18 1.21	3 14 37·9 3 10 23·6 3 6 8·7 3 1 53·1 2 57 37·0	1·15 1·18 1·22 1·26 1·29
44 45 46 47 48	2 58 56·8 2 54 49·1 2 50 41·0 2 46 32·5 2 42 23·7	.95	2 57 59·2 2 53 49·9 2 49 40·1 2 45 29·9 2 41 19·2	1.00 1.03 1.06 1.09 1.12	2 52 45·8 2 48 34·2 2 44 22·0	1.11	2 55 49.7 2 51 36.6 2 47 23.0 2 43 8.6 2 38 53.6	1·16 1·20 1·23 1·27 1·31	2 54 37·5 2 50 22·2 2 46 6·3 2 41 49·6 2 37 32·0	1.37	2 53 20·I 2 49 2·4 2 44 44·0 2 40 24·6 2 36 4·2	1·33 1·38 1·42 1·47 1·52
49 50 51 52 53	2 38 14·3 2 34 4·6 2 29 54·3 2 25 43·4 2 21 32·0	1·09 1·12 1·16	2 37 8·0 2 32 56·2 2 28 43·8 2 24 30·8 2 20 16·9	1·15 1·19 1·23 1·27 1·31	2 35 55·9 2 31 41·8 2 27 27·0 2 23 11·4 2 18 54·8	1·25 1·29 1·33 1·38 1·43		1·35 1·40 1·44 1·49 1·55	2 33 13·6 2 28 54·2 2 24 33·7 2 20 12·0 2 15 49·1	1.46 1.51 1.56 1.62 1.68	2 22 56.5	1.57 1.62 1.68 1.74 1.81
		VA	ARIATIO	N TO	ı' OF	LAT	TUDE A	AND .	ALTITU:	DE.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	Α.	L. 9°	A	L. 10°	Α.	L. 11°	Α.
0 4 8 12 14	s '42 '45 '48 '51 '53	s. -4:04 4:04 4:04 4:05 4:05	s. - '50 - '52 '55 '58 '60	s. -4.04 4.05 4.05 4.06 4.06	s. - '57 - '59 '62 '66 '68	s. -4·05 4·06 4·06 4·07 4·07	s. 64 .67 .70 .73 .75	s. -4.06 4.07 4.07 4.08 4.08	s. - ·71 ·74 ·77 ·81 ·83	s. -4.08 4.08 4.09 4.09 4.10	s. - ·78 - ·81 ·84 ·88 ·90	S. -4·09 4·10 4·11 4·11
16 18 20 22 24	*54 *56 *58 *60 *62	4·05 4·06 4·06 4·06	·62 ·64 ·66 ·68 ·70	4·06 4·07 4·07 4·07 4·08	·69 ·71 ·74 ·76 ·78	4.07 4.08 4.08 4.09 4.09	•77 •79 •81 •84 •87	4.09 4.10 4.10 4.10	·85 ·87 ·89 ·92 ·95	4·10 4·11 4·12 4·13	·92 ·95 ·97 I·00 I·03	4·12 4·13 4·13 4·14 4·15
26 28 30 32 34	·65 ·67 ·70 ·73 ·76	4·07 4·08 4·08 4·09	.73 .76 .78 .81 .85	4·08 4·08 4·09 4·10 4·10	·81 ·84 ·87 ·90 ·94	4·10 4·10 4·11 4·12 4·12	·89 ·92 ·96 ·99 1·03	4·II 4·I2 4·I3 4·I4 4·I4	·98 I·01 I·04 I·08 I·12	4·13 4·14 4·15 4·16 4·17	1.06 1.10 1.13 1.17 1.22	4·15 4·16 4·17 4·18 4·20

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I·49 I·58

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1·58 1·67 1·76 1·88

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4·31 4·35 4·39

4·43 4·46

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I·54 I·63

I·73

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LATITUDE 5°. DECLINATION—CONTRARY NAME TO—LATITUDE

		וננ	SCLINAT	TON-	<i>-CONTR</i>	ARY	NAME	TO-	LATITU	DE.		
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 5 55 44.3 5 14 36.0 5 6 20.9 4 58 5.3 4 49 49.0	s. - '37 '53 '56 '60 '64	H. M. S. 5 55 22·2 5 14 3·8 5 5 46·5 4 57 28·7 4 49 10·1	s. - ·37 ·54 ·58 ·62 ·66		s. - '37 '56 '60 '65 '69	H. M. S. 5 54 37.6 5 12 56.3 5 4 34.1 4 56 11.2 4 47 47.3	s. - ·37 ·58 ·62 ·67 ·72	H. M. S. 5 54 15.0 5 12 20.9 5 3 56.0 4 55 30.2 4 47 3.4	s. - ·38 ·60 ·65 ·70 ·75	H. M. S. 5 53 52·1 5 11 44·4 5 3 16·5 4 54 47·7 4 46 17·8	s. - ·38 ·62 ·67 ·72 ·78
18 20 22 24 26	4 41 32·0 4 33 14·3 4 24 55·7 4 16 36·2 4 8 15·6	·71	4 40 50·7 4 32 30·4 4 24 9·2 4 15 46·9 4 7 23·4	·75 ·79	4 40 7.5 4 31 44.5 4 23 20.5 4 14 55.2 4 6 28.6	.73 .78 .83 .88	4 39 22·5 4 30 56·5 4 22 29·4 4 14 1·0 4 5 31·0	·77 ·82 ·87 ·93 ·98	4 38 35.5 4 30 6.5 4 21 36.0 4 13 4.1 4 4 30.5	.91	4 37 46·6 4 29 14·1 4 20 40·2 4 12 4·6 4 3 27·1	·83 ·89 ·95 1·02 1·08
28 29 30 31 32	3 59 53.8 3 55 42.5 3 51 30.8 3 47 18.8 3 43 6.4	·92 ·95 ·97	3 58 58·6 3 54 45·7 3 50 32·4 3 46 18·7 3 42 4·6	·97 I·00 I·03	3 58 0·5 3 53 45·9 3 49 30·8 3 45 15·3 3 40 59·3	1·02 1·05 1·09	3 56 59·4 3 52 42·9 3 48 25·9 3 44 8·4 3 39 50·4	1·08 1·11 1·14	3 55 55·1 3 51 36·6 3 47 17·6 3 42 58·0 3 38 37·7	1·13 1·17 1·20	3 54 47.6 3 50 27.0 3 46 5.7 3 41 43.8 3 37 21.2	1·15 1·19 1·23 1·27 1·31
33 34 35 36 37	3 38 53.6 3 34 40.3 3 30 26.6 3 26 12.4 3 21 57.7	1.12	3 37 50·0 3 33 34·8 3 29 19·2 3 25 3·1 3 20 46·3	1·12 1·16 1·19	3 36 42·7 3 32 25·6 3 28 7·9 3 23 49·6 3 19 30·6	1·22 1·26	3 35 31.7 3 31 12.4 3 26 52.5 3 22 31.9 3 18 10.5	1·25 1·29 1·33	3 34 16·8 3 29 55·2 3 25 32·9 3 21 9·7 3 16 45·7	1·32 1·36 1·41	3 32 57·9 3 28 33·8 3 24 8·8 3 19 42·9 3 15 16·1	1·35 1·39 1·44 1·49 1·54
38 39 40 41 42	3 17 42.5 3 13 26.7 3 9 10.2 3 4 53.1 3 0 35.3	1·26 1·26	3 16 29.0 3 12 10.9 3 7 52.2 3 3 32.6 2 59 12.3	1·30 1·34 1·38	3 15 11.0 3 10 50.5 3 6 29.3 3 2 7.1 2 57 44.0	1·34 1·38 1·42 1·47 1·52		1·46 1·51 1·56	3 12 20·8 3 7 54·9 3 3 28·0 2 58 59·9 2 54 30·6	1·55 1·60 1·65	3 10 48·3 3 6 19·3 3 1 49·1 2 57 17·7 2 52 44·9	1·59 1·64 1·70 1·75 1·81
43 44 45 46 47	2 56 16·7 2 51 57·3 2 47 37·0 2 43 15·7 2 38 53·5	1·43 1·47 1·52	2 54 51·1 2 50 29·0 2 46 5·8 2 41 41·5 2 37 16·0	1·52 1·57 1·62	2 53 20·0 2 48 54·8 2 44 28·5 2 40 0·8 2 35 31·8	1·57 1·62 1·68 1·73 1·80	2 51 43.0 2 47 14.5 2 42 44.7 2 38 13.4 2 33 40.5	1·72 1·78	2 50 0.0 2 45 27.9 2 40 54.3 2 36 19.0 2 31 41.9	1·83 1·90 1·97	2 48 10·5 2 43 34·6 2 38 56·8 2 34 17·2 2 29 35·4	1.88 1.95 2.02 2.10 2.18
48 49 50 51 52	2 34 30·1 2 30 5·4 2 25 39·4 2 21 11·9 2 16 42·9	1·68 1·74 1·81	2 32 49·2 2 28 20·9 2 23 51·1 2 19 19·6 2 14 46·2	1·87 1·94	2 31 1·3 2 26 29·1 2 21 55·0 2 17 19·0 2 12 40·8		2 29 5·9 2 24 29·4 2 19 50·7 2 15 9·7 2 10 26·2	2.06		2·21 2·30	2 24 51·4 2 20 4·7 2 15 15·2 2 10 22·6 2 5 26·5	2·26 2·36 2·46 2·56 2·68
		VA	RIATIO	N TO	ı' OF	LATI	TUDE A	ND .	ALTITUI	DE.		
Alt.	L. 12°	Α.	L. 13°	A.	L. 14°	A.	L. 15 °	A.	L. 16°	A.	L. 17°	A.
0 4 8 10 12	s. 86 .88 .92 .94 .96	S. -4·II 4·II 4·I2 4·I2 4·I3	s. '93 '96 '99 1.01 1.03	S. -4·12 4·13 4·14 4·14 4·15	s. 1·00 1·03 1·07 1·09 1·11	s. -4·14 4·15 4·16 4·16 4·17	s. -1.08 - 1.11 1.15 1.17 1.19	s. -4·16 4·17 4·18 4·18 4·19	S. -1·16 - 1·19 1·22 1·25 1·27	S. -4·18 4·19 4·20 4·20 4·21	s. -1·23 - 1·26 1·30 1·32 1·35	s. -4·20 4·21 4·22 4·23 4·24
14 16 18 20 22	·98 1·00 1·03 1·05 1·08	4·13 4·14 4·15 4·16	1.06 1.08 1.11 1.14 1.17	4·15 4·16 4·17 4·17 4·18	1·14 1·16 1·19 1·22 1·25	4·17 4·18 4·19 4·20 4·21	1·21 1·24 1·27 1·30 1·33	4·19 4·20 4·21 4·23	1·29 1·32 1·35 1·39 1·42	4·22 4·23 4·24 4·25 4·26	1·38 1·41 1·44 1·47 1·51	4·24 4·25 4·27 4·28 4·29
24 26 28 30 32	1·11 1·15 1·18 1·22 1·27	4·17 4·18 4·19 4·20 4·21	1·20 1·23 1·27 1·31 1·36	4·19 4·20 4·21 4·22 4·24	1·28 1·32 1·36 1·41 1·46	4·22 4·23 4·24 4·25 4·27	1·37 1·41 1·46 1·50 1·55	4·24 4·26 4·27 4·29 4·31	1·46 1·50 1·55 1·60 1·65	4·27 4·29 4·30 4·32 4·34	1·55 1·59 1·64 1·70 1·76	4·30 4·32 4·34 4·36 4·38
34 36 38 40 42	1·31 1·36 1·42 1·48 1·55	4·22 4·24 4·26 4·28 4·30	1·41 1·46 1·52 1·59 1·66	4·26 4·27 4·29 4·32 4·35	1·51 1·57 1·63 1·70 1·78	4·29 4·31 4·36 4·39	1.61 1.67 1.74 1.82 1.90	4·33 4·35 4·38 4·41 4·44	1·71 1·78 1·86 1:94 2·03	4·37 4·39 4·42 4·46 4·50	1·82 1·89 1·97 2·06 2·16	4·41 4·44 4·47 4·51 4·56
44 46 48 50 52	1·62 1·71 1·80 1·91 2·03	4·33 4·36 4·40 4·45 4·50	1·74 1·84 1·94 2·06 2·19	4·38 4·41 4·46 4·51 4·57	1·87 1·97 2·08 2·21 2·36	4·43 4·47 4·52 4·58 4·65	2·00 2·11 2·23 2·37 2·54	4·49 4·53 4·59 4·66 4·75	2·13 2·25 2·39 2·54 2·73	4·55 4·60 4·67 4·75 4·85	2·27 2·40 2·55 2·72 2·92	4·61 4·68 4·76 4·85 4·96

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 145 LATITUDE 5°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 8 10 12 14	H. M. S. 5 53 29 1 5 19 36 6 5 11 6 6 6 5 2 35 6 4 5 4 3 5	s. - ·39 ·59		s. - ·39	5 I 9.4	s. - ·40 ·62 ·68 ·74 ·81	5 9 5·6 5 0 23·9	s. - ·40	H. M. S. 5 51 53.9 5 17 7.0 5 8 22.6 4 59 36.9 4 50 49.6	s. - ·41 ·66 ·73	H. M. S. 5 51 29.2 5 16 26.6 5 7 38.1 4 58 48.1 4 49 56.4	s. - ·41 ·68 ·75 ·83 ·90
16 18 20 22 23	4 45 30·2 4 36 55·6 4 28 19·6 4 19 41·8 4 15 22·3	·87	4 27 22.6 4 18 40.8	·90 ·97 I·04	4 26 23·2 4 17 37·1 4 13 13·2	1·12	4 34 9.6 4 25 21.2 4 16 30.5 4 12 4.3	1.13	4 33 9.6 4 24 16.5 4 15 21.0 4 10 52.2	1·18 1·23	4 32 7·2 4 23 9·1 4 14 8·4 4 9 37·0	·98 1·06 1·15 1·24 1·28
24 25 26 27 28	4 II 2·2 4 6 4I·7 4 2 20·6 3 57 59·0 3 53 36·7	1.13	4 5 34·3 4 1 11·0 3 56 47·0 3 52 22·3	I·23	4 4 23.7 3 59 57.9 3 55 31.5 3 51 4.3	1.33	4 3 9.8 3 58 41.5 3 54 12.4 3 49 42.4	1.35	4 I 52·5 3 57 21·4 3 52 49·5 3 48 16·7	1·37 1·41 1·46	4 0 31·7 3 55 57·6 3 51 22·7 3 46 46·7	1.48
29 30 31 32 33	3 49 13·8 3 44 50·2 3 40 25·8 3 36 0·7 3 31 34·7	1.38	3 43 30·8 3 39 3·8 3 34 36·0	1.36 1.40 1.45	3 46 36·2 3 42 7·4 3 37 37·6 3 33 6·8 3 28 35·1	1·42 1·47 1·52 1·58	3 45 11·6 3 40 39·8 3 36 7·0 3 31 33·2 3 26 58·1	1.50 1.55 1.60 1.66	3 43 42·8 3 39 7·9 3 34 31·9 3 29 54·7 3 25 16·2	1·57 1·63 1·68 1·74	3 42 9.7 3 37 31.5 3 32 52.0 3 28 11.2 3 23 29.0	1.59 1.65 1.71 1.77 1.83
34 35 36 37 38	3 27 7·9 3 22 40·1 3 18 11·3 3 13 41·4 3 9 10·4	1·52 1·57 1·62 1·68	3 25 37·4 3 21 6·6 3 16 34·7 3 12 1·5 3 7 27·1	1.65 1.71 1.77	3 19 28·I 3 14 52·8 3 10 16·I 3 5 37·9	1.68	3 3 42.7	1.78 1.84 1.91 1.97	3 II I2·I 3 6 27·4 3 I 41·0	1.87 1.94 2.01 2.08	3 18 45·3 3 13 59·8 3 9 12·7 3 4 23·6 2 59 32·5	2.12
39 40 41 42 43	3 4 38·1 3 0 4·5 2 55 29·4 2 50 52·8 2 46 14·4	1.79 1.86 1.92	3 2 51·2 2 58 13·8 2 53 34·8 2 48 54·0 2 44 11·2	1.90 1.97 2.04	3 0 58·I 2 56 16·6 2 5I 33·4 2 46 48·0 2 42 0·5	2·08 2·16 2·24	2 54 12·8 2 49 24·8 2 44 34·6 2 39 41·8	2·12 2·20 2·29 2·38		2·25 2·33 2·43 2·53	2 39 43·2 2 34 38·5	2·47 2·57 2·68
44 45 46 47 48	2 41 34·2 2 36 52·0 2 32 7·5 2 27 20·6 2 22 31·1	2·15 2·23 2·32	2 39 26·3 2 34 39·2 2 29 49·5 2 24 57·0 2 20 1·4	2·28 2·37 2·47	2 37 10·5 2 32 18·0 2 27 22·5 2 22 23·9 2 17 21·7	2·43 2·53 2·64	2 34 46·3 2 29 47·8 2 24 46·0 2 19 40·6 2 14 31·0	2·58 2·69 2·81	2 32 13·1 2 27 8·1 2 21 59·3 2 16 46·3 2 11 28·5	2·75 2·87 3·00	2 19 1·5 2 13 40·1	2·93 3·06 3·21

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
° 0 2 4 6 8	S. S. -1·31 -4·22 1·33 4·23 1·34 4·23 1·36 4·24	s. s. -1·39 -4·25 1·40 4·25 1·42 4·26 1·44 4·27	S. S. -1:47 -4:27 1:48 4:28 1:50 4:29 1:52 4:29	S. S. -1.55 -4.30 1.56 4.31 1.58 4.32 1.60 4.32 1.63 4.33	S. S. -1.63 -4.33 1.65 4.34 1.67 4.35 1.69 4.36 1.71 4.37	s. s. -1·71 -4·36 1·73 4·37 1·75 4·38 1·77 4·39 1·80 4·40
10 12 14 16 18	1·38 4·25 1·41 4·25 1·43 4·26 1·46 4·27 1·49 4·28 1·52 4·29	1·46 4·27 1·49 4·28 1·51 4·29 1·54 4·30 1·57 4·31 1·61 4·33	1·54 4·30 1·57 4·31 1·60 4·32 1·63 4·33 1·66 4·34 1·70 4·36	1.65 4.34 1.68 4.35 1.71 4.36 1.75 4.38 1.79 4.39	1.74 4.38 1.77 4.39 1.80 4.40 1.84 4.42 1.88 4.43	1·82 4·41 1·86 4·42 1·89 4·44 1·93 4·45 1·97 4·47
20	1.56 4.31	1.65 4.34	1.74 4.38	1·83 4·41	1·92 4·45	2·02 4·49
22	1.60 4.32	1.69 4.36	1.78 4.39	1·88 4·43	1·97 4·47	2·07 4·52
24	1.64 4.34	1.74 4.37	1.83 4.41	1·93 4·45	2·03 4·50	2·13 4·54
26	1.69 4.36	1.78 4.39	1.88 4.43	1·98 4·48	2·09 4·53	2·19 4·57
28	1.74 4.38	1.84 4.42	1.94 4.46	2·05 4·51	2·15 4·56	2·26 4·61
30	1·80 4·40	1·90 4·44	2·01 4·49	2·II 4·54	2·23 4·59	2·34 4·65
32	1·86 4·43	1·97 4·47	2·08 4·52	2·I9 4·57	2·31 4·63	2·43 4·69
34	1·93 4·46	2·04 4·50	2·16 4·56	2·27 4·6I	2·40 4·68	2·52 4·74
36	2·01 4·49	2·12 4·54	2·25 4·60	2·37 4·66	2·50 4·73	2·63 4·80
38	2·09 4·53	2·22 4·59	2·34 4·65	2·48 4·72	2·61 4·79	2·76 4·87
40	2·19 4·57	2·32 4·64	2·46 4·71	2·60 4·78	2·75 4·86	2·90 4·95
42	2·30 4·62	2·44 4·70	2·58 4·77	2·73 4·86	2·90 4·95	3·06 5·05
44	2·42 4·69	2·57 4·77	2·73 4·85	2·89 4·95	3·07 5·05	3·26 5·17
46	2·56 4·76	2·72 4·85	2·89, 4·95	3·08 5·06	3·28 5·18	3·48 5·32
48	2·72 4·85	2·90 4·95	3·09 5·07	3·30 5·20	3·52 5·34	3·76 5·50

LATITUDE 6°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 46.6 5 11 43.9 5 3 41.1 4 55 38.3	·43	H. M. S. 5 59 34·8 5 19 20·6 5 11 17·6 5 3 14·6 4 55 11·4	s. - ·42 ·44 ·44 ·45 ·46	5 10 50·5 5 2 47·0	s. - ·42 ·45 ·46 ·47 ·48	5 2 18.3	s. - ·42 ·47 ·48 ·49 ·50	5 I 48·4	s. - ·42 ·48 ·49 ·51	H. M. S. 5 57 53.6 5 17 28.8 5 9 23.2 5 1 17.4 4 53 11.3	s. '42 '49 '51 '53
18 20 22 24 26	4 47 35.4 4 39 32.4 4 31 29.4 4 23 26.3 4 15 23.0	·44 ·45 ·45 ·46 ·47	4 47 8·2 4 39 4·8 4 31 1·3 4 22 57·7 4 14 53·9	•47 •47 •48 •49 •50		*49 *50 *51 *52 *54	4 46 9.4 4 38 4.7 4 29 59.8 4 21 54.7 4 13 49.2	·51 ·53 ·54 ·56 ·57	4 21 20.2	·54 ·55 ·57 ·59 ·61	4 45 4.9 4 36 58.2 4 28 51.1 4 20 43.7 4 12 35.9	·56 ·58 ·60 ·63 ·65
28 30 32 33 34	4 7 19·7 3 59 16·2 3 51 12·6 3 47 10·8 3 43 8·8	·50 ·50	4 6 49·9 3 58 45·8 3 50 41·5 3 46 39·2 3 42 36·9	·51 ·53 ·54 ·55 ·56	3 58 12·9 3 50 7·6 3 46 4·8	·55 ·57 ·59 ·60 ·61	3 49 31·0 3 45 27·6	•59 •61 •63 •64 •66	3 56 59·4 3 48 51·6	·63 ·66 ·68 ·69 ·71	4 4 27.6 3 56 18.7 3 48 9.4 3 44 4.4 3 39 59.3	·67 ·70 ·73 ·74 ·76
35 36 37 38 39	3 39 6·9 3 35 4·9 3 31 2·8 3 27 0·7 3 22 58·5	·52 ·53 ·54	3 30 29.5		3 33 56.1	-65	3 33 16·8 3 29 13·0	·67 ·68 ·69 ·71 ·72	3 32 34·4 3 28 29·7	·72 ·73 ·75 ·77 ·78	3 35 54·I 3 3I 48·6 3 27 43·0 3 23 37·I 3 I9 3I·0	·77 ·79 ·81 ·83 ·84
40 41 42 43 44	3 18 56·3 3 14 54·0 3 10 51·7 3 6 49·2 3 2 46·7	.56	3 10 15·6 3 6 12·5	·61 ·62 ·63 ·64 ·66	3 5 31.8	·67 ·69 ·70 ·71 ·73	3 17 0.7 3 12 56.2 3 8 51.6 3 4 46.9 3 0 41.8	•74 •75 •77 •78 •80	3 12 9·2 3 8 3·6 3 3 57·7	·80 ·82 ·84 ·86 ·88	3 15 24·7 3 11 18·2 3 7 11·3 3 3 4·2 2 58 56·8	·86 ·88 ·91 ·93 ·95
45 46 47 48 49	2 58 43.9 2 54 41.3 2 50 38.5 2 46 35.7 2 42 32.5	·61 ·62 ·63	2 58 6·0 2 54 2·5 2 49 58·9 2 45 55·2 2 41 51·3	·70 ·71	2 57 23.5 2 53 19.2 2 49 14.7 2 45 10.0 2 41 5.0	•78 •80	2 56 36·6 2 52 31·2 2 48 25·6 2 44 19·6 2 40 13·2	·84 ·86 ·88	2 55 45.2 2 51 38.5 2 47 31.5 2 43 24.3 2 39 16.6	·94 ·97	2 54 49·1 2 50 41·0 2 46 32·5 2 42 23·7 2 38 14·3	·97 1·00 1·03 1·05 1·08
50 51 52 53 54	2 38 29·4 2 34 26·1 2 30 22·6 2 26 18·9 2 22 15·2	·67 ·69	2 37 47·2 2 33 42·9 2 29 38·4 2 25 33·7 2 21 28·8	·78 ·80	2 36 59·7 2 32 54·3 2 28 48·6 2 24 42·6 2 20 36·2	•88 •90	2 36 6.9 2 32 0.1 2 27 52.9 2 23 45.3 2 19 37.3	·95 ·98 I·0I	2 35 8.6 2 31 0.1 2 26 51.2 2 22 41.8 2 18 31.9	1·05 1·08 1·11	2 34 4·6 2 29 54·3 2 25 43·4 2 21 32·0 2 17 19·8	1·11 1·15 1·18 1·22 1·26

Alt.	L. 0°	Α.	L. 1 °	A.	L. 2°	Α.	L. 3°	Α.	L. 4°	Α.	L. 5 °	A.
٠	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	S.
0	00 -	-4.02	− · 07	-4.02	- 14	-4·03	21	-4.03	- ⋅2 8	-4.03		-4.04
4	.03	4.02	.10	4.02	.17	4.03	•24	4.03	.31	4.03	•38	4.04
8	•06	4.02	•13	4.02	•20	4.03	•27	4.03	-35	4.04	.42	4.04
12	-09	4.02	•16	4.02	.23	4.03	.31	4.03	•38	4.04	.45	4.05
14	•10	4.02	.18	4.03	•25	4.03	-32	4.03	•40	4.04	·4 <i>7</i>	4.05
16	.12	4.02	•19	4.03	.27	4.03	.34	4.04	.42	4.04	•49	4.05
18	.14	4.02	.21	4.03	•29	4.03	-36	4.04	'44	4.05	•51	4.05
20	.12	4.02	.23	4.03	•31	4.03	•38	4.04	•46	4.05	•53	4.06
22	17	4.02	•25	4.03	•32	4.04	•40	4.04	·48	4.05	•56	4.06
24	•19	4.03	.27	4.03	·34	4.04	.42	4.04	•50	4.02	•58	4.06
26	-21	4.03	· 2 8	4.03	•36	4.04	•44	4.05	.52	4.06	·61	4.07
28	-22	4.03	.31	4.03	.39	4.04	47	4.05	•55	4.06	∙63	4.07
30	•24	4.03	•33	4.03	•41	4.04	.49	4.05	·58	4.06	.66	4.08
32	•26	4.03	•35	4.04	*43	4.05	.52	4.06	•60	4.07	-69	4.08
34	•28	4.03	•37	4.04	•46	4.05	.55	4.06	•63	4.07	•72	4.09
36	-31	4.03	•40	4.04	•48	4.05	.57	4.06	∙66	4.08	•76	4.09
38	•33	4.03	•42	4.04	·51	4.05	·61	4.07	.70	4.08	•79	4.10
40	•36	4.04	•45	4.05	•54	4.06	.64	4.07	•73	4.00	.83	4.11
42	.38	4.04	•48	4.05	•58	4.06	-67	4.08	•77	4.10	-87	4.12
44	.41	4.04	.51	4.05	·61	4.07	.71	4.09	.82	4.10	.92	4.13
46	.44	4.04	•54	4.06	.65	4.07	.76	4.09	-86	4.11	-97	4.14
48	•47	4.05	.58	4.06	•69	4.08	-80	4.10	.01	4.12	1.03	4.12
50	•51	4.05	.62	4.07	.74	4.09	-85	4.11	•97	4.14	1.09	4.17
52	•55	4.06	.67	4.08	•78	4.10	.91	4.12	1.03	4.12	1.16	4.19
54	•59	4.06	·71	4.08	.84	4.11	.97	4.14	1.10	4.17	1.24	4.20
34	1 33		/ -		- 4	,	37	7 -7	1	7 -/		+

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 147 LATITUDE 6°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 5 57 28·I 5 16 58·8 5 8 52·2 5 0 45·2 4 52 38·0	s. - ·43 ·51 ·53 ·55 ·57		s. - :43 :52 :54 :57 :59	H. M. S. 5 56 36.9 5 15 56.0 5 7 46.9 4 59 37.2 4 51 27.2	s. - ·43 ·54 ·56 ·59 ·61	H. M. S. 5 56 11·1 5 15 23·3 5 7 12·6 4 59 1·4 4 50 49·7	s. - ·43 ·55 ·58 ·61 ·64	H. M. S. 5 55 45.2 5 14 49.6 5 6 37.2 4 58 24.2 4 50 10.7		H. M. S. 5 55 19·1 5 14 14·9 5 6 0·6 4 57 45·7 4 49 30·2	s. - ·44 ·58 ·62 ·65 ·69
18 20 22 24 26	4 44 30·4 4 36 22·4 4 28 14·0 4 20 5·2 4 11 55·9	·61 ·63 ·66	4 43 54·3 4 35 44·9 4 27 35·0 4 19 24·5 4 11 13·5	·61 ·64 ·67 ·69 ·73	4 43 16·7 4 35 5·7 4 26 54·0 4 18 41·8 4 10 28·8	·64 ·67 ·70 ·73 ·76	4 42 37.4 4 34 24.6 4 26 11.1 4 17 56.8 4 9 41.7	·67 ·70 ·73 ·77 ·80	4 41 56.6 4 33 41.7 4 25 26.0 4 17 9.6 4 8 52.2	·73 ·77	4 4I 13·9 4 32 56·8 4 24 38·9 4 16 20·0 4 8 0·1	·72 ·76 ·80 ·85 ·89
28 29 30 31 32	4 3 45.9 3 59 40.8 3 55 35.4 3 51 29.9 3 47 24.2	•74 •76	4 3 1.8 3 58 55.6 3 54 49.4 3 50 42.8 3 46 36.1	·76 ·77 ·79 ·81 ·83	4 2 15·1 3 58 7·9 3 54 0·5 3 49 52·9 3 45 45·0		4 I 25·8 3 57 I7·4 3 53 8·8 3 49 0·0 3 44 50·8	·84 ·86 ·89 ·91	4 0 33·8 3 56 24·1 3 52 14·2 3 48 4·0 3 43 53·4	·91 ·93	3 59 39.0 3 55 28.0 3 51 16.6 3 47 4.8 3 42 52.7	·94 ·96 ·99 I·01 I·04
33 34 35 36 37	3 43 18·4 3 39 12·3 3 35 6·0 3 30 59·5 3 26 52·7	·79 ·81 ·83 ·85 ·87	3 42 29·2 3 38 22·0 3 34 14·5 3 30 6·8 3 25 58·8		3 4I 36·8 3 37 28·4 3 33 I9·7 3 29 I0·7 3 25 I·3	·90 ·92 ·94 ·97 ·99	3 40 41.4 3 36 31.5 3 32 21.4 3 28 10.9 3 24 0.0	·95 ·98 I·00 I·03 I·05	3 39 42·5 3 35 31·2 3 31 19·5 3 27 7·4 3 22 54·8	1.09 1.09	3 38 40·2 3 34 27·3 3 30 13·9 3 26 0·0 3 21 45·6	1.07 1.10 1.13 1.16 1.19
38 39 40 41 42	3 22 45.7 3 18 38.5 3 14 30.9 3 10 23.1 3 6 14.9	·89 ·91 ·93 ·95 ·98	3 21 50·6 3 17 42·0 3 13 33·0 3 9 23·7 3 5 14·1	·95 ·97 I·00 I·02 I·05	3 20 51.6 3 16 41.5 3 12 31.0 3 8 20.1 3 4 8.8	1.04	3 19 48·7 3 15 37·0 3 11 24·8 3 7 12·1 3 2 58·8	1.08 1.11 1.14 1.17 1.20	3 14 28·2 3 10 14·2 3 5 59·5	1·15 1·18 1·21 1·25 1·28	3 17 30·6 3 13 15·1 3 8 59·0 3 4 42·2 3 0 24·6	I·22 I·26 I·29 I·33 I·37
43 44 45 46 47	3 2 6·4 2 57 57·5 2 53 48·2 2 49 38·5 2 45 28·3	1.00 1.08 1.08 1.01	3 I 4.0 2 56 53.4 2 52 42.4 2 48 30.9 2 44 18.8	1·11 1·14 1·17	2 59 56·9 2 55 44·5 2 51 31·6 2 47 18·1 2 43 3·9	1·19 1·22 1·26	2 58 45·I 2 54 30·6 2 50 15·6 2 45 59·8 2 41 43·3	1·24 1·27 1·31 1·35 1·39	2 53 11·6 2 48 54·2 2 44 35·9	1·36 1·40 1·45	2 56 6·3 2 51 47·2 2 47 27·2 2 43 6·2 2 38 44·2	
48 49 50 51 52	2 41 17·7 2 37 6·5 2 32 54·8 2 28 42·4 2 24 29·3	1·19 1·21	2 40 6·2 2 35 52·9 2 31 38·9 2 27 24·2 2 23 8·6	1.36	2 38 49.0 2 34 33.2 2 30 16.9 2 25 59.5 2 21 41.2	I·42 I·47	2 37 25·9 2 33 7·6 2 28 48·4 2 24 28·1 2 20 6·6	1·44 1·48 1·53 1·58 1·64	2 31 35·5 2 27 13·2 2 22 49·6	1·59 1·64 1·70	2 34 21·1 2 29 56·7 2 25 31·0 2 21 3·8 2 16 35·0	1.71 1.77 1.83
		V	ARIATIO	N TO	ı' OF	LAT	TUDE	AND	ALTITU	DE.		
Alt.	L. 6°	Α.	L. 7°	A.	L. 8°	Α.	L. 9°	A.	L. 10	A.	L. 11	° A.
0 4 8 10 12	s. - '43 - '46 '49 '51	s. -4.04 4.05 4.05 4.05 4.06	s. - ·50 ·53 ·56 ·58 ·60	s. -4.05 4.06 4.06 4.06 4.07	s. - '57 - '60 '64 '65 '67	s. -4.06 4.07 4.07 4.07 4.08	s. - ·64 ·67 ·71 ·73 ·75	s. -4.07 4.08 4.08 4.09 4.09	s. - ·71 ·75 ·78 ·80 -82	s. -4.08 4.09 4.10 4.10 4.11	s. - ·79 ·82 ·86 ·88 ·90	S. -4·10 4·10 4·11 4·12 4·12
14 16 18 20 22	·55 ·57 ·59 ·61 ·63	4.06 4.06 4.07 4.07 4.07	·62 ·64 ·66 ·69 ·71	4.07 4.08 4.08 4.08	·70 ·72 ·74 ·77 ·79	4·08 4·09 4·09 4·10	.77 .79 .82 .84 .87	4·10 4·10 4·11 4·12	.85 .87 .90 .92	4·II 4·II 4·I3 4·I3	·92 ·95 ·98 I·01 I·04	4·13 4·14 4·15 4·15
24 26 28 30 32	·66 ·69 ·71 ·74 ·78	4·08 4·09 4·09 4·10	.74 .77 .80 .83	4·11 4·11 4·10 4·09	·82 ·85 ·89 ·92 ·95	4·10 4·11 4·12 4·13	·90 ·93 ·97 I·00 I·04	4·12 4·13 4·14 4·14 4·15	·99 I·02 I·05 I·09 I·13	4·14 4·15 4·16 4·17 4·18	1.07 1.10 1.14 1.18 1.23	4·16 4·17 4·18 4·19 4·20
34 36 38 40 42	·81 ·85 ·89 ·93 ·98	4·10 4·11 4·12 4·14	·90 ·94 ·98 I·03 I·08	4·12 4·13 4·14 4·15 4·16	·99 1·04 1·08 1·13 1·19	4·14 4·15 4·16 4·18 4·19	1·09 1·13 1·18 1·23 1·29	4·17 4·18 4·19 4·21 4·22	1·18 1·23 1·28 1·34 1·40	4·19 4·21 4·22 4·24 4·26	1·28 1·33 1·39 1·45 1·52	4·22 4·24 4·25 4·27 4·30
44 46 48 50 52	1.03 1.08 1.15 1.21 1.29	4·15 4·17 4·18 4·20 4·22	1·14 1·20 1·26 1·34 1·42	4·18 4·20 4·22 4·24 4·27	1·25 1·31 1·39 1·47 1·56	4·21 4·23 4·26 4·28 4·31	1·36 1·43 1·51 1·60 1·71	4·25 4·27 4·30 4·33 4·37	1·47 1·55 1·64 1·74 1·85	4·28 4·31 4·34 4·38 4·43	1·59 1·68 1·77 1·88 2·01	4·33 4·36 4·40 4·44 4·49

LATITUDE 6°.

DECLINATION—CONTRARY NAME TO—LATITUDE.												
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 10 12 14 16	H. M. S. 5 54 52·8 5 13 39·3 5 5 23·0 4 57 5·9 4 48 48·1	∙64	H. M. S. 5 54 26·3 5 13 2·5 5 4 43·9 4 56 24·6 4 48 4·4	∙66	H. M. S. 5 53 59·6 5 12 24·7 5 4 3·7 4 55 41·8 4 47 19·1	s. - ·45 ·64 ·68 ·72 ·77	H. M. S. 5 53 32·7 5 11 45·7 5 3 22·1 4 54 57·6 4 46 32·0	·70 ·75	H. M. S. 5 53 5.5 5 11 5.6 5 2 39.2 4 54 11.8 4 45 43.2	s. - '45 ·68 ·73 ·78 ·83	H. M. S. 5 52 38·1 5 10 24·3 5 1 54·9 4 53 24·3 4 44 52·5	s. - ·46 ·70 ·75 ·80 ·86
18 20 22 24 25	4 40 29·6 4 32 10·1 4 23 49·7 4 15 28·1 4 11 16·9	·75 ·80 ·84 ·88 ·91	4 39 43.4 4 31 21.3 4 22 58.1 4 14 33.8 4 10 21.1	·83 ·88	4 38 55·3 4 30 30·4 4 22 4·3 4 13 36·9 4 9 22·6	.87	4 38 5·4 4 29 37·4 4 21 8·2 4 12 37·4 4 8 21·4	·90 ·96	4 37 13·4 4 28 42·2 4 20 9·6 4 11 35·2 4 7 17·3	1.00	4 36 19·4 4 27 44·8 4 19 8·4 4 10 30·2 4 6 10·4	·92 ·98 I·04 I·11 I·14
26 27 28 29 30	4 7 5.4 4 2 53.6 3 58 41.4 3 54 28.8 3 50 15.9	1.01	4 6 8·0 4 I 54·6 3 57 40·8 3 53 26·6 3 49 I2·0	1.06		1·09	4 4 4·9 3 59 48·0 3 55 30·5 3 51 12·6 3 46 54·1	1.14	3 58 40·1 3 54 20·6 3 50 0·6	1·19 1·23	4 I 50·0 3 57 29·0 3 53 7·4 3 48 45·I 3 44 22·I	1·18 1·21 1·25 1·29 1·33
31 32 33 34 35	3 46 2·5 3 41 48·7 3 37 34·5 3 33 19·7 3 29 4·5	1.19 1.13	3 44 56·8 3 40 41·2 3 36 25·1 3 32 8·4 3 27 51·1	1·15 1·19 1·22	3 43 47·7 3 39 30·1 3 35 11·9 3 30 53·1 3 26 33·7	1·22 1·25 1·29	3 42 35 0 3 38 15 3 3 33 54 9 3 29 33 8 3 25 12 0	1·32 1·36	3 41 18.6 3 36 56.6 3 32 33.9 3 28 10.3 3 23 45.9	1.34	3 39 58·4 3 35 34·0 3 31 8·6 3 26 42·4 3 22 15·3	1·37 1·41 1·46 1·50 1·55
36 37 38 39 40	3 24 48.6 3 20 32.2 3 16 15.2 3 11 57.5 3 7 39.1	1·22 1·26 1·29 1·33 1·37	3 14 55·3 3 10 35·3	1.33		1.41	3 16 25·8 3 12 1·4	1.23	3 14 54·3 3 10 27·1 3 5 58·7	1·57 1·62 1·67	3 17 47·1 3 13 17·8 3 8 47·4 3 4 15·8 2 59 42·7	1·60 1·65 1·71 1·76 1·82
41 42 43 44 45	3 3 20·0 2 59 0·0 2 54 39·1 2 50 17·2 2 45 54·4	1·50 1·55	3 I 52·6 2 57 30·0 2 53 6·3 2 48 4I·5 2 44 I5·5	1·59 1·65	3 0 20·1 2 55 54·5 2 51 27·7 2 46 59·7 2 42 30·3	1.64 1.69 1.75	2 58 42·0 2 54 13·2 2 49 43·1 2 45 11·5 2 40 38·4	1·74 1·80 1·86	2 56 58·1 2 52 25·9 2 47 52·1 2 43 16·7 2 38 39·5	1.84 1.90 1.97	2 55 8·3 2 50 32·2 2 45 54·5 2 41 14·9 2 36 33·3	1.88 1.95 2.02 2.09 2.17
46 47 48 49 50	2 4I 30·4 2 37 5·2 2 32 38·8 2 28 I0·8 2 23 4I·3	1·70 1·76 1·83	2 39 48·3 2 35 19·6 2 30 49·5 2 26 17·6 2 21 44·0	1·82 1·88 1·95	2 37 59·5 2 33 27·0 2 28 52·8 2 24 16·7 2 19 38·4	2·01 2·08	2 36 3.6 2 31 27.0 2 26 48.3 2 22 7.5 2 17 24.2	2·06 2·14 2·23	2 34 0·4 2 29 19·2 2 24 35·7 2 19 49·6 2 15 0·6	2·20 2·28 2·38	2 31 49·4 2 27 3·2 2 22 14·2 2 17 22·3 2 12 27·2	2·25 2·34 2·44 2·54 2·65
		V	ARIATIO	N TO	ı' OF	LAT	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 12°	Α.	L. 13°	Α.	L. 14°	Α.	L. 15°	A	L. 16°	Α.	I. 17º	A

Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.
0 4 6 8	S. S. 86 -4.11 .89 4.12 .91 4.12 .93 4.13 .95 4.13	S. S. - '93 -4'13 '97 4'14 '99 4'14 1'01 4'15 1'03 4'15	S. S. -1.01 -4.15 1.04 4.15 1.06 4.16 1.08 4.17 1.11 4.17	S. S. -1.08 -4.17 1.12 4.17 1.14 4.18 1.16 4.19 1.19 4.19	S. S. -1·16 -4·18 1·20 4·20 1·22 4·20 1·24 4·21 1·26 4·22	S. S. -1·24 -4·21 1·27 4·22 1·30 4·23 1·31 4·23 1·34 4·24
12	·98 4·14	1.05 4.16	1·13 4·18	I·2I 4·20	1·29 4·22	1·37 4·25
14	1·00 4·14	1.08 4.16	1·16 4·19	I·24 4·21	1·32 4·23	1·40 4·26
16	1·03 4·15	1.11 4.17	1·19 4·19	I·27 4·22	1·35 4·24	1·43 4·27
18	1·06 4·16	1.14 4.18	1·22 4·20	I·30 4·23	1·38 4·25	1·47 4·28
20	1·09 4·17	1.17 4.19	1·25 4·21	I·34 4·24	1·42 4·27	1·51 4·30
22	1·12 4·18	1·20 4·20	1·29 4·22	1·37 4·25	1.46 4.28	1·55 4·31
24	1·15 4·18	1·24 4·21	1·33 4·23	1·41 4·26	1.50 4.30	1·60 4·33
26	1·19 4·19	1·28 4·22	1·37 4·25	1·46 4·28	1.55 4.31	1·64 4·34
28	1·23 4·21	1·32 4·23	1·41 4·26	1·51 4·29	1.60 4.33	1·70 4·37
30	1·27 4·22	1·37 4·25	1·46 4·28	1·56 4·31	1.66 4.35	1·76 4·39
32	1·32 4·23	1·42 4·26	1·52 4·30	1·62 4·33	1·72 4·37	1·82 4·41
34	1·37 4·25	1·47 4·28	1·57 4·32	1·68 4·36	1·78 4·40	1·89 4·44
36	1·43 4·27	1·53 4·30	1·64 4·34	1·75 4·38	1·86 4·43	1·97 4·48
38	1·49 4·29	1·60 4·33	1·71 4·37	1·82 4·41	1·94 4·46	2·06 4·52
40	1·56 4·31	1·67 4·36	1·79 4·40	1·91 4·45	2·03 4·50	2·15 4·56
42	1.63 4.34	1.75 4.39	1.87 4.44	2·00 4·49	2·13 4·55	2·26 4·61
44	1.71 4.37	1.84 4.42	1.97 4.48	2·10 4·54	2·24 4·60	2·39 4·68
46	1.81 4.41	1.94 4.47	2.08 4.53	2·22 4·59	2·37 4·67	2·53 4·75
48	1.91 4.45	2.05 4.52	2.20 4.59	2·36 4·66	2·52 4·75	2·69 4·84
50	2.03 4.50	2.18 4.58	2.34 4.66	2·52 4·74	2·60 4·84	2·78 4·95

LATITUDE 6°.

		DI	ECLINAT	NOI-	-CONTR	ARY	NAME	TO-	LATITU	DE.		
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 6 8 10	H. M. S. 5 52 10·3 5 26 43·8 5 18 13·2 5 9 41·7 5 1 9·1	s. - ·46 ·62 ·67 ·72 ·78	5 17 32·6 5 8 57·8	s. - ·47 ·63 ·69 ·74 ·80	H. M. S. 5 51 13.8 5 25 28.1 5 16 50.9 5 8 12.5 4 59 32.8	s. - ·48 ·65 ·70 ·77 ·83	H. M. S. 5 50 45·1 5 24 48·8 5 16 8·0 5 7 25·8 4 58 42·3	s. ·48 ·66 ·73 ·79 ·86	H. M. S. 5 50 15·9 5 24 8·5 5 15 23·8 5 6 37·7 4 57 50·0	s. - '49 ·68 ·75 ·81 ·89	H. M. S. 5 49 46·3 5 23 27·2 5 14 38·3 5 5 48·0 4 56 56·0	s. - ·50 ·70 ·77 ·84 ·92
14 16 18 20 22	4 52 35·2 4 44 0·0 4 35 23·3 4 26 44·9 4 18 4·7	·89	4 34 24·9 4 25 42·6	·86 ·93 ·99 I·06 I·13	4 50 51.7 4 42 8.9 4 33 24.3 4 24 37.7 4 15 48.9		4 49 57·I 4 4I I0·2 4 32 2I·3 4 23 30·2 4 I4 36·6	.93 1.00 1.07 1.15 1.23	4 49 0.6 4 40 9.3 4 31 15.8 4 22 19.9 4 13 21.3	·96 1·03 1·11 1·19 1·28	4 48 2·0 4 39 6·0 4 30 7·7 4 21 6·7 4 12 2·7	·99 1·07 1·16 1·24 1·34
23 24 25 26 27	4 13 43.8 4 9 22.4 4 5 0.4 4 0 37.8 3 56 14.5	1·12 1·16 1·19 1·23 1·27	4 8 11.5	1·17 1·21 1·25 1·29 1·33	4 II 23.5 4 6 57.5 4 2 30.8 3 58 3.3 3 53 35.1		4 10 8.8 4 5 40.3 4 1 11.0 3 56 40.8 3 52 9.8	1·27 1·32 1·36 1·41 1·45	4 8 50·9 4 4 19·6 3 59 47·6 3 55 14·6 3 50 40·6	1·33 1·37 1·42 1·47 1·52	4 2 55·4 3 58 20·4	1·38 1·43 1·48 1·54 1·59
28 29 30 31 32	3 51 50·6 3 47 25·9 3 43 0·5 3 38 34·2 3 34 7·1	1.39	3 50 30·2 3 46 3·0 3 41 34·8 3 37 5·8 3 32 35·9	1·37 1·42 1·46 1·51 1·56	3 49 6·0 3 44 36·0 3 40 5·1 3 35 33·1 3 31 0·1	1·44 1·48 1·53 1·58 1·64	3 47 37.9 3 43 5.0 3 38 31.0 3 33 55.8 3 29 19.5	1.61	3 41 29·6 3 36 52·3 3 32 13·8	1.63	3 44 29·I 3 39 49·6 3 35 8·9 3 30 26·8 3 25 43·2	1.65 1.70 1.76 1.83 1.89
33 34 35 36 37	3 29 39·0 3 25 10·0 3 20 39·8 3 16 8·6 3 11 36·1	1·53 1·58 1·63 1·69 1·74	3 28 4·8 3 23 32·7 3 18 59·4 3 14 24·8 3 9 48·9	1.61 1.66 1.72 1.78 1.84	3 26 25.9 3 21 50.5 3 17 13.7 3 12 35.5 3 7 55.8	1.69 1.75 1.81 1.87 1.93	3 24 42.0 3 20 3.0 3 15 22.5 3 10 40.5 3 5 56.7		3 18 10·0 3 13 25·5 3 8 39·3	1.87 1.93 2.00 2.07 2.15	3 6 31.8	1.96 2.03 2.10 2.18 2.26
38 39 40 41 42	3 7 2·3 3 2 27·1 2 57 50·4 2 53 12·0 2 48 31·9	1.99	3 5 11·4 3 0 32·4 2 55 51·7 2 51 9·1 2 46 24·5	1·90 1·96 2·03 2·11 2·19	3 3 14·5 2 58 31·3 2 53 46·2 2 48 59·2 2 44 9·6	2·00 2·07 2·15 2·23 2·31	3 I II·I 2 56 23·5 2 5I 33·7 2 46 4I·5 2 4I 46·8	2·11 2·19 2·27 2·36 2·45	2 54 8·5 2 49 13·6	2.50	2 51 46·0 2 46 45·5	2·35 2·44 2·54 2·64 2·75
	2 43 49·8 2 39 5·6 2 34 19·1 2 29 30·1 2 24 38·3	2·30 2·30	2 4I 37.7 2 36 48.5 2 3I 56.7 2 27 I.9 2 22 4.0	2·27 2·35 2·45 2·55 2·66	2 39 17·6 2 34 23·0 2 29 25·3 2 24 24·3 2 19 19·6	2.71		2·55 2·65 2·77 2·89 3·02	2 29 4·5 2 23 53·3 2 18 37·7		2 26 10·1 2 20 51·0 2 15 26·9	3.28
		VA	ARIATIO	N TO	ı' OF	LAT	TUDE A	AND	ALTITU	DE.		

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	S. S.	s. s.	s. s.
	-1·31 -4·23	-1·39 -4·26	-1.47 -4.28	-1.55 -4.31	-1.63 -4.34	-1.72 -4.37
	1·33 4·24	1·41 4·26	1.49 4.29	1.57 4.32	1.66 4.35	1.74 4.38
	1·35 4·24	1·43 4·27	1.51 4.30	1.60 4.33	1.68 4.36	1.76 4.39
	1·37 4·25	1·46 4·28	1.54 4.31	1.62 4.34	1.70 4.37	1.79 4.40
	1·40 4·26	1·48 4·28	1.56 4.32	1.65 4.35	1.73 4.38	1.82 4.41
10	1·43 4·27	1·51 4·29	1·59 4·33	1.67 4.37	1.76 4.39	1·85 4·43
12	1·45 4·28	1·54 4·31	1·62 4·34	1.71 4.37	1.79 4.40	1·88 4·44
14	1·49 4·29	1·57 4·32	1·66 4·35	1.74 4.38	1.83 4.42	1·92 4·46
16	1·52 4·30	1·61 4·33	1·69 4·36	1.78 4.40	1.87 4.44	1·96 4·48
18	1·56 4·31	1·64 4·34	1·73 4·38	1.82 4.42	1.92 4.46	2·01 4·50
20	1.60 4.33	1.69 4.36	1.78 4.40	1·87 4·44	1.97 4.48	2·06 4·52
22	1.64 4.34	1.73 4.38	1.83 4.42	1·92 4·46	2.02 4.50	2·12 4·55
24	1.69 4.36	1.78 4.40	1.88 4.44	1·98 4·48	2.08 4.53	2·18 4·58
26	1.74 4.38	1.84 4.42	1.94 4.46	2·04 4·51	2.14 4.56	2·25 4·61
28	1.80 4.40	1.90 4.45	2.00 4.49	2·11 4·54	2.22 4.59	2·33 4·65
30	1·86 4·43	1.96 4.48	2·07 4·52	2·18 4·58	2·30 4·63	2·41 4·69
32	1·93 4·46	2.04 4.51	2·15 4·56	2·26 4·61	2·38 4·67	2·51 4·74
34	2·00 4·49	2.12 4.54	2·24 4·60	2·36 4·66	2·48 4·73	2·61 4·80
36	2·09 4·53	2.21 4.59	2·33 4·65	2·46 4·71	2·59 4·79	2·73 4·86
38	2·18 4·57	2.31 4.64	2·44 4·70	2·58 4·78	2·72 4·86	2·87 4·94
40	2·28 4·63	2·42 4·69	2·56 4·77	2·71 4·85	2·86 4·94	3·03 5·03
42	2·40 4·68	2·55 4·76	2·70 4·85	2·86 4·94	3·03 5·03	3·21 · 5·14
44	2·54 4·76	2·70 4·84	2·86 4·94	3·04 5·04	3·22 5·15	3·42 5·28
46	2·69 4·84	2·87 4·94	3·05 5·05	3·24 5·17	3·45 5·30	3·67 5·45
47	2·78 4·89	2·96 4·99	3·15 5·11	3·36 5·24	3·57 5·39	3·81 5·55

LATITUDE 7°.

True Decl De												
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
° 0 10 12 14 16	H. M. S. 6 0 0.0 5 19 41.8 5 11 38.0 5 3 34.2 4 55 30.4	s. - ·49 ·50 ·50 ·51	H. M. S. 5 59 30·6 5 19 11·5 5 11 7·4 5 3 3·3 4 54 59·1	.51	H. M. S. 5 59 1.0 5 18 40.4 5 10 36.0 5 2 31.3 4 54 26.5	s. - ·49 ·52 ·53 ·54 ·55	H. M. S. 5 58 31.5 5 18 8.5 5 10 3.4 5 1 58.2 4 53 52.7	s. - '49 '54 '55 '56 '57		s. - '49 *55 *57 *58 *60	H. M. S. 5 57 32·3 5 17 2·3 5 8 55·5 5 0 48·5 4 52 41·1	s. - ·50 ·57 ·58 ·60 ·62
18 20 22 24 26	4 47 26·5 4 39 22·4 4 31 18·3 4 23 14·0 4 15 9·6	•54	4 46 54·7 4 38 50·2 4 30 45·5 4 22 40·7 4 14 35·7		4 46 21.6 4 38 16.4 4 30 11.1 4 22 5.5 4 13 59.7	·59 ·60	4 45 47.0 4 37 41.1 4 29 34.8 4 21 28.3 4 13 21.5	·59 ·60 ·62 ·64 ·66	4 28 56·8 4 20 49·I	·61 ·63 ·65 ·67 ·69	4 44 33.4 4 36 25.3 4 28 16.8 4 20 7.9 4 II 58.4	·64 ·66 ·68 ·70 ·73
28 30 32 33 34	4 7 5.0 3 59 0.3 3 50 55.4 3 46 52.8 3 42 50.2	·57 ·58	4 6 30·4 3 58 24·9 3 50 19·2 3 46 16·2 3 42 13·1	·60 ·61 ·63 ·63 ·64	4 5 53.5 3 57 47.0 3 49 40.2 3 45 36.6 3 41 33.0	•67	4 5 14·2 3 57 6·6 3 48 58·5 3 44 54·3 3 40 49·9	·67 ·70 ·72 ·73 ·74	4 4 32·5 3 56 23·5 3 48 13·9 3 44 8·9 3 40 3·7	·71 ·74 ·77 ·78 ·79	4 3 48·4 3 55 37·8 3 47 26·5 3 43 20·6 3 39 14·5	·76 ·78 ·81 ·83 ·85
35 36 37 38 39	3 38 47·5 3 34 44·8 3 30 42·0 3 26 39·1 3 22 36·1	·60 ·61 ·62 ·63 ·63	3 38 9.9 3 34 6.7 3 30 3.3 3 25 59.8 3 21 56.3	·65 ·66 ·67 ·68 ·69	3 37 29·2 3 33 25·3 3 29 21·3 3 25 17·1 3 21 12·8	·70 ·72 ·73 ·74 ·75	3 36 45·4 3 32 40·7 3 28 35·9 3 24 30·9 3 20 25·8	·76 ·77 ·78 ·80 ·81	3 35 58·3 3 31 52·8 3 27 47·1 3 23 41·1 3 19 35·0	·81 ·83 ·84 ·86 ·88	3 26 54·8 3 22 47·7	·86 ·88 ·90 ·92 ·94
40 41 42 43 44	3 18 33·1 3 14 30·0 3 10 26·7 3 6 23·4 3 2 19·9	·64 ·65 ·66 ·68 ·69	3 17 52.6 3 13 48.8 3 9 44.8 3 5 40.8 3 1 36.5	·71 ·72 ·73 ·74 ·76	3 17 8·4 3 13 3·8 3 8 59·0 3 4 54·0 3 0 48·9	·77 ·78 ·80 ·81 ·83	3 16 20·4 3 12 14·8 3 8 9·1 3 4 3·1 2 59 56·8	·83 ·85 ·87 ·89 ·91	3 11 21·9 3 7 15·0	·90 ·92 ·94 ·96 ·98	3 10 24·8 3 6 16·7 3 2 8·1	·96 ·98 I·01 I·03 I·06
45 46 47 48 49	2 58 16·3 2 54 12·6 2 50 8·8 2 46 4·8 2 42 0·6	·70 ·71 ·73 ·74 ·76	2 57 32·I 2 53 27·5 2 49 22·8 2 45 17·8 2 41 12·7		2 56 43·5 2 52 37·9 2 48 32·1 2 44 25·9 2 40 19·6	·89	2 55 50·3 2 51 43·5 2 47 36·4 2 43 29·0 2 39 21·2	·93 ·95 ·97 ·99 1·02	2 54 52·5 2 50 44·3 2 46 35·7 2 42 26·8 2 38 17·4	1·03 1·05	2 53 49.9 2 49 40.1 2 45 29.9 2 41 19.2 2 37 8.0	1·08 1·11 1·14 1·17 1·20
51 52	2 37 56·3 2 33 51·7 2 29 47·0 2 25 42·0 2 21 36·8	·79 ·81	2 37 7·3 2 33 1·6 2 28 55·6 2 24 49·4 2 20 42·9	.90	2 36 12·9 2 32 5·9 2 27 58·5 2 23 50·8 2 19 42·6	1·03 1·03	2 35 13.0 2 31 4.5 2 26 55.4 2 22 45.9 2 18 35.9	1.10	2 34 7·5 2 29 57·1 2 25 46·2 2 21 34·7 2 17 22·5	1·17 1·20 1·24	2 32 56·2 2 28 43·8 2 24 30·8 2 20 16·9 2 16 2·2	1·24 1·27 1·31 1·35 1·40
		V.A	RIATIO	N TC	ı' OF	LATI	TUDE A	AND .	ALTITŲI	DE.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	Α.	L. 3°	A.	L. 4°	Α.	L. 5°	A.
0 4 8 12 14	s. :00 :03 :07 :10 :12	s. -4·03 4·03 4·03 4·03 4·03	s. 07 - .11 .14 .18 .20	s. -4·03 4·03 4·03 4·03 4·03	s. - ·14 - ·17 ·21 ·25 ·27	s. -4.03 4.03 4.04 4.04 4.04	s. - ·21 - ·25 ·28 ·32 ·34	s. -4·03 4·04 4·04 4·04 4·04	s. - ·28 - ·32 ·36 ·40 ·42	s. -4.04 4.04 4.05 4.05 4.05	s. - ·36 - ·39 ·43 ·47 ·49	s. -4·04 4·05 4·05 4·06 4·06
16 18 20 22 24	·14 ·16 ·18 ·20 ·22	4·03 4·03 4·03 4·04	·22 ·24 ·26 ·28 ·30	4.04 4.04 4.04 4.04 4.04	·29 ·31 ·33 ·35 ·38	4·04 4·04 4·05 4·05	·36 ·39 ·41 ·43 ·46	4.05 4.05 4.05 4.05 4.06	.44 .46 .48 .51	4·05 4·06 4·06 4·06 4·07	·51 ·54 ·56 ·59 ·61	4·06 4·07 4·07 4·08
26 28 30 32 34	·24 ·26 ·28 ·31 ·33	4.04 4.04 4.04 4.04	*32 *34 *37 *39 *42	4.04 4.04 4.05 4.05 4.05	·40 ·43 ·45 ·48 ·51	4.05 4.05 4.06 4.06 4.06	·48 ·51 ·54 ·56 ·60	4.06 4.06 4.06 4.07 4.07	·56 ·59 ·62 ·65 ·69	4·07 4·07 4·08 4·08 4·09	·64 ·67 ·70 ·74 ·77	4·08 4·08 4·10 4·10
36 38 40 42 44	·36 ·39 ·42 ·45 ·48	4.04 4.05 4.05 4.05 4.06	.45 .48 .51 .55 .58	4.05 4.06 4.06 4.07 4.07	·54 ·57 ·61 ·64 ·68	4·07 4·07 4·08 4·09	.63 .66 .70 .74 .79	4.08 4.08 4.09 4.10 4.11	·72 ·76 ·80 ·84 ·89	4·09 4·10 4·11 4·12 4·13	·81 ·85 ·90 ·95 1 ·00	4·11 4·13 4·14 4·15
46 48 50 52 54	•52 •56 •60 •64 •69	4.06 4.07 4.07 4.08 4.09	·62 ·66 ·71 ·76 ·82	4.08 4.08 4.09 4.10 4.11	.73 .78 .83 .88	4·10 4·11 4·13 4·14	·84 ·89 ·95 1·01 1·08	4·12 4·13 4·14 4·15 4·17	·94 1·00 1·07 1·14 1·21	4·14 4·15 4·17 4·19 4·21	1·06 1·12 1·19 1·27 1·36	4·17 4·18 4·20 4·22 4·24

LATITUDE 7°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 5 57 2.5 5 16 27.9 5 8 20.0 5 0 11.8 4 52 3.3	s. - ·50 ·58 ·60	H. M. S. 5 56 32.7 5 15 52.5 5 7 43.5 4 59 34.0 4 51 24.1	s. - ·50 ·60 ·62 ·64 ·67	H. M. S. 5 56 2.7 5 15 16.3 5 7 5.8 4 58 54.9 4 50 43.4	s. - ·50 ·61 ·64	H. M. S. 5 55 32.5 5 14 39.1 5 6 27.1 4 58 14.5 4 50 1.3	s. - ·50 ·63 ·66 ·68 ·71	H. M. S. 5 55 2·3 5 14 0·9 5 5 47·1 4 57 32·7 4 49 17·6	s. - ·51 ·64 ·68 ·71	H. M. S. 5 54 31.8 5 13 21.7 5 5 6.0 4 56 49.6 4 48 32.4	s. - ·51 ·66 ·69 ·73 ·77
18 20 22 24 26	4 43 54·3 4 35 44·9 4 27 35·0 4 19 24·5 4 II 13·5	·66 ·68 ·71 ·74 ·77	4 43 13.7 4 35 2.7 4 26 51.2 4 18 39.1 4 10 26.2	·69 ·72 ·75 ·78 ·81	4 42 31·4 4 34 18·8 4 26 5·4 4 17 51·4 4 9 36·6	·72 ·75 ·78 ·81 ·85	4 41 47·5 4 33 33·0 4 25 17·6 4 17 1·5 4 8 44·4	·75 ·78 ·81 ·85 ·89	4 16 9.3	·81 ·85 ·89	4 40 14·4 4 31 55·5 4 23 35·7 4 15 14·7 4 6 52·5	·80 ·84 ·89 ·93 ·98
28 29 30 31 32	4 3 1.8 3 58 55.6 3 54 49.4 3 50 42.8 3 46 36.1	·80 ·81 ·83 ·85 ·86	4 2 12·6 3 58 5·5 3 53 58·1 3 49 50·6 3 45 42·7	·84 ·86 ·88 ·90 ·92	4 I 20·8 3 57 I2·6 3 53 4·I 3 48 55·3 3 44 46·2		4 0 26·3 3 56 16·8 3 52 7·1 3 47 57·0 3 43 46·6	.93 .95 .97 1.00 1.02	3 51 7·1 3 46 55·6	1.00 1.02 1.05	3 50 4·I 3 45 5I·0	1.02 1.05 1.08 1.10 1.13
33 34 35 36 37	3 42 29·2 3 38 22·0 3 34 14·5 3 30 6·8 3 25 58·8	·88 ·90 ·92 ·94 ·96	3 41 34·6 3 37 26·2 3 33 17·6 3 29 8·6 3 24 59·3		3 40 36·9 3 36 27·2 3 32 17·1 3 28 6·7 3 23 56·0	.99 1.01 1.03 1.06 1.09	3 39 35·8 3 35 24·7 3 31 13·1 3 27 1·1 3 22 48·7	1.07 1.10 1.12	3 38 31·4 3 34 18·6 3 30 5·4 3 25 51·7 3 21 37·5	1.10 1.19	3 33 8·9 3 28 53·9 3 24 38·3	1·16 1·19 1·22 1·26 1·29
38 39 40 41 42	3 21 50·6 3 17 42·0 3 13 33·0 3 9 23·7 3 5 14·1	1.01	3 20 49·6 3 16 39·6 3 12 29·1 3 8 18·3 3 4 6·9	1.07	3 19 44.7 3 15 33.1 3 11 21.0 3 7 8.4 3 2 55.3	1·11 1·14 1·17 1·20 1·23	3 18 35.8 3 14 22.4 3 10 8.5 3 5 54.0 3 1 38.8	1·18 1·21 1·25 1·28 1·31	3 13 7·4 3 8 51·5 3 4 34·9	1·29 1·32 1·36	3 II 48.0 3 7 29.8	1·33 1·36 1·40 1·44 1·48
43 44 45 46 47	3 I 4·0 2 56 53·4 2 52 42·4 2 48 30·9 2 44 I8·8	1·14 1·17 1·20	2 59 55·I 2 55 42·8 2 5I 29·9 2 47 I6·4 2 43 2·3	1·22 1·25 1·28	2 58 41·5 2 54 27·2 2 50 12·3 2 45 56·6 2 41 40·1	1.38 1.38	2 57 23·0 2 53 6·5 2 48 49·2 2 44 31·1 2 40 12·1	1·35 1·39 1·43 1·47 1·52	2 51 40·5 2 47 20·6 2 42 59·9	1.48 1.52 1.57	2 54 30·5 2 50 8·9 2 45 46·2 2 41 22·5 2 36 57·6	1·53 1·57 1·62 1·68 1·73
48 49 50 51 52	2 40 6·2 2 35 52·9 2 31 38·9 2 27 24·2 2 23 8·6	1·30 1·34 1·38	2 38 47.4 2 34 31.9 2 30 15.4 2 25 58.1 2 21 39.8	1.40 1.44 1.49	2 37 22·8 2 33 4·7 2 28 45·5 2 24 25·3 2 20 3·9	1.21 1.22	2 35 52·I 2 3I 3I·I 2 27 8·9 2 22 45·5 2 18 20·7	1·56 1·62 1·67 1·72 1·78	2 29 50·8 2 25 25·3 2 20 58·3	1·73 1·85	2 32 31·3 2 28 3·6 2 23 34·4 2 19 3·5 2 14 30·6	1·79 1·85 1·91 1·98 2·06
		V	ARIATIC	N TO	ı' OF	LAT	TUDE .	AND	ALTITU	DE.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	Α.	L. 9°	Α.	L. 10	° A.	L. 11°	Α.
0 4 8 10 12	s. '43 - '46 '50 '52 '54	s. -4.05 4.06 4.06 4.06 4.07	s. 	s. -4.06 4.06 4.07 4.07 4.08	s. '57 -61 -65 -67 -69	s. -4:07 4:08 4:08 4:08 4:09	S64 .68 .72 .74 .77	s. -4.08 4.09 4.09 4.10 4.10	s. - ·72 ·75 ·80 ·82 ·84	s. -4.09 4.10 4.11 4.11 4.12	s. - ·79 - ·83 ·87 ·89 ·92	s. -4·10 4·11 4·12 4·13 4·13
14 16 18 20 22	·57 ·59 ·61 ·64 ·67	4.07 4.07 4.08 4.08 4.08	·64 ·67 ·69 ·72 ·75	4.08 4.08 4.09 4.09 4.10	·72 ·74 ·77 ·80 ·83	4.09 4.10 4.10 4.14	.79 .82 .85 .88	4·II 4·II 4·I2 4·I2 4·I3	·87 ·90 ·93 ·96 ·99	4·12 4·13 4·14 4·15	·95 ·98 I·01 I·04 I·07	4·14 4·15 4·16 4·17
24 26 28 30 32	·69 ·73 ·76 ·79 ·83	4.09 4.10 4.11 4.11	·78 ·81 ·84 ·88 ·92	4·10 4·11 4·12 4·13	•86 •89 •93 •96	4·12 4·13 4·14 4·14 4·15	.94 .97 1.01 1.05 1.10	4·14 4·15 4·16 4·16 4·18	1.02 1.06 1.10 1.14 1.19	4·16 4·17 4·18 4·19 4·20	1·11 1·15 1·19 1·23 1·28	4·18 4·19 4·20 4·21 4·23
34 36 38 40 42	·87 ·91 ·95 I·00 I·05	4·12 4·13 4·14 4·15 4·16	·96 1·00 1·05 1·10 1·16	4·14 4·15 4·16 4·18 4·19	1·05 1·10 1·15 1·20 1·26	4·16 4·18 4·19 4·21 4·22	1·14 1·19 1·25 1·31 1·37	4·19 4·20 4·22 4·24 4·26	1·24 1·29 1·35 1·42 1·49	4·22 4·23 4·25 4·27 4·30	1·34 1·39 1·46 1·53 1·60	4·25 4·26 4·28 4·31 4·34
44 46 48 50 52	1·11 1·17 1·24 1·32 1·40	4·18 4·20 4·22 4·24 4·27	1·22 1·29 1·36 1·44 1·54	4·21 4·23 4·25 4·28 4·31	1·33 1·40 1·49 1·58 1·68	4·24 4·27 4·29 4·33 4·37	1.45 1.53 1.61 1.72 1.83	4·28 4·31 4·34 4·38 4·43	1·56 1·65 1·75 1·86 1·98	4·32 4·35 4·39 4·44 4·49	1.69 1.78 1.89 2.01 2.14	4·37 4·40 4·45 4·50 4·56

152 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 7°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 8 10 12 14	H. M. S. 5 54 1·1 5 20 58·6 5 12 41·5 5 4 23·7 4 56 5·1	s. - ·51 ·64 ·68 ·72 ·75	H. M. S. 5 53 30·2 5 20 19·4 5 12 0·1 5 3 40·0 4 55 19·1	•66	H. M. S. 5 52 59.0 5 19 39.4 5 11 17.7 5 2 55.1 4 54 31.6	·72 ·76	H. M. S. 5 52 27.5 5 18 58.3 5 10 34.0 5 2 8.8 4 53 42.5	·74 ·78	H. M. S. 5 51 55.7 5 18 16.2 5 9 49.1 5 1 21.0 4 52 51.8	s. - ·53 ·71 ·76 ·81 ·86	H. M. S. 5 51 23.7 5 17 33.0 5 9 3.0 5 0 31.8 4 51 59.4	s. - ·54 ·73 ·78 ·83 ·89
16 18 20 22 24	4 47 45.7 4 39 25.3 4 31 3.9 4 22 41.4 4 14 17.7	·88	4 30 10.2	·91	4 46 7.0 4 37 41.3 4 29 14.3 4 20 45.9 4 12 16.1	·90 ·95 I·00	4 45 15.0 4 36 46.3 4 28 16.2 4 19 44.6 4 11 11.2	1.04	4 44 21·2 4 35 49·3 4 27 15·9 4 18 40·7 4 10 3·6	1.03 1.09 1.15	4 26 13·1 4 17 34·2 4 8 53·1	.94 1.00 1.07 1.13 1.20
25 26 27 28 29	4 10 5.4 4 5 52.6 4 1 39.6 3 57 26.1 3 53 12.2	1.00 1.02 1.05 1.07 1.10	4 4 50·0 4 0 35·2 3 56 20·1	1.13		1.12	4 6 53.9 4 2 36.0 3 58 17.6 3 53 58.6 3 49 39.1	1.23			4 4 31·8 4 0 9·8 3 55 47·1 3 51 23·8 3 46 59·8	1·23 1·27 1·31 1·35 1·39
30 31 32 33 34	3 48 57·8 3 44 43·0 3 40 27·7 3 36 11·9 3 31 55·5	1.19	3 47 48·3 3 43 31·6 3 39 14·4 3 34 56·6 3 30 38·1	1·22 1·25 1·29	3 46 35·4 3 42 16·7 3 37 57·4 3 33 37·4 3 29 16·8	1.32	3 40 58·1 3 36 36·5 3 32 14·3	1·34 1·38 1·42	3 43 58·8 3 39 35·6 3 35 11·7 3 30 46·9 3 26 21·2	1.45	3 38 9·3 3 33 42·7 3 29 15·2	
35 36 37 38 39	3 27 38·5 3 23 20·9 3 19 2·6 3 14 43·6 3 10 23·8	1.32	3 17 38·6 3 13 17·2	1.40		1·43 1·47 1·52 1·56 1·61	3 19 2·4 3 14 36·6 3 10 9·8	1.55 1.60 1.65	3 17 27·0 3 12 58·2 3 8 28·3	1·58 1·63 1·68 1·74 1·79	3 6 41.4	I.77
40 41 42 43 44	3 6 3·3 3 1 41·8 2 57 19·4 2 52 56·0 2 48 31·5	1.57	3 0 7·5 2 55 42·3 2 51 15·8	1·57 1·62 1·67 1·72 1·78	2 58 27·7 2 53 59·3 2 49 29·6	1.66 1.71 1.76 1.82 1.88	2 56 42·2 2 52 10·4 2 47 37·1	1.87 1.93	2 59 24·7 2 54 50·7 2 50 15·2 2 45 37·9 2 40 58·8	1.98	2 43 31.7	2·02 2·09 2·16
45 46 47 48 49	2 44 5.8 2 39 38.8 2 35 10.5 2 30 40.6 2 26 9.1	1.91	2 42 19·1 2 37 48·6 2 33 16·5 2 28 42·6 2 24 6·8	1.90 1.96 2.03	2 40 25.7 2 35 51.3 2 31 15.1 2 26 36.8 2 21 56.4	2.16	2 33 46·7 2 29 6·0	2·14 2·22 2·30	2 36 17·6 2 31 34·4 2 26 48·6 2 22 0·2 2 17 8·8	2·27 2·36 2·46	2 24 22.5	2·42 2·51 2·62

Alt.	L. 12°	A.,	L. 13	° A.	L. 14	° A.	L. 15	° A.	L. 16	° A.	L. 17	° A.
0	s. - ·86 -	S. -4·12	s. ·94	s. -4·14	s. — i·oi	s. -4·15	s. -1.09	s. -4·17	s. -1·16	s. -4·19	s. - 1·24	s. -4·21
4	.90	4.13	∙98	4.12	1.05	4.16	1.13	4.19	1.21	4.21	1.29	4.23
6	.92	4.13	1.00	4.12	1.08	4.17	1.12	4.10	1.23	4.31	1.31	4.24
8	.95	4.14	1.02	4.16	1.10	4.18	1.18	4.20	1.26	4.22	1.34	4.22
10	•97	4.14	1.05	4.16	1.13	4.18	1.20	4.31	1.28	4.53	1.36	4.25
12	1.00	4.15	1.08	4.17	1.15	4.19	1.23	4.21	1.31	4.24	1.40	4.26
14	1.03	4.16	1.10	4.18	1.18	4.20	1.26	4.22	1.35	4.25	1.43	4.28
16	1.06	4.17	1.13	4.19	1.22	4.21	1.30	4.23	1.38	4.26	1.46	4.29
18	1.00	4.17	1.17	4.20	1.25	4.22	1.33	4.24	1.42	4.27	1.50	4.30
20	1.13	4.18	1.20	4.31	1.29	4.53	1.37	4.26	1.46	4.59	1.55	4.32
22	1.16	4.19	1.24	4.22	1.33	4.24	1.41	4.27	1.50	4.30	1.59	4.33
24	1.10	4.20	1.28	4.23	1.37	4.25	1.46	4.29	1.55	4.32	1.64	4.35
26	1.23	4.21	1.32	4.24	1.41	4.27	1.51	4.30	1.60	4.34	1.70	4.37
28	1.28	4.23	1.37	4.26	1.46	4.29	1.56	4.32	1.65	4.36	1.75	4.39
30	1.33	4.24	1.42	4.27	1.52	4.31	1.62	4.34	1.71	4.38	1.82	4.42
32	1.38	4.26	1.48	4.29	1.58	4:33	1.68	4.36	1.78	4.41	1.89	4.45
34	1.44	4.28	1.54	4.31	1.64	4.35	1.74	4.39	1.85	4.44	1.96	4.48
36	1.50	4.30	1.60	4.34	1.71	4.38	1.82	4.42	1.93	4.47	2.05	4.52
38	1.56	4.32	1.67	4.36	1.79	4.41	1.90	4.46	2.02	4.21	2.14	4.57
40	1.64	4.35	1.75	4.39	1.87	4.44	1.99	4.20	2.12	4.55	2.25	4.62
42	1.72	4.38	1.84	4.43	1.97	4.48	2.10	4.54	2.23	4·61	2.37	4.68
44	1.81	4.42	1.94	4.47	2.07	4.53	2.21	4.60	2.36	4.67	2.51	4.75
46	1.91	4.46	2.05	4.52	2.19	4.59	2.34	4.66	2.50	4.74	2.66	4.83
48	2.03	4.51	2.18	4.58	2.33	4.66	2.49	4.74	2.66	4.83	2.85	4.93
49	2.09	4.54	2.25	4.61	2.41	4.69	2.58	4.78	2.75	4.88	2.95	4.99

LATITUDE 7°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 6 8 10	H. M. S. 5 50 51·3 5 25 20·8 5 16 48·7 5 8 15·5 4 59 41·1	s. - ·54 ·69 ·75 •80 ·86	H. M. S. 5 50 18·5 5 24 38·6 5 16 3·3 5 7 26·7 4 58 48·7	s. - ·55 ·71	H. M. S. 5 49 45 ² 5 23 55 ⁴ 5 15 16 ⁶ 5 6 36 ⁴ 4 57 54 ⁸	s. - '55 '73 '79 '85 '91	H. M. S. 5 49 11·6 5 23 11·1 5 14 28·6 5 5 44·6 4 56 59·0	s.	H. M. S. 5 48 37.5 5 22 25.9 5 13 39.3 5 4 51.3 4 56 1.5	s. - ·57 ·76		s. - ·58 ·79 ·86 ·93 r·01
14 16 18 20 21	4 51 5·2 4 42 27·9 4 33 48·9 4 25 8·0 4 20 46·7	1.11	4 50 9·3 4 4I 28·2 4 32 45·2 4 24 0·2 4 I9 36·9	•95 1•01 1•08 1•15 1•19	4 49 II·4 4 40 26·3 4 3I 39·2 4 22 49·8 4 I8 24·2	1.05 1.12 1.20	4 48 11.6 4 39 22.3 4 30 30.7 4 21 36.6 4 17 8.6	1·09 1·16 1·24	4 47 9.8 4 38 15.9 4 29 19.6 4 20 20.6 4 15 50.0	1·13 1·21 1·29		1.09 1.17 1.25 1.34 1.39
22 23 24 25 26	4 16 25.0 4 12 2.7 4 7 39.7 4 3 16.1 3 58 51.8	1·21 1·25 1·29	4 15 13·0 4 10 48·3 4 6 23·1 4 1 57·1 3 57 30·4	I.34	4 13 57·9 4 9 31·0 4 5 3·3 4 0 34·8 3 56 5·4	1·32 1·36 1·40	4 12 39·9 4 8 10·4 4 3 40·0 3 59 8·9 3 54 36·7	1·37 1·42 1·46		1·38 1·43 1·48 1·53 1·58	4 5 18.9	1.44 1.49 1.54 1.59 1.65
27 28 29 30 31	3 54 26·8 3 50 1·1 3 45 34·5 3 41 7·1 3 36 38·7	1.20	3 53 2·9 3 48 34·6 3 44 5·3 3 39 35·1 3 35 3·8	1·43 1·47 1·52 1·57 1·62	3 51 35·2 3 47 4·1 3 42 32·0 3 37 58·8 3 33 24·4	1·54 1·59 1·64	3 50 3.7 3 45 29.5 3 40 54.3 3 36 18.0 3 31 40.3	1.61 1.66 1.72	3 48 28·0 3 43 50·7 3 39 12·2 3 34 32·4 3 29 51·2	1.80	3 42 7·4 3 37 25·4	1.70 1.76 1.82 1.89
32 33 34 35 36	3 32 9·4 3 27 39·0 3 23 7·5 3 18 34·9 3 14 0·9	1.64 1.69 1.75	3 30 31·5 3 25 58·1 3 21 23·3 3 16 47·3 3 12 9·8	1.78 1.84	3 28 48·9 3 24 12·1 3 19 33·9 3 14 54·2 3 10 13·0	1.87	3 22 21·0 3 17 39·0 3 12 55·4	1.90	3 25 8.6 3 20 24.3 3 15 38.3 3 10 50.5 3 6 0.7		3 18 21·9 3 13 31·6 3 8 39·2	2·02 2·09 2·17 2·24 2·33
37 38 39 40 41	3 9 25.6 3 4 48.8 3 0 10.4 2 55 30.3 2 50 48.4	2.06		2.18		2·22 2·30	3 3 22·8 2 58 33·4 2 53 41·7 2 48 47·6 2 43 50·9	2·34 2·43	3 I 8·8 2 56 I4·4 2 5I I7·7 2 46 I8·I 2 4I I5·5	2·29 2·38 2·47 2·56 2·67	2 53 48·I 2 48 45·6 2 43 40·0	2·42 2·51 2·61 2·71 2·82
42 43 44 45 46	2 46 4·4 2 41 18·2 2 36 29·6 2 31 38·5 2 26 44·4	2.38	2 43 48·1 2 38 56·8 2 34 2·8 2 29 5·8 2 24 5·5	2·43 2·52 2·62	2 4I 23·8 2 36 27·0 2 3I 27·I 2 26 23·7 2 2I 16·6	2·67 2·79	2 38 51·2 2 33 48·3 2 28 41·8 2 23 31·5 2 18 16·7	2.96	2 30 59·9 2 25 46·3 2 20 28·2	3.12	2 22 39·7 2 17 12·9	2·94 3·07 3·21 3·36 3·52
		V	ARIATIC	N TO	ı' OF	LATI	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 18°	A.	L. 19	A.	L. 20°	Α.	L. 21°	A.	L. 22°	Α.	L. 23°	A.
0 2 4 6 8	s. -1·32 - 1·34 1·36 1·39 1·42	s. -4·24 4·25 4·25 4·26 4·27	s. -1·40 1·42 1·44 1·47 1·50	s. -4·26 4·27 4·28 4·29 4·30	s. -1.48 - 1.50 1.53 1.55 1.58	s. -4·29 4·30 4·31 4·32 4·33	s. -1.56 - 1.58 1.61 1.63 1.67	s. -4·32 4·33 4·34 4·35 4·36	S. - 1.64 1.67 1.69 1.72 1.75	s. -4·35 4·36 4·37 4·38 4·39	s. -1.73 - 1.75 1.78 1.81 1.84	s. -4·38 4·39 4·40 4·41 4·43
10 12 14 16 18	1.45 1.48 1.51 1.55 1.59	4·28 4·29 4·30 4·32 4·33	1·53 1·56 1·60 1·64 1·68	4·31 4·32 4·33 4·35 4·37	1.61 1.65 1.69 1.73 1.77	4:34 4:35 4:37 4:38 4:40	1.70 1.73 1.77 1.82 1.86	4·37 4·39 4·40 4·42 4·44	1.78 1.82 1.86 1.91 1.96	4·41 4·42 4·44 4·46 4·48	1.87 1.91 1.95 2.00 2.05	4·44 4·46 4·48 4·50 4·52
20 22 24 26 28	1.64 1.68 1.74 1.79 1.85	4·35 4·37 4·39 4·41 4·44	1·73 1·78 1·83 1·89 1·96	4·39 4·41 4·43 4·45 4·48	1·82 1·87 1·93 1·99 2·06	4·42 4·44 4·47 4·50 4·53	1.91 1.97 2.03 2.10 2.17	4·46 4·48 4·51 4·54 4·58	2·01 2·07 2·13 2·20 2·28	4·50 4·53 4·56 4·59 4·63	2·11 2·17 2·24 2·31 2·40	4·55 4·58 4·61 4·65 4·69
30 32 34 36 38	1.92 2.00 2.08 2.17 2.27	4·46 4·50 4·53 4·58 4·63	2·03 2·11 2·20 2·29 2·40	4·51 4·55 4·59 4·64 4·69	2·14 2·22 2·32 2·42 2·54	4·56 4·65 4·70 4·76	2·25 2·34 2·44 2·56 2·68	4·62 4·66 4·71 4·77 4·84	2·37 2·47 2·57 2·69 2·83	4·67 4·72 4·78 4·85 4·93	2·49 2·59 2·71 2·84 2·99	4·74 4·79 4·86 4·93 5·02
40 42 44 45 46	2·39 2·52 2·66 2·75 2·84	4·68 4·75 4·83 4·88 4·93	2·53 2·67 2·83 2·92 3·02	4·76 4·83 4·92 4·98 5·03	2.67 2.83 3.01 3.10 3.21	4·84 4·92 5·03 5·09 5·15	2·83 3·00 3·19 3·30 3·42	4.92 5.02 5.14 5.21 5.29	2·99 3·17 3·39 3·51 3·64	5·02 5·13 5·26 5·34 5·43	3·16 3·36 3·60 3·73 3·88	5·12 5·25 5·40 5·49 5·60

LATITUDE 8°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0·0 5 19 36·2 5 11 31·3 5 3 26·3 4 55 21·2	s. - ·56 ·57 ·57 ·58 ·58	H. M. S. 5 59 26·3 5 19 1·5 5 10 56·3 5 2 50·9 4 54 45·5		H. M. S. 5 58 52·5 5 18 26·1 5 10 20·4 5 2 14·5 4 54 8·5	s. - ·56 ·60 ·61 ·62 ·63	H. M. S. 5 58 18·7 5 17 49·9 5 9 43·5 5 1 37·0 4 53 30·2	s. - ·56 ·61 ·62 ·63 ·65	5 17 12·8 5 9 5·7	s. - ·56 ·62 ·64 ·66 ·67	H. M. S. 5 57 10·9 5 16 34·9 5 8 26·8 5 0 18·4 4 52 9·6	s. - ·57 ·64 ·66 ·68 ·70
18 20 22 24 26	4 47 16·1 4 39 10·8 4 31 5·4 4 22 59·8 4 14 54·0		4 46 39.8 4 38 34.0 4 30 28.0 4 22 21.8 4 14 15.3	·63 ·64	4 46 2·2 4 37 55·7 4 29 49·0 4 21 41·9 4 13 34·5	·67	4 45 23·I 4 37 15·7 4 29 8·0 4 21 0·0 4 12 51·5	·66 ·68 ·70 ·72 ·74	4 44 42·5 4 36 34·1 4 28 25·3 4 20 16·0 4 12 6·2	·69 ·71 ·73 ·75 ·77	4 44 0·4 4 35 50·7 4 27 40·6 4 19 29·9 4 II 18·7	·72 ·74 ·76 ·78 ·81
28 30 32 33 34	4 6 48·0 3 58 41·9 3 50 35·4 3 46 32·1 3 42 28·6	·64 ·65 ·67 ·67 ·68	4 6 8·5 3 58 1·5 3 49 54·1 3 45 50·2 3 41 46·3	·68 ·69 ·71 ·72 ·73	4 5 26·8 3 57 18·6 3 49 10·0 3 45 5·5 3 41 1·0	·76	4 4 42·5 3 56 33·1 3 48 23·2 3 44 17·9 3 40 12·6	·76 ·78 ·80 ·82 ·83	3 43 27.3	·80 ·82 ·85 ·87 ·88	4 3 6·8 3 54 54·1 3 46 40·7 3 42 33·6 3 38 26·4	·84 ·87 ·90 •92 •94
35 36 37 38 39	3 38 25·I 3 34 2I·5 3 30 I7·9 3 26 I4·I 3 22 I0·2		3 37 42·2 3 33 38·0 3 29 33·7 3 25 29·3 3 21 24·7	·74 ·75 ·76 ·78 ·79	3 36 56·2 3 32 51·3 3 28 46·2 3 24 41·0 3 20 35·6	·82 ·83	3 36 7.0 3 32 1.3 3 27 55.3 3 23 49.2 3 19 42.9	·85 ·86 ·88 ·89	3 3I 7.9 3 27 0.9 3 22 53.7	•90 •92 •94 •96 •98	3 21 54.6	·96 ·98 1·00 1·02 1·04
40 41 42 43 44	3 18 6·2 3 14 2·1 3 9 57·8 3 5 53·4 3 1 48·9	·74 ·75 ·76 ·78 ·79	3 17 20·0 3 13 15·1 3 9 10·1 3 5 4·8 3 0 59·4	·80 ·81 ·83 ·84 ·86	3 8 18.3	·86 ·88 ·90 ·91	3 3 15.0	·93 ·95 ·97 ·99	3 10 30·5 3 6 22·2 3 2 13·5	1.00 1.02 1.04 1.06 1.09	3 9 27·5 3 5 17·7 3 1 7·5	1.06 1.09 1.11 1.14 1.17
45 46 47 48 4 9	2 57 44·2 2 53 39·3 2 49 34·2 2 45 29·0 2 41 23·5	·82 ·83 ·85	2 56 53.8 2 52 47.9 2 48 41.8 2 44 35.4 2 40 28.8	190	2 47 44·5 2 43 36·8	·97 1·00 1·02	2 54 59·3 2 50 50·9 2 46 42·2 2 42 33·0 2 38 23·5	1.08	2 49 45·1 2 45 34·7 2 41 23·9	1·14 1·17 1·20		1·19 1·22 1·26 1·29 1·33
50 51 52 53 54	2 37 17·8 2 33 11·8 2 29 5·6 2 24 59·1 2 20 52·2	·89 ·91 ·93 ·95 ·97	2 36 21.9 2 32 14.6 2 28 7.0 2 23 58.9 2 19 50.6	1.00 1.03 1.05	2 27 2.4	1.19 1.13	2 34 13.4 2 30 2.9 2 25 51.8 2 21 40.1 2 17 27.7		2 28 48·0 2 24 34·8 2 20 20·9	1.38 1.38	2 31 41·8 2 27 27·0 2 23 11·4 2 18 54·8 2 14 37·3	1·36 1·40 1·45 1·49 1·54
		V	ARIATIO	ON TO	ı' OF	LAT	TUDE .	AND	ALTITU	DE.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	Α.	L. 3°	A.	L. 4°	A.	L. 5°	Α.
0 4 8 12 14	S00 .04 .08 .12 .14	S. 4·04 4·04 4·04 4·04 4·04	s. - ·07 ·11 ·15 ·19 ·21	s. -4·04 4·04 4·04 4·05	s ·14 -18 -22 -27 -29	s. -4.04 4.04 4.05 4.05 4.05	s. - ·21 ·25 ·30 ·34 ·36	s. -4.04 4.05 4.05 4.05 4.06	s. - ·29 ·33 ·37 ·41 ·44	s. -4·05 4·05 4·06 4·06 4·06	s3640 .44 .49 .51	s. -4.05 4.06 4.06 4.07 4.07
16 18 20 22 24	·16 ·18 ·21 ·23 ·25	4·04 4·04 4·05 4·05	·24 ·26 ·28 ·31 ·33	4·05 4·05 4·05 4·05 4·05	·31 ·33 ·36 ·38 ·41	4·05 4·05 4·05 4·06 4·06	·39 ·41 ·44 ·46 ·49	4.06 4.06 4.06 4.07 4.07	.46 .49 .51 .54	4·07 4·07 4·07 4·08	.54 .56 .59 .62 .65	4.07 4.08 4.08 4.09 4.09
26 28 30 32 34	·28 ·30 ·33 ·36 ·38	4·05 4·05 4·05 4·05 4·06	·36 ·38 ·41 ·44 ·47	4·05 4·06 4·06 4·06 4·07	.44 .47 .50 .53 .56	4·06 4·07 4·07 4·07 4·08	•52 •55 •58 •61 •65	4.07 4.08 4.08 4.09 4.09	·60 ·63 ·67 ·70 ·74	4·08 4·09 4·10 4·11	·68 ·72 ·75 ·79 ·83	4·I0 4·I1 4·I2 4·I2
36 38 40 42 44	·41 ·45 ·48 ·51 ·55	4·06 4·06 4·07 4·07 4·08	•50 •54 •57 •61 •66	4·07 4·07 4·08 4·09 4·09	·59 ·63 ·67 ·71 ·76	4·08 4·09 4·10 4·11	·69 ·73 ·77 ·81 ·86	4·10 4·11 4·12 4·13	·78 ·82 ·87 ·92 ·97	4·11 4·12 4·13 4·14 4·15	·87 ·92 ·97 I·02 I·08	4·13 4·14 4·15 4·17 4·18
46 48 50 52 54	·59 ·64 ·69 ·74 ·80	4.08 4.09 4.10 4.11 4.12	·70 ·75 ·80 ·86 ·93	4·10 4·11 4·12 4·13 4·14	·81 ·86 ·92 ·99 1·06	4·12 4·13 4·14 4·16 4·18	·92 ·98 I·04 I·11 I·19	4·14 4·16 4·17 4·19 4·21	1·03 1·09 1·17 1·24 1·33	4·17 4·18 4·20 4·23 4·25	1·14 1·21 1·29 1·38 1·48	4·20 4·22 4·24 4·27 4·29

LATITUDE 8°.

			ECLINA									
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 10 12 1 4 16	H. M. S. 5 56 36·9 5 15 56·0 5 7 46·9 4 59 37·2 4 51 27·2	s. - ·57 ·65 ·67 ·70 ·72	H. M. S. 5 56 2.7 5 15 16.3 5 7 5.8 4 58 54.9 4 50 43.4	s. - ·57 ·67 ·69 ·72 ·74	H. M. S. 5 55 28.4 5 14 35.6 5 6 23.7 4 58 11.2 4 49 58.1	s. - ·57 ·69 ·71 ·74 ·77	H. M. S. 5 54 53.9 5 13 53.9 5 5 40.4 4 57 26.2 4 49 11.4	s. - ·58 ·70 ·73 ·76 ·79	H. M. S. 5 54 19·2 5 13 11·3 5 4 55·9 4 56 39·9 4 48 23·1	·75 ·78	H. M. S. 5 53 44'3 5 12 27'5 5 4 10'2 4 55 52'1 4 47 33'1	s. - ·58 ·74 ·77 ·81 ·85
18 20 22 24 26	4 43 16·7 4 35 5·7 4 26 54·0 4 18 41·8 4 10 28·8	·74 ·77 ·79 ·82 ·85	4 17 51.4	•77 •80 •83 •86 •89	4 41 44.4 4 33 30.0 4 25 14.9 4 16 58.8 4 8 41.9	·80 ·83 ·86 ·90 ·93	4 40 55·8 4 32 39·4 4 24 22·2 4 16 3·9 4 7 44·7	·82 ·86 ·90 ·93 ·97	4 40 5.5 4 31 46.9 4 23 27.4 4 15 6.7 4 6 44.9	-89 .	4 39 13·2 4 30 52·3 4 22 30·3 4 14 7·0 4 5 42·4	·89 ·93 ·97 I·01 I·06
27 28 29 30 31	4 6 22·1 4 2 15·1 3 58 7·9 3 54 0·5 3 49 52·9	·87 ·88 ·90 ·92 ·93	4 5 28.8 4 I 20.8 3 57 I2.6 3 53 4.1 3 48 55.3	·91 ·93 ·95 ·97 ·99	4 4 33.0 4 0 23.9 3 56 14.4 3 52 4.7 3 47 54.7	1.01	4 3 34.6 3 59 24.2 3 55 13.4 3 51 2.4 3 46 51.0	I.04 I.06		1.12	4 1 29·5 3 57 16·3 3 53 2·6 3 48 48·4 3 44 33·8	1·09 1·12 1·14 1·17 1·20
32 33 34 35 36	3 45 45.0 3 41 36.8 3 37 28.4 3 33 19.7 3 29 10.7	1.01 .66	3 44 46·2 3 40 36·9 3 36 27·2 3 32 17·1 3 28 6·7	1.07	3 43 44·3 3 39 33·6 3 35 22·5 3 31 11·0 3 26 59·1	1.13	3 42 39·2 3 38 26·9 3 34 14·3 3 30 1·2 3 25 47·6	1·14 1·17 1·19	3 41 30·7 3 37 16·8 3 33 2·5 3 28 47·6 3 24 32·2	I·23	3 40 18·7 3 36 3·1 3 31 46·9 3 27 30·1 3 23 12·7	1·23 1·26 1·29 1·32 1·36
37 38 39 40 41	3 25 1·3 3 20 51·6 3 16 41·5 3 12 31·0 3 8 20·1	1.11	3 23 56·0 3 19 44·7 3 15 33·1 3 11 21·0 3 7 8·4	1·12 1·15 1·17 1·20 1·23	3 22 46·7 3 18 33·9 3 14 20·5 3 10 6·6 3 5 52·1		3 17 18·9 3 13 3·6 3 8 47·7	1·25 1·29 1·32 1·35 1·39			3 14 35·8 3 10 16·2 3 5 55·9	1·39 1·43 1·47 1·51 1·56
42 43 44 45 46	3 4 8.8 2 59 56.9 2 55 44.5 2 51 31.6 2 47 18.1	1.25	3 2 55·3 2 58 41·5 2 54 27·2 2 50 12·3 2 45 56·6	I·37	3 I 37·0 2 57 2I·3 2 53 4·8 2 48 47·6 2 44 29·5	1·42 1·46	3 0 14·0 2 55 56·0 2 51 37·1 2 47 17·4 2 42 56·7	1.55		1.56 1.60 1.65	2 57 12·4 2 52 49·2 2 48 24·9 2 43 59·4 2 39 32·6	1.60 1.65 1.70 1.75 1.81
47 48 49 50 51	2 43 3.9 2 38 49.0 2 34 33.2 2 30 16.9 2 25 59.5	I·43	2 4I 40·I 2 37 22·8 2 33 4·7 2 28 45 5 2 24 25·3	1·53 1·58	2 40 10·6 2 35 50·6 2 31 29·7 2 27 7·5 2 22 44·1	1.69	2 38 34·9 2 34 12·1 2 29 48·0 2 25 22·5 2 20 55·6	1.81		1.87	2 35 4.4 2 30 34.8 2 26 3.4 2 21 30.3 2 16 55.1	1.87 1.93 2.00 2.07 2.14
		V	ARIATIO	N TO	ı' OF	LAT	ITUDE .	AND	ALTITU:	DE.		
Alt.	L. 6	A.	L. 7	Α.	L. 8°	A.	L. 9°	Α.	L. 10°	A.	L. 11°	Α.
0 4 8 10 12	s. - '43 '47 '51 '54 '56	s. -4·06 4·07 4·07 4·07 4·08	s. - ·50 ·54 ·59 ·61 ·64	s. -4.07 4.08 4.08 4.08 4.09	s. - ·57 ·62 ·66 ·69 ·71	s. -4.08 4.08 4.09 4.10 4.10	s. 65 .69 .74 .76	S. -4.09 4.10 4.11 4.11 4.12	s. - ·72 ·76 ·81 ·84 ·86	S. -4·10 4·11 4·12 4·12 4·13	s. - '79 -84 -89 -91 -94	s. -4·11 4·12 4·13 4·14 4·15
14 16 18 20 22	·59 ·61 ·64 ·67 ·70	4·08 4·09 4·09 4·10	·66 ·69 ·72 ·75 ·78	4.09 4.10 4.11 4.11	.74 .77 .80 .83	4·II 4·II 4·I2 4·I2 4·I3	·82 ·84 ·88 ·91 ·94	4·12 4·13 4·13 4·14 4·15	·89 ·92 ·95 ·99 I·03	4·14 4·14 4·15 4·16 4·17	·97 1·00 1·03 1·07 1·11	4·15 4·16 4·17 4·18 4·19
24 26 28 30 32	.73 .76 .80 .84	4·10 4·11 4·12 4·13	·81 ·85 ·89 ·92 ·97	4·12 4·13 4·14 4·14 4·15	·90 ·93 ·97 I·01 I·06	4·14 4·15 4·16 4·18	·98 1·02 1·06 1·10 1·15	4·16 4·17 4·18 4·19 4·20	1·06 1·10 1·15 1·19 1·25	4·18 4·19 4·20 4·21 4·23	1·15 1·19 1·24 1·29 1·34	4·20 4·21 4·22 4·24 4·26
34 36 38 40 42	·92 ·97 I·02 I·07 I·13	4·14 4·15 4·16 4·18 4·19	1·01 1·06 1·11 1·17 1·23	4·16 4·18 4·19 4·21 4·22	1·11 1·16 1·21 1·28 1·34	4·19 4·20 4·22 4·24 4·26	1·20 1·26 1·32 1·38 1·46	4·21 4·23 4·25 4·27 4·29	1·30 1·36 1·42 1·49 1·57	4·24 4·26 4·28 4·31 4·33	1·40 1·46 1·53 1·60 1·69	4·27 4·30 4·32 4·35 4·38
44 46 48 50 51	I·19 I·26 I·34 I·42 I·47	4·21 4·23 4·26 4·28 4·30	1·30 1·38 1·46 1·55 1·61	4·24 4·27 4·29 4·33 4·35	1·42 1·50 1·59 1·69	4·28 4·31 4·34 4·38 4·40	1·54 1·62 1·72 1·83 1·89	4·32 4·35 4·39 4·44 4·46	1.66 1.75 1.86 1.98 2.05	4·37 4·40 4·45 4·50 4·53	1·78 1·89 2·00 2·14 2·21	4·41 4·46 4·51 4·57 4·60

LATITUDE 8°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 8 10 12 14	H. M. S. 5 53 9.2 5 20 1.3 5 11 42.7 5 3 23.2 4 55 2.8	s. - ·59 ·72 ·76 ·79 ·83	5 10 56·7 5 2 34·8	s. - ·59 ·74 ·78 ·82 ·86		s. 60 .75 .80 .84 .89	H. M. S. 5 51 22 0 5 17 47 1 5 9 21 1 5 0 54 1 4 52 25 8	s. 60 .77 .82 .86 .91	5 17 0·3 5 8 31·4 5 0 1·5	s. - ·61 ·79 ·84 ·89 ·94	5 16 12.3	s. 62 .81 .86 .92 .97
16 18 20 22 24	4 46 41.6 4 38 19.2 4 29 55.7 4 21 31.0 4 13 4.9	·92 ·96 I·01	4 45 48·2 4 37 23·3 4 28 57·0 4 20 29·3 4 12 0·1	·95 1·00 1·05	4 44 53·2 4 36 25·3 4 27 56·0 4 19 25·2 4 10 52·7	·98	4 26 52·8 4 18 18·6	1.02	4 25 47·2 4 17 9·3	I.11	4 41 56·7 4 33 18·9 4 24 39·2 4 15 57·4 4 7 13·3	1.03 1.09 1.15 1.22 1.29
25 26 27 28 29	4 8 51·2 4 4 37·2 4 0 22·7 3 56 7·8 3 51 52·5	I·14 I·17	4 7 44.9 4 3 29.2 3 59 13.0 3 54 56.3 3 50 39.1	1.22	4 6 35.7 4 2 18.2 3 58 0.2 3 53 41.6 3 49 22.4	1.27	4 5 23.6 4 I 4.1 3 56 44.2 3 52 23.5 3 48 2.2	1.33	4 4 8·5 3 59 47·0 3 55 24·8 3 51 2·0 3 46 38·4	1.35	4 2 50·3 3 58 26·5 3 54 2·1 3 49 36·9 3 45 10·9	1·33 1·37 1·41 1·45 1·49
30 31 32 33 34	3 47 36·6 3 43 20·2 3 39 3·2 3 34 45·6 3 30 27·4	I·29	3 46 21·4 3 42 3·0 3 37 44·0 3 33 24·3 3 29 4·1	1·32 1·35 1·39	3 45 2.6 3 40 42.1 3 36 21.0 3 31 59.1 3 27 36.3	1·42 1·46	3 43 40·2 3 39 17·5 3 34 54·0 3 30 29·6 3 26 4·4	1·44 1·48 1·53	3 42 14·1 3 37 48·9 3 33 22·8 3 28 55·9 3 24 27·8	1·51 1·55 1·60	3 40 44·0 3 36 16·2 3 31 47·4 3 27 17·6 3 22 46·6	1·54 1·58 1·63 1·68 1·73
35 36 37 38 39	3 26 8.6 3 21 49.0 3 17 28.7 3 13 7.5 3 8 45.5	I·43 I·47	3 24 42·8 3 20 20·9 3 15 58·1 3 11 34·4 3 7 9·7	1.51	3 23 12·8 3 18 48·3 3 14 22·8 3 9 56·3 3 5 28·8	1·58 1·63 1·68	3 17 10·9 3 12 42·6	1.66	3 10 57·1 3 6 24·4	1·75 1·80 1·86	3 18 14·5 3 13 41·1 3 9 6·3 3 4 30·0 2 59 52·1	1·78 1·84 1·89 1·96 2·02
40 41 42 43 44	3 4 22.5 2 59 58.6 2 55 33.6 2 51 7.3 2 46 39.9	1·65 1·69 1·75	3 2 44.0 2 58 17.1 2 53 49.0 2 49 19.5 2 44 48.7	1·79 1·85	3 I 0.0 2 56 29.9 2 51 58.4 2 47 25.4 2 42 50.8	1·84 1·90 1·96	2 59 10·2 2 54 36·7 2 50 1·5 2 45 24·7 2 40 46·0	1·94 2·00 2·07	2 57 14·6 2 52 37·2 2 47 58·1 2 43 17·0 2 38 33·9	2·05 2·11 2·19	2 55 12·6 2 50 31·1 2 45 47·7 2 41 2·0 2 36 14·0	2·09 2·16 2·23 2·31 2·40
45 46 47 48 49	2 42 II·I 2 37 40·8 2 33 9·0 2 28 35·3 2 23 59·8	1·92 1·98 2·05	2 40 16·2 2 35 42·1 2 31 6·2 2 26 28·2 2 21 48·0	2·04 2·11 2·19	2 38 14·4 2 33 36·1 2 28 55·7 2 24 13·0 2 19 27·7	2·16 2·24 2·33	2 36 5·3 2 31 22·4 2 26 37·0 2 21 49·0 2 16 58·1	2·30 2·38 2·48	2 33 48·4 2 29 0·4 2 24 9·7 2 19 15·9 2 14 18·6	2·53 2·64	2 31 23·3 2 26 29·7 2 21 33·0 2 16 32·7 2 11 28·5	2·49 2·58 2·69 2·81 2·93
		VA	RIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 12°	A.	L. 13°	A.	L. 14°	Α.	L. 15°	Α.	L. 16°	Α.	L. 17°	Α.
0 4 6 8	s. - ·87 - ·91 ·94 ·96 ·99	s. -4·13 4·14 4·15 4·15 4·16	s. - '94 - '99 1'01 1'04 1'07	s. -4·15 4·16 4·16 4·17 4·18	s. -1.02 - 1.06 1.09 1.12 1.15	s. -4·16 4·18 4·18 4·19 4·20	S. -1.09 - 1.14 1.17 1.19 1.22	S. -4·18 4·20 4·20 4·21 4·22	s. -1·17 - 1·22 1·25 1·27 1·30	S. -4·20 4·22 4·23 4·24 4·24	S. -1·25 - 1·30 1·32 1·35 1·39	s. -4·23 4·24 4·25 4·26 4·27
12 14 16 18 20	1.02 1.05 1.08 1.12 1.15	4·17 4·17 4·18 4·19 4·20	1·10 1·13 1·16 1·20 1·24	4·19 4·19 4·20 4·21 4·22	1·18 1·21 1·24 1·28 1·32	4·21 4·22 4·23 4·24 4·25	1·26 1·29 1·33 1·37 1·41	4·23 4·24 4·25 4·26 4·28	1·34 1·37 1·41 1·45 1·50	4·25 4·27 4·28 4·29 4·31	1·42 1·46 1·50 1·54 1·59	4·28 4·29 4·31 4·32 4·34
22 24 26 28 30	1·19 1·23 1·28 1·33 1·38	4·21 4·22 4·24 4·25 4·27	1·28 1·32 1·37 1·42 1·48	4·24 4·25 4·27 4·28 4·30	1·36 1·41 1·46 1·52 1·58	4·26 4·28 4·30 4·32 4·34	1·45 1·50 1·56 1·61 1·67	4·29 4·31 4·35 4·37	1·54 1·59 1·65 1·71 1·78	4·32 4·34 4·36 4·39 4·41	1·64 1·69 1·75 1·81 1·88	4·36 4·38 4·40 4·43 4·46
32 34 36 38 40	1.44 1.50 1.57 1.64 1.72	4·29 4·31 4·36 4·39	1.54 1.60 1.67 1.75 1.84	4·32 4·35 4·37 4·40 4·44	1·64 1·71 1·78 1·87 1·96	4·36 4·39 4·42 4·45 4·49	1·74 1·82 1·90 1·99 2·09	4·40 4·43 4·46 4·50 4·55	1·85 1·93 2·01 2·11 2·22	4:44 4:48 4:51 4:56 4:61	1.96 2.04 2.13 2.24 2.35	4·49 4·53 4·57 4·62 4·67
42 44 46 48 49	1.81 1.91 2.02 2.15 2.22	4·43 4·47 4·52 4•58 4·61	1.94 2.04 2.17 2.31 2.38	4·48 4·53 4·58 4·65 4·69	2·07 2·18 2·32 2·47 2·55	4·54 4·59 4·66 4·73 4·78	2·20 2·33 2·47 2·64 2·73	4.60 4.66 4.74 4.82 4.88	2·34 2·48 2·64 2·81 2·91	4·67 4·74 4·82 4·93 4·99	2·48 2·63 2·81 3·00 3·11	4·74 4·82 4·92 5·04 5·11

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 157 LATITUDE 8°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 6 8 10	H. M. S. 5 49 31·8 5 23 57·0 5 15 23·2 5 6 48·0 4 58 11·6	s. - ·62 ·78 ·83 ·88 · ·94	H. M. S. 5 48 54·3 5 23 9·9 5 14 32·8 5 5 54·3 4 57 14·2	s. - ·63 ·79 ·85 ·91	H. M. S. 5 48 16·3 5 22 21·8 5 13 41·1 5 4 58·9 4 56 15·1	s. - ·64 ·81 ·87 ·94 1·00	5 21 32.6	·83 ·89 ·96	H. M. S. 5 46 58·8 5 20 42·2 5 11 53·7 5 3 3·5 4 54 11·3	s. - ·65 ·85 ·92 ·99 I·06	H. M. s. 5 46 19·2 5 19 50·5 5 10 57·8 5 2 3·3 4 53 6·5	s. 66 .87 .94 1.02 1.10
14 16 18 20 21	4 49 33.6 4 40 53.9 4 32 12.3 4 23 28.6 4 19 5.9	I·13	4 48 32·5 4 39 48·9 4 31 3·3 4 22 15·4 4 17 50·5		4 47 29.4 4 38 41.7 4 29 51.8 4 20 59.4 4 16 32.1	1.21	4 46 24·3 4 37 32·2 4 28 37·7 4 19 40·5 4 15 10·8	1·18 1·26 1·34	4 45 17·0 4 36 20·3 4 27 21·0 4 18 18·6 4 13 46·2	1·14 1·22 1·30 1·39 1·44	4 44 7·5 4 35 5·9 4 26 1·4 4 16 53·6 4 12 18·3	1·18 1·26 1·35 1·44 1·49
22 23 24 25 26	4 I4 42·7 4 I0 I8·7 4 5 54·I 4 I 28·8 3 57 2·7	I·35	4 0 3.9	I·40	4 12 4·2 4 7 35·5 4 3 5·9 3 58 35·5 3 54 4·1	1·41 1·46 1·50	4 10 40·2 4 6 8·9 4 1 36·6 3 57 3·3 3 52 29·1	1·43 1·47 1·52 1·57 1·62	4 4 38.8	1·48 1·53 1·58 1·63 1·69	4 3 5·0 3 58 26·7	1.54 1.59 1.65 1.70 1.76
27 28 29 30 31	3 52 35·8 3 48 8·1 3 43 39·4 3 39 9·8 3 34 39·2	1·47 1·51 1·56 1·61 1·65	3 46 35·3 3 42 3·8 3 37 31·3	1.63	3 49 31·8 3 44 58·4 3 40 24·0 3 35 48·3 3 31 11·4	1.65 1.70 1.75	3 47 53·8 3 43 17·3 3 38 39·6 3 34 0·7 3 29 20·3	1·72 1·78 1·84	3 46 11·5 3 41 31·7 3 36 50·6 3 32 8·0 3 27 23·9	1.86 1.92	3 44 24.7 3 39 41.4 3 34 56.6 3 30 10.2 3 25 22.0	1.82 1.88 1.94 2.01 2.08
32 33 34 35 36	3 30 7.5 3 25 34.6 3 21 0.5 3 16 25.0 3 11 48.1	1.81 1.87	3 28 22·8 3 23 46·6 3 19 9·1 3 14 30·1 3 9 49·4	1.90	3 26 33·2 3 21 53·5 3 17 12·3 3 12 29·4 3 7 44·8	1.99	3 24 38·4 3 19 54·9 3 15 9·8 3 10 22·7 3 5 33·7	2.02			3 5 49.8	2·15 2·23 2·31 2·39 2·48
37 38 39 40 41	3 7 9.7 3 2 29.6 2 57 47.8 2 53 4.0 2 48 18.1		3 0 22.9 2 55 36.7 2 50 48.3	2.17	3 2 58·2 2 58 9·5 2 53 18·6 2 48 25·2 2 43 29·2	2.28	3 0 42·5 2 55 49·0 2 50 53·0 2 45 54·2 2 40 52·4	2·40 2·49 2·59	2 58 19·8 2 53 21·1 2 48 19·5 2 43 14·7 2 38 6·6	2·44 2·53 2·63 2·73 2·84	2 50 45·I 2 45 37·4 2 40 26·2	2·57 2·67 2·78 2·89 3·01
42 43 44 45 46	2 43 29·9 2 38 39·2 2 33 45·8 2 28 49·4 2 23 49·7	2·45 2·54 2·64	2 41 4·2 2 36 8·1 2 31 8·8 2 26 6·1 2 20 59·6	2·59 2·70 2·81	2 38 30·2 2 33 28·0 2 28 22·3 2 23 12·7 2 17 58·6	2.98	2 35 47·3 2 30 38·5 2 25 25·6 2 20 8·3 2 14 45·9	2·91 3·04 3·17	2 32 54·7 2 27 38·6 2 22 17·9 2 16 52·0 2 11 20·3	2·96 3·09 3·23 3·38 3·54	2 18 58·2 2 13 22·7	3·14 3·28 3·44 3·60 3·79

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
° 0 . 2 4 6 8	s. s.					
	-1·33 -4·25	-1:40 -4:28	-1:49 -4:30	-1·57 -4·33	-1.65 -4.36	-1.73 -4.39
	1·35 4·26	1:43 4:28	1:51 4:31	1·59 4·34	1.68 4.37	1.76 4.41
	1·38 4·27	1:46 4:29	1:54 4:32	1·62 4·35	1.70 4.38	1.79 4.42
	1·40 4·28	1:49 4:30	1:57 4:33	1·65 4·36	1.74 4.40	1.82 4.43
	1·43 4·29	1:52 4:31	1:60 4:35	1·69 4·38	1.77 4.41	1.86 4.45
10	1·47 4·30	1·55 4·33	1.64 4.36	1.72 4.39	1.81 4.43	1·90 4·46
12	1·50 4·31	1·59 4·34	1.68 4.37	1.76 4.41	1.85 4.44	1·94 4·48
14	1·54 4·32	1·63 4·35	1.72 4.39	1.80 4.42	1.90 4.46	1·99 4·50
16	1·58 4·34	1·67 4·37	1.76 4.41	1.85 4.44	1.94 4.48	2·04 4·52
18	1·63 4·36	1·72 4·39	1.81 4.43	1.90 4.46	2.00 4.51	2·10 4·55
20	1.68 4.37	1·77 4·41	1.86 4.45	1.96 4.49	2·06 4·53	2·16 4·58
22	1.73 4.39	1·82 4·43	1.92 4.47	2.02 4.52	2·12 4·56	2·22 4·61
24	1.78 4.42	1·88 4·46	1.98 4.50	2.08 4.55	2·19 4·60	2·30 4·65
26	1.85 4.44	1·95 4·48	2.05 4.53	2.16 4.58	2·27 4·63	2·38 4·69
28	1.91 4.47	2·02 4·52	2.13 4.56	2.24 4.62	2·35 4·67	2·47 4·73
30	1.99 4.50	2·10 4·55	2·21 4·60	2·33 4·66	2·45 4·72	2·57 4·79
32	2.07 4.54	2·18 4·59	2·30 4·65	2·42 4·71	2·55 4·78	2·68 4·85
34	2.16 4.58	2·28 4·64	2·40 4·70	2·53 4·77	2·67 4·84	2·80 4·92
36	2.26 4.63	2·39 4·69	2·52 4·76	2·66 4·83	2·80 4·92	2·95 5·00
38	2.37 4.68	2·51 4·75	2·65 4·83	2·80 4·91	2·95 5·00	3·12 5·10
40	2·49 4·75	2·64 4·83	2·79 4·91	2·96 5·00	3·13 5·11	3·30 5·22
42	2·64 4·82	2·80 4·91	2·96 5·01	3·14 5·12	3·33 5·23	3·53 5·36
44	2·80 4·91	2·97 5·02	3·16 5·13	3·36 5·25	3·57 5·39	3·79 5·54
45	2·89 5·97	3·07 5·08	3·27 5·20	3·48 5·33	3·70 5·48	3·95 5·65
46	2·99 5·03	3·18 5·14	3·39 5·27	3·61 5·42	3·86 5·59	4·12 5·77

LATITUDE 9°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	0°	Decl. Var.	1 °	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	De c l. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 29.8 5 11 23.5 5 3 17.2 4 55 10.8	s. - ·63 ·64 ·65 ·65 ·66	H. M. S. 5 59 22·0 5 18 50·8 5 10 44·2 5 2 37·5 4 54 30·6	s. - ·63 ·66 ·66 ·67 ·68	H. M. S. 5 58 44.0 5 18 11.0 5 10 3.9 5 1 56.6 4 53 49.1	s. - ·63 ·67 ·68 ·69 ·70	H. M. S. 5 58 5.9 5 17 30.4 5 9 22.6 5 1 14.6 4 53 6.3	s. - ·64 ·68 ·70 ·71 ·72	H. M. S. 5 57 27.7 5 16 48.9 5 8 40.3 5 0 31.4 4 52 22.1	s. - ·64 ·70 ·71 ·73 ·75	H. M. S. 5 56 49.4 5 16 6.5 5 7 57.0 4 59 47.0 4 51 36.6	s. - ·64 ·71 ·73 ·75 ·77
18 20 22 24 26	4 47 4·2 4 38 57·6 4 30 50·7 4 22 43·6 4 14 36·3	·67 ·68 ·68 ·69 ·71	4 46 23·5 4 38 16·2 4 30 8·7 4 22 0·9 4 13 52·8	·70 ·71	4 45 41.4 4 37 33.3 4 29 25.0 4 21 16.2 4 13 7.1	·71 ·73 ·74 ·76 ·78	4 44 57.7 4 36 48.7 4 28 39.3 4 20 29.5 4 12 19.2	·74 ·76 ·78 ·80 ·82	4 44 12·4 4 36 2·4 4 27 51·8 4 19 40·7 4 11 29·0	·77 ·79 ·81 ·83 ·85	4 43 25.8 4 35 14.4 4 27 2.4 4 18 49.8 4 10 36.6	·79 ·81 ·84 ·87 ·89
28 30 32 33 34	4 6 28·7 3 58 20·8 3 50 12·6 3 46 8·4 3 42 4·1	·72 ·73 ·75 ·76 ·77	4 5 44·3 3 57 35·5 3 49 26·2 3 45 21·4 3 41 16·4	•76 •78 •80 •81 •82	4 4 57.6 3 56 47.5 3 48 37.0 3 44 31.5 3 40 25.8	·80 ·82 ·84 ·86 ·87	4 4 8·4 3 55 57·0 3 47 44·9 3 43 38·6 3 39 32·1	·84 ·87 ·89 ·91	4 3 16·7 3 55 3·6 3 46 49·8 3 42 42·6 3 38 35·1	·88 ·91 ·94 ·96 ·98	4 2 22.5 3 54 7.7 3 45 51.8 3 41 43.5 3 37 35.0	·92 ·96 ·99 I·01 I·03
35 36 37 38 39	3 37 59·6 3 33 55·0 3 29 50·3 3 25 45·5 3 21 40·6	·78 ·79 ·80 ·81 ·82	3 37 11·4 3 33 6·1 3 29 0·7 3 24 55·2 3 20 49·5	·83 ·84 ·85 ·87 •88	3 36 20·0 3 32 14·0 3 28 7·7 3 24 1·3 3 19 54·7	·88 ·90 ·91 ·93 ·94	3 35 25·3 3 31 18·4 3 27 11·2 3 23 3·8 3 18 56·1	·94 ·95 ·97 ·99			3 33 26·1 3 29 17·0 3 25 7·4 3 20 57·6 3 16 47·4	1.05 1.07 1.09 1.11 1.14
40 41 42 43 44	3 17 35·5 3 13 30·3 3 9 24·9 3 5 19·3 3 1 13·5	·83 ·85 ·86 ·88 ·89	3 16 43·6 3 12 37·5 3 8 31·2 3 4 24·6 3 0 17·8	·91 ·93 ·95		1.02	3 14 48·1 3 10 39·9 3 6 31·3 3 2 22·4 2 58 13·1	1.03 1.05 1.07 1.09 1.12	3 9 34·9 3 5 24·9	1·09 1·12 1·14 1·17 1·19	3 4 14·2 3 0 2·2	1·16 1·19 1·22 1·25 1·28
45 46 47 48 49	2 57 7.5 2 53 1.3 2 48 54.9 2 44 48.1 2 40 41.1	·91 ·92 ·94 ·96 ·98	2 56 10·8 2 52 3·4 2 47 55·8 2 43 47·9 2 39 39·6	I.00	2 55 9.5 2 51 0.8 2 46 51.8 2 42 42.4 2 38 32.6	1.13 1.11	2 54 3.4 2 49 53.3 2 45 42.8 2 41 31.7 2 37 20.1	1.17	2 52 52·5 2 48 40·7 2 44 28·4 2 40 15·4 2 36 1·9	1·25 1·28	2 51 36.6 2 47 23.0 2 43 8.6 2 38 53.6 2 34 37.8	1·31 1·34 1·38 1·41 1·45
50 51 52 53 54	2 36 33·9 2 32 26·3 2 28 18·3 2 24 9·9 2 20 1·2	1.03 1.05 1.08	2 35 30·9 2 31 21·8 2 27 12·3 2 23 2·2 2 18 51·7	1·12 1·15 1·18	2 34 22·3 2 30 11·5 2 26 0·1 2 21 48·2 2 17 35·6	1·22 1·25 1·29	2 33 8·0 2 28 55·2 2 24 41·7 2 20 27·6 2 16 12·6	1·32 1·36 1·40	2 31 47·6 2 27 32·6 2 23 16·8 2 19 0·1 2 14 42·5	1·43 1·47 1·52	2 30 21·2 2 26 3·7 2 21 45·3 2 17 25·7 2 13 5·0	1·49 1·54 1·58 1·64 1·69
		VA	RIATIO	N TC	ı' OF	LAT	ITUDE	AND	ALTITU	DE.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	Α.	L. 3°	Α.	L. 4°	Α.	L. 5°	Α
0 4 8 12 14	s. - ·00 - ·04 ·09 ·14 ·16	s. -4.05 4.05 4.05 4.05 4.05	s. - ·07 - ·12 ·16 ·21 ·23	s. -4.05 4.05 4.05 4.06 4.06	s. - ·14 - ·19 ·23 ·28 ·31	s. -4.05 4.05 4.06 4.06 4.06	s. - ·21 - ·26 ·31 ·36 ·38	s. -4·06 4·06 4·06 4·07 4·07	s. - ·29 - ·33 ·38 ·43 ·46	s. -4·06 4·06 4·07 4·07 4·08	s. - ·36 - ·40 ·45 ·51 ·53	s. -4.06 4.07 4.07 4.08 4.08
16 18 20 22 24	·18 ·21 ·23 ·26 ·29	4.05 4.05 4.06 4.06 4.06	·26 ·28 ·31 ·34 ·36	4.06 4.06 4.06 4.06 4.07	·33 ·36 ·39 ·42 ·44	4.06 4.07 4.07 4.07 4.07	·41 ·44 ·46 ·49 ·52	4.07 4.07 4.08 4.08 4.08	·48 ·51 ·54 ·57 ·61	4·08 4·08 4·09 4·09	•56 •59 •62 •65 •69	4·09 4·10 4·10 4·11
26 28 30 32 34	·31 ·34 ·37 ·40 ·43	4.06 4.06 4.07 4.07 4.07	·39 ·42 ·46 ·49 ·52	4.07 4.07 4.08 4.08	·47 ·51 ·54 ·57 ·61	4.08 4.09 4.09 4.10	•56 •59 •62 •66 •70	4.09 4.10 4.10 4.11	·64 ·67 ·71 ·75 ·79	4·10 4·11 4·11 4·13	•72 •76 •80 •84 •88	4·II 4·I2 4·I3 4·I4 4·I4
36 38 40 42 44	.47 .50 .54 .58 .63	4.08 4.08 4.09 4.09 4.10	·56 ·60 ·64 ·68 ·73	4·09 4·10 4·11 4·12	•65 •69 •74 •78 •83	4·10 4·11 4·12 4·13	•74 •79 •84 •89	4·12 4·13 4·15 4·16	•84 •88 •93 •99	4·14 4·15 4·16 4·17 4·18	·93 ·98 I·04 I·10 I·16	4·15 4·17 4·18 4·20 4·21
46 48 50 52 54	·67 ·72 ·78 ·84 ·90	4·10 4·11 4·12 4·14 4·15	·78 ·84 ·90 ·96 1·04	4·13 4·14 4·15 4·16 4·18	·89 ·95 1·02 1·09 1·17	4·15 4·16 4·18 4·19 4·21	1·00 1·07 1·14 1·22 1·31	4·17 4·19 4·21 4·23 4·25	1·12 1·19 1·27 1·36 1·46	4·20 4·22 4·24 4·27 4·30	1·23 1·31 1·40 1·49 1·60	4·23 4·26 4·28 4·32 4·34

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 159 LATITUDE 9°.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 10 12 14 16	H. M. S. 5 56 11·1 5 15 23·3 5 7 12·6 4 59 1·4 4 50 49·7	s. - ·64 ·73 ·75 ·77 ·79	H. M. S. 5 55 32.5 5 14 39.1 5 6 27.1 4 58 14.5 4 50 1.3	s. - ·64 ·74 ·77 ·79 ·82	H. M. S. 5 54 53.9 5 13 53.9 5 5 40.4 4 57 26.2 4 49 11.4	.82	H. M. S. 5 54 15.0 5 13 7.7 5 4 52.5 4 56 36.6 4 48 19.9	·78 ·81	4 55 45.6	s. - ·65 ·80 ·83 ·86 ·90	H. M. S. 5 52 56.6 5 11 32.2 5 3 13.1 4 54 53.1 4 46 32.2	s. 66 .81 .85 .89
18 20 22 24 26	4 42 37.4 4 34 24.6 4 26 11.1 4 17 56.8 4 9 41.7	.87	4 41 47·5 4 33 33·0 4 25 17·6 4 17 1·5 4 8 44·4	·85 ·88 ·91 ·94 ·97	4 40 55·8 4 32 39·4 4 24 22·2 4 16 3·9 4 7 44·7	·91 ·94 ·98	4 40 2·4 4 31 44·0 4 23 24·6 4 15 4·0 4 6 42·3	1.02 1.06		1.02 1.06	4 38 10·2 4 29 47·1 4 21 22·7 4 12 56·9 4 4 29·5	·97 I·01 I·05 I·10 I·15
27 28 29 30 31	4 5 33.9 4 1 25.8 3 57 17.4 3 53 8.8 3 49 0.0	·95 ·97 ·99 I·00 I·02	4 4 35·5 4 0 26·3 3 56 16·8 3 52 7·1 3 47 57·0	I.03	4 3 34·6 3 59 24·2 3 55 13·4 3 51 2·4 3 46 51·0	1.08	4 2 30·9 3 58 19·2 3 54 7·1 3 49 54·6 3 45 41·7	1.08 1.11 1.13 1.16 1.18	3 57 II·3 3 52 57·8	1·21 1·24	3 56 0·5 3 51 45·3 3 47 29·5 3 43 13·3	1·18 1·21 1·23 1·26 1·29
32 33 34 35 36	3 44 50·8 3 40 4I·4 3 36 3I·5 3 32 2I·4 3 28 10·9	1.00	3 43 46·6 3 39 35·8 3 35 24·7 3 31 13·1 3 27 1·1	I·12 I·14 I·17	3 42 39·2 3 38 26·9 3 34 14·3 3 30 1·2 3 25 47·6	1.20	3 4I 28·4 3 37 I4·6 3 33 0·3 3 28 45·5 3 24 30·I	1.26	3 40 14·2 3 35 58·7 3 31 42·6 3 27 25·9 3 23 8·6	1.30	3 38 56·5 3 34 39·1 3 30 21·0 3 26 2·3 3 21 42·9	1·33 1·36 1·39 1·43 1·46
37 38 39 40 41	3 24 0·0 3 19 48·7 3 15 37·0 3 11 24·8 3 7 12·1	1·18 1·21 1·23	3 22 48.7 3 18 35.8 3 14 22.4 3 10 8.5 3 5 54.0	I·22 I·25 I·31 I·34		1·29 1·32 1·35 1·38 1·42		1·36 1·39 1·43 1·46 1·50	3 14 31·9 3 10 12·5 3 5 52·2	1·47 1·50 1·54	3 17 22·7 3 13 1·7 3 8 39·8 3 4 17·2 2 59 53·2	1·50 1·54 1·59 1·63 1·67
42 43 44 45 46	3 2 58·8 2 58 45·1 2 54 30·6 2 50 15·6 2 45 59·8	1.36	3 I 38·8 2 57 23·0 2 53 6·5 2 48 49·2 2 44 3I·I	1·45 1·48	3 0 14·0 2 55 56·0 2 51 37·1 2 47 17·4 2 42 56·7	1·54 1·58	2 58 44·0 2 54 23·6 2 50 2·2 2 45 39·7 2 41 16·2	1.63	2 52 45·8 2 48 21·6 2 43 56·2	1.63 1.68 1.73 1.78 1.83	2 42 6.3	1·72 1·77 1·83 1·89 1·95
47 48 49 50 51	2 4I 43·3 2 37 25·9 2 33 7·6 2 28 48·4 2 24 28·I	1·51 1·56 1·60	2 40 12·1 2 35 52·1 2 31 31·1 2 27 8·9 2 22 45·5	1.61 1.66 1.72	2 29 48.0	1.78	2 36 51·4 2 32 25·4 2 27 57·9 2 23 28·8 2 18 58·1	1.84 1.89 1.96	2 35 1.4 2 30 31.8 2 26 0.6 2 21 27.5 2 16 52.4	2.09		2·01 2·08 2·15 2·23 2·31
		VA	RIATIO	N TO	ı' OF	LAT	ITUDE	AND	ALTITU	DE.		

Alt.	L. 6°	A.	L. 7°	A.	L. 8°	A.	L. 9°	A.	L. 10	° A.	L. 11	° A.
0 4 8 10 12	s. - :43 :48 :53 :55 :58	s. -4.07 4.08 4.08 4.09 4.09	s. - ·50 ·55 ·60 ·63 ·66	s. -4.08 4.09 4.09 4.10 4.10	s. - ·58 ·62 ·67 ·70 ·73	s. -4.09 4.10 4.11 4.11 4.12	s. ·65 ·70 ·75 ·78 ·81	s. -4·10 4·11 4·12 4·13 4·13	s. - ·72 ·77 ·83 ·85 ·88	s. -4·11 4·12 4·13 4·14 4·15	s. - ·80 ·85 ·90 ·93 ·96	s. -4·13 4·14 4·15 4·16 4·16
14 16 18 20 22	·61 ·64 ·67 ·70 ·73	4.09 4.10 4.11 4.12	-68 -71 -75 -78 -81	4·II 4·II 4·I2 4·I2 4·I3	•76 •79 •82 •86 •90	4·12 4·13 4·14 4·15	·84 ·87 ·90 ·94 ·98	4·14 4·14 4·15 4·16 4·17	·92 ·95 ·99 1·02 1·06	4·15 4·16 4·17 4·18 4·19	·99 1·03 1·07 1·10 1·15	4·17 4·18 4·19 4·20 4·21
24 26 28 30 32	•77 •80 •84 •89	4·12 4·13 4·14 4·14 4·15	•85 •39 •93 •97	4·14 4·15 4·16 4·16 4·18	*93 *97 1.02 1.06 1.11	4·16 4·17 4·18 4·19 4·20	1·02 1·06 1·11 1·16 1·21	4·18 4·19 4·20 4·21 4·23	1·10 1·15 1·20 1·25 1·30	4·20 4·21 4·22 4·24 4·25	1·19 1·24 1·29 1·34 1·40	4·22 4·23 4·25 4·27 4·28
34 36 38 40 42	·98 1·03 1·08 1·14 1·20	4·17 4·18 4·19 4·21 4·22	1.07 1.12 1.18 1.25 1.31	4·19 4·20 4·22 4·24 4·26	1·17 1·22 1·29 1·35 1·43	4·21 4·23 4·25 4·27 4·29	1·26 1·32 1·39 1·46 1·54	4·24 4·26 4·28 4·31 4·33	1·36 1·43 1·50 1·57 1·66	4·27 4·29 4·32 4·35 4·38	1·46 1·53 1·61 1·69 1·78	4·31 4·36 4·39 4·42
44 46 48 50 51	1·27 1·35 1·44 1·53 1·58	4·25 4·27 4·30 4·33 4·35	1·39 1·47 1·56 1·67	4·28 4·31 4·34 4·38 4·40	1.51 1.60 1.70 1.81 1.87	4·32 4·35 4·39 4·44 4·46	1.63 1.73 1.84 1.96 2.03	4·37 4·40 4·45 4·50 4·53	1·75 1·86 1·98 2·11 2·19	4.41 4.46 4.51 4.57 4.60	1.88 2.00 2.13 2.27 2.36	4·47 4·51 4·57 4·64 4·69

LATITUDE 9°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 8 10 12 14	H. M. S. 5 52 17.0 5 19 3.1 5 10 42.7 5 2 21.4 4 53 59.2	s. 66 .80 .83 .87	5 I 28·4	- ·67 ·81 ·85 ·90	5 17 25.4 5 9 0.2	- ·67 ·83 ·87 ·92	H. M. S. 5 50 16·2 5 16 34·9 5 8 7·0 4 59 37·9 4 51 7·6	·85 ·90 ·95	H. M. S. 5 49 35·3 5 15 43·3 5 7 12·5 4 58 40·4 4 50 6·9	·87 ·92 ·97	H. M. S. 5 48 53.9 5 14 50.5 5 6 16.6 4 57 41.4 4 49 4.5	S. - ·69 ·89 ·94 I·00 I·06
16 18 20 22 24	4 45 35.8 4 37 11.3 4 28 45.5 4 20 18.2 4 11 49.5	1.00 1.05	4 44 37.6 4 36 10.4 4 27 41.6 4 19 11.4 4 10 39.4	1.03 1.03	4 43 37·6 4 35 7·4 4 26 35·6 4 18 2·1 4 9 26·6	1.07 1.12 1.18	4 42 35·7 4 34 2·3 4 25 27·1 4 16 50·1 4 8 10·9	1·10 1·16 1·22	4 4I 3I·8 4 32 55·0 4 24 I6·3 4 I5 35·4 4 6 52·2	1·14 1·20 1·27	4 40 25·9 4 31 45·4 4 23 2·7 4 14 17·9 4 5 30·5	1·12 1·18 1·25 1·31 1·39
25 26 27 28 29	4 7 34·5 4 3 19·0 3 59 3·0 3 54 46·5 3 50 29·6	1.26		1.31		1.33	3 59 29·3 3 55 7·6 3 50 45·1	1.35	4 2 29.6 3 58 6.4 3 53 42.4 3 49 17.6 3 44 52.1	1.45	4 1 5.6 3 56 40.1 3 52 13.7 3 47 46.5 3 43 18.3	1.47 1.51 1.55
30 31 32 33 34	3 46 12·0 3 41 53·9 3 37 35·1 3 33 15·6 3 28 55·5	I·39	3 44 51.0 3 40 30.8 3 36 9.9 3 31 48.2 3 27 25.8	1.42 1.45 1.49	3 43 26·3 3 39 3·9 3 34 40·7 3 30 16·7 3 25 51·7	1.52	3 4 ¹ 57·9 3 37 33·1 3 33 7·4 3 28 40·8 3 24 13·2	1.55	3 40 25.6 3 35 58.2 3 31 29.9 3 27 0.5 3 22 30.0	1.62 1.66 1.71	3 38 49·2 3 34 19·1 3 29 47·8 3 25 15·5 3 20 41·8	1.69 1.74 1.79
35 36 37 38 39	3 24 34·5 3 20 12·8 3 15 50·2 3 11 26·7 3 7 2·2	1·54 1·58 1·62	3 23 2·4 3 18 38·2 3 14 13·0 3 9 46·8 3 5 19·5	1.62	3 21 25·8 3 16 58·9 3 12 30·9 3 8 1·7 3 3 31·3		3 15 14·7 3 10 43·6 3 6 11·2	1.83	3 13 25·2 3 8 50·9	1.03	3 II 30·4 3 6 52·5	1.96 2.02 2.09
40 41 42 43 44	3 2 36.6 2 58 10.0 2 53 42.1 2 49 12.8 2 44 42.1	1.77 1.82 1.88		1.86 1.92 1.98	2 58 59.4 2 54 26.2 2 49 51.4 2 45 14.8 2 40 36.4	1·97 2·03 2·10	2 57 2·1 2 52 25·1 2 47 46·3 2 43 5·7 2 38 22·8	2.14	2 54 58·4 2 50 17·4 2 45 34·4 2 40 49·1 2 36 1·5	2.19	2 52 48·2 2 48 2·8 2 43 15·1 2 38 24·9 2 33 31·9	2·31 2·39 2·47
45 46 47 48 49	2 40 9·9 2 35 36·0 2 31 0·3 2 26 22·5 2 21 42·5	2·06 2·13 2·21	2 38 6.6 2 33 28.6 2 28 48.4 2 24 5.9 2 19 20.9	2·19 2·27 2·35	2 35 56·0 2 31 13·4 2 26 28·4 2 21 40·7 2 16 50·0	2·32 2·41 2·50	2 33 37·8 2 28 50·1 2 23 59·7 2 19 6·2 2 14 8·4	2·46 2·56 2·66	2 31 11·3 2 26 18·1 2 21 21·8 2 16 21·9 2 11 18·1	2·61 2·71 2·83		2·77 2·89 3·01

VARIATION TO 1' OF LATITUDE AND ALTITUDE.

Alt.	L. 12°	Α	L. 13	° A.	L. 14	° A.	L. 15	° A.	L. 16	° A.	L. 17	° A.
	s.	s.	s.	s.	s.	, s.	s.	s.	s.	s.	s.	s.
0		-4.14		-4.16	-1.02	-4·17		-4.19		-4.22		-4.24
4	.92	4.12	1.90	4.17	1.07	4.19	1.12	4.21	1.53	4.53	1.31	4.26
6	•95	4.16	1.03	4.18	1.10	4.20	1.18	4.22	1.26	4.24	1.34	4.27
8	-98	4.17	1.06	4.19	1.13	4.21	1.21	4.53	1.29	4.25	1.37	4.28
10	1.01	4.17	1.09	4.19	1.17	4.31	1.25	4.24	1.33	4.26	1.41	4.29
12	1.04	4.18	1.12	4.20	1.20	4.22	1.28	4.25	1.36	4.27	1.45	4.30
14	1.07	4.19	1.15	4.21	1.24	4.23	1.32	4.26	1.40	4.29	1.49	4.31
16	1.11	4.20	1.10	4.22	1.27	4.25	1.36	4.27	1.44	4.30	1.53	4.33
18	1.15	4.21	1.23	4.23	1.32	4.26	1.40	4.28	1.49	4.31	1.58	4.35
20	1.19	4.22	1.27	4.25	1.36	4.27	1.45	4.30	1.26	4.33	1.63	4.36
22	1.23	4.23	1.32	4.26	1.41	4.29	1.50	4:32	1.59	4.35	1.68	4.38
24	1.28	4.24	1.37	4.27	1.46	4.30	1.55	4:34	1.64	4.37	1.74	4.41
26	1.33	4.26	1.42	4.29	1.51	4.32	1.61	4.36	1.70	4.39	1.80	4.43
28	1.38	4.28	1.47	4.31	1.57	4.34	1.67	4.38	1.77	4.42	1.87	4.46
30	1.44	4.30	1.54	4.33	1.63	4.37	1.74	4.41	1.84	4.45	1.95	4.49
32	1.50	4.32	1.60	4.35	1.70	4.39	1.81	4.44	1.92	4.48	2.03	4.53
34	1.57	4.34	1.67	4.38	1.78	4.42	1.89	4.47	2.00	4.52	2.12	4.57
36	1.64	4.37	1.75	4.41	1.86	4.46	1.98	4.51	2.10	4.56	2.22	4.62
38	1.72	4.40	1.84	4.45	1.95	4.50	2.08	4.55	2.20	4.61	2.33	4.67
40	1.81	4.43	1.93	4.49	2.06	4.24	2.19	4.60	2.32	4.67	2.46	4.74
42	1.01	4.48	2.04	4.53	2.17	4.59	2.31	4.66	2.45	4.74	2.61	4.82
44	2.02	4.52	2.15	4.59	2.30	4.66	2.45	4.73	2.61	4.81	2.77	4.91
46	2.14	4.58	2.29	4.65	2.44	4.73	2.61	4.82	2.78	4.01	2.96	5.02
48	2.28	4.65	2.44	4.73	2.61	4.82	2.79	4.93	2.98	5.03	3.10	5.12
49	2.36	4.69	2.53	4.77	2.71	4.87	2.90	4.98	3.10	5.10	3.31	5.23

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 161 LATITUDE 9°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 6 8 10	H. M. S. 5 48 12·0 5 22 32·2 5 13 56·5 5 5 19·3 4 56 40·6	s. - ·70 ·86 ·91 ·97 I·03	H. M. S. 5 47 29.7 5 21 40.2 5 13 1.1 5 4 20.4 4 55 38.1	s. - ·71 ·87 ·93 ·99 I·06	H. M. S. 5 46 46·8 5 20 47·2 5 12 4·4 5 3 20·0 4 54 33·7	s. - ·72 ·89 ·96 I·02 I·09	H. M. S. 5 46 3·5 5 19 52·9 5 11 6·3 5 2 17·9 4 53 27·5	s. - :73 :92 :98 I:05 I:12	H. M. S. 5 45 19·5 5 18 57·3 5 10 6·7 5 1 14·1 4 52 19·3	s. - :74 :94 1:01 1:08 1:15	H. M. S. 5 44 34·8 5 18 0·5 5 9 5·5 5 0 8·5 4 51 9·1	s. 75 .96 1.03 1.11
14 16 18 20 21	4 48 0·2 4 39 17·9 4 30 33·5 4 21 46·8 4 17 22·6	1.22	4 46 53.9 4 38 7.6 4 29 19.0 4 20 28.0 4 16 1.4	1·12 1·19 1·26 1·34 1·38	4 45 45.5 4 36 55.0 4 28 2.0 4 19 6.3 4 14 37.3	I·23 I·31 I·39	4 44 35.0 4 35 40.0 4 26 42.3 4 17 41.6 4 13 10.0	1·27 1·35 1·44	4 43 22·2 4 34 22·5 4 25 19·8 4 16 13·8 4 11 39·4	I·40 I·49	4 33 2·3 4 23 54·2	1·27 1·36 1·45 1·55 1·60
22 23 24 25 26	4 12 57.6 4 8 31.9 4 4 5.5 3 59 38.3 3 55 10.2	1·36 1·40 1·45 1·49 1·53		1.50	4 10 7.5 4 5 36.8 4 1 5.3 3 56 32.7 3 51 59.2	1.61		1.53 1.57 1.62 1.67 1.73	4 7 4·I 4 2 27·8 3 57 50·4 3 53 II·8 3 48 32·0	1.74		1.65 1.70 1.76 1.82 1.87
27 28 29 30 31	3 50 41·3 3 46 11·4 3 41 40·5 3 37 8·5 3 32 35·4	1·67	3 49 5.0 3 44 32.2 3 39 58.4 3 35 23.4 3 30 47.1	I·74	3 47 24.6 3 42 48.8 3 38 11.8 3 33 33.5 3 28 53.8	1·76 1·81 1·87	3 45 40·0 3 41 1·0 3 36 20·6 3 31 38·8 3 26 55·4	1.84 1.89 1.95	3 43 50·9 3 39 8·4 3 34 24·4 3 29 38·9 3 24 51·5	1.86 1.92 1.98 2.04 2.11	3 37 II·0 3 32 23·I 3 27 33·5	1.94 2.00 2.07 2.14 2.21
32 33 34 35 36	3 28 1·1 3 23 25·5 3 18 48·5 3 14 10·0 3 9 29·9	1.82 1.88 1.93 1.99 2.06	3 26 9.5 3 21 30.4 3 16 49.8 3 12 7.5 3 7 23.5	1.96	3 24 12·6 3 19 29·9 3 14 45·4 3 9 59·0 3 5 10·7	2.06	3 22 10·4 3 17 23·6 3 12 34·9 3 7 44·2 3 2 51·2	2.15	3 10 18·1 3 5 22·6	2·18 2·26 2·34 2·42 2·51	3 12 52·7 3 7 54·6	2·29 2·37 2·45 2·54 2·64
37 38 39 40 41	3 4 48·1 3 0 4·5 2 55 18·8 2 50 31·0 2 45 40·8	2·12 2·20 2·27 2·35 2·43	3 2 37·5 2 57 49·4 2 52 59·1 2 48 6·3 2 43 10·9		3 0 20·2 2 55 27·3 2 50 32·0 2 45 33·9 2 40 32·6	2.52	2 57 55·8 2 52 57·8 2 47 56·9 2 42 52·9 2 37 45·5	2·47 2·56 2·65 2·76 2·86		2·70 2·80 2·91	2 52 44·0 2 47 34·2 2 42 20·9 2 37 3·4 2 31 41·7	2·74 2·84 2·96 3·08 3·21
42 43 44 45 46	2 40 47·9 2 35 52·3 2 30 53·6 2 25 51·5 2 20 45·5	2·62 2·72 2·83	2 38 12·5 2 33 11·0 2 28 5·8 2 22 56·8 2 17 43·4	2·77 2·88 3·00	2 35 28·2 2 30 20·1 2 25 8·0 2 19 51·3 2 14 29·6	2·93 3·06 3·19	2 32 34·4 2 27 19·1 2 21 59·1 2 16 34·0 2 11 3·0	3·11 3·25 3·40	2 18 38·4 2 13 3·7	3.30		3·36 3·51 3·68 3·87 4·08
		V.	ARIATIC	N TO	ı' OF	LAT	TUDE .	AND	ALTITU:	DE.		
Alt.	L. 18°	A.	L. 19°	A.	L. 20°	A.	L. 21°	A.	L. 22°	A.	L. 23°	A.

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
	s. s.	s. s.	s. s.	s. s.	s. s.	S. S.
0	-1.33 -4.26	-1.41 -4.29	-1.49 -4.31	-1.58 -4.35	-1.66 -4.38	-1.74 -4.41
2	1.36 4.27	1.44 4.30	1.53 4.33	1.61 4.36	1.00 4.30	1.77 4.42
4	1.39 4.28	1.47 4.31	1.55 4.34	1.64 4.37	1.72 4.40	1.81 4.44
6	1.42 4.20	1.50 4.32	1.59 4.35	1.67 4.38	1.76 4.41	1.84 4.45
8	1.46 4.30	1.54 4.33	1.62 4.36	1.71 4.39	1.80 4.43	1.88 4.47
10	1.49 4.32	1.58 4.35	1.66 4.38	1.75 4.41	1.84 4.45	1.93 4.49
12	I·53 4·33		1.70 4.39	1.79 4.43	1.88 4.47	1.97 4.51
14	1.57 4.34		1.75 4.41	1.84 4.45	1.93 4.49	2.02 4.53
16	1.62 4.36		1.80 4.43	1.89 4.47	1.98 4.51	2.08 4.55
18	1.67 4.38		1.85 4.45	1.94 4.49	2.04 4.54	2.14 4.28
20	1.72 4.40	1.81 4.44	1.91 4.48	2.01 4.52	2.10 4.57	2.21 4.61
22	1.78 4.42		1.97 4.50	2.07 4.55	2.17 4.60	2.28 4.65
24	1.84 4.45		2.04 4.53	2.14 4.58	2.25 4.63	2.36 4.69
26	1.90 4.47		2.11 4.57	2.22 4.62	2.33 4.67	2.45 4.73
28	1.98 4.50		2.19 4.61	2.31 4.66	2.43 4.72	2.55 4.78
30	2.06 4.54	2.17 4.59	2.28 4.65	2.40 4.71	2.53 4.77	2.66 4.84
32	2.14 4.58		2.38 4.70	2.51 4.76	2.64 4.83	2.78 4.91
34	2.24 4.63		2.50 4.76	2.63 4.83	2.77 4.91	2.91 4.99
36	2.35 4.68	2.48 4.75	2.62 4.82	2.76 4.90	2.91 4.99	3.07 5.08
38	2.47 4.74	2.61 4.82	2.76 4.90	2.92 4.99	3⁵08 5.09	3.25 5.19
40	2.61 4.82	2.76 4.90	2.92 4.99	3.09 5.09	3.27 5.20	3.46 5.33
42	2.76 4.90		3.11 5.10	3.20 5.22	3.49 5.35	3.71 5.49
44	2.94 5.01		3.32 5.24	3.53 5.38	3.76 5.53	4.01 5.40
45	3.05 5.07		3.45 5.32	3.67 5.47	3.92 5.63	4.18 5.82
46	3.16 5.13		3.58 5.41	3.82 5.57	4.09 5.75	4.37 5.96
<u> </u>	<u>'</u>					11

162 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 10°.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 22.6 5 11 14.9 5 3 7.1 4 54 59.2	s. - ·70 ·72 ·72 ·73 ·73	H. M. S. 5 59 17.7 5 18 39.2 5 10 31.1 5 2 22.9 4 54 14.4	s. ·70 ·73 ·74 ·75 ·76	H. M. S. 5 58 35 4 5 17 55 1 5 9 46 4 5 1 37 6 4 53 28 4	s. - ·71 ·74 ·75 ·76 ·78	H. M. S. 5 57 53.0 5 17 10.0 5 9 0.7 5 0 51.1 4 52 41.1	s. - ·71 ·76 ·77 ·78 ·80	H. M. S. 5 57 10·4 5 16 24·1 5 8 13·9 5 0 3·4 4 51° 52·4	s. - ·71 ·77 ·79 ·81 ·82	H. M. S. 5 56 27.9 5 15 37.3 5 7 26.1 4 59 14.4 4 51 2.3	s. - ·71 ·79 ·81 ·82 ·85
18 20 22 24 26	4 46 51·0 4 38 42·7 4 30 34·2 4 22 25·4 4 14 16·4	•74 •75 •76 •77 •79	4 46 5.7 4 37 56.8 4 29 47.5 4 21 38.0 4 13 28.0	·77 ·78 ·79 ·81 ·82		·79 ·81 ·82 ·84 ·86	4 44 30.7 4 36 20.0 4 28 8.7 4 19 57.0 4 11 44.7	·82 ·83 ·85 ·88 ·90	4 27 16·5 4 19 3·3	·84 ·86 ·89 ·91	4 42 49·5 4 34 36·2 4 26 22·2 4 18 7·6 4 9 52·1	·87 ·89 ·92 ·95 ·98
28 30 31 32 33	4 6 7·0 3 57 57·2 3 53 52·2 3 49 47·0 3 45 41·8	·83	4 5 17.6 3 57 6.8 3 53 1.2 3 48 55.4 3 44 49.5	•84 •86 •87 •88 •90	3 56 13·7 3 52 7·5 3 48 1·0	·88 ·91 ·92 ·93 ·94	4 3 31·7 3 55 18·1 3 51 11·0 3 47 3·6 3 42 56·1	·92 ·95 ·97 ·98 I·00	3 54 19·6 3 50 11·6 3 46 3·3	·97 1·00 1·01 1·03 1·05	3 49 9·3 3 44 59·9	1.01 1.04 1.06 1.08 1.10
34 35 36 37 38	3 41 36·4 3 37 30·9 3 33 25·2 3 29 19·4 3 25 13·5	1 .89	3 40 43.5 3 36 37.3 3 32 30.8 3 28 24.3 3 24 17.5	•91 •92 •93 •95 •96	3 35 40·4 3 31 33·2 3 27 25·7	•96 •97 •99 1•01 1•02	3 38 48·3 3 34 40·3 3 30 32·0 3 26 23·5 3 22 14·6	1.01 1.03 1.05 1.07 1.09	3 33 36·8 3 29 27·4 3 25 17·7	1.07 1.09 1.11 1.13 1.15	3 32 29·9 3 28 19·2 3 24 8·2	1·12 1·14 1·17 1·19 1·21
39 40 41 42 43	3 21 7·3 3 17 1·0 3 12 54·5 3 8 47·8 3 4 40·8	•92 •93 •95 •96 •98	3 20 10·5 3 16 3·2 3 11 55·8 3 7 48·0 3 3 40·0	·98 ·99 I·01 I·03 I·05	3 15 1.6 3 10 53.0 3 6 44.1	1.04 1.06 1.08 1.10 1.12	3 18 5.5 3 13 56.0 3 9 46.1 3 5 35.9 3 1 25.2	1·11 1·13 1·15 1·17 1·20	3 12 46·3 3 8 35·0 3 4 23·2	1·17 1·20 1·22 1·25 1·28	3 7 19·5 3 6·1	1·24 1·27 1·30 1·32 1·36
44 45 46 47 48	3 0 33.7 2 56 26.2 2 52 18.5 2 48 10.5 2 44 2.1	1.03 1.02	2 59 31·7 2 55 23·1 2 51 14·1 2 47 4·8 2 42 55·0	1·14 1·14	2 58 25·3 2 54 15·3 2 50 4·8 2 45 54·0 2 41 42·6	1·15 1·17 1·20 1·22 1·25	2 53 2·6 2 48 50·6	1·22 1·25 1·28 1·31 1·34	2 51 45.0 2 47 31.1 2 43 16.6	1·31 1·34 1·37 1·40 1·44	2 50 22·2 2 46 6·3 2 4I 49·6	1·39 1·42 1·46 1·50
49 50 51 52 53	2 39 53·4 2 35 44·4 2 31 34·9 2 27 25·0 2 23 14·5	1·12 1·15	2 38 44·8 2 34 34·2 2 30 23·0 2 26 11·3 2 21 59·0	1·22 1·25	2 37 30·7 2 33 18·3 2 29 5·2 2 24 51·5 2 20 37·0	1.32 1.32	2 36 11·0 2 31 56·4 2 27 41·2 2 23 25·1 2 19 8·1		2 30 28·5 2 26 10·7 2 21 52·1	1.48 1.52 1.56 1.61 1.66	2 28 54·2 2 24 33·7 2 20 12·0	1·58 1·63 1·68 1·73 1·78
		VA	ARIATIC	N TO	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	A.	L. 3°	Α.	L. 4°	A.	L. 5°	Α.
0 4 8 12 14	s. 00 .05 .10 .15 .18	s. -4.06 4.06 4.06 4.06 4.06	s. 07 .12 .17 .23 .25	s. -4·06 4·06 4·07 4·07	s. - ·14 ·19 ·25 ·30 ·33	s. -4.07 4.07 4.07 4.07 4.07	s. - ·22 - ·27 ·32 ·37 ·40	s. -4.07 4.07 4.07 4.08 4.08	s. - ·29 - ·34 ·39 ·45 ·48	s. -4·07 4·08 4·08 4·09 4·09	s. - ·36 - ·41 ·47 ·52 ·55	s. -4.08 4.08 4.09 4.09 4.10
16 18 20 22 24	·20 ·23 ·26 ·29 ·32	4·07 4·07 4·07 4·07 4·07	·28 ·31 ·34 ·37 ·40	4.07 4.07 4.08 4.08 4.08	·36 ·39 ·42 ·45 ·48	4·08 4·08 4·09 4·09	.43 .46 .49 .53 .56	4.08 4.09 4.09 4.10	•51 •54 •57 •61 •64	4.10 4.10 4.11 4.11	·58 ·62 ·65 ·69 ·72	4·10 4·11 4·12 4·13
26 28 30 32 34	*35 *38 *41 *45 *49	4.08 4.08 4.09 4.09	.43 .47 .50 .54 .58	4.08 4.08 4.09 4.10 4.10	·51 ·55 ·59 ·62 ·67	4·09 4·10 4·11 4·12	•60 •63 •67 •71 •76	4·II 4·II 4·I2 4·I3	•68 •72 •76 •80 •85	4·12 4·13 4·14 4·15	·76 ·80 ·85 ·89 ·94	4·13 4·14 4·15 4·16 4·17
36 38 40 42 44	·52 ·56 ·61 ·65 ·70	4.09 4.10 4.11 4.11 4.12	·62 ·66 ·71 ·75 ·81	4·II 4·II 4·I2 4·I3 4·I4	·71 ·75 ·80 ·86 ·91	4·12 4·13 4·14 4·15 4·16	·80 ·85 ·90 ·96 I·02	4·14 4·15 4·16 4·17 4·19	·90 ·95 ·01 ·07 ·13	4·16 4·17 4·18 4·20 4·22	.99 1.05 1.11 1.18 1.25	4·18 4·19 4·21 4·23 4·25
46 48 50 52 53	•75 •81 •87 •94 •98	4·13 4·14 4·15 4·17 4·18	·86 ·93 ·99 I·07 I·II	4·15 4·17 4·18 4·20 4·21	·98 I·04 I·12 I·20 I·24	4·18 4·19 4·21 4·23 4·25	1.09 1.16 1.24 1.33 1.38	4·21 4·23 4·25 4·28 4·29	1·21 1·28 1·37 1·47 1·53	4·24 4·26 4·29 4·32 4·34	1·32 1·41 1·51 1·62 1·67	4·27 4·30 4·33 4·37 4·39

LATITUDE 10°.

		D	ECLINA	TION-	-CONT	RARY	NAME	TO-	-LATITU	DE.		
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 10 12 14 16	H. M. S. 5 55 45·2 5 14 49·6 5 6 37·2 4 58 24·2 4 50 10·7	s. - ·71 ·80 ·82 ·85 ·87	H. M. S. 5 55 2·3 5 14 0·9 5 5 47·1 4 57 32·7 4 49 17·6	s. - ·72 ·82 ·84 ·87 ·90	H. M. S. 5 54 19·2 5 13 11·3 5 4 55·9 4 56 39·9 4 48 23·1	s. - ·72 ·84 ·86 ·89 ·92	H. M. S. 5 53 35.9 5 12 20.5 5 4 3.5 4 55 45.6 4 47 26.9	s. 72 .85 .88 .92 .95	H. M. S. 5 52 52.4 5 11 28.7 5 3 9.8 4 54 49.9 4 46 29.1	s. - ·73 ·87 ·91 ·94 ·98	H. M. S. 5 52 8.6 5 10 35.8 5 2 14.7 4 53 52.7 4 45 29.6	s. - :73 :89 :93 :97
18 20 22 24 26	4 4I 56·6 4 33 4I·7 4 25 26·0 4 I7 9·6 4 8 52·2	·92 ·95	4 41 1.8 4 32 45.2 4 24 27.8 4 16 9.3 4 7 49.8	.93 .96 .99 1.02 1.06	4 40 5.5 4 31 46.9 4 23 27.4 4 15 6.7 4 6 44.9	·95 ·99 1·03 1·06 1·10	4 39 7·3 4 30 46·6 4 22 24·7 4 14 1·7 4 5 37·3	·99 1·02 1·06 1·10 1·15	4 12 54.2	1.02 1.06 1.10 1.15 1.19	4 37 5·3 4 28 39·7 4 20 12·7 4 11 44·2 4 3 13·9	1.05 1.09 1.14 1.19 1.24
27 28 29 30 31	4 4 43·I 4 0 33·8 3 56 24·I 3 52 I4·2 3 48 4·0	1.07	4 3 39.6 3 59 29.1 3 55 18.3 3 51 7.1 3 46 55.6	1.08 1.10 1.12 1.14 1.17	4 2 33.4 3 58 21.7 3 54 9.5 3 49 57.0 3 45 44.1	1·13 1·15 1·17 1·19 1·22	4 I 24·5 3 57 II·3 3 52 57·8 3 48 43·7 3 44 29·2	1·17 1·20 1·22 1·25 1·28	4 0 12·8 3 55 58·1 3 51 42·9 3 47 27·2 3 43 11·0	1·22 1·25 1·27 1·30 1·33	3 58 58·0 3 54 4I·7 3 50 24·8 3 46 7·4 3 4I 49·3	1·27 1·30 1·33 1·36 1·39
32 33 34 35 36	3 43 53.4 3 39 42.5 3 35 31.2 3 31 19.5 3 27 7.4	1.18	3 42 43.7 3 38 31.4 3 34 18.6 3 30 5.4 3 25 51.7	1·21 1·24 1·27	3 41 30·7 3 37 16·8 3 33 2·5 3 28 47·6 3 24 32·2	1·25 1·27 1·30 1·33 1·36	3 35 58.7		3 38 54·3 3 34 36·9 3 30 18·9 3 26 0·3 3 21 40·9	1·36 1·39 1·43 1·46 1·50	3 37 30·7 3 33 11·3 3 28 51·2 3 24 30·4 3 20 8·8	1.43 1.46 1.50 1.53 1.57
37 38 39 40 41	3 22 54·8 3 18 41·8 3 14 28·2 3 10 14·2 3 5 59·5	1·26 1·28 1·31 1·34 1·37	3 8 51.5	1·32 1·35 1·38 1·42 1·45	3 20 16·2 3 15 59·5 3 11 42·2 3 7 24·2 3 3 5·4	1·39 1·42 1·46 1·49 1·53	3 18 50·6 3 14 31·9 3 10 12·5 3 5 52·2 3 1 31·0	1.46 1.50 1.53 1.57 1.62	3 17 20·7 3 12 59·8 3 8 38·0 3 4 15·2 2 59 51·4	1.62 1.66	3 15 46·3 3 11 22·9 3 6 58·5 3 2 33·0 2 58 6·4	1.61 1.66 1.70 1.75 1.80
42 43 44 45 46	3 I 44.2 2 57 28.3 2 53 II.6 2 48 54.2 2 44 35.9	I·47 I·51	3 Q 17·5 2 55 59·4 2 51 40·5 2 47 20·6 2 42 59·9	1·49 1·52 1·56 1·61 1·65	2 58 45·8 2 54 25·3 2 50 3·8 2 45 41·4 2 41 17·8	1.57 1.61 1.66 1.70 1.75	2 57 8·9 2 52 45·8 2 48 21·6 2 43 56·2 2 39 29·5	1.66 1.71 1.75 1.80 1.86	2 55 26.6 2 51 0.6 2 46 33.3 2 42 4.8 2 37 34.6	1.86	2 53 38·6 2 49 9·4 2 44 38·9 2 40 6·7 2 35 32·9	1.85 1.90 1.96 2.02 2.09
	2 40 16·8 2 35 56·7 2 31 35·5 2 27 13·2 2 22 49·6	I·69	2 38 38·0 2 34 15·1 2 29 50·8 2 25 25·3 2 20 58·3		2 36 53·0 2 32 26·9 2 27 59·3 2 23 30·2 2 18 59·4	1.80 1.86 1.92 1.98 2.05	2 35 1·4 2 30 31·8 2 26 0·6 2 21 27·5 2 16 52·4	1·92 1·98 2·04 2·11 2·19	2 33 3.0 2 28 29.6 2 23 54.2 2 19 16.8 2 14 37.0	2·17 2·25	2 30 57·3 2 26 19·6 2 21 39·7 2 16 57·4 2 12 12·4	2·16 2·23 2·31 2·40 2·49
		VA	ARIATIC	N TC	ı' OF	LATI	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	Α.	L. 9°	A.	L. 10°	Α.	L. 11°	A.
0 4 8 10 12	s. - :43 :49 :54 :57 :60	s. -4.08 4.09 4.10 4.10 4.11	s. - ·51 ·56 ·61 ·64 ·68	s. -4.09 4.10 4.11 4.11 4.12	s. - ·58 ·63 ·69 ·72 ·75	S. -4·I0 4·II 4·I2 4·I2 4·I3	s. 65 .71 .76 .80 .83	s. -4·11 4·12 4·13 4·14 4·15	s. - '73 '78 '84 '87 '91	S. -4·12 4·14 4·15 4·15 4·16	s. - ·80 ·86 ·92 ·95 ·98	s. -4·14 4·15 4·16 4·17 4·18
14 16 18 20 22	·63 ·66 ·70 ·73 ·77	4·II 4·II 4·I2 4·I3 4·I3	.71 .74 .78 .81 .85	4·12 4·13 4·14 4·15	·78 ·82 ·85 ·89 ·93	4·14 4·14 4·15 4·16 4·17	·86 ·90 ·93 ·97 I·02	4·15 4·16 4·17 4·18 4·19	.94 .98 1.02 1.06 1.10	4·17 4·18 4·19 4·20 4·21	1.02 1.06 1.10 1.14 1.19	4·19 4·20 4·21 4·22 4·3
24 26 28 30 32	·81 ·85 ·89 ·93 ·98	4·14 4·15 4·16 4·17 4·18	·89 ·93 ·98 I·02 I·08	4·16 4·17 4·18 4·19 4·20	·97 I·02 I·07 I·12 I·17	4·18 4·19 4·20 4·21 4·23	1.06 1.11 1.16 1.21 1.27	4·20 4·21 4·22 4·24 4·25	1·15 1·19 1·25 1·30 1·36	4·22 4·23 4·25 4·27 4·28	1·23 1·28 1·34 1·40 1·46	4·24 4·26 4·28 4·30 4·32

4·24 4·26 4·28

4.31

4.33

4.37

4.40

4·45 4·50 4·53

1.23

1·29 1·36

1.43

1.21

1.60

1.70

1.81

1.93

2.00

1.03

1.09

1.12

1.21

1.28

1.36

1·45 1·54 1·64

1.70

34 36

38

40

42

44 46 48

50

51

4.19

4.21

4.22

4·24 4·26

4.28

4.31

4·34 4·38

4.40

1.13

1.19

1.25

1.32

1.40

1.48

I·57

1·79 1·85

4.22

4.23

4.25

4.27

4.30

4.32

4·35 4·39

4·44 4·46

1·43 1·50 1·57 1·66

1.75

I.86

1.97

2.10

2.25

2.33

4.30

4·36 4·36

4.39

4.42

4.46

4·51 4·57 4·64 4·68

4.27

4.29

4.32

4·35 4·38

4.41

4.46

4·51 4·57 4·60

1.33

1·33 1·39 1·47 1·54 1·63

1·73 1·83

1.95

2·09 2·16

1.23

1.61

1.69 1.78 1.88

1.99

2.11

2.26

2.42

2.51

4.34

4.37

4.40

4.43

4.47

4.52

4.58

4.65 4·73 4·77

LATITUDE 10°.

DECLINATION—CONTRARY NAME TO-LATITUDE. Decl.

Var.

Decl.

Var.

16°

15°

Decl.

Var.

17°

2·73 2·92

3·38

3.52

4.90

5.00

5·13 5·28

5.38

True

Alt.

42

44

48

49

2.01

2·13 2·26

2.42

2.50

4·53 4·58 4·65

4.73

4.77

2.14

2.27

2.42 2·59 2·68

4·59 4·65

4.87

2.28

2.42

2.58

2·77 2·87

4.66

4·73 4·81

4.92

4.98

12°

Decl.

Var.

13°

Decl.

Var.

14°

Decl.

Var.

	·	I		!		
0 8 10 12 14	H. M. S. 5 51 24.5 74 87 87 87 87 87 87 87 87 87 87 87 87 87	5 17 10·9 ·89 5 8 46·2 ·93 5 0 20·5 ·98	4 59 21.2 1.00	H. M. S. 5. 76 93 15 21 6 98 4 58 20 3 1 0 8 4 49 47 6 1 0 8	5 5 52.2 1.00	H. M. S. S. 777 5 13 27.5 97 5 4 51.4 1.03 4 56 13.8 1.08 4 47 34.4 1.14
16 18 20 22 24	4 44 28·3 1·04 4 36 1·4 1·08 4 27 33·1 1·13 4 19 3·1 1·18 4 10 31·5 1·23	4 34 55·5 1·12 4 26 24·1 1·17 4 17 51·0 1·22	4 25 12·9 1·21 4 16 36·4 1·27	4 41 13·3 1·13 4 32 37·2 1·19 4 23 59·1 1·25 4 15 18·9 1·31 4 6 36·5 1·38	4 22 42·9 1·29 4 13 58·8 1·36	4 38 53·I 1·20 4 30 9·7 1·27 4 2I 24·0 1·34 4 I2 35·8 1·41 4 3 44·6 1·49
25 26 27 28 29	3 53 22.2 1.35	4 0 38·9 1·34 3 56 19·4 1·38	3 59 16·7 1·40 3 54 55·2 1·43	4 2 14·2 1·41 3 57 51·3 1·45 3 53 27·7 1·49 3 49 3·2 1·53 3 44 38·0 1·57	3 56 22·5 1·51 3 51 56·5 1·55 3 47 29·7 1·59	3 59 17.8 1.53 3 54 50.2 1.57 3 50 21.7 1.61 3 45 52.3 1.66 3 41 21.9 1.70
30 31 32 33 34	3 44 44.0 1.42 3 40 24.0 1.45 3 36 3.2 1.45 3 31 41.7 1.53 3 27 19.4 1.57	3 38 54·9 1·52 3 34 31·9 1·56 3 30 8·0 1·60	3 32 56.5 1.63	3 26 47.7 1.75	3 34 3·5 I·73 3 29 32·6 I·77	3 36 50·3 1·75 3 32 17·7 1·80 3 27 43·8 1·85 3 23 8·6 1·91 3 18 32·1 1·97
35 36 37 38 39	3 22 56·3 3 18 32·2 3 14 7·2 3 9 41·1 3 5 13·9	3 16 50·9 3 12 23·1 3 7 54·1 3 3 23·9 1·88	3 10 33·9 1·86 3 6 1·8 1·92 3 1 28·2 1·98	3 17 46·1 1·85 3 13 13·4 1·90 3 8 39·3 1·96 3 4 3·8 2·02 2 59 26·7 2·08	3 6 39·1 2·05 3 1 59·9 2·12	3 13 54·0 2·03 3 9 14·4 2·09 3 4 33·0 2·15 2 59 49·8 2·22 2 55 4·6 2·30
40 41 42 43 44	3 0 45.5 1.84 2 56 15.8 1.89 2 51 44.7 1.95 2 47 12.1 2.01 2 42 37.9 2.07	2 54 19·2 1·99 2 49 44·6 2·06 2 45 8·2 2·12	2 56 53·2 2·04 2 52 16·5 2·10 2 47 38·0 2·17 2 42 57·5 2·24 2 38 15·0 2·32	2 45 24·4 2·29 2 40 39·5 2·36	2 52 36·0 2·26 2 47 50·9 2·33 2 43 3·6 2·41 2 38 13·7 2·50 2 33 21·2 2·59	2 50 17·1 2·37 2 45 27·4 2·46 2 40 35·0 2·55 2 35 39·8 2·64 2 30 41·5 2·74
45 46 47 48 49	2 33 24·0 2·21 2 28 44·0 2·29 2 24 1·7 2·37		2 23 52·6 2·58 2 18 59·4 2·68	2 3I 2·2 2·54 2 26 9·4 2·63 2 2I 13·4 2·74 2 16 13·8 2·85 2 1I 10·3 2·97	2 18 24·3 2·91 2 13 17·7 3·03	2 25 39·8 2·85 2 20 34·3 2·96 2 15 24·5 3·09 2 10 10·1 3·23 2 4 50·3 3·38
	V	ARIATION TO	O. r' OF LAT.	TUDE AND	ALTITUDE.	
Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.
0 4 6 8 10	s. s. - ·88 -4·15 ·93 4·17 ·96 4·17 ·99 4·18 1·03 4·19	s. s. - ·95 - 4·17 1·01 4·19 1·04 4·19 1·07 4·20 1·11 4·21	S. S. -1.03 -4.19 1.09 4.21 1.12 4.21 1.15 4.22 1.19 4.23	S. S. -1·11 -4·21 1·16 4·23 1·20 4·23 1·23 4·24 1·27 4·26	s. s. -1·18 -4·23 1·24 4·25 1·28 4·26 1·31 4·27 1·35 4·28	s. s. -1·26 -4·25 1·29 4·27 1·36 4·28 1·39 4·29 1·43 4·31
12 14 16 18 20	1.06 4.20 1.10 4.21 1.14 4.22 1.18 4.23 1.23 4.24	1·14 4·22 1·18 4·23 1·22 4·24 1·27 4·25 1·31 4·27	1·22 4·24 1·26 4·25 1·31 4·27 1·35 4·28 1·40 4·30	1·31 4·27 1·35 4·28 1·39 4·29 1·44 4·31 1·49 4·33	1·39 4·29 1·43 4·31 1·48 4·32 1·53 4·34 1·58 4·36	1·47 4·32 1·52 4·34 1·56 4·35 1·61 4·37 1·67 4·39
22 24 26 28 30	1·27 4·26 1·32 4·27 1·38 4·29 1·43 4·31 1·50 4·33	1·36 4·28 1·41 4·30 1·47 4·32 1·53 4·34 1·60 4·36	1.45 4.31 1.51 4.33 1.56 4.35 1.63 4.38 1.70 4.40	1.54 4.34 1.60 4.36 1.66 4.39 1.73 4.41 1.80 4.44	1.63 4.38 1.69 4.40 1.76 4.43 1.83 4.46 1.91 4.49	1.73 4.41 1.79 4.44 1.86 4.47 1.94 4.50 2.02 4.53
32 34 36 38	1·56 4·35 1·64 4·38 1·72 4·41 1·80 4·44	1.67 4.39 1.74 4.42 1.83 4.45 1.92 4.49	1.77 4.43 1.85 4.46 1.94 4.50 2.04 4.55	1.88 4.48 1.97 4.51 2.06 4.56 2.17 4.60	1.99 4.52 2.08 4.56 2.19 4.61 2.30 4.67	2·10 4·58 2·20 4·62 2·31 4·67 2·44 4·74 2·58 4·81

2·42 2·58

2.75

2.96

3.08

4·73 4·81

4.91

5.03

5.09

2·58 2·74 2·93 3·17

3.19

4·8I

4·90 5·01 5·15

5.23

LATITUDE 10°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 6 8 10 12	H. M. S. 5 46 51·8 5 21 6·3 5 12 28·5 5 3 49·1 4 55 8·0	*94 *99 1.05	5 20 9·5 5 II 28·I	1.08	H. M. S. 5 45 16·9 5 19 11·4 5 10 26·3 5 1 39·5 4 52 50·7	·98 1·04 1·11	5 18 12·0 5 9 23·1	1.00 1.07 1.14	H. M. S. 5 43 39.5 5 17 11.3 5 8 18.2 4 59 23.0 4 50 25.5	I·02 I·09 I·17	H. M. S. 5 42 49·8 5 16 9·2 5 7 11·7 4 58 12·0 4 49 9·6	s. - ·83 I·05 I·12 I·20 I·28
14 16 18 19 20	4 46 24·9 4 37 39·8 4 28 52·4 4 24 27·7 4 20 2·4	I·24 I·31 I·35	4 45 13·3 4 36 24·1 4 27 32·4 4 23 5·5 4 18 37·9	I.35	4 43 59.6 4 35 6.0 4 26 9.8 4 21 40.5 4 17 10.4	I.40	4 42 43.6 4 33 45.4 4 24 44.3 4 20 12.5 4 15 39.8	1.36 1.45 1.49	4 4I 25·3 4 32 22·2 4 23 I5·9 4 I8 4I·4 4 I4 6·0	1.41 1.50 1.55	4 40 4.5 4 30 56.2 4 21 44.4 4 17 7.0 4 12 28.7	1·37 1·46 1·55 1·60 1·65
21 22 23 24 25	4 15 36·4 4 11 9·6 4 6 42·1 4 2 13·7 3 57 44·4	1·46 1·50 1·54	4 5 10.3	1·52 1·56 1·60	4 12 39.5 4 8 7.7 4 3 35.0 3 59 1.3 3 54 26.5	1.57 1.62 1.67	4 1 56.1	1.58 1.63 1.68 1.73 1.78	4 4 52.0	1.69 1.75 1.80	4 7 49.2 4 3 8.5 3 58 26.6 3 53 43.4 3 48 58.9	1.70 1.76 1.81 1.87 1.93
26 27 28 29 30	3 53 14·2 3 48 43·1 3 44 10·9 3 39 37·5 3 35 3·0	1·68 1·73 1·78	3 51 34.4 3 47 0.4 3 42 25.2 3 37 48.8 3 33 11.0	1.75 1.80 1.85	3 49 50·6 3 45 13·4 3 40 35·1 3 35 55·3 3 1 14·1	1.82 1.87 1.93		1.89 1.95 2.01	3 46 10·0 3 41 26·1 3 36 40·6 3 31 53·5 3 27 4·7	1.97 2.04 2.10	3 44 12·8 3 39 25·1 3 34 35·8 3 29 44·6 3 24 51·5	1.99 2.06 2.13 2.20 2.27
31 32 33 34 35	3 30 27·2 3 25 50·1 3 21 11·5 3 16 31·4 3 11 49·7	2.00	3 28 31·9 3 23 51·3 3 19 9·0 3 14 25·1 3 9 39·3		3 26 31·4 3 21 47·0 3 17 0·9 3 12 12·8 3 7 22·7	2·05 2·12 2·19 2·26 2·33	3 19 37·1 3 14 46·7 3 9 54·2	2.22		2·32 2·40 2·48	3 19 56·3 3 14 58·8 3 9 58·9 3 4 56·4 2 59 51·0	2·35 2·43 2·51 2·60 2·70
36 37 38 39 40	3 7 6·1 3 2 20·6 2 57 33·1 2 52 43·2 2 47 51·0	2·34 2·42	3 4 51·5 3 0 1·6 2 55 9·3 2 50 14·5 2 45 16·9	2.54	3 2 30·3 2 57 35·6 2 52 38·2 2 47 37·9 2 42 34·6	2:41 2:50 2:58 2:68 2:78	2 55 2·0 2 49 59·I 2 44 52·9	2·62 2·72 2·82	2 57 26·3 2 52 20·6 2 47 11·6 2 41 59·0 2 36 42·3	2·76 2·87 2·98	2 54 42·5 2 49 30·6 2 44 15·0 2 38 55·3 2 33 31·1	2·80 2·91 3·02 3·15 3·28
41 42 43 44 45	2 42 56·0 2 37 58·1 2 32 57·0 2 27 52·4 2 22 43·9	2·69 2·79 2·90	2 40 16·3 2 35 12·4 2 30 4·9 2 24 53·3 2 19 37·2	2·95 3·08	2 37 27.8 2 32 17.3 2 27 2.6 2 21 43.3 2 16 18.8	3·13 3·27	2 34 29·7 2 29 11·9 2 23 49·3 2 18 21·4 2 12 47·5	3.18	2 31 21·3 2 25 55·4 2 20 24·1 2 14 46·6 2 9 2·1	3·37 3·53 3·70	2 28 1.8 2 22 26.9 2 16 45.8 2 10 57.5 2 5 1.1	3.43 3.58 3.76 3.95 4.16

VARIATION TO I' OF LATITUDE AND ALTITUDE.

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
	s. s.	S. S.	s. s.	s. s.	s. s.	s. s.
0	-1.34 - 4.28	-1.42 -4.30	-1.50 -4.33	-1·59 -4·36	-I-67 -4-39	-1.76 -4.42
2	1.37 4.29	1.42 4.31	1.24 4.34	1.62 4.37	1.71 4.40	1.79 4.44
4	1.40 4.30	1.49 4.33	1.57 4.35	1.65 4.39	1.74 4.42	1.83 4.45
6	1.44 4.31	1.25 4.34	1.61 4.37	1.69 4.40	1.78 4.43	1.87 4.47
8	1.48 4.32	1.56 4.35	1.65 4.38	1.73 4.42	1.82 4.45	1.91 4.49
10	1.52 4.33	1.60 4.37	1.69 4.40	1.78 4.43	1.87 4.47	1.96 4.51
12	1.26 4.32	1.65 4.38	1.73 4.42	1.82 4.45	1.91 4.49	2·01 4·53
14	I·60 4·37	1.69 4.40	1.78 4.44	1.87 4.47	1.97 4.21	2.06 4.56
16	1.65 4.39	1.74 4.42	1.84 4.46	1.93 4.20	2.03 4.24	2.12 4.58
18	1.71 4.41	1.80 4.44	1.89 4.48	1.99 4.52	2.09 4.57	2.19 4.61
20	1.76 4.43	1.86 4.47	1.96 4.51	2.06 4.55	2.16 4.60	2.26 4.65
22	1.82 4.45	1.92 4.49	2.02 4.54	2.13 4.58	2.23 4.63	2.34 4.69
24	1.89 4.48	1.99 4.52	2.10 4.57	2.20 4.62	2.31 4.67	2.43 4.73
26	1.96 4.51	2.07 4.56	2.18 4.61	2.29 4.66	2.40 4.72	2.52 4.78
28	2.04 4.55	2.15 4.60	2.27 4.65	2.38 4.71	2.50 4.77	2.63 4.84
30	2.13 4.59	2.24 4.64	2.36 4.70	2.49 4.76	2.61 - 4.83	2.75 4.90
32	2.22 4.63	2.35 4.69	2.47 4.75	2.60 4.82	2.73 4.90	2.88 4.98
34	2.33 4.68	2.46 4.75	2.59 4.82	2.73 4.89	2.88 4.98	3.03 5.07
36	2.45 4.74	2.58 4.81	2.73 4.89	2.88 4.98	3.03 5.07	3.20 5.17
38	2.58 4.81	2.73 4.89	2.88 4.98	3.04 5.08	3.22 5.18	3.40 5.29
40	2.73 4.89	2.89 4.98	3.06 5.08	3.24 5.19	3.43 5.31	3.63 5.45
42	2.90 4.99	3.08 5.09	3.26 5.21	3.46 5.34	3.67 5.48	3.90 5.63
43	3.00 5.05	3.18 5.16	3.38 5.28	3.59 5.42	3.82 5.57	4.06 5.74
44	3.10 2.11	3.30 5.23	3'51 5.36	3.73 5.21	3.97 5.68	4.24 5.87
45	3.51 2.18	3.42 5.31	3.64 5.46	3.89 5.62	4.12 2.81	4.44 6.02
-	-	1			1	

LATITUDE 11°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 19 14.6 5 11 5.2 5 2 55.8 4 54 46.1	•79	H. M. S. 5 59 13.4 5 18 26.8 5 10 17.0 5 2 7.1 4 53 56.8	·80 ·81 ·82	H. M. S. 5 58 26·6 5 17 38·2 5 9 27·9 5 1 17·3 4 53 6·3	·82 ·83 ·84	H. M. S. 5 57 39.9 5 16 48.7 5 8 37.7 5 0 26.3 4 52 14.4	·83	5 7 46·4 4 59 34·0	·85 ·86 ·88	H. M. S. 5 56 6·2 5 15 7·2 5 6 54·1 4 58 40·5 4 50 26·4	s. - ·78 ·86 ·88 ·90 ·92
18 20 22 24 26	4 46 36·3 4 38 26·2 4 30 15·8 4 22 5·2 4 13 54·2	·83 ·84 ·85	4 45 46·4 4 37 35·6 4 29 24·4 4 21 12·9 4 13 0·9	·86 ·87	4 44 55.0 4 36 43.4 4 28 31.2 4 20 18.6 4 12 5.5	·88 ·90 ·92	4 44 2·I 4 35 49·4 4 27 36·I 4 19 22·2 4 II 7·7	·89 ·91 ·93 ·96 ·98		·94 ·97	4 42 11.6 4 33 56.2 4 25 40.0 4 17 23.0 4 9 5.1	.95 .97 1.00 1.03 1.06
28 30 31 32 33	4 5 42·8 3 57 30·9 3 53 24·8 3 49 18·6 3 45 12·2	·91	4 4 48.4 3 56 35.4 3 52 28.6 3 48 21.7 3 44 14.6	·96	4 3 51·7 3 55 37·2 3 51 29·7 3 47 22·0 3 43 14·1	I.00 I.02	4 2 52·4 3 54 36·3 3 50 28·0 3 46 19·3 3 42 10·4	1.07	4 I 50·6 3 53 32·6 3 49 23·2 3 45 I3·6 3 4I 3·6	1.12	3 52 26·1 3 48 15·6	1·10 1·13 1·15 1·17
34 35 36 37 38	3 41 5.6 3 36 58.9 3 32 52.1 3 28 45.0 3 24 37.7	•96 •97 •98	3 40 7·3 3 35 59·8 3 31 52·1 3 27 44·2 3 23 36·0	1.01 1.03 1.04	3 39 5.9 3 34 57.5 3 30 48.8 3 26 39.9 3 22 30.7	1.02 1.08 1.10	3 38 I·3 3 33 5I·8 3 29 42·I 3 25 32·0 3 21 2I·6	1·12 1·14 1·16	3 36 53·3 3 32 42·7 3 28 31·7 3 24 20·4 3 20 8·6	1·18 1·20 1·23	3 35 42·0 3 31 30·1 3 27 17·7 3 23 4·9 3 18 51·7	1·22 1·24 1·26 1·29 1·32
39 40 41 42 43	3 20 30·3 3 16 22·6 3 12 14·6 3 8 6·4 3 3 57·9	1.03	3 15 18·9 3 11 9·9 3 7 0·6	1.09	3 18 21·1 3 14 11·3 3 10 1·0 3 5 50·5 3 1 39·4	1·14 1·16 1·18 1·21 1·23	3 4 35.9	1·23 1·25 1·28		1.39		1·34 1·37 1·40 1·44 1·47
44 45 46 47 48	2 59 49·2 2 55 40·1 2 51 30·7 2 47 20·9 2 43 10·8	· 1·12 1·14 1·17	2 58 40·9 2 54 30·5 2 50 19·7 2 46 8·4 2 41 56·7	1·20 1·22 1·25	2 57 28·0 2 53 16·1 2 49 3·7 2 44 50·7 2 40 37·2	1.28	2 56 10·2 2 51 56·7 2 47 42·5 2 43 27·6 2 39 12·1	1·37 1·40 1·43	2 54 47·7 2 50 32·2 2 46 16·0 2 41 59·0 2 37 41·2	I·45 I·49 I·52	2 53 20·I 2 49 2·4 2 44 44·0 2 40 24·6 2 36 4·2	1·50 1·54 1·58 1·62 1·67
49 50 51 52 53	2 39 0·1 2 34 49·1 2 30 37·5 2 26 25·3 2 22 12·6	1·27 1·30	2 37 44.4 2 33 31.5 2 29 18.1 2 25 3.9 2 20 49.1	1·34 1·37 1·41	2 36 23·0 2 32 8·1 2 27 52·5 2 23 36·1 2 19 18·8	1.52	2 34 55·8 2 30 38·6 2 26 20·6 2 22 1·6 2 17 41·5	1.54 1.59 1.63	2 33 22·4 2 29 2·8 2 24 42·0 2 20 20·1 2 15 56·9	I·70	2 31 42·9 2 27 20·3 2 22 56·5 2 18 31·4 2 14 4·7	1·71 1·76 1·82 1·88 1·94
		VA	RIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 0°	Α.	L. 1°	Α	L. 2°	Α.	L. 3°	Α.	L. 4 °	Α.	L. 5°	Α.
0 4 8 12 14	s. '00 '05 '11 '17 '20	s. -4.07 4.07 4.08 4.08 4.08	s. 07 - .13 .18 .24 .27	s. -4.08 4.08 4.08 4.08 4.08	s. - ·14 ·20 ·26 ·32 ·35	s. -4.08 4.08 4.08 4.09 4.09	s. - ·22 ·27 ·33 ·39 ·42	s. -4.08 4.08 4.09 4.09 4.10	s. - ·29 ·35 ·41 ·47 ·50	s. -4.08 4.09 4.09 4.10 4.10	s. - ·36 - ·42 ·48 ·54 ·58	s. -4.09 4.10 4.10 4.11 4.11
16 18 20 22 24	·23 ·26 ·29 ·32 ·35	4.08 4.08 4.08 4.09 4.09	·30 ·33 ·37 ·40 ·43	4.09 4.09 4.09 4.09	·38 ·41 ·44 ·48 ·52	4.10 4.10 4.10 4.10	·46 ·49 ·52 ·56 ·60	4·10 4·11 4·11 4·11	•53 •57 •60 •64 •68	4·II 4·II 4·I2 4·I3	.61 .65 .68 .72 .76	4·12 4·13 4·14 4·15
26 28 30 32 34	*39 *42 *46 *50 *54	4·10 4·10 4·10	.47 .51 .55 .59 .63	4·10 4·11 4·12 4·12	.55 .59 .63 .67 .72	4·II 4·I2 4·I3 4·I4	·64 ·68 ·72 ·76 ·81	4·12 4·13 4·14 4·15 4·16	.72 .76 .81 .85	4·14 4·15 4·16 4·17	·80 ·85 ·90 ·95 I·00	4·15 4·16 4·17 4·18 4·20
36 38 40 42 44	·58 ·63 ·67 ·72 ·78	4·11 4·12 4·13 4·14 4·15	·67 ·72 ·77 ·83 ·89	4·13 4·14 4·15 4·16 4·17	.77 .82 .87 .93	4·15 4·16 4·17 4·18 4·19	·86 ·92 ·97 I·04 I·II	4·17 4·18 4·19 4·20 4·22	·96 1·02 1·08 1·15 1·22	4·19 4·20 4·21 4·23 4·25	1.06 1.12 1.18 1.26 1.33	4·21 4·22 4·24 4·26 4·29
46 48 50 52 53	·84 ·90 ·97 1· 05 1· 09	4·16 4·17 4·19 4·21 4·22	.95 1.02 1.09 1.18 1.22	4·18 4·20 4·22 4·24 4·25	1.06 1.14 1.22 1.31 1.36	4·21 4·23 4·25 4·28 4·30	1·18 1·26 1·35 1·45 1·51	4·24 4·26 4·29 4·33 4·34	1·30 1·39 1·48 1·59 1·65	4·28 4·30 4·34 4·38 4·40	1·42 1·52 1·62 1·74 1·81	4·31 4·35 4·39 4·43 4·46

LATITUDE 11°.

			CCLINA		-001/11/1			10-	LATITO			
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14 16	H. M. S. 5 55 19·1 5 14 14·9 5 6 0·6 4 57 45·7 4 49 30·2	s. - '79 '88 '90 '92 '95	H. M. S. 5 54 31·8 5 13 21·7 5 5 6·0 4 56 49·6 4 48 32·4	s. - ·79 ·89 ·92 ·95 ·98	H. M. S. 5 53 44.3 5 12 27.5 5 4 10.2 4 55 52.1 4 47 33.1	s. '79 '91 '94 '97 I'00	H. M. S. 5 52 56.6 5 11 32.2 5 3 13.1 4 54 53.1 4 46 32.2	s. - ·80 ·93 ·96 ·99 I·03	H. M. s. 5 52 8.6 5 10 35.8 5 2 14.7 4 53 52.7 4 45 29.6	s. - ·80 ·95 ·98 I·02 I·06	H. M. S. 5 51 20·3 5 9 38·1 5 1 14·9 4 52 50·6 4 44 25·2	s. - ·81 ·97 I·01 I·05 I·09
18 20 22 24 26	4 41 13.9 4 32 56.8 4 24 38.9 4 16 20.0 4 8 0.1	·98 1·01 1·04 1·07 1·10	4 31 55.5 4 23 35.7 4 15 14.7		4 39 13·2 4 30 52·3 4 22 30·3 4 14 7·0 4 5 42·4		4 29 47·1 4 21 22·7 4 12 56·9	1.07 1.10 1.15 1.19 1.24	4 28 39.7 4 20 12.7 4 11 44.2	1.14	4 35 58·4 4 27 30·1 4 19 0·4 4 10 28·8 4 1 55·3	1·13 1·18 1·23 1·28 1·33
27 28 29 30 31	4 3 49.7 3 59 39.0 3 55 28.0 3 51 16.6 3 47 4.8	1.18	4 2 41.0 3 58 29.0 3 54 16.7 3 50 4.1 3 45 51.0	I.53	4 I 29·5 3 57 I6·3 3 53 2·6 3 48 48·4 3 44 33·8	1·21 1·24 1·26 1·29 1·31	3 56 0·5 3 51 45·3 3 47 29·5	1.34		1.37	3 57 37.8 3 53 19.7 3 49 1.0 3 44 41.7 3 40 21.7	1·36 1·39 1·42 1·46 1·49
32 33 34 35 36	3 42 52·7 3 38 40·2 3 34 27·3 3 30 13·9 3 26 0·0	1.30	3 41 37·4 3 37 23·4 3 33 8·9 3 28 53·9 3 24 38·3	1·28 1·31 1·34 1·36 1·39	3 40 18·7 3 36 3·1 3 31 46·9 3 27 30·1 3 23 12·7	1.43	3 30 21.0	1·46 1·50	3 37 30·7 3 33 11·3 3 28 51·2 3 24 30·4 3 20 8·8	I·53	3 36 I·0 3 31 39·6 3 27 17·3 3 22 54·2 3 18 30·2	1·53 1·56 1·60 1·64 1·68
37 38 39 40 41	3 21 45.6 3 17 30.6 3 13 15.1 3 8 59.0 3 4 42.2	1·36 1·39 1·42 1·45 1·48	3 16 5.4 3 11 48.0 3 7 29.8		3 18 54·6 3 14 35·8 3 10 16·2 3 5 55·9 3 1 34·6		3 17 22.7 3 13 1.7 3 8 39.8 3 4 17.2 2 59 53.2	1·57 1·61 1·65 1·69 1·73	3 6 58·5 3 2 33·0	1.65 1.69 1.73 1.78 1.83	3 5 12.0	1·73 1·77 1·82 1·87 1·92
42 43 44 45 46	3 0 24·6 2 56 6·3 2 51 47·2 2 47 27·2 2 43 6·2	1.63	2 58 51·1 2 54 30·5 2 50 8·9 2 45 46·2 2 41 22·5	1.60 1.64 1.69 1.73 1.78	2 57 12·4 2 52 49·2 2 48 24·9 2 43 59·4 2 39 32·6	1·69 1·74 1·78 1·83 1·89		1.94	2 53 38·6 2 49 9·4 2 44 38·9 2 40 6·7 2 35 32·9	1·99 2·05	2 51 42·9 2 47 10·5 2 42 36·3 2 38 0·3 2 33 22·5	1·98 2·04 2·10 2·17 2·24
47 48 49 50 51	2 38 44·2 2 34 21·1 2 29 56·7 2 25 31·0 2 21 3·8	1.77	2 23 34.4	1.94 2.01	2 35 4.4 2 30 34.8 2 26 3.4 2 21 30.3 2 16 55.1	2·07 2·14	2 33 4·5 2 28 31·0 2 23 55·6 2 19 18·1 2 14 38·3	2.20	2 30 57·3 2 26 19·6 2 21 39·7 2 16 57·4 2 12 12·4	2.33	2 24 0·2 2 19 15·4 2 14 27·7	2·31 2·39 2·48 2·58 2·68
		V	ARIATIO	N TO) 1' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 6°	A.	L. 7°	Α.	L. 8°	A.	L. 9°	A.	L. 10°	Α.	L. 11°	A.
0 4 8 10 12	s. - '44 '49 '55 '59 '62	S. -4·10 4·10 4·11 4·12 4·12	s. - ·51 ·57 ·63 ·66 ·69	s. -4·10 4·11 4·12 4·13 4·13	s. - ·58 - ·64 ·71 ·74 ·77	s. -4·11 4·12 4·13 4·14 4·15	s. 66 .72 .78 .81 .85	s. -4·13 4·14 4·15 4·16 4·16	s. - *73 *76 *86 *89 *93	s. -4·14 4·15 4·16 4·17 4·18	s. 81 .87 .93 .97 I.01	s. -4·15 4·17 4·18 4·19 4·20
14 16 18 20 22	·65 ·69 ·72 ·76 ·80	4·13 4·14 4·15 4·15	.73 .77 .80 .84 .89	4·14 4·15 4·16 4·17	·81 ·85 ·89 ·93 ·97	4·15 4·16 4·17 4·18 4·19	·89 ·93 ·97 I·01 I·05	4·17 4·18 4·19 4·20 4·21	·97 I·01 I·05 I·09 I·14	4·19 4·20 4·21 4·22 4·23	1.05 1.09 1.13 1.18 1.23	4·21 4·22 4·23 4·24 4·25
24 26 28 30 32	•85 •89 •94 •99 ••04	4·16 4·17 4·18 4·19 4·20	.93 .98 1.02 1.08 1.13	4·18 4·19 4·20 4·21 4·23	1.01 1.06 1.12 1.17 1.23	4·20 4·21 4·22 4·24 4·26	1·10 1·15 1·21 1·26 1·33	4·22 4·23 4·25 4·27 4·28	1·19 1·24 1·30 1·36 1·43	4·24 4·26 4·28 4·30 4·32	1·28 1·33 1·39 1·46 1·53	4·27 4·29 4·31 4·33 4·35
34 36 38 40 42	1·10 1·16 1·22 1·29 1·37	4·22 4·24 4·25 4·27 4·30	1·19 1·26 1·33 1·40 1·48	4:25 4:26 4:28 4:31 4:34	1·29 1·36 1·43 1·51 1·60	4·27 4·30 4·32 4·35 4·38	1·39 1·46 1·54 1·63 1·72	4·31 4·33 4·36 4·39 4·42	1·50 1·57 1·66 1·75 1·85	4·34 4·37 4·40 4·43 4·47	1.60 1.68 1.77 1.87 1.98	4·38 4·41 4·48 4·53
44 46 48 50 51	1·45 1·55 1·65 1·77 1·83	4·33 4·36 4·40 4·44 4· 47	1·57 1·68 1·79 1·91 1·98	4·37 4·40 4·45 4·50 4·53	1.70 1.81 1.93 2.07 2.14	4·41 4·46 4·51 4·57 4·60	1.83 1.95 2.08 2.22 2.31	4·47 4·51 4·57 4·64 4·69	1·96 2·09 2·23 2·40 2·49	4·52 4·58 4·65 4·73 4·77	2·10 2·24 2·39 2·58 2·68	4·58 4·65 4·73 4·82 4·88

LATITUDE 11°.

True	12°	Decl.	13°	Decl. Var.	14°	Decl.	15°	Decl. Var.	16°	Decl.	17°	Decl.
Alt.		Var.				Var.				Var.		Var.
0 8 10 12 14	H. M. S. 5 50 31.7 5 17 3.7 5 8 39.3 5 0 13.8 4 51 47.0	.95 .99	H. M. S. 5 49 42.7 5 16 5.9 5 7 39.1 4 59 11.1 4 50 41.7	s. - ·82 ·97 I·01 I·06 I·10	H. M. S. 5 48 53·3 5 15 7·1 5 6 37·7 4 58 6·9 4 49 34·7	s. - ·83 ·99 I·04 I·08	H. M. S. 5 48 3.5 5 14 7.0 5 5 34.8 4 57 1.1 4 48 25.9	1.11 1.00	H. M. S. 5 47 13·1 5 13 5·8 5 4 30·5 4 55 53·7 4 47 15·1	- ·84 1·03 1·08 1·14	H. M. S. 5 46 22·3 5 12 3·2 5 3 24·7 4 54 44·5 4 46 2·4	s. - ·85 1·05 1·11 1·17 1·23
16 18 20 22 23	4 43 19.0 4 34 49.5 4 26 18.4 4 17 45.5 4 13 28.4	1·17 1·21 1·27	4 42 10·9 4 33 38·5 4 25 4·3 4 16 28·1 4 12 9·2	1·26 1·31	4 4I 0.9 4 32 25.2 4 23 47.7 4 I5 8.0 4 I0 47.3	1.30	4 39 48.8 4 31 9.8 4 22 28.6 4 13 45.1 4 9 22.4	1.34	4 38 34·6 4 29 51·9 4 21 6·9 4 12 19·4 4 7 54·5	1·32 1·38 1·45	4 37 18·2 4 28 31·6 4 19 42·5 4 10 50·6 4 6 23·4	1·29 1·36 1·43 1·51 1·55
24 25 26 27 28	4 9 10·7 4 4 52·5 4 0 33·8 3 56 14·4 3 51 54·5	1·32 1·35 1·38 1·42 1·45	4 7 49·8 4 3 29·8 3 59 9·1 3 54 47·8 3 50 25·8	I·44 I·47	4 6 25.9 4 2 3.9 3 57 41.2 3 53 17.8 3 48 53.6	1.49	4 4 59.0 4 0 34.9 3 56 10.0 3 51 44.3 3 47 17.7	I·55	4 3 28·9 3 59 2·5 3 54 35·2 3 50 7·1 3 45 38·0	1.57 1.61 1.65	4 I 55.5 3 57 26.6 3 52 56.8 3 48 26.1 3 43 54.2	1.59 1.63 1.67 1.72 1.76
29 30 31 32 33	3 47 33.8 3 43 12.5 3 38 50.4 3 34 27.5 3 30 3.7	1.55	3 41 39·5 3 37 15·1 3 32 49·9	1.58 1.62 1.66	3 44 28.6 3 40 2.7 3 35 35.8 3 31 8.0 3 26 39.2		3 38 21·8 3 33 52·3	1.76	3 4I 7·9 3 36 36·7 3 32 4·4 3 27 30·8 3 22 56·0	1·79 1·84 1·89	3 39 21·3 3 34 47·2 3 30 11·8 3 25 35·1 3 20 56·9	1.81 1.86 1.92 1.97 2.03
34 35 36 37 38	3 25 39·1 3 21 13·5 3 16 46·9 3 12 19·2 3 7 50·3	1·72 1·76 1·81	3 23 56·4 3 19 28·2 3 14 58·8 3 10 28·1 3 5 56·1	1.75 1.80 1.84 1.90 1.95	3 17 37·9 3 13 5·5 3 8 31·7	1.88	3 20 17·0 3 15 42·7 3 11 6·9 3 6 29·6 3 1 50·6	1.97 2.02 2.08	3 18 19·8 3 13 42·0 3 9 2·7 3 4 21·7 2 59 38·8	2.06		2·09 2·15 2·22 2·29 2·37
39 40 41 42 43	3 3 20·2 2 58 48·7 2 54 15·7 2 49 41·2 2 45 4·9	2·02 2·08	3 I 22.7 2 56 47.8 2 52 II.3 2 47 32.9 2 42 52.6	2·07 2·13 2·19	2 59 19·4 2 54 40·8 2 50 0·3 2 45 17·8 2 40 33·1	2·17 2·24	2 57 9.9 2 52 27.2 2 47 42.4 2 42 55.4 2 38 5.8	2·28 2·36 2·44	2 54 53.9 2 50 6.7 2 45 17.3 2 40 25.2 2 35 30.4	2·40 2·48 2·57	2 52 30·9 2 47 39·0 2 42 44·4 2 37 46·9 2 32 46·2	2·44 2·53 2·62 2·71 2·81
44 45 46 47 48	2 40 26·9 2 35 46·8 2 31 4·5 2 26 19·7 2 21 32·3	2.29	2 38 10·2 2 33 25·5 2 28 38·3 2 23 48·3 2 18 55·2	2·42 2·51 2·60	2 35 45.9 2 30 56.2 2 26 3.6 2 21 7.8 2 16 8.4	2·56 2·66 2·76	2 33 13·5 2 28 18·2 2 23 19·6 2 18 17·4 2 13 11·1	2·71 2·81 2·93	2 30 32·4 2 25 31·0 2 20 25·9 2 15 16·4 2 10 2·3	2·87 2·98 3·11	2 27 42·0 2 22 33·9 2 17 21·4 2 12 4·0 2 6 41·1	2·92 3·04 3·17 3·31 3·47
		V.	ARIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 12°	Α.	L. 13°	Α,	L. 14°	Α	L. 15°	Α.	L. 16°	Α.	L. 17°	Α.
° 0 2 4 6 8	s. 88 - .91 .94 .98	s. -4·17 4·18 4·18 4·19 4·20	s. ·96 ·99 1·02 1·06 1·09	s. -4·19 4·19 4·20 4·21 4·22	S. -1.04 - 1.07 1.10 1.13 1.17	s. -4·20 4·21 4·22 4·23 4·24	s. -1·11 1·15 1·18 1·21 1·25	s. -4·22 4·23 4·24 4·25 4·26	S. -1·19 · 1·22 1·26 1·29 1·33	s. -4·24 4·25 4·26 4·28 4·29	s. -1·27 1·30 1·34 1·38 1·42	s. -4·27 4·28 4·29 4·30 4·31
10 12 14 16 18	1.05 1.09 1.13 1.17 1.22	4·21 4·22 4·23 4·24 4·25	1·13 1·17 1·21 1·25 1·30	4·23 4·24 4·25 4·26 4·28	1·21 1·25 1·29 1·34 1·39	4·25 4·26 4·27 4·29 4·30	1·29 1·33 1·38 1·42 1·48	4·27 4·29 4·30 4·32 4·33	1·37 1·42 1·46 1·51 1·56	4·30 4·31 4·35 4·37	1·46 1·50 1·55 1·60 1·65	4·33 4·34 4·36 4·38 4·40
20 22 24 26 28	1·26 1·31 1·37 1·43 1·49	4·27 4·28 4·30 4·32 4·34	1·35 1·40 1·46 1·52 1·59	4·29 4·31 4·33 4·35 4·37	1.44 1.50 1.55 1.62 1.69	4·32 4·34 4·36 4·38 4·41	1·53 1·59 1·65 1·72 1·79	4·35 4·37 4·40 4·42 4·45	1.62 1.68 1.75 1.82 1.89	4·39 4·41 4·43 4·46 4·49	1·71 1·78 1·85 1·92 2·00	4·42 4·45 4·47 4·50 4·54
30 32 34 36 38	1.56 1.63 1.71 1.79 1.89	4·36 4·39 4·42 4·45 4·49	1.66 1.73 1.82 1.91 2.01	4·40 4·43 4·46 4·50 4·54	1.76 1.84 1.93 2.03 2.14	4.44 4.47 4.51 4.55 4.60	1.87 1.95 2.05 2.15 2.27	4.48. 4.52 4.56 4.61 4.66	1·98 2·07 2·17 2·28 2·40	4·53 4·57 4·62 4·67 4·73	2·09 2·19 2·29 2·41 2·55	4·58 4·62 4·68 4·74 4·80
40 42 44 46 48	1·99 2·11 2·24 2·39 2·56	4.54 4.59 4.65 4.73 4.81	2·12 . 2·25 2·39 2·56 2·74	4·59 4·66 4·73 4·81 4·91	2·26 2·40 2·55 2·73 2·94	4.66 4.73 4.81 4.90 5.02	2·40 2·55 2·71 2·91 3·14	4.73 4.80 4.90 5.01 5.14	2·55 2·71 2·89 3·10 3·35	4·80 4·89 4·99 5·12 5·28	2·70 2·87 3·07 3·31 3·59	4·89 4·98 5·10 5·25 5·43

LATITUDE 11°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 4 6 8 10	H. M. S. 5 45 30.9 5 28 18.0 5 19 39.4 5 10 59.2 5 2 17.3	s. - ·86 ·97 I·02 I·08 I·14	H. M. S. 5 44 38·9 5 27 19·5 5 18 37·5 5 9 53·8 5 1 8·2	s. - ·87 ·98 I·04 I·10 I·17	5 26 20·0 5 17 34·3	1.06	H. M. S. 5 42 53.0 5 25 19.3 5 16 29.8 5 7 38.4 4 58 44.8	S. - ·89 1·02 1·09 1·16 1·23	5 24 17·5 5 15 23·9	s. - ·91 1·04 1·11 1·18 1·26	H. M. S. 5 41 4·1 5 23 14·4 5 14 16·5 5 5 16·3 4 56 13·6	S. - ·92 1·06 1·14 1·21 1·29
12 14 16 18 19	4 53 33.5 4 44 47.6 4 35 59.5 4 27 8.7 4 22 42.4	1·26 1·33 1·40	4 52 20·6 4 43 30·7 4 34 3 ⁸ ·3 4 25 43·2 4 21 14·5	1·30 1·37 1·45	4 51 5.7 4 42 11.5 4 33 14.7 4 24 14.8 4 19 43.6	1·34 1·42 1·50	4 49 48·7 4 40 50·0 4 31 48·4 4 22 43·5 4 18 9·7	1·38 1·46 1·55	4 48 29·5 4 39 26·0 4 30 19·3 4 21 9·1 4 16 32·5	1.42 1.51 1.60	4 47 8·1 4 37 59·5 4 28 47·4 4 19 31·5 4 14 51·9	1·38 1·46 1·56 1·65
20 21 22 23 24	4 18 15·2 4 13 47·4 4 9 18·6 4 4 49·0 4 0 18·6	1·52 1·56 1·60	4 16 45.0 4 12 14.7 4 7 43.4 4 3 11.2 3 58 38.0	1·57 1·62 1·66	4 6 4.7	1.63 1.72	4 13 34·9 4 8 59·2 4 4 22·4 3 59 44·4 3 55 5·3	1.69		1.75 1.80 1.86	4 10 11·2 4 5 29·4 4 0 46·3 3 56 1·7 3 51 15·6	1·76 1·81 1·87 1·93 1·99
25 26 27 28 29	3 55 47·1 3 51 14·6 3 46 41·0 3 42 6·3 3 37 30·3	1.74 1.79 1.84	3 54 3.7 3 49 28.4 3 44 51.8 3 40 13.9 3 35 34.7	1.81 1.86	3 52 16·4 3 47 37·9 3 42 58·1 3 38 16·9 3 33 34·2	1.88 1.93	3 50 24·9 3 45 43·1 3 40 59·8 3 36 15·0 3 31 28·6	1·90 1·95 2·01 2·07 2·14	3 38 56·7 3 34 8·0		3 46 28·3 3 41 39·2 3 36 48·3 3 31 55·6 3 27 0·9	2·05 2·12 2·18 2·25 2·33
30 31 32 33 34	3 32 53·I 3 28 I4·4 3 23 34·2 3 I8 52·4 3 I4 8·9	2·00 2·06 2·12	3 30 54.0 3 26 11.9 3 21 27.9 3 16 42.3 3 11 54.7	2·09 2·15	3 28 49·8 3 24 3·7 3 19 16·0 3 14 26·2 3 9 34·3	2.18	3 26 40·4 3 21 50·3 3 16 58·2 3 12 3·8 3 7 7·2	2·20 2·27 2·35 2·43 2·51	3 19 30·7 3 14 33·9 3 9 34·8	2·30 2·38 2·46 2·54 2·63	3 17 4.7	2·41 2·49 2·57 2·67 2·76
35 36 37 38 39	3 9 23.6 3 4 36.3 2 59 46.7 2 54 54.9 2 50 0.5	2.48		2·52 2·61	3 4 40.0 2 59 43.3 2 54 43.9 2 49 41.5 2 44 35.9	2.75	3 2 7·9 2 57 5·9 2 52 0·8 2 46 52·5 2 41 40·5	2.69 2.79 2.89	2 59 28·4 2 54 20·5 2 49 9·3 2 43 54·4 2 38 35·4	2·83 2·93 3·05	2 56 40·7 2 51 26·6 2 46 8·7 2 40 46·7 2 35 19·9	2·87 2·97 3·09 3·22 3·35
40 41 42 43 44	2 45 3.4 2 40 3.3 2 34 59.8 2 29 52.7 2 24 41.6	2·76 2·86 2·98	2 42 19·6 2 37 13·3 2 32 3·3 2 26 49·1 2 21 30·3	2·91 3·03 3·15	2 39 26·8 2 34 13·9 2 28 56·6 2 23 34·6 2 18 7·3	3.34	2 31 4·2 2 25 38·9	3·25 3·39 3·55	2 33 11·9 2 27 43·4 2 22 9·3 2 16 28·9 2 10 41·4	3·45 3·60	2 18 26·5 2 12 35·2	3.50 3.66 3.83 4.03 4.24
		V	ARIATIO	N TO	1' OF	LAT	TUDE	AND	ALTITU:	DE.		
Alt.	L. 18°	Α.	L. 19	° A.	L. 20°	Α.	L. 21°	Α.	L. 22°	Α.	L. 23°	A.
° 0 2 4 6 8	s. -1·35 1·38 1·42 1·46 1·50	s. -4·29 4·30 4·32 4·33 4·34	s. -1·43 1·47 1·50 1·54 1·58	s. -4·32 4·33 4·34 4·36 4·37	s. -1.51 1.55 1.59 1.63 1.67	s. -4·35 4·36 4·37 4·39 4·40	s. - 1.60 1.63 1.67 1.71	s. -4·37 4·39 4·40 4·42 4·44	s. -1.68 1.72 1.76 1.80 1.85	s. -4·41 4·42 4·44 4·46 4·47	s. -1.77 1.81 1.85 1.89 1.94	s. -4·44 4·46 4·47 4·49 4·51
10 12 14 16 18	1·54 1·59 1·64 1·69 1·75	4·36 4·37 4·39 4·41 4·43	1.63 1.68 1.73 1.78 1.84	4·39 4·41 4·43 4·45 4·47	1.72 1.77 1.82 1.88 1.94	4·42 4·44 4·46 4·49 4·51	1.80 1.86 1.91 1.97 2.04	4·46 4·48 4·50 4·53 4·56	1·90 1·95 2·01 2·07 2·14	4·49 4·52 4·54 4·57 4·60	1.99 2.04 2.10 2.17 2.24	4·53 4·56 4·59 4·62 4·65
20 22 24 26 28	1.81 1.88 1.95 2.02 2.11	4·46 4·49 4·52 4·55 4·59	1.91 1.98 2.05 2.13 2.23	4·50 4·53 4·56 4·60 4·64	2·00 2·08 2·16 2·25 2·34	4·54 4·57 4·61 4·65 4·70	2·11 2·18 2·27 2·36 2·46	4·59 4·62 4·66 4·71 4·76	2·21 2·29 2·38 2·48 2·58	4·64 4·67 4·72 4·77 4·83	2·32 2·40 2·50 2·60 2·71	4·69 4·73 4·78 4·83 4·89
30 32 34 36 38	2·20 2·31 2·42 2·55 2·69	4·63 4·68 4·74 4·81 4·88	2·32 2·43 2·56 2·69 2·85	4·69 4·75 4·81 4·88 4·97	2·45 2·56 2·69 2·84 3·01	4·75 4·81 4·88 4·97 5·07	2·57 2·70 2·84 3·00 3·18	4·82 4·89 4·97 5·06 5·17	2·70 2·84 2·99 3·16 3·36	4·89 4·97 5·05 5·16 5·28	2.84 2.98 3.15 3.34 3.55	4·97 ° 5·05 5·15 5·27 5·41
40 41 42 43 44	2·86 2·95 3·05 3·15 3·27	4·98 5·03 5·09 5·15 5·22	3·03 3·13 3·23 3·35 3·48	5·08 5·14 5·20 5·27 5·36	3·20 3·31 3·43 3·56 3·70	5·18 5·25 5·33 5·41 5·50	3·39 3·51 3·64 3·79 3·95	5·30 5·38 5·47 5·56 5·67	3·59 3·73 3·87 4·03 4·21	5·43 5·52 5·56 5·73 5·86	3.81 3.96 4.12 4.30 4.50	5·58 5·68 5·79 5·92 6·07

LATITUDE 12°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0·0 5 19 5·8 5 10 54·7 5 2 43·4 4 54 31·8	s. 85 .86 .87 .88	H. M. S. 5 59 9.0 5 18 13.6 5 10 2.0 5 1 50.1 4 53 38.0	s. 85 .88 .89 .90 .91	5 0 55.8	s. ·85 ·89 ·90 ·92 ·93	H. M. S. 5 57 26·8 5 16 26·6 5 8 13·6 5 0 0·2 4 51 46·4	s. - ·85 ·91 ·92 ·94 ·95	4 59 3.4	s. - ·85 ·92 ·94 ·96 ·98	H. M. S. 5 55 44·3 5 14 36·0 5 6 20·9 4 58 5·3 4 49 49·0	s. - ·86 ·94 ·96 ·98 I·00
18 20 22 24 26	4 46 20·1 4 38 8·0 4 29 55·6 4 21 42·9 4 13 29·8	·92	4 45 25.6 4 37 12.8 4 28 59.5 4 20 45.8 4 12 31.6		4 44 29.5 4 36 15.8 4 28 1.5 4 19 46.6 4 11 31.1		4 43 32·0 4 35 17·1 4 27 1·6 4 18 45·3 4 10 28·4			1.00 1.02 1.05 1.08 1.11	4 24 55.7 4 16 36.2	1.03 1.05 1.08 1.11
28 30 31 32 33	4 5 16·1 3 57 2·0 3 52 54·7 3 48 47·2 3 44 39·6	I.01	4 4 16·8 3 56 1·3 3 51 53·3 3 47 45·0 3 43 36·6	1.05 1.06	3 54 57·9 3 50 49·1	1.05 1.08 1.09 1.11 1.13	4 2 10·5 3 53 51·7 3 49 42·0 3 45 31·9 3 41 21·5	1·10 1·13 1·14 1·16 1·18	3 52 42·7 3 48 3I·9 3 44 20·7	1·17 1·19 1·21		1·18 1·22 1·24 1·27 1·29
34 35 36 37 38	3 40 31·7 3 36 23·7 3 32 15·5 3 28 7·0 3 23 58·3	1.08 1.08	3 39 28·0 3 35 19·1 3 31 9·9 3 27 0·5 3 22 50·8	1·10 1·12 1·14	3 38 21·1 3 34 11·2 3 30 1·0 3 25 50·4 3 21 39·6	1·16 1·18 1·20	3 37 10·9 3 32 59·8 3 28 48·5 3 24 36·7 3 20 24·5	1·20 1·22 1·24 1·26 1·28	3 31 45.0 3 27 32.3 3 23 19.1	1·30 1·32	3 26 12.4	1·31 1·34 1·36 1·39 1·42
39 40 41 42 43	3 19 49·4 3 15 40·1 3 11 30·6 3 7 20·8 3 3 10·7				3 4 52.3	1·24 1·26 1·29 1·31 1·34	3 16 12·0 3 11 59·0 3 7 45·4 3 3 31·3 2 59 16·7	1·31 1·33 1·36 1·39 1·42	3 10 36·8 3 6 21·6 3 2 5·7	I·41 I·44 I·47	3 4 53·I	1.45 1.48 1.51 1.55 1.58
44 45 46 47 48	2 59 0·2 2 54 49·3 2 50 37·9 2 46 26·2 2 42 13·9	1·21 1·23 1·26 1·28 1·31	2 49 20·I	1·31 1·34 1·37	2 56 25.9 2 52 11.9 2 47 57.2 2 43 42.0 2 39 26.0	1·40 1·43 1·46	2 55 1.5 2 50 45.5 2 46 29.0 2 42 11.6 2 37 53.4	I·52 I·55	2 53 32·0 2 49 14·0 2 44 55·2 2 40 35·5 2 36 14·8	1.57 1.61 1.65	2 51 57·3 2 47 37·0 2 43 15·7 2 38 53·5 2 34 30·1	1.62 1.66 1.71 1.75 1.80
49 50 51 52 53	2 38 1·2 2 33 47·9 2 29 33·9 2 25 19·3 2 21 3·9	1·37 1·40 1·44	2 36 38·1 2 32 22·8 2 28 6·7 2 23 49·9 2 19 32·2	1·47 1·50 1·54	2 35 9·3 2 30 51·7 2 26 33·3 2 22 13·9 2 17 53·4	1·57 1·61 1·66	2 33 34·3 2 29 14·3 2 24 53·2 2 20 31·0 2 16 7·4	I·73	2 27 30.3	1·79 1·84 1·90	2 30 5.4 2 25 39.4 2 21 11.9 2 16 42.9 2 12 12.1	1.85 1.91 1.97 2.03 2.10
		VA	RIATIO	N TC	ı' OF	LATI	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	Α.	L. 3°	Α.	L. 4 °	Α.	L. 5°	Α.
0 4 8 12 14	s. - ·00 - ·06 ·12 ·18 ·22	s. -4·09 4·09 4·09 4·09	s. ·07 ·13 ·20 ·26 ·29	s. -4·09 4·09 4·10 4·10	s. - ·15 - ·21 ·27 ·33 ·37	s. -4·09 4·09 4·10 4·11	s. - ·22 - ·28 ·34 ·41 ·45	s. -4.09 4.10 4.10 4.11 4.11	s. ·29 - ·35 ·42 ·49 ·52	S. -4·10 4·10 4·11 4·12 4·12	s. - ·37 - ·43 ·49 ·56 ·60	s. -4·II 4·II 4·I2 4·I3 4·I3
16 18 20 22 24	•25 •28 •32 •35 •39	4·10 4·10 4·10	*33 *36 *40 *43 *47	4·I0 4·II 4·II 4·I2	•40 •44 •47 •51 •55	4·II 4·II 4·I2 4·I2 4·I3	·48 ·52 ·55 ·59 ·63	4·12 4·13 4·13 4·14	·56 ·60 ·63 ·67 ·72	4·I3 4·I4 4·I4 4·I5	·64 ·67 ·71 ·76 ·80	4·14 4·14 4·15 4·16 4·17
26 28 30 32 34	*43 *46 *50 *55 *59	4·II 4·II 4·I3 4·I3	•51 •55 •59 •64 •68	4·12 4·13 4·14 4·15	·59 ·63 ·68 ·73 ·78	4·13 4·14 4·14 4·15 4·16	·68 ·72 ·77 ·82 ·87	4·14 4·15 4·16 4·17 4·18	•76 •81 •86 •91 •96	4·16 4·17 4·18 4·19 4·20	.85 .90 .95 1.00 1.06	4·18 4·19 4·20 4·21 4·22
36 38 40 42 44	·64 ·69 ·74 ·80 ·86	4·14 4·14 4·15 4·16 4·18	• 73 • 7 9 •84 •90 •97	4·15 4·16 4·17 4·19 4·20	·83 ·88 ·94 1·01 1·08	4·17 4·18 4·20 4·21 4·23	·92 ·98 I·05 I·12 I·19	4·19 4·21 4·22 4·24 4·26	1.02 1.09 1.15 1.23 1.31	4·22 4·23 4·25 4·27 4·29	1·12 1·19 1·26 1·34 1·43	4·24 4·26 4·28 4·30 4·33
46 48 50 52 53	•92 •99 1•07 1•16 1•20	4·19 4·21 4·23 4·25 4·26	1.04 1.11 1.20 1.29 1.34	4·22 4·24 4·26 4·29 4·30	1·15 1·24 1·33 1·43 1·48	4·25 4·27 4·30 4·33 4·35	1·27 1·36 1·46 1·57 1·63	4·28 4·31 4·34 4·38 4·40	1·39 1·49 1·60 1·72 1·79	4·32 4·35 4·39 4·44 4·46	1·52 1·62 1·74 1·88 1·95	4·36 4·40 4·45 4·50 4·53

LATITUDE 12°.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 10 12 14	H. M. S. 5 54 52·8 5 13 39·3 5 5 23·0 4 57 5·9	s. - ·86 ·95 ·98	H. M. S. 5 54 I·I 5 I2 4I·5 5 4 23·7 4 56 5·I	s. - ·86 ·97 ·00 ·03	H. M. S. 5 53 9.2 5 11 42.7 5 3 23.2 4 55 2.8	s. - ·87 ·99 I·02	H. M. S. 5 52 17.0 5 10 42.7 5 2 21.4 4 53 59.2	s. - ·87 I·01 I·04	5 9 41.6 5 1 18.3 4 52 54.0	s. - ·88 1·03 1·06	5 8 39·3 5 0 13·8 4 51 47·0	s. - ·88 1·05 1·09
16 18 20 22 24 25	4 48 48·1 4 40 29·6 4 32 10·1 4 23 49·7 4 15 28·1 4 11 16·9	1·12 1·15	4 47 45.7 4 39 25.3 4 31 3.9 4 22 41.4	1.05 1.09 1.12 1.16 1.19 1.21	4 46 41.6 4 38 19.2 4 29 55.7 4 21 31.0 4 13 4.9 4 8 51.2	1·08 1·12 1·15 1·19	4 45 35·8 4 37 11·3 4 28 45·5 4 20 18·2 4 11 49·5 4 7 34·5	1·11 1·15 1·19	4 44 28·3 4 36 I·4 4 27 33·I 4 19 3·I 4 10 3I·5	1·14 1·18 1·23 1·27 1·32	4 34 49.5 4 26 18.4 4 17 45.5 4 9 10.7	1·17 1·22 1·26 1·31 1·37 1·40
26 27 28 29 30	4 7 5.4 4 2 53.6 3 58 41.4 3 54 28.8 3 50 15.9	1·19 1·21 1·23	4 5 52.6 4 I 39.6 3 57 26.1 3 53 12.2 3 48 57.8	1·23 1·26 1·28 1·30	4 4 37·2 4 0 22·7 3 56 7·8 3 51 52·5 3 47 36·6	1·28 1·30	4 3 19·0 3 59 3·0 3 54 46·5 3 50 29·6 3 46 12·0	1·33 1·35 1·38 1·41	4 I 57.9 3 57 40.3 3 53 22.2	I·38 I·40 I·43 I·46	1	1.43 1.46 1.49 1.52 1.56
31 32 33 34 35	3 46 2.5 3 41 48.7 3 37 34.5 3 33 19.7 3 29 4.5	1·32 1·35	3 44 43.0 3 40 27.7 3 36 11.9 3 31 55.5 3 27 38.5	1·38 1·41 1·44	3 43 20·2 3 39 3·2 3 34 45·6 3 30 27·4 3 26 8·6	1.47	3 4 ¹ 53.9 3 37 35.1 3 33 15.6 3 28 55.5 3 24 34.5	I·53	3 40 24·0 3 36 3·2 3 31 4·7 3 27 19·4 3 22 56·3	1.56 1.60 1.64	3 38 50 4 3 34 27 5 3 30 3 7 3 25 39 1 3 21 13 5	1.59 1.63 1.67 1.71
36 37 38 39 40	3 24 48·6 3 20 32·2 3 16 15·2 3 11 57·5 3 7 39·1	1·49 1·52 1·56		1.53 1.56 1.60 1.64	3 4 22.5	1.60 1.64 1.68 1.72	3 2 36.6	1.81	3 14 7.2 3 9 41.1 3 5 13.9 3 0 45.5	1.76 1.80 1.85 1.90	3 7 50·3 3 3 20·2 2 58 48·7	1.79 1.84 1.89 1.94 1.99
41 42 43 44 45	3 3 20·0 2 59 0·0 2 54 39·1 2 50 17·2 2 45 54·4	1·67 1·71 1·76	2 57 19.4 2 52 56.0 2 48 31.5 2 44 5.8	1·72 1·76 1·81 1·86	2 59 58·6 2 55 33·6 2 51 7·3 2 46 39·9 2 42 11·1	1.81 1.86 1.91 1.97	2 49 12·8 2 44 42·1 2 40 9·9	1.91 1.96 2.02 2.08	2 47 12·1 2 42 37·9 2 38 1·9	2·01 2·07 2·13 2·19	2 54 15.7 2 49 41.2 2 45 4.9 2 40 26.9 2 35 46.8	2·05 2·IT 2·T8 2·24 2·32
46 47 48 49 50	2 4I 30·4 2 37 5·2 2 32 38·8 2 28 10·8 2 23 4I·3	1.86 1.91 1.97	2 39 38·8 2 35 10·5 2 30 40·6 2 26 9·1 2 21 35·8	2.09	2 37 40·8 2 33 9·0 2 28 35·3 2 23 59·8 2 19 22·2	2·08 2·15 2·22	2 35 36·0 2 31 0·3 2 26 22·5 2 21 42·5 2 17 0·1	2·21 2·28 2·36	2 33 24·0 2 28 44·0 2 24 1·7 2 19 16·8 2 14 29·0	2·34 2·42 2·50	2 31 4·5 2 26 19·7 2 21 32·3 2 16 41·9 2 11 48·3	2·39 2·48 2·56 2·66 2·76
		VA	ARIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	Α.	L. 9°	Α.	L. 10	° A.	L. 11°	' A.
0 4 6 8	s. - '44 '50 '53 '57 '60	s. -4·11 4·12 4·13 4·13	s. - ·51 ·58 ·61 ·64 ·68	s. -4·12 4·13 4·14 4·14	s. - ·59 - ·65 ·69 ·72 ·76	s. -4·13 4·14 4·15 4·15 4·16	s. 66 - .73 .76 .80 .83	s. -4·14 4·15 4·16 4·17 4·17	s. - ·74 ·80 ·84 ·87 ·91	s. -4·15 4·17 4·17 4·18 4·19	s. 81 .88 .92 .95 .99	S. -4·17 4·18 4·19 4·20 4·21
12 14 16 18 20	•64 •68 •71 •75 •80	4·14 4·14 4·15 4·16 4·17	•72 •75 •79 •83 •88	4·15 4·16 4·17 4·18	•79 •83 •87 •92 •96	4·17 4·17 4·18 4·19 4·20	·87 ·91 ·95 ·00 ·05	4·18 4·19 4·20 4·21 4·22		4·20 4·21 4·22 4·23 4·24	1.03 1.07 1.12 1.17 1.21	4·22 4·23 4·24 4·25 4·27
22 24 26 28 30	·84 ·88 ·93 ·98 I·04	4·18 4·19 4·21 4·22	·92 ·97 I·02 I·07 I·13	4·19 4·20 4·21 4·23 4·24	1.01 1.06 1.11 1.17 1.22	4·21 4·22 4·24 4·25 4·27	1·09 1·15 1·20 1·26 1·32	4·23 4·24 4·26 4·28 4·30	1·18 1·23 1·29 1·35 1·42	4·26 4·27 4·29 4·31 4·33	1·27 1·32 1·38 1·45 1·52	4·28 4·30 4·32 4·34 4·36
32 34 36 38 40	1·10 1·16 1·22 1·29 1·37	4·23 4·25 4·27 4·29 4·31	1·19 1·26 1·33 1·40 1·48	4·26 4·28 4·30 4·32 4·35	1·29 1·36 1·43 1·51 1·60	4·29 4·31 4·36 4·39	1·39 1·46 1·54 1·62 1·72	4·32 4·34 4·37 4·40 4·43	1·49 1·57 1·65 1·74 1·84	4·35 4·38 4·41 4·44 4·48	1.59 1.67 1.76 1.86 1.96	4·39 4·42 4·45 4·49 4·54
42 44 46 48 50	1.45 1.55 1.65 1.76 1.89	4.34 4.37 4.41 4.45 4.50	1.57 1.67 1.78 1.91 2.04	4·38 4·42 4·46 4·51 4·57	1.69 1.80 1.92 2.05 2.20	4.43 4.47 4.52 4.58 4.65	1·82 1·93 2·06 2·21 2·37	4·48 4·52 4·58 4·65 4·73	1.95 2.07 2.21 2.37 2.55	4.53 4.58 4.65 4.73 4.82	2·08 2·22 2·37 2·54 2·74	4·59 4·65 4·73 4·81 4·92

LATITUDE 12°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 6 8 10 12	H. M. S. 5 49 38·5 5 24 27·9 5 16 2·3 5 7 35·7 4 59 · 7·8	s. - ·89 ·99 I·03 I·07 I·II	H. M. S. 5 48 44.9 5 23 27.8 5 14 59.9 5 6 30.7 4 58 0.3	1.09	H. M. S. 5 47 50·9 5 22 26·7 5 13 56·3 5 5 24·4 4 56 51·2	I·07 I·12	H. M. S. 5 46 56·4 5 21 24·6 5 12 51·4 5 4 16·7 4 55 40·4	s. - '91 1'04 1'09 1'14 1'19	H. M. S. 5 46 1.4 5 20 21.3 5 11 45.2 5 3 7.4 4 54 27.9	I·II I·I7	H. M. S. 5 45 5.8 5 19 17.0 5 10 37.6 5 1 56.5 4 53 13.6	s. - '93 1.08 1.14 1.19 1.25
14 16 18 20 22	4 50 38.6 4 42 7.8 4 33 35.5 4 25 1.4 4 16 25.4	1·20 1·25 1·30	4 49 28·3 4 40 54·7 4 32 19·3 4 23 42·0 4 15 2·6	1·24 1·29 1·34	4 48 16·2 4 39 39·5 4 31 0·9 4 22 20·1 4 13 36·9	I.33	4 47 2·3 4 38 22·3 4 29 40·1 4 20 55·6 4 12 8·5	1.43	4 28 16.9	1.41	4 44 28·5 4 35 41·0 4 26 51·1 4 17 58·3 4 9 2·4	1·32 1·38 1·45 1·53 1·60
23 24 25 26 27	4 12 6.6 4 7 47.2 4 3 27.2 3 59 6.7 3 54 45.4	1·42 1·45 1·48	4 10 41·9 4 6 20·7 4 1 58·8 3 57 36·2 3 53 12·9	1.43 1.47 1.50 1.53 1.57	4 9 14·4 4 4 51·2 4 0 27·3 3 56 2·5 3 51 36·9	1.59	4 7 43.9 4 3 18.5 3 58 52.3 3 54 25.3 3 49 57.4	1.65	4 6 10·2 4 1 42·5 3 57 13·9 3 52 44·4 3 48 13·9	1.71	4 4 33.2 4 0 3.1 3 55 31.9 3 50 59.8 3 46 26.5	1.64 1.69 1.73 1.78 1.82
28 29 30 31 32	3 50 23.4 3 46 0.7 3 41 37.2 3 37 12.9 3 32 47.7	1.58 1.62 1.66	3 48 48.9 3 44 23.9 3 39 58.1 3 35 31.4 3 31 3.7	1.73	3 47 10·6 3 42 43·3 3 38 15·0 3 33 45·7 3 29 15·3	1·71 1·75 1·80	3 45 28·5 3 40 58·6 3 36 27·7 3 31 55·5 3 27 22·2	1.78 1.83 1.87	3 43 42.4 3 39 9.8 3 34 35.9 3 30 0.7 3 25 24.4	1.85 1.90 1.95	3 41 52·2 3 37 16·6 3 32 39·6 3 28 1·3 3 23 21·4	1.87 1.93 1.98 2.03 2.09
33 34 35 36 37	3 28 21·6 3 23 54·4 3 19 26·2 3 14 56·8 3 10 26·2	1·74 1·78 1·83 1·88 1·93	3 26 34·9 3 22 5·0 3 17 33·9 3 13 1·6 3 8 27·9	1.91	3 11 1.1	1.89 1.94 2.00 2.06 2.11	3 22 47·6 3 18 11·6 3 13 34·1 3 8 54·9 3 4 14·1		3 16 7·0 3 11 25·9 3 6 43·0	2·12 2·19 2·25		2·15 2·22 2·29 2·36 2·43
38 39 40 41 42	3 5 54·3 3 1 20·9 2 56 46·1 2 52 9·6 2 47 31·3	2·04 2·09 2·16	3 3 52·6 2 59 15·8 2 54 37·3 2 49 56·9 2 45 14·5	2.27	3 I 45·I 2 57 4·5 2 52 22·0 2 47 37·4 2 42 50·5	2·34 2·31 2·39	2 59 31·4 2 54 46·8 2 49 59·9 2 45 10·6 2 40 18·8	2·35 2·43 2·51	2 57 11·3 2 52 22·1 2 47 30·5 2 42 36·2 2 37 38·9	2·47 2·55 2·64	2 54 44·2 2 49 50·1 2 44 53·4 2 39 53·5 2 34 50·4	2·52 2·60 2·69 2·78 2·89
43 44 45 46 47	2 42 51.0 2 38 8.7 2 33 24.0 2 28 36.8 2 23 46.9	2·36 2·45 2·53	2 40 29·8 2 35 42·8 2 30 53·2 2 26 0·7 2 21 5·0	2·50 2·58 2·68	2 38 1·1 2 33 8·9 2 28 13·8 2 23 15·4 2 18 13·3	2.64 2.73 2.84	2 35 24·1 2 30 26·4 2 25 25·2 2 20 20·2 2 15 11·0	2·79 2·89 3·01	2 32 38·5 2 27 34·6 2 22 26·7 2 17 14·5 2 11 57·4	2·95 3·06	2 29 43.6 2 24 32.8 2 19 17.5 2 13 57.2 2 8 31.3	3·00 3·12 3·25 3·39 3·55
		V.	ARIATIC	N TO) 1' OF	LAT	TUDE 4	AND	ÄLT ITU	DE.		
Alt.	L. 12°	° A.	L. 13°	Α.	L. 14°	A.	L. 15°	Α.	L. 16°	Α.	L. 17°	Α.
0 2 4 6 8	s. 89 .92 .96 .99 I.03	s. -4·18 4·19 4·20 4·21 4·22	s. - '97 · 1'00 1'04 1'07 1'11	s. -4·20 4·21 4·22 4·23 4·24	s. -1.04 - 1.08 1.11 1.15 1.19	s. -4·22 4·23 4·24 4·25 4·26	S. -1·12 · 1·16 1·19 1·23 1·27	s. -4·24 4·25 4·26 4·27 4·28	s. - 1·20 · 1·24 1·27 1·31 1·35	s. -4·26 4·27 4·28 4·29 4·31	s. -1·28 - 1·32 1·36 1·39 1·44	s. -4·28 4·30 4·31 4·32 4·33
10 12 14 16 18	1·07 1·11 1·16 1·20 1·25	4·23 4·24 4·25 4·26 4·28	1·15 1·19 1·24 1·29 1·34	4·25 4·26 4·27 4·29 4·30	1·23 1·28 1·32 1·37 1·42	4·27 4·28 4·30 4·31 4·33	1·31 1·36 1·41 1·46 1·51	4·30 4·31 4·32 4·34 4·36	1.40 1.45 1.50 1.55 1.60	4·32 4·34 4·35 4·37 4·39	1·48 1·53 1·58 1·64 1·70	4·35 4·37 4·39 4·41 4·43
20 22 24 26 28	1·30 1·36 1·42 1·48 1·55	4·29 4·31 4·33 4·35 4·37	1·39 1·45 1·51 1·58 1·65	4·32 4·34 4·36 4·38 4·41	1·48 1·54 1·60 1·67 1·75	4·35 4·37 4·39 4·42 4·45	1·57 1·63 1·70 1·77 1·85	4·38 4·40 4·43 4·46 4·49	1.67 1.73 1.80 1.88 1.96	4·42 4·44 4·47 4·50 4·53	1.76 1.83 1.90 1.98 2.07	4:45 4:48 4:51 4:54 4:58
30 32 34 36 38	1.62 1.70 1.78 1.88 1.98	4·40 4·43 4·46 4·50 4·54	1·72 1·81 1·90 2·00 2·11	4·44 4·47 4·51 4·55 4·60	1.83 1.92 2.01 2.12 2.24	4·48 4·52 4·56 4·61 4·66	1.94 2.03 2.13 2.25 2.37	4·52 4·57 4·61 4·67 4·73	2·05 2·15 2·26 2·38 2·51	4·58 4·62 4·67 4·73 4·80	2·17 2·27 2·39 2·52 2·66	4·63 4·68 4·73 4·80 4·88
40 42 44 46 47	2·09 2·22 2·37 2·53 2·62	4·59 4·65 4·72 4·81 4·86	2·23 2·37 2·52 2·70 2·80	4·66 4·73 4·80 4·90 4·96	2·37 2·52 2·69 2·88 2·99	4·73 4·80 4·89 5·00 5·07	2·51 2·68 2·86 3·07 3·19	4·80 4·89 4·99 5·12 5·19	2·67 2·84 3·05 3·29 3·42	4.88 4.98 5.10 5.24 5.33	2·83 3·02 3·24 3·50 3·65	4.97 5.08 5.22 5.38 5.48

LATITUDE 12°.

DECLINATION—CONTRARY N	IAME	TO-LATITUDE
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True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl.
	н. м. s.	var.	н. м. s.	s.	H. M. S.	var.	H. M. S.	var.	H. M. S.	var.	н. м. s.	Var.
6 8 10	5 44 9.6 5 26 52.3 5 18 11.3 5 9 28.6 5 0 44.0	- ·94 1·05 1·10 1·16	5 43 12·7 5 25 48·8 5 17 4·4	- ·95	5 42 15·1 5 24 44·2 5 15 56·1 5 7 5·9	- ·97	5 41 16·7 5 23 38·5 5 14 46·4 5 5 52·2 4 56 55·6	98	5 40 17.6 5 22 31.4 5 13 35.2 5 4 36.6	- ·99 I·13 I·20 I·27	5 39 17.6	1.31 1.31 1.31
12 14 16 18 19	4 51 57·3 4 43 8·4 4 34 16·9 4 25 22·6 4 20 54·3	I·42 I·50	4 50 39·I 4 4I 46·0 4 32 50·2 4 23 5I·3 4 I9 20·7	1·47 1·55 1·59	4 49 18·8 4 40 21·3 4 31 20·9 4 22 17·1 4 17 43·9	1.59	4 47 56·3 4 38 54·1 4 29 48·8 4 20 39·9 4 16 3·9	1.65		1.70	4 45 4.4 4 35 52.0 4 26 35.9 4 17 15.5 4 12 33.6	1.47 1.56 1.66 1.76 1.81
20 21 22 23 24	4 16 25·3 4 11 55·4 4 7 24·5 4 2 52·8 3 58 19·9	1·66 1·70	4 14 49·1 4 10 16·7 4 5 43·2 4 1 8·7 3 56 33·1	1.72	4 13 9.8 4 8 34.6 4 3 58.3 3 59 20.9 3 54 42.3	1.68 1.73 1.78 1.83 1.88	4 II 26·9 4 6 48·9 4 2 9·6 3 57 29·I 3 52 47·3		4 4 59.4	1.80 1.86 1.91 1.97 2.03	4 7 50·5 4 3 6·0 3 58 20·2 3 53 32·8 3 48 43·9	1.87 1.92 1.98 2.04 2.11
25 26 27 28 29	3 53 46·1 3 49 11·2 3 44 35·0 3 39 57·5 3 35 18·7	1·95	3 51 56·4 3 47 18·4 3 42 39·0 3 37 58·3 3 33 16·0	1·92 1·97 2·03	3 50 2·4 3 45 21·1 3 40 38·4 3 35 54·2 3 31 8·3	2·05	3 48 4·I 3 43 I9·3 3 38 33·0 3 33 45·0 3 28 55·2	2.13	3 46 I·I 3 4I I2·7 3 36 22·5 3 3I 30·4 3 26 36·4	2.29	3 43 53·3 3 39 0·9 3 34 6·5 3 29 10·1 3 24 11·5	2·17 2·24 2·31 2·39 2·47
30 31 32 33 34	3 30 38·5 3 25 56·7 3 21 13·2 3 16 27·9 3 11 40·8	2·18	3 28 32·2 3 23 46·7 3 18 59·3 3 14 9·9 3 9 18·4	2·21 2·21	3 26 20·6 3 21 31·1 3 16 39·5 3 11 45·7 3 6 49·5	2·38 2·46	3 24 3·2 3 19 9·5 3 14 13·3 3 9 14·7 3 4 13·5	2.41	3 21 40·1 3 16 41·6 3 11 40·5 3 6 36·8 3 1 30·0	2·61 2·70	3 19 10·5 3 14 6·9 3 9 0·6 3 3 51·2 2 58 38·6	2·55 2·64 2·73 2·83 2·93
35 36 37 38 39	3 6 51·6 3 2 0·1 2 57 6·2 2 52 9·8 2 47 10·4	2·55 2·64	3 4 24.7 2 59 28.4 2 54 29.4 2 49 27.5 2 44 22.4	2·59 2·68 2·77	3 I 50·7 2 56 49·3 2 5I 44·7 2 46 36·9 2 4I 25·5	2·72 2·81 2·92	2 59 9.4 2 54 2.3 2 48 51.7 2 43 37.4 2 38 18.9	2·85 2·96 3·07	2 56 20·1 2 51 6·8 2 45 49·6 2 40 28·2 2 35 2·2	3·12 3·24	2 53 22·4 2 48 2·2 2 42 37·8 2 37 8·6 2 31 34·2	3·04 3·16 3·28 3·42 3·57
40 41 42 43 44	2 42 7.9 2 37 2.1 2 31 52.5 2 26 38.7 2 21 20.3	2·94 3·05 3·17	2 39 13.7 2 34 1.2 2 28 44.5 2 23 22.9 2 17 56.1	3·10 3·22 3·36	2 36 10·0 2 30 50·2 2 25 25·5 2 19 55·4 2 14 19·1	3·41 3·57	2 32 56·1 2 27 28·2 2 21 54·7 2 16 14·9 2 10 27·1	3·47 3·62	2 29 31·0 2 23 54·1 2 18 10·8 2 12 20·2 2 6 21·3	3·85 4·04	2 25 53·8 2 20 6·9 2 14 12·6 2 8 9·8 2 1 57·2	3.73 3.91 4.10 4.32 4.57
		VA	RIATIO	N TC	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 18°	A.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α.	L. 22°	A.	L. 23°	A.
° 0 2 4 6 8	s. -1·36 - 1·40 1·44 1·48 1·52	s. -4·31 4·32 4·33 4·35 4·36	s. -1·44 - 1·48 1·52 1·56 1·61	s. -4·34 4·35 4·36 4·38 4·39	s. -1·53 - 1·56 1·61 1·65 1·70	s. -4·36 4·38 4·39 4·41 4·43	s. -1.61 - 1.65 1.69 1.74 1.78	s. -4·39 4·41 4·43 4·44 4·46	s. 1;·69 1·73 1·78 1·82 1·87	s. -4·43 4·44 4·46 4·48 4·50	s. - 1·78 - 1·82 1·87 1·91 1·97	s. -4·46 4·48 4·50 4·52 4·54
10 12 14 16 18	1·57 1·62 1·67 1·73 1·79	4·38 4·40 4·42 4·44 4·46	1·66 1·71 1·76 1·82 1·89	4·41 4·43 4·45 4·48 4·50	1·75 1·80 1·86 1·92 1·99	4·45 4·47 4·49 4·52 4·55	1·84 1·89 1·95 2·02 2·09	4·48 4·51 4·53 4·56 4·59	1·93 1·98 2·05 2·11 2·19	4·53 4·55 4·57 4·60 4·64	2·02 2·08 2·15 2·22 2·29	4·56 4·59 4·62 4·65 4·69
20 22 24 26 28	1.86 1.93 2.01 2.09 2.18	4·49 4·52 4·56 4·59 4·64	1.96 2.03 2.11 2.20 2.30	4·53 4·57 4·60 4·64 4·69	2·06 2·14 2·22 2·32 2·42	4·58 4·61 4·65 4·70 4·75	2·16 2·24 2·33 2·43 2·54	4·62 4·66 4·71 4·76 4·81	2·27 2·35 2·45 2·56 2·67	4·68 4·72 4·77 4·82 4·88	2·38 2·47 2·57 2·68 2·80	4.73 4.78 4.83 4.89 4.96
30 32 34 36 38	2·28 2·40 2·52 2·66 2·82	4·68 4·74 4·80 4·88 4·96	2:41 2:52 2:66 2:81 2:98	4·74 4·81 4·88 4·96 5·06	2·53 2·66 2·80 2·96 3·15	4·81 4·88 4·96 5·05 5·16	2.66 2.80 2.95 3.13 3.33	4·88 4·96 5·04 5·15 5·27	2·80 2·95 3·11 3·30 3·52	4·96 5·04 5·14 5·25 5·39	2·94 3·10 3·28 3·48 3·72	5·04 5·13 5·24 5·37 5·53
40 41 42 43 44	3·00 3·10 3·20 3·32 3·45	5·07 5·13 5·19 5·27 5·35	3·17 3·28 3·40 3·53 3·68	5·18 5·24 5·32 5·40 5·50	3·36 3·48 3·61 3·76 3·92	5·29 5·37 5·46 5·55 5·66	3·56 3·70 3·84 4·01 4·18	5·42 5·51 5·61 5·73 5·85	3·78 3·93 4·09 4·26 4·45	5.57 5.67 5.78 5.90 6.05	4·01 4·17 4·35 4·54 4·76	5·73 5·84 5·98 6·13 6·30

LATITUDE 13°.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0·0 5 18 56·2 5 10 43·1 5 2 29·7 4 54 16·2	s. ·92 ·94 ·95 ·95 ·96	H. M. S. 5 59 4.5 5 17 59.5 5 9 45.9 5 1 31.9 4 53 17.7	s. - ·92 ·95 ·96 ·97 ·98	H. M. S. 5 58 9.2 5 17 1.9 5 8 47.7 5 0 33.0 4 52 18.0		H. M. S. 5 57 13.6 5 16 3.5 5 7 48.4 4 59 32.8 4 51 16.8	s. - ·93 ·98 1·00 1·01 1·03	H. M. S. 5 56 18·0 5 15 4·1 5 6 48·1 4 58 31·4 4 50 14·2	s. '93 1'00 1'02 1'03 1'06	H. M. S. 5 55 22·2 5 14 3·8 5 5 46·5 4 57 28·7 4 49 10·1	s. 93 1.01 1.03 1.06 1.08
18 20 22 24 26	4 46 2·3 4 37 48·1 4 29 33·5 4 21 18·5 4 13 3·0	I.00	4 45 3·1 4 36 48·1 4 28 32·6 4 20 16·5 4 11 59·8	1.03	4 35 46·4 4 27 29·7	1.02 1.04 1.06 1.09 1.11	4 43 0·2 4 34 42·9 4 26 25·0 4 18 6·1 4 9 46·5	1.07		1.10 1.13 1.10 1.08	4 40 50·7 4 32 30·4 4 24 9·2 4 15 46·9 4 7 23·4	1·11 1·14 1·17 1·20 1·23
28 29 30 31 32	4 4 46·9 4 0 38·7 3 56 30·3 3 52 21·6 3 48 12·8	1.08	4 3 42·5 3 59 33·5 3 55 24·3 3 51 14·9 3 47 5·3	1.09 1.11 1.12 1.13 1.15	3 58 25·7 3 54 15·7 3 50 5·4	1·14 1·15 1·17 1·18 1·20	3 57 15·2 3 53 4·2 3 48 52·9	1.23	3 56 1·9 3 51 49·8	1·25 1·26 1·28	3 58 58·6 3 54 45·7 3 50 32·4 3 46 18·7 3 42 4·6	1·27 1·29 1·31 1·34 1·36
33 34 35 36 37	3 44 3.8 3 39 54.5 3 35 45.1 3 31 35.3 3 27 25.3	1·13 1·14 1·16	3 42 55·4 3 38 45·3 3 34 34·8 3 30 24·1 3 26 13·1	1·16 1·18 1·20 1·22 1·23	3 37 32·8 3 33 21·3	1·22 1·24 1·25 1·27 1·30		1·27 1·29 1·31 1·34 1·36	3 34 57·6 3 30 43·6	1·33 1·35 1·37 1·40 1·43	3 37 50·0 3 33 34·8 3 29 19·2 3 25 3·1 3 20 46·3	1·38 1·41 1·44 1·46 1·49
38 39 40 41 42	3 23 15·1 3 19 4·5 3 14 53·6 3 10 42·3 3 6 30·7	1.51			3 8 4.0	1·32 1·34 1·37 1·39 1·42	3 15 8·9 3 10 53·8	1·38 1·41 1·44 1·47 1·50	3 9 25·3 3 5 7·8	1.48 1.51 1.55	3 16 29·0 3 12 10·9 3 7 52·2 3 3 32·6 2 59 12·3	1·52 1·56 1·59 1·63 1·66
43 44 45 46 47	3 2 18·7 2 58 6·3 2 53 53·4 2 49 39·9 2 45 26·0	I·34 I·37	3 0 58·8 2 56 44·9 2 52 30·4 2 48 15·2 2 43 59·5	1·40 1·43 1·46	2 59 34·3 2 55 18·6 2 51 2·3 2 46 45·2 2 42 27·4		2 58 5·0 2 53 47·3 2 49 28·9 2 45 9·7 2 40 49·6	1.56 1.60 1.64	2 56 30·6 2 52 10·9 2 47 50·2 2 43 28·6 2 39 5·9	1·65 1·69 1·73	2 46 5.8	1·70 1·74 1·79 1·84 1·89
48 49 50 51 52	2 41 11.5 2 36 56.3 2 32 40.5 2 28 23.9 2 24 6.5	1·46 1·49	2 39 43.0 2 35 25.8 2 31 7.8 2 26 48.8 2 22 28.9	1·56 1·60 1·64	2 38 8·7 2 33 49·2 2 29 28·7 2 25 7·2 2 20 44·6	1·66 1·71 1·75	2 36 28·5 2 32 6·4 2 27 43·1 2 23 18·6 2 18 52·7	1·77 1·82	2 21 22.9	1.93	2 32 49·2 2 28 20·9 2 23 51·1 2 19 19·6 2 14 46·2	1·94 2·00 2·06 2·12 2·19
		VA	RIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITU]	DE.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	Α.	L. 3°	Α.	L. 4°	Α.	L. 5°	Α.
0 4 8 10 12	s. ·00 ·07 ·13 ·17 ·20	S. -4·10 4·10 4·11 4·11 4·11	s. - ·07 - ·14 ·21 ·24 ·28	S. -4·IO 4·II 4·II 4·II	s. ·15 ·21 ·28 ·32 ·35	S. -4·11 4·11 4·11 4·12 4·12	s. - ·22 - ·29 ·36 ·39 ·43	S. -4·11 4·12 4·12 4·13	s. :29 :36 :43 :47 :51	S. -4·II 4·I2 4·I3 4·I3 4·I4	s. - '37 - '44 51 '54 -58	S. -4·12 4·13 4·14 4·14 4·15
14 16 18 20 22	·24 ·27 ·31 ·34 ·38	4·11 4·12 4·12 4·12	·31 ·35 ·39 ·43 ·46	4·12 4·12 4·13 4·13	*39 *43 *46 *51 *55	4·12 4·13 4·13 4·14 4·14	.47 .51 .54 .59 .63	4·13 4·14 4·15 4·15	·54 ·58 ·62 ·67 ·71	4·14 4·15 4·16 4·17	·62 ·66 ·70 ·75 ·79	4·15 4·16 4·17 4·17 4·18
24 26 28 30 32	•42 •46 •51 •55 •57	4·13 4·13 4·14 4·15	•51 •55 •59 •64 •69	4·14 4·14 4·15 4·16	•59 •63 •68 •73 •78	4·15 4·16 4·17 4·18	·67 ·72 ·77 ·82 ·87	4·16 4·17 4·18 4·19 4·20	•76 •80 •85 •91 •96	4·17 4·18 4·19 4·20 4·22	·84 ·89 ·94 1·00 1·06	4·19 4·20 4·21 4·22 4·24
34 36 38 40 42	.65 .70 .75 .81 .87	4·16 4·16 4·17 4·18 4·19	·74 ·79 ·85 · •91 ·98	4·17 4·18 4·19 4·21 4·22	·83 ·89 ·95 I·02 I·09	4·19 4·20 4·21 4·23 4·25	·93 ·99 I·05 I·12 I·20	4·21 4·22 4·24 4·26 4·28	1.02 1.09 1.16 1.23 1.31	4·23 4·25 4·26 4·29 4·31	1·12 1·19 1·26 1·34 1·43	4·26 4·27 4·29 4·32 4·35
44 46 48 50 52	*94 1.01 1.09 1.17 1.27	4·21 4·23 4·25 4·27 4·30	1·05 1·13 1·21 1·31 1·41	4·24 4·26 4·28 4·31 4·34	1·16 1·25 1·34 1·44 1·55	4·27 4·29 4·32 4·35 4·39	1·28 1·37 1·47 1·58 1·70	4·30 4·33 4·36 4·40 4·44	1·40 1·49 1·60 1·72 1· 86	4·34 4·37 4·41 4·45 4·50	1·52 1·62 1·74 1·87 2·02	4·38 4·41 4·46 4·51 4·57

LATITUDE 13°.

True	8°	Decl.	7°	Decl.	8°	Decl.	9°	Decl.	10°	Decl.	11°	Decl.
Alt.		Var.		Var.		Var.		Var.		Var.		Var.
0 8 10 12 14	H. M. S. 5 54 26·3 5 21 20·4 5 13 2·5 5 4 43·9 4 56 24·6	1.01 1.03 1.05	5 12 0.1	1.08	H. M. S. 5 52 33.8 5 19 17.6 5 10 56.7 5 2 34.8 4 54 12.1	s. - '94 1'04 1'07 1'10 1'13	5 1 28.4	s. 95 1.06 1.09 1.12 1.15	5 8 46·2 5 0 20·5	I·11 I·14	H. M. S. 5 49 42.7 5 16 5.9 5 7 39.1 4 59 11.1 4 50 41.7	s. 96 1.09 1.13 1.17 1.21
16 18 20 22 24	4 48 4.4 4 39 43.4 4 31 21.3 4 22 58.1 4 14 33.8	1.17	4 46 57°2 4 38 34°2 4 30 10°2 4 21 44°9 4 13 18°2	I·20	4 45 48·2 4 37 23·3 4 28 57·0 4 20 29·3 4 12 0·1	1.16 1.20 1.24 1.28 1.32	4 19 11.4	1.27	4 43 25.2 4 34 55.5 4 26 24.1 4 17 51.0 4 9 16.0	1.31	4 42 10°9 4 33 38°5 4 25 4°3 4 16 28°1 4 7 49°8	1.35 1.35 1.40 1.46
25 26 27 28 29	4 10 21·1 4 6 8·0 4 1 54·6 3 57 40·8 3 53 26·6	1.26 1.28 1.30 1.32 1.34	4 4 50.0 4 0 35.2 3 56 20.1	1·30 1·32 1·35 1·37 1·40	4 3 29°2 3 59 13°0		4 6 22.7 4 2 5.5 3 57 47.7 3 53 29.4 3 49 10.5	1·39 1·42 1·45 1·47 1·51		1.20	4 3 29.8 3 59 9.1 3 54 47.8 3 50 25.8 3 46 3.1	1.49 1.52 1.55 1.59 1.62
30 31 32 33 34	3 49 12·0 3 44 56·8 3 40 41·2 3 36 25·1 3 32 8·4	I·42	3 47 48·3 3 43 31·6 3 39 14·4 3 34 56·6 3 30 38·1	1·42 1·45 1·48 1·51 1·54	3 46 21.4 3 42 3.0 3 37 44.0 3 33 24.3 3 29 4.1	I·54	3 44 51.0 3 40 30.8 3 36 9.9 3 31 48.2 3 27 25.8	1.60	3 43 17·1 3 38 54·9 3 34 31·9 3 30 8·0 3 25 43·3	1.70	3 41 39.5 3 37 15.1 3 32 49.9 3 28 23.7 3 23 56.4	1.66 1.70 1.73 1.78 1.82
35 36 37 38 39	3 27 51·1 3 23 33·2 3 19 14·6 3 14 55·3 3 10 35·3	1·50 1·53 1·56 1·60 1·63	3 21 59·2 3 17 38·6 3 13 17·2	1·57 1·60 1·64 1·67	3 24 42·8 3 20 20·9 3 15 58·1 3 11 34·4 3 7 9·7	1.71	3 23 2·4 3 18 38·2 3 14 13·0 3 9 46·8 3 5 19·5	1.75	3 16 50·9 3 12 23·1 3 7 54·1	1.87	3 14 58·8 3 10 28·1 3 5 56·1	1.86 1.91 1.96 2.01 2.07
40 41 42 43 44	3 6 14·4 3 1 52·6 2 57 30·0 2 53 6·3 2 48 41·5	1.79	3 0 7·5 2 55 42·3	I·84 I·89	3 2 44·0 2 58 17·1 2 53 49·0 2 49 19·5 2 44 48·7	1.94	3 0 50·9 2 56 21·0 2 51 49·9 2 47 17·1 2 42 42·8	1·98 2·04 2·09	2 58 52·3 2 54 19·2 2 49 44·6 2 45 8·2 2 40 30·1	2·08 2·14 2·20	2 56 47·8 2 52 11·3 2 47 32·9 2 42 52·6 2 38 10·2	2·12 2·19 2·25 2·32 2·39
45 46 47 48 49	2 44 15.5 2 39 48.3 2 35 19.6 2 30 49.5 2 26 17.6	1.94 2.00 2.05	2 42 19·1 2 37 48·6 2 33 16·5 2 28 42·6 2 24 6·8	2·05 2·11 2·18	2 40 16·2 2 35 42·1 2 31 6·2 2 26 28·2 2 21 48·0		2 38 6.6 2 33 28.6 2 28 48.4 2 24 5.9 2 19 20.9	2·29 2·36 2·44	2 35 49.9 2 31 7.4 2 26 22.6 2 21 35.1 2 16 44.6	2·42 2·50 2·59	2 33 25.5 2 28 38.3 2 23 48.3 2 18 55.2 2 13 58.8	2·56 2·65 2·74
		V.	ARIATIO	ON TO	ı OF	LAT	TUDE .	AND	ALTITU	DE.		
Alt.	L. 6°	A.	L. 7°	A.	L. 8°	A.	L. 9°	Α.	L. 10°	A.	L. 11°	A.
° 0 4 6 8 10	s. - '44 '51 '55 '58 '62	s. -4·13 4·14 4·14 4·15 4·15	s. - ·52 ·59 ·62 ·66 ·70	s. 4·14 4·15 4·15 4·16 4·16	s. - ·59 ·66 ·70 ·74 ·78	s. -4·15 4·16 4·16 4·17 4·18	s. 67 .74 .78 .81 .85	s. -4·16 4·17 4·18 4·19	s. - ·74 ·81 ·85 ·89 ·93	s. -4·17 4·19 4:19 4·20 4·21	s. - ·82 ·89 ·93 ·97 I·01	s. -4·19 4·20 4·21 4·22 4·23
12 14 16 18 20	·66 ·70 ·74 ·79 ·83	4·16 4·17 4·18 4·19	·74 ·78 ·82 ·87 ·91	4·17 4·18 4·19 4·20 4·21	.82 .86 .90 .95	4·19 4·19 4·20 4·21 4·22	·90 ·94 ·98 I·03 I·08	4·20 4·21 4·22 4·23 4·25	·98 1·02 1·07 1·12 1·17	4·22 4·23 4·24 4·25 4·27	1.06 1.10 1.15 1.20 1.26	4·24 4·25 4·26 4·28 4·29
22 24 26 28 30	-88 -93 -98 1-03 1-09	4·20 4·21 4·22 4·23 4·25	·96 1·01 1·07 1·13 1·19	4·22 4·23 4·24 4·26 4·27	1·05 1·10 1·16 1·22 1·28	4·24 4·25 4·27 4·28 4·30	1·13 1·19 1·25 1·31 1·38	4·26 4·27 4·29 4·31 4·33	1·22 1·28 1·34 1·41 1·48	4·28 4·30 4·32 4·34 4·36	1·31 1·37 1·44 1·51 1·58	4·31 4·33 4·35 4·37 4·40
32 34 36 38 40	1·15 1·22 1·29 1·37 1·45	4·26 4·28 4·30 4·33 4·36	1·25 1·32 .1·40 1·48 1·57	4·29 4·31 4·36 4·39	1·35 1·43 1·51 1·59 1·69	4·32 4·35 4·37 4·40 4·44	1·45 1·53 1·62 1·71 1·81	4·35 4·38 4·41 4·45 4·49	1·56 1·64 1·73 1·83 1·94	4·39 4·42 4·45 4·49 4·54	1.66 1.75 1.84 1.95 2.07	4·43 4·46 •4·50 4·54 4·59
42 44 46 48 49	1·55 1·65 1·76 1·88 1·95	4·39 4·42 4·47 4·52 4·55	1.67 1.78 1.90 2.03 2.11	4·43 4·47 4·52 4·58 4·61	1·79 1·91 2·04 2·19 2·27	4·48 4·53 4·58 4·65 4·69	1.92 2.05 2.19 2.35 2.44	4·53 4·59 4·65 4·73 4·77	2·06 2·19 2·34 2·52 2·62	4·59 4·65 4·73 4·82 4·87	2·19 2·34 2·51 2·70 2·81	4.66 4.73 4.81 4.91 4.97

LATITUDE 13°.

True	12°	Decl.	13°	Decl.	_CON I R	Decl.	15°	Decl.	-LATITU	Decl.	17°	Decl.
Alt.		Var.		Var.		Var.		Var.		Var.		Var.
0 6 8 10 12	H. M. S. 5 48 44.9 5 23 27.8 5 14 59.9 5 6 30.7 4 58 0.3	s. 97 1.07 1.11 1.15 1.19	H. M. S. 5 47 46.7 5 22 23.0 5 13 52.6 5 5 21.0 4 56 47.8		H. M. S. 5 46 48.0 5 21 17.1 5 12 44.2 5 4 9.7 4 55 33.7	s. 98 1.11 1.15 1.20 1.25	5 11 34.3	S. ·99 I·13 I·17 I·22 I·28	5 19 2·0 5 10 23·2 5 1 42·7		5 0 26.7	s. -1.01 1.17 1.22 1.28 1.34
14 16 18 20 21	4 49 28·3 4 40 54·7 4 32 19·3 4 23 42·0 4 19 22·6	I.34	4 48 13.0 4 39 36.4 4 30 57.9 4 22 17.3 4 17 56.1	1·27 1·32 1·38 1·43 1·46	4 46 55·9 4 38 16·1 4 29 34·2 4 20 49·9 4 16 26·9	I·42 I·48	4 45 36·8 4 36 53·6 4 28 8·0 4 19 19·9 4 14 54·8	I·46 I·52	4 44 15.6 4 35 28.7 4 26 39.3 4 17 47.0 4 13 19.7	1.57		1.41 1.47 1.55 1.62 1.66
22 23 24 25 26	4 15 2.6 4 10 41.9 4 6 20.7 4 1 58.8 3 57 36.2	1·48 1·51 1·54	4 13 34·3 4 9 11·7 4 4 48·6 4 0 24·7 3 56 0·0	I·53	4 12 3·1 4 7 38·6 4 3 13·3 3 58 47·3 3 54 20·3	1·58 1·62	4 10 28·9 4 6 2·2 4 1 34·7 3 57 6·3 3 52 37·0	1.67	4 8 51.6 4 4 22.6 3 59 52.7 3 55 21.8 3 50 49.9	1.65 1.69 1.73 1.77 1.82		1·70 1·75 1·79 1·84 1·88
27 28 29 30 31	3 53 12·9 3 48 48·9 3 44 23·9 3 39 58·1 3 35 31·4	1.72	3 51 34·5 3 47 8·2 3 42 40·9 3 38 12·7 3 33 43·4	1.67 1.71 1.75 1.79 1.84	3 49 52·5 3 45 23·8 3 40 54·0 3 36 23·1 3 31 51·1		3 48 6·7 3 43 35·3 3 39 2·9 3 34 29·2 3 29 54·2	1.84 1.89 1.94	3 46 16·9 3 41 42·8 3 37 7·4 3 32 30·7 3 27 52·5	2.02	0 11 -0 :	1.93 1.99 2.04 2.10 2.16
32 33 34 35 36	3 31 3·7 3 26 34·9 3 22 5·0 3 17 33·9 3 13 1·6	1.85 1.90	3 29 13·1 3 24 41·6 3 20 8·8 3 15 34·7 3 10 59·1	1.88 1.93 1.98 2.03 2.09	3 27 17·9 3 22 43·4 3 18 7·5 3 13 30·1 3 8 51·1	2.01	3 25 17·9 3 20 40·2 3 16 0·9 3 11 19·9 3 6 37·2	2.10		2.19		2·22 2·28 2·35 2·42 2·50
37 38 39 40 41	3 8 27·9 3 3 52·6 2 59 15·8 2 54 37·3 2 49 56·9	2.23		2·21 2·27 2·34	3 4 10·4 2 59 27·8 2 54 43·2 2 49 56·4 2 45 7·3	2·38 2·46	3 I 52·5 2 57 5·8 2 52 I6·7 2 47 25·4 2 42 3I·2	2·42 2·50 2·58	2 59 28·3 2 54 37·0 2 49 43·2 2 44 46·6 2 39 47·0	2·54 2·62 2·71	2 56 57·1 2 52 0·9 2 47 1·8 2 41 59·7 2 36 54·1	2·58 2·67 2·76 2·86 2·96
42 43 44 45 46	2 45 14·5 2 40 29·8 2 35 42·8 2 30 53·2 2 26 0·7	2·44 2·52 2·61	2 28 12.3	2·57 2·66 2·76	2 40 15.6 2 35 21.0 2 30 23.4 2 25 22.3 2 20 17.4	2·81 2·92	2 37 34·2 2 32 33·9 2 27 30·1 2 22 22·4 2 17 10·3	2.86		3·02 3·14 3·27	2 31 44·8 2 26 31·3 2 21 13·2 2 15 49·9 2 10 20·8	3·07 3·19 3·33 3·47 3·63
		V	ARIATIC	N TO	o i' OF	LAT	TUDE A	AND	ALTITU	DE.		
Alt.	L. 12°	A.	L. 13°	A.	L. 14°	A.	L. 15°	Α.	L. 16°	A.	L. 17°	A.
0 2 4 6 8	s. - ·90 - ·93 ·97 I·01 I·05	S. -4·20 4·21 4·22 4·23 4·24	s. ·97 I·01 I·05 I·09 I·13	s. -4·22 4·23 4·24 4·25 4·26	s. -1.05 - 1.09 1.13 1.17 1.21	s. -4·23 4·25 4·26 4·27 4·28	s. -1·13 - 1·17 1·21 1·25 1·29	s. -4·25 4·27 4·28 4·29 4·30	s. -1·21 1·25 1·29 1·33 1·38	s. -4·28 4·29 4·30 4·32 4·33	s. — 1·29 - 1·33 1·37 1·42 1·46	s. -4·30 4·32 4·33 4·34 4·36
10 12 14 16 18	1.09 1.14 1.19 1.24 1.29	4·25 4·26 4·27 4·29 4·30	1·17 1·22 1·27 1·32 1·38	4·27 4·28 4·30 4·31 4·33	1·26 1·31 1·35 1·41 1·46	4·29 4·31 4·34 4·36	1·34 1·39 1·44 1·50 1·56	4·32 4·33 4·35 4·37 4·39	1:42 1:48 1:53 1:59 1:65	4·35 4·36 4·38 4·40 4·42	1·51 1·56 1·62 1·68 1·74	4·37 4·39 4·41 4·43 4·46
20 22 24 26 28	1·34 1·40 1·47 1·53 1·61	4·32 4·34 4·36 4·38 4·41	1.43 1.50 1.56 1.63 1.71	4·35 4·37 4·39 4·42 4·45	1·52 1·59 1·66 1·73 1·81	4·38 4·40 4·43 4·46 4·49	1·62 1·69 1·76 1·84 1·92	4·41 4·44 4·46 4·50 4·53	1·71 1·78 1·86 1·94 2·03	4·45 4·48 4·51 4·54 4·58	1.81 1.88 1.96 2.05 2.14	4·49 4·52 4·55 4·59 4·63
30 32 34 36 38	1.68 1.77 1.86 1.96 2.08	4·44 4·47 4·51 4·55 4·60	1·79 1·88 1·98 2·09 2·21	4·48 4·51 4·56 4·61 4·66	1.90 2.00 2.10 2.21 2.34	4·52 4·56 4·61 4·66 4·73	2·01 2·11 2·22 2·35 2·48	4·57 4·62 4·67 4·73 4·80	2·13 2·23 2·35 2·48 2·63	4·62 4·67 4·73 4·80 4·88	2·24 2·36 2·48 2·63 2·78	4.68 4.73 4.80 4.87 4.96
40 42 44 45 46	2·20 2·34 2·50 2·58 2·68	4·66 4·73 4·80 4·85 4·90	2·34 2·49 2·66 2·76 2·86	4·72 4·80 4·89 4·95 5·01	2·49 2·65 2·84 2·94 3·05	4·80 4·89 4·99 5·05 5·12	2.64 2.81 3.02 3.13 3.26	4·88 4·98 5·10 5·16 5·24	2·80 2·99 3·21 3·33 3·47	4.97 5.08 5.21 5.29 5.38	2·97 3·18 3·42 3·56 3·71	5·06 5·19 5·34 5·44 5·54

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 177 LATITUDE 13°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 2 4 6 8	H. M. S. 5 42 47.5 5 34 7.3 5 25 25.5 5 16 41.9 5 7 56.5	1.13	H. M. S. 5 41 45.7 5 33 2.3 5 24 17.0 5 15 29.9 5 6 40.8	1.12	H. M. S. 5 40 43·I 5 31 56·2 5 23 7·4 5 14 16·5 5 5 23·4	S. -1.05 1.11 1.17 1.24 1.30	5 13 1.5	1.19	5 29 40·9 5 20 44·1 5 11 45·0	1.22	H. M. S. 5 37 30·3 5 28 31·4 5 19 30·3 5 10 26·7 5 1 20·4	s. -1.09 1.17 1.24 1.32 1.40
10 12 14 16 18	4 59 9.0 4 50 19.2 4 41 26.9 4 32 31.8 4 23 33.8	1·38 1·44 1·52	4 57 49.4 4 48 55.6 4 39 59.0 4 30 59.5 4 21 56.7	1·48 1·56	4 56 27·9 4 47 29·8 4 38 28·7 4 29 24·4 4 20 16·5	1.61	4 55 4.4 4 46 1.8 4 36 55.9 4 27 46.5 4 18 33.2	1·49 1·57 1·66	4 53 38·9 4 44 31·3 4 35 20·3 4 26 5·5 4 16 46·5	1·53 1·62 1·71	4 52 11·0 4 42 58·3 4 33 41·9 4 24 21·4 4 14 56·3	1·48 1·57 1·66 1·76 1·87
19 20 21 22 23	4 19 3.5 4 14 32.3 4 10 0.2 4 5 27.1 4 0 53.0	1.67 1.72 1.76	4 17 23.9 4 12 50.2 4 8 15.4 4 3 39.6 3 59 2.6	1·73 1·78 1·82	4 15 41·1 4 11 4·7 4 6 27·1 4 1 48·3 3 57 8·3	1.84 1.89	4 13 54·9 4 9 15·6 4 4 34·9 3 59 53·1 3 55 9·8	1.85 1.90 1.95	4 12 5·3 4 7 22·8 4 2 38·9 3 57 53·7 3 53 7·0	1·91 1·97	4 0 38·8 3 55 50·0	1·92 1·98 2·04 2·10 2·16
24 25 26 27 28	3 56 17·7 3 51 41·3 3 47 3·7 3 42 24·7 3 37 44·3	1.86 1.91 1.96 2.01 2.06	3 49 44·9 3 45 4·1 3 40 21·9	1·92 1·98 2·03 2·09 2·15	3 52 26·9 3 47 44·2 3 43 0·0 3 38 14·2 3 33 26·6	2.05	3 50 25·2 3 45 38·9 3 40 51·0 3 36 1·4 3 31 9·9	2·13 2·19 2·26	3 48 18·7 3 43 28·7 3 38 36·9 3 33 43·2 3 28 47·5	2·15 2·21 2·28 2·35 2·42	3 46 7.5 3 41 13.5 3 36 17.5 3 31 1 9.4 3 26 19.1	2·23 2·30 2·37 2·45 2·53
29 30 31 32 33	3 33 2·4 3 28 19·0 3 23 33·7 3 18 46·7 3 13 57·7	2·18 2·25 2·31	3 30 52·5 3 26 5·3 3 21 16·1 3 16 24·9 3 11 31·5	2.34	3 28 37·3 3 23 45·9 3 18 52·5 3 13 56·8 3 8 58·7	2·37 2·44 2·52	3 26 16·4 3 21 20·7 3 16 22·7 3 11 22·2 3 6 18·9	2.47		2·50 2·58 2·67 2·76 2·85	3 16 10·8 3 11 2·5 3 5 51·1	2·61 2·70 2·79 2·89 2·99
34 35 36 37 38	3 9 6.6 3 4 13.1 2 59 17.2 2 54 18.6 2 49 17.0	2.71			3 3 58·0 2 58 54·4 2 53 47·7 2 48 37·6 2 43 23·8	2·88 2·99	3 1 12·8 2 56 3·4 2 50 50·6 2 45 33·9 2 40 13·1	2·92 3·03 3·14	2 58 19·6 2 53 4·0 2 47 44·5 2 42 20·7 2 36 52·1	2·96 3·07 3·18 3·31 3·44	2 49 55.5	3·10 3·22 3·35 3·49 3·64
39 40 41 42 43	2 44 12·2 2 39 3·9 2 33 51·8 2 28 35·3 2 23 14·2	3·01 3·12 3·25	2 41 13.8 2 35 58.8 2 30 39.4 2 25 15.1 2 19 45.3	3·05 3·17 3·30 3·44 3·59	2 27 16·0 2 21 42·9		2 34 47·6 2 29 17·0 2 23 40·7 2 17 57·9 2 12 7·9	3·54 3·70	2 31 18·3 2 25 38·6 2 19 52·3 2 13 58·6 2 7 56·5	3·59 3·75 3·93 4·12 4·34	2 15 49·6 2 9 43·5	3.80 3.89 4.18 4.40 4.65

VARIATION TO 1' OF LATITUDE AND ALTITUDE.

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
	s. s.	s. s.	S. S.	s. s.	s. s.	s. s.
0	-1.37 -4.3		-1.54 -4.38	-1.62 -4.41	-1.71 -4.44	-1·80 -4·48
2	1.41 4.3		1.58 4.40	1.67 4.43	1.75 4.46	1.84 4.50
4	1.46 4.30		1.62 4.41	1.71 4.45	1.80 4.48	1.89 4.52
6 8	1.50 4.3		1.67 4.43	1.76 4.47	1.85 4.50	1.94 4.54
°	1.55 4.39	1.63 4.42	1.72 4.45	1.81 4.49	1.90 4.53	2.00 4.56
10	1.60 4.4	1.69 4.44	1.78 4.47	1.87 4.51	1.96 4.55	2.06 4.59
12	1.65 4.4	3 1.74 4.46	1.83 4.50	1.93 4.54	2.02 4.58	2.12 4.62
14	1.71 4.4		1.90 4.52	1.99 4.56	2.09 4.61	2.19 4.65
16	1.77 4.4	7 1.87 4.51	1.96 4.55	2.06 4.59	2.16 4.64	2.27 4.69
18	1.84 4.50	1.93 4.54	2.03 4.58	2.14 4.63	2.24 4.68	2.35 4.73
20	1.91 4.5	2.01 4.57	2.11 4.62	2.22 4.67	2.33 4.72	2.44 4.77
22	1.98 4.50		2.20 4.66	2.31 4.71	2.42 4.77	2.54 4.83
24	2.07 4.60	2.18 4.65	2.29 4.70	2.40 4.76	2.52 4.82	2.65 4.88
26	2.16 4.6		2.39 4.75	2.51 4.81	2.64 4.88	2.77 4.95
28	2.26 4.6	2.38 4.74	2.50 4.81	2.63 4.87	2.76 4.95	2.90 5.03
30	2.37 4.74	2.49 4.80	2.62 4.87	2.76 4.95	2.90 5.03	3.05 5.11
32	2.49 4.80	2.62 4.87	2.76 4.95	2.91 5.03	3.06 5.12	3.22 5.22
34	2.62 4.8	7 2.77 4.95	2.92 5.04	3.07 5.13	3.24 5.23	3.42 5.34
36	2.77 4.9	2.93 5.04	3.09 5.14	3.27 5.25	3.45 5.36	3.64 5.49
38	2.95 5.0	3.13 2.12	3.30 5.26	3.49 5.39	3.69 5.52	3.91 5.67
39	3.04 5.1	3.22 5.22	3.41 5.34	3.61 5.47	3.83 5.61	4.06 5.77
40	3.14 5.1	7 3.33 5.29	3.53 5.41	3.75 5.56	3.98 5.72	4.23 5.89
41	3.25 5.2		3.67 5.50	3.90 5.66	4.14 5.83	4.41 6.03
42	3.37 5.3		3.81 5.60	4.06 5.77	4.32 5.96	4.60 6.18
43	3.50 5.40	3.73 5.55	3.97 5.71	4.23 5.90	4.52 6.11	4.82 6.36

LATITUDE 14°.

			3013111111	1011-	-CONTR.		NAME	10-	LAIIIU	DE.		
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	II. M. S. 6 0 0.0 5 18 45.7 5 10 30.5 5 2 14.9 4 53 59.1	. 1.03	H. M. S. 5 59 0·2 5 17 44·5 5 9 28·7 5 1 12·6 4 52 56·1	s. 1·00 1·03 1·04 1·05	H. M. S. 5 58 0·3 5 16 42·4 5 8 26·0 5 0 9·0 4 51 51·6	s. 1·00 1·04 1·05 1·07	5 15 39·4 5 7 22·1 4 59 4·2	s. 1·00 1·06 1·07 1·09	5 14 35·5 5 6 17·1 4 57 58·1	1.07	5 13 30·6 5 5 11·0 4 56 50·7	S. -1.01 1.09 1.11 1.14 1.16
18 20 22 24 26	4 45 43.0 4 37 26.5 4 29 9.5 4 20 52.0 4 12 33.9	1.07 1.08 1.10	4 44 39 1 4 36 21 7 4 28 3 7 4 19 45 0 4 11 25 7	1.09	4 43 33.7 4 35 15.1 4 26 55.9 4 18 36.0 4 10 15.1	I·12			4 32 56.6 4 24 34.4 4 16 11.1	1·19 1·21 1·25		1·19 1·22 1·25 1·28 1·32
28 29 30 31 32	4 4 15·2 4 0 5·6 3 55 55·7 3 51 45·6 3 47 35·3	1.18	4 3 5.6 3 58 55.1 3 54 44.5 3 50 33.6 3 46 22.4	1·18 1·20 1·21 1·22 1·24	3 53 30·5 3 49 18·6	1.26	3 56 26·2 3 52 13·6	1·31 1·33	3 59 20.9 3 55 7.5 3 50 53.7 3 46 39.5 3 42 25.0	1·34 1·36 1·38	3 58 0·5 3 53 45·9 3 49 30·8 3 45 15·3 3 40 59·3	1·36 1·39 1·41 1·43 1·46
33 34 35 36 37	3 43 24.8 3 39 14.0 3 35 3.0 3 30 51.6 3 26 39.9	1·22 1·24 1·25	3 42 10·9 3 37 59·2 3 33 47·1 3 29 34·6 3 25 21·8	1.31	3 36 41 0 3 32 27 7	I·35	3 35 19.4 3 37 4.9	1.41	3 33 54·3 3 29 38·3	I·45 I·47 I·50	3 36 42:7 3 32 25:6 3 28 7:9 3 23 49:6 3 19 30:6	1.48 1.51 1.54 1.57 1.60
38 39 40 41 42	3 22 27.9 3 18 15.6 3 14 2.8 3 9 49.7 3 5 36.1	1.31 1.32	3 21 8.6 3 16 55.0 3 12 40.9 3 8 26.3 3 4 11.2	1.38		1·42 1·45 1·47 1·50 1·53	3 5 26.2	1·52 1·58	3 16 46.7 3 12 28.2 3 8 9.0 3 3 49.1 2 59 28.3	1.59 1.62 1.66		1.63 1.67 1.70 1.74 1.78
43 44 45 46 47	3 I 22·0 2 57 7·4 2 52 52·3 2 48 36·6 2 44 20·3	I·43 I·46 I·49	2 59 55·5 2 55 39·3 2 51 22·4 2 47 4·8 2 42 46·4	I·54 I·58	2 54 6·1 2 49 47·2	1.60 1.63 1.67	2 56 48·1 2 52 27·8 2 48 6·6 2 43 44·6 2 39 21·4	1.68 1.72 1.76	2 55 6.7 2 50 44.1 2 46 20.5 2 41 55.9 2 37 29.8	1.77 1.82 1.86	2 53 20·0 2 48 54·8 2 44 28·5 2 40 0·8 2 35 31·8	1·82 1·87 1·92 1·97 2·02
48 49 50 51 52	2 40 3·2 2 35 45·4 2 31 26·8 2 27 7·3 2 22 46·8	1.59 1.63 1.67	2 38 27·2 2 34 7·1 2 29 46·1 2 25 24·0 2 21 0·7	1.69 1.73 1.78	2 36 45·3 2 32 22·7 2 27 58·9 2 23 33·9 2 19 7·5	1·79 1·84 1·89	2 34 57·2 2 30 3I·7 2 26 4·9 2 2I 36·6 2 I7 6·7	1.91	2 33 2.6 2 28 33.9 2 24 3.7 2 19 31.8 2 14 57.9	2·02 2·08 2·15	2 31 1·3 2 26 29·1 2 21 55·0 2 17 19·0 2 12 40·8	
		V.	ARIATIO	ON TO	O i' OF	LAT	ITUDE	AND	ALTITU	JDE.		
Alt.	L. 0°	A.	L. 1°	A.	L. 2°	A.	L. 3°	A.	L. 4	A.	L. 5°	A.
0 4 8 10 12	S. - ·00 ·07 ·14 ·18 ·22	s. -4·12 4·12 4·13 4·13	s. - ·07 ·15 ·22 ·26 ·30	s. -4·12 4·13 4·13 4·13	s. - ·15 ·22 ·29 ·33 ·37	s. -4·13 4·13 4·14 4·14	S ·22 ·30 ·37 ·41 ·45	s. -4·13 4·14 4·14 4·15	s. - '30 '37 '45 '49 '53	s. -4·13 4·14 4·15 4·15 4·16	s. - ·37 ·45 ·52 ·56 ·60	s. -4·14 4·15 4·16 4·16 4·17
14 16 18 20 22	·26 ·29 ·33 ·37 ·42	4·13 4·14 4·14 4·14	·33 ·37 ·41 ·46 ·50	4·14 4·14 4·15 4·15	.41 .45 .49 .54 .58	4·14 4·15 4·16 4·16	.49 .53 .57 .62 .66	4·15 4·16 4·16 4·17	·57 ·61 ·65 ·70 ·75	4·16 4·17 4·18 4·19	·65 ·69 ·73 ·78 ·83	4·17 4·18 4·19 4·20 4·21
24 26 28 30 32	•46 •50 •55 •60 •65	4·15 4·16 4·16 4·17	*54 *59 •64 •69 •74	4·16 4·16 4·17 4·18 4·19	·63 ·68 ·73 ·78 ·83	4·17 4·18 4·19 4·20 4·21	·71 ·76 ·81 ·87 ·93	4·18 4·19 4·20 4·21 4·22	·80 ·85 ·90 ·96 I·02	4·20 4·21 4·23 4·25	·88 ·94 ·99 I·05 I·12	4·22 4·23 4·24 4·25 4·27
34 36 38 40 42	.70 .76 .82 .88	4·18 4·19 4·20 4·21 4·23	·80 ·86 ·92 ·99 I·06	4·20 4·21 4·22 4·24 4·26	·89 ·95 I·02 I·09 I·17	4·22 4·23 4·25 4·26 4·28	.99 I.05 I.12 I.20 I.28	4·24 4·26 4·27 4·29 4·32	1.09 1.16 1.23 1.31 1.40	4·26 4·28 4·30 4·33 4·35	1·19 1·26 1·34 1·42 1·52	4·29 4·31 4·36 4·39
44 46 48 50 52	1·02 1·10 1·19 1·28 1·39	4·25 4·27 4·29 4·32 4·35	1·14 1·22 1·31 1·42 1·53	4·28 4·30 4·33 4·36 4·40	1·25 1·34 1·44 1·56 1·68	4·31 4·34 4·37 4·41 4·45	1·37 1·47 1·58 1·70 1·84	4·34 4·38 4·41 4·46 4·51	1.49 1.60 1.72 1.85 2.00	4·38 4·42 4·47 4·52 4·58	1.62 1.73 1.86 2.00 2.17	4·43 4·47 4·52 4·58 4·65

LATITUDE 14°.

			3013111111	1011	-CONTR		NAME		LAIIIU.			
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 8 10 12 14	H. M. S. 5 53 59.6 5 20 45.0 5 12 24.7 5 4 3.7 4 55 41.8	1.13	5 19 39·4 5 11 17·7	1.13	H. M. S. 5 51 58·1 5 18 32·9 5 10 9·5 5 1 45·2 4 53 19·8	1·15	5 17 25·4 5 9 0·2	1·17 1·20	5 16 16.8		5 15 7.1	S. 1·04 1·17 1·21 1·25 1·29
16 18 20 22 24	4 47 19·1 4 38 55·3 4 30 30·4 4 22 4·3 4 13 36·9	1.25	4 46 7.0 4 37 41.3 4 29 14.3 4 20 45.9 4 12 16.1	1.33	4 44 53·2 4 36 25·3 4 27 56·0 4 19 25·2 4 10 52·7	1.32	4 35 7.4 4 26 35.6 4 18 2.1	1.36	4 16 36.4	1.40	4 32 25·2 4 23 47·7 4 15 8·0	1·34 1·39 1·44 1·50 1·55
25 26 27 28 29	4 9 22.6 4 5 7.9 4 0 52.8 3 56 37.3 3 52 21.2	1.41	4 8 0·5 4 3 44·5 3 59 28·0 3 55 11·0 3 50 53·5	1·44 1·46	4 6 35.7 4 2 18.2 3 58 0.2 3 53 41.6 3 49 22.4	1.2	4 5 8·1 4 0 49·0 3 56 29·3 3 52 9·0 3 47 48·0	I·54 I·57	4 3 37·5 3 59 16·7 3 54 55·2 3 50 33·1 3 46 10·1	1.60	4 2 3.9 3 57 41.2 3 53 17.8 3 48 53.6 3 44 28.6	1·58 1·62 1·65 1·69 1·72
30 31 32 33 34	3 48 4.7 3 43 47.7 3 39 30.1 3 35 11.9 3 30 53.1	1.2	3 42 16·7 3 37 57·4	1·55 1·58 1·61	3 45 2.6 3 40 42.1 3 36 21.0 3 31 59.1 3 27 36.3	1·58 1·61 1·64 1·67	3 34 40·7 3 30 16·7	1.63 1.67 1.70 1.74 1.78	3 32 56·5 3 28 30·1	1.81	3 40 2·7 3 35 35·8 3 31 8·0 3 26 39·2 3 22 9·2	1·76 1·80 1·84 1·89 1·93
35 36 37 38 39	3 26 33.7 3 22 13.5 3 17 52.5 3 13 30.8 3 9 8.2	1.60 1.64 1.67 1.81 1.75	3 24 55·3 3 20 33·1 3 16 10·0 3 11 46·0 3 7 21·0	1.67 1.71 1.75 1.79 1.83		1·75 1·78 1·83 1·87 1·91	3 16 58·9 3 12 30·9 3 8 1·7	1.82 1.86 1.91 1.95 2.00	3 10 33·9 3 6 1·8	1.94	3 3 56.4	1.98 2.03 2.08 2.14 2.20
40 41 42 43 44	3 4 44*6 3 0 20*1 2 55 54*5 2 51 27*7 2 46 59*7	1.87	2 58 27·7 2 53 59·3 2 49 29·6	1.87 1.92 1.97 2.02 2.07	2 51 58.4		2 54 26·2 2 49 51·4 2 45 14·8	2.17	2 56 53·2 2 52 16·5 2 47 38·0 2 42 57·5 2 38 15·0	2·22 2·28 2·35	2 54 40·8 2 50 0·3 2 45 17·8 2 40 33·1 2 35 45·9	2·26 2·33 2·40 2·47 2·55
45 46 47 48 49	2 42 30·3 2 37 59·4 2 33 27·0 2 28 52·8 2 24 16·7	2.08	2 40 25.7 2 35 51.3 2 31 15.1 2 26 36.8 2 21 56.4	2·19 2·26	2 28 55·7 2 24 13·0	2·32 2·39	2 35 56·0 2 31 13·4 2 26 28·4 2 21 40·7 2 16 50·0	2.53	2 28 42·7 2 23 52·6 2 18 59·4	2·58 2·67 2·77	2 26 3.6 2 21 7.8 2 16 8.4	2.64 2.73 2.83 2.94 3.05
		V.	ARIATIC	N TO	ı' OF	LAT	ITUDE .	AND	ALTITU	DE.		
Alt.	L. 6°	A.	L. 7°	A.	L. 8°	Α.	L. 9°	A.	L. 10	° A.	L. 11°	A.
0 4 6 8 10	s. - :45 :52 :56 :60 :64	s. -4·15 4·15 4·16 4·17 4·17	s. - ·52 ·60 ·64 ·68 ·72	s. -4·15 4·16 4·17 4·18 4·18	s. - ·60 ·67 ·71 ·75 ·80	s. -4·16 4·18 4·18 4·19 4·20	s. 67 .75 .80 .83 .87	s. -4·17 4·19 4·20 4·21 4·21	s. - ·75 ·83 ·87 ·91 ·95	S. -4·19 4·21 4·21 4·22 4·23	s. - ·83 ·91 ·95 ·99 1·04	s. -4·20 4·22 4·23 4·24 4·25
12 14 16 18 20	·68 ·72 ·77 ·82 ·87	4·18 4·19 4·19 4·20 4·21	.76 .80 .85 .90	4·19 4·20 4·21 4·22 4·23	·84 ·89 ·93 ·98 I·03	4·21 4·22 4·23 4·24 4·25	·92 ·97 I·02 I·07 I·12	4·22 4·23 4·25 4·26 4·27	1.00 1.05 1.10 1.15 1.21	4·24 4·25 4·27 4·28 4·30	1.08 1.13 1.18 1.24 1.30	4·26 4·27 4·29 4·30 4·32
22 24 26 28 30	·92 ·97 I·03 I·09 I·15	4·22 4·23 4·25 4·26 4·28	1·00 1·06 1·12 1·18 1·24	4·24 4·25 4·27 4·29 4·31	1.09 1.15 1.21 1.27 1.34	4·26 4·28 4·30 4·32 4·34	1·18 1·24 1·30 1·37 1·44	4·29 4·30 4·32 4·34 4·37	1·27 1·33 1·40 1·47 1·54	4·31 4·33 4·35 4·38 4·40	1·36 1·42 1·49 1·57 1·65	4·34 4·36 4·38 4·41 4·44
32 34 36 38 40	1·22 1·29 1·37 1·45 1·54	4·30 4·32 4·34 4·37 4·40	1·32 1·39 1·47 1·56 1·66	4·33 4·35 4·38 4·41 4·44	1·42 1·50 1·58 1·68 1·78	4·36 4·39 4·42 4·45 4·49	1·52 1·60 1·70 1·80 1·91	4·39 4·42 4·46 4·50 4·54	1.63 1.71 1.81 1.92 2.04	4.43 4.46 4.50 4.55 4.60	1.73 1.83 1.93 2.05 2.17	4:47 4:51 4:55 4:60 4:66
42 44 46 48 49	1.64 1.75 1.87 2.01 2.08	4.44 4.48 4.53 4.59 4.63	1.77 1.88 2.02 2.16 2.25	4·48 4·53 4·59 4·66 4·69	1.90 2.02 2.16 2.33 2.42	4·54 4·59 4·66 4·73 4·78	2·03 2·17 2·32 2·50 2·60	4.59 4.66 4.73 4.82 4.87	2·17 2·32 2·48 2·68 2·79	4.66 4.73 4.81 4.92 4.98	2·31 2·47 2·66 2·87 2·99	4.73 4.81 4.90 5.02 5.09

LATITUDE 14°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 6 8 10	H. M. S. 5 47 50.9 5 22 26.7 5 13 56.3 5 5 24.4 4 56 51.2	s. 1·04 1·15 1·19 1·23	H. M. S. 5 46 48.0 5 21 17.1 5 12 44.2 5 4 9.7 4 55 33.7	s. -1.05 1.17 1.21 1.26	H. M. S. 5 45 44.6 5 20 6.4 5 11 30.8 5 2 53.6 4 54 14.6	s. -1.06 1.19 1.23 1.28	H. M. S. 5 44 40·6 5 18 54·5 5 10 16·0 5 1 35·7 4 52 53·6	S. 1·07 1·21 1·26 1·31		s. -1.08 1.23 1.28 1.34	H. M. S. 5 42 30·8 5 16 27·0 5 7 42·2 4 58 55·2 4 50 5·9	s. -1.09 1.25 1.31 1.37 1.43
14 16 18 19 20	4 48 16·2 4 39 39·5 4 31 0·9 4 26 40·8 4 22 20·1	1·42 1·45	4 46 55.9 4 38 16.1 4 29 34.2 4 25 12.4 4 20 49.9	1.49	4 45 33.6 4 36 50.5 4 28 5.1 4 23 41.4 4 19 17.1	1·45 1·51 1·54	4 44 9·3 4 35 22·6 4 26 33·4 4 22 7·8 4 17 41·4	1.48 1.55 1.58	4 42 42·8 4 33 52·4 4 24 59·1 4 20 31·3 4 16 2·8	1·52 1·59 1·63	4 41 14·2 4 32 19·6 4 23 22·1 4 18 52·0 4 14 21·1	1·50 1·57 1·64 1·68 1·72
21 22 23 24 25	4 17 58·9 4 13 36·9 4 9 14·4 4 4 51·2 4 0 27·3	1·54 1·57 1·60	4 16 26·9 4 12 3·1 4 7 38·6 4 3 13·3 3 58 47·3	1.59 1.62 1.66	4 14 52.0 4 10 26.2 4 5 59.6 4 1 32.1 3 57. 3.8	1.64 1.68 1.71	4 13 14·2 4 8 46·2 4 4 17·3 3 59 47·6 3 55 16·8	1.73 1.77	4 2 31.7	1·71 1·75 1·79 1·83 1·88	4 5 16.4	1·76 1·81 1·85 1·90 1·94
26 27 28 29 30	3 56 2·5 3 51 36·9 3 47 10·6 3 42 43·3 3 38 15·0	1.79	3 54 20·3 3 49 52·5 3 45 23·8 3 40 54·0 3 36 23·1	1.81 1.86	3 52 34·6 3 48 4·3 3 43 33·0 3 39 0·6 3 34 26·9	1.88	3 50 45.0 3 46 12.1 3 41 38.1 3 37 2.8 3 32 26.2	2.00	3 44 15·8 3 39 38·8	1.97 2.02 2.08	3 46 53·9 3 42 15·2 3 37 35·1 3 32 53·4 3 28 10·2	2·00 2·05 2·10 2·16 2·22
31 32 33 34 35	3 33 45.7 3 29 15.3 3 24 43.7 3 20 10.9 3 15 36.7	1·92 1·96 2·01	3 31 51·1 3 27 17·9 3 22 43·4 3 18 7·5 3 13 30·1	2·05 2·10	3 29 52·1 3 25 15·8 3 20 38·1 3 15 58·9 3 11 18·0		3 23 8·7 3 18 27·6 3 13 44·7	2.22	3 20 56·3 3 16 11·5 3 11 24·8	2·32 2·38	3 18 38·4 3 13 49·6 3 8 58·7	2·28 2·35 2·42 2·49 2·57
36 37 38 39 40	3 11 1·1 3 6 23·9 3 1 45·1 2 57 4·5 2 52 22·0	2.24	3 4 10·4 2 59 27·8 2 54 43·2	2·34 2·41	3 6 35·3 3 1 50·7 2 57 4·0 2 52 15·1 2 47 23·7	2·45 2·53	2 59 24·6 2·54 33·4	2·57 2·65	3 I 45.0 2 56 51.6 2 51 55.6 2 46 56.7 2 41 54.7	2.61 2.69 2.78	2 59 9·8 2 54 11·4 2 49 10·0 2 44 5·5 2 38 57·4	2·65 2·74 2·83 2·93 3·03
41 42 43 44 45	2 47 37.4 2 42 50.5 2 38 1.1 2 33 8.9 2 28 13.8	2.60	2 40 15·6 2 35 21·0 2 30 23·4			2.89	2 34 4I·0 2 29 34·5 2 24 24·I	3.02	2 36 49·3 2 31 40·1 2 26 26·8 2 21 8·9 2 15 45·8	3.10	2 33 45.5 2 28 29.3 2 23 8.3 2 17 42.1 2 12 9.9	3·15 3·27 3·40 3·55 3·71
		V.	ARIATIC	N TO	ı' OF	LAT	ITUDE .	AND	ALTITU	DE.		
Alt.	L. 12	° A.	L. 13	A.	L. 14°	A.	L. 15°	A.	L. 16	А.	L. 17°	Α.
0 2 4 6 8	s. - '90 '94 '98 1'03 1'07	s. -4·22 4·23 4·24 4·25 4·26	s. ·98 1·02 1·06 1·11 1·15	s. -4·23 4·25 4·26 4·27 4·28	s. -1.06 1.10 1.14 1.19 1.23	s. -4·26 4·27 4·28 4·29 4·30	S. -1·14 1·18 1·22 1·27 1·32	s. -4·28 4·29 4·30 4·31 4·33	s. -1·22 1·26 1·31 1·35 1·40	s. -4·30 4·31 4·32 4·34 4·35	s. -1·30 ·35 ·39 ·44 ·49	s. -4·3² 4·34 4·35 4·36 4·38
10 12 14 16 18	1·12 1·17 1·22 1·27 1·33	4·27 4·28 4·30 4·31 4·33	1·20 1·25 1·30 1·36 1·42	4·29 4·31 4·32 4·34 4·36	1·28 1·33 1·39 1·45 1·51	4·32 4·33 4·35 4·37 4·39	1·37 1·42 1·48 1·54 1·60	4·34 4·36 4·38 4·40 4·42	1·45 1·51 1·56 1·63 1·69	4·37 4·39 4·41 4·43 4·46	1.54 1.60 1.66 1.72 1.79	4·40 4·42 4·44 4·47 4·49
20 22 24 26 28	1·39 1·45 1·52 1·59 1·67	4·35 4·37 4·39 4·42 4·45	1·48 1·54 1·62 1·69	4·38 4·40 4·43 4·46 4·49	1·57 1·64 1·71 1·79 1·88	4·41 4·46 4·50 4·53	1·67 1·74 1·82 1·90 1·99	4·45 4·47 4·50 4·54 4·58	1.76 1.84 1.92 2.01 2.10	4·48 4·51 4·55 4·58 4·63	1·86 1·94 2·02 2·12 2·22	4·52 4·56 4·59 4·63 4·68
30 32 34 36 38	1·75 1·85 1·94 2·06 2·18	4·48 4·52 4·56 4·61 4·66	1.86 1.96 2.07 2.18 2.31	4·52 4·56 4·61 4·66 4·73	1.97 2.08 2.19 2.31 2.45	4·57 4·62 4·67 4·73 4·80	2·09 2·20 2·32 2·45 2·60	4·62 4·67 4·73 4·80 4·87	2·21 2·32 2·45 2·59 2·75	4·68 4·73 4·80 4·87 4·96	2·33 2·45 2·59 2·74 2·92	4.73 4.80 4.87 4.95 5.05
40 42 43 44 45	2·31 2·46 2·55 2·64 2·73	4·73 4·80 4·85 4·89 4·95	2·46 2·62 2·71 2·81 2·92	4·80 4·89 4·93 4·99 5·05	2.61 2.79 2.89 2.99 3.11	4·88 4·98 5·03 5·09 5·15	2·77 2·96 3·07 3·19 3·32	4·97 5·08 5·14 5·21 5·29	2·94 3·15 3·27 3·40 3·54	5·06 5·19 5·26 5·34 5·43	3·11 3·35 3·48 3·62 3·78	5·17 5·31 5·39 5·49 5·59

LATITUDE 14°.

		D	ECLINA	TION	_CONTI	RARY		TO-	-LATITU	DE.		
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 2 4 6 8	H. M. S. 5 41 24·8 5 32 42·1 5 23 57·6 5 15 11·3 5 6 22·9	s. -1·11 1·16 1·22 1·27 1·34	H. M. S. 5 40 18·0 5 31 32·0 5 22 44·1 5 13 54·1 5 5 1·9	1·18 1·24	H. M. S. 5 39 10.4 5 30 20.8 5 21 29.2 5 12 35.4 5 3 39.2	s. -1·13 1·19 1·26 1·32 1·39	5 29 8·6 5 20 13·0 5 11 15·1	s. -1·15 1·21 1·28 1·35 1·42	H. M. S. 5 36 52·5 5 27 55·1 5 18 55·4 5 9 53·2 5 0 48·2		H. M. S. 5 35 42·0 5 26 40·3 5 17 36·3 5 8 29·4 4 59 19·6	S. -1·18 1·26 1·33 1·41 1·49
10 12 14 16 17	4 57 32·2 4 48 39·1 4 39 43·2 4 30 44·3 4 26 13·6	1·47 1·54 1·61	4 56 7·3 4 47 10·0 4 38 9·7 4 29 6·2 4 24 33·1	1·50 1·58 1·66	4 54 40·4 4 45 38·7 4 36 33·7 4 27 25·2 4 22 49·6	1·54 1·62 1·71	4 53 II·4 4 44 4·9 4 34 55·0 4 25 4I·3 4 2I 2·9	1.58 1.67 1.76	4 51 40·1 4 42 28·7 4 33 13·5 4 23 54·2 4 19 12·9	1.63 1.72 1.81	4 50 6·5 4 40 49·8 4 31 29·0 4 22 3·8 4 17 19·3	1·58 1·67 1·77 1·87 1·92
18 19 20 21 22	4 21 42·1 4 17 9·7 4 12 36·2 4 8 1·8 4 3 26·3	1·73	4 19 59·1 4 15 24·1 4 10 47·9 4 6 10·8 4 1 32·4	1·79 1·83 1·88	4 18 12·9 4 13 35·1 4 ·8 56·2 4 4 16·0 3 59 34·6	1·84 1·89 1·94		1·90 1·96 2·01		2·02 2·08	4 12 33.6 4 7 46.4 4 2 57.7 3 58 7.5 3 53 15.6	1·98 2·04 2·09 2·16 2·22
23 24 25 26 27	3 58 49·6 3 54 11·7 3 49 32·6 3 44 52·0 3 40 10·0	1·96 2·02 2·07	3 56 52·7 3 52 11·8 3 47 29·4 3 42 45·5 3 8 0·1	1.98 2.03 2.09 2.15 2.21	3 54 51.7 3 50 7.5 3 45 21.7 3 40 34.2 3 35 45.0	2·11 2·17 2·23	3 52 46·5 3 47 58·7 3 43 9·2 3 38 17·9 3 33 24·7	2·13 2·19 2·25 2·32 2·39	3 45 45·0 3 40 51·6 3 35 56·2	2·27 2·34 2·41	3 48 21·9 3 43 26·3 3 38 28·7 3 33 28·8 3 28 26·7	2·29 2·36 2·43 2·51 2·59
28 29 30 31 32	3 35 26·5 3 30 41·3 3 25 54·3 3 21 5·5 3 16 14·6	2·25 2·31 2·38	3 33 12·9 3 28 23·9 3 23 32·9 3 18 39·9 3 13 44·5	2·27 2·34 2·41 2·48 2·56	3 30 53.9 3 26 0.9 3 21 5.6 3 16 8.0 3 11 7.9	2·43 2·51	3 28 29·4 3 23 31·9 3 18 32·0 3 13 29·5 3 8 24·3	2.61	3 20 56.6 3 15 51.8 3 10 44.0	2·64 2·73	3 23 22·I 3 18 14·7 3 13 4·4 3 7 50·9 3 2 34·I	2·67 2·76 2·85 2·95 3·06
33 34 35 36 37	3 II 21·5 3 6 26·0 3 I 27·9 2 56 27·2 2 51 23·3	2·69 2·77	3 8 46·8 3 3 46·4 2 58 43·1 2 53 36·8 2 48 27·0	2·81 2·91	3 6 5·I 3 0 59·4 2 55 50·5 2 50 38·I 2 45 2I·8	2·95 3·05	3 3 16·0 2 58 4·5 2 52 49·4 2 47 30·3 2 42 7·0		3 0 18·9 2 55 1·1 2 49 39·2 2 44 13·0 2 38 41·8	3·13 3·25 3·38	2 57 13.4 2 51 48.7 2 46 19.4 2 40 45.2 2 35 5.4	3·17 3·29 3·42 3·56 3·71
38 39 40 41 42	2 46 16·2 2 41 5·5 2 35 50·7 2 30 31·7 2 25 7·6	3·08 3·20 3·32	2 43 13.6 2 37 56.0 2 32 33.9 2 27 6.8 2 21 34.2	3·24 3·37 3·51	2 40 1.4 2 34 36.4 2 29 6.2 2 23 30.3 2 17 47.9	3·42 3·56 3·72	2 36 38·9 2 31 5·7 2 25 26·5 2 19 40·7 2 13 47·5	3·47 3·61 3·77 3·95 4·14	2 33 5.4 2 27 22.8 2 21 33.6 2 15 36.8 2 9 31.4	3·82 4·00	2 29 19·6 2 23 26·9 2 17 26·3 2 11 17·0 2 4 57·5	3·87 4·05 4·25 4·46 4·69
		VA	RIATIO	N TC	r' OF	LATI	TUDE A	AND .	ALTITUI	DE.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α.	L. 22°	Α.	L. 23°	A.
0 2 4 6 8	s. -1·38 - 1·43 1·47 1·52 1·57	s. -4·35 4·36 4·38 4·39 4·41	s. 1·47 1·51 1·56 1·61 1·66	s. ~4·37 4·39 4·41 4·43 4·45	s. - 1·55 - 1·60 1·65 1·70 1·75	s. -4·40 4·42 4·44 4·46 4·48	s. -1.64 - 1.68 1.73 1.79 1.84	s. -4·43 4·45 4·47 4·49 4·51	s. -1.73 - 1.77 1.82 1.88 1.93	s. -4·47 4·49 4·51 4·53 4·55	s. -1.81 - 1.86 1.91 1.97 2.03	s. -4·50 4·52 4·54 4·57 4·60
10 12 14 16 18	1·63 1·69 1·75 1·81 1·89	4·43 4·45 4·48 4·50 4·53	1·72 1·78 1·84 1·91 1·99	4·47 4·49 4·52 4·54 4·57	1·81 1·87 1·94 2·01 2·09	4·50 4·53 4·56 4·59 4·62	1·90 1·97 2·04 2·11 2·19	4·54 4·57 4·60 4·63 4·67	2·00 2·06 2·14 2·21 2·30	4·58 4·61 4·64 4·68 4·72	2·09 2·16 2·24 2·32 2·41	4·63 4·66 4·69 4·73 4·77
20 22 24 26 28	1·96 2·04 2·13 2·23 2·34	4·57 4·60 4·64 4·69 4·74	2·06 2·15 2·25 2·35 2·46	4·61 4·65 4·69 4·74 4·80	2·17 2·26 2·36 2·47 2·59	4·66 4·70 4·75 4·80 4·87	2·28 2·37 2·48 2·59 2·72	4·71 4·76 4·81 4·87 4·94	2·39 2·49 2·60 2·72 2·86	4·77 4·82 4·87 4·94 5·02	2·50 2·61 2·73 2·86 3·00	4·82 4·88 4·94 5·02 5·10
30 32 34 36 37	2·46 2·59 2·73 2·90 2·99	4·80 4·87 4·95 5·04 5·09	2·59 2·73 2·88 3·06 3·16	4·87 4·94 5·03 5·13 5·19	2·72 2·87 3·04 3·23 3·34	4·94 5·02 5·12 5·24 5·31	2·86 3·02 3·21 3·41 3·53	5·02 5·11 5·22 5·35 5·43	3·01 3·18 3·38 3·61 3·74	5·10 5·21 5·33 5·48 5·56	3·17 3·35 3·56 3·81 3·95	5·20 5·31 5·45 5·62 5·71
38 39 40 41 42	3·08 3·19 3·30 3·42 3·56	5·15 5·21 5·28 5·36 5·45	3·26 3·38 3·50 3·64 3·79	5·26 5·33 5·41 5·50 5·59	3·46 3·58 3·72 3·87 4·03	5·38 5·46 5·55 5·65 5·76	3·66 3·80 3·95 4·11 4·30	5.51 5.60 5.71 5.83 5.95	3·88 4·03 4·20 4·39 4·60	5.66 5.76 5.88 6.02 6.17	4·11 4·28 4·47 4·68 4·91	5·82 5·94 6·08 6·24 6·42

LATITUDE 15°.

T	1		l I		-CONTR		NAME		LAIIIU.			n . I
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 18 34.4 5 10 16.8 5 1 58.9 4 53 40.7		H. M. S. 5 58 55.7 5 17 28.6 5 9 10.4 5 0 51.9 4 52 32.9	1.11 1.10	H. M. S. 5 57 51·3 5 16 22·0 5 8 3·1 4 59 43·7 4 51 23·7	s. -1·07 1·12 1·13 1·15 1·16		s. -1.07 1.13 1.15 1.17 1.19	5 14 5.8	s. -1.08 1.15 1.17 1.19 1.21		s. -1.08 1.17 1.19 1.21 1.24
18 20 22 24 26	4 45 22·I 4 37 3·0 4 28 43·4 4 20 23·2 4 I2 2·4	1·15 1·16	4 44 13·4 4 35 53·4 4 27 32·7 4 19 11·3 4 10 49·0	1.19	4 43 3·2 4 34 42·0 4 26 20·0 4 17 57·2 4 9 33·3	1.23	4 41 51.4 4 33 28.8 4 25 5.3 4 16 40.8 4 8 15.1		4 40 37·8 4 32 13·6 4 23 48·4 4 15 22·0 4 6 54;4		4 30 56·5 4 22 29·4 4 14 1·0	1·27 1·30 1·33 1·37 1·41
27 28 29 30 31	4 7 51·7 4 3 40·8 3 59 29·6 3 55 18·2 3 51 6·6	1·21 1·23 1·24 1·25 1·27		1.28	4 5 21.0 4 1 8.4 3 56 55.5 3 52 42.3 3 48 28.7		3 59 48·2 3 55 34·2		3 58 25·2 3 54 10·1 3 49 54·5	1.43	4 I 15·4 3 56 59·4 3 52 42·9 3 48 25·9 3 44 8·4	1·43 1·46 1·48 1·50 1·53
32 33 34 35 36	3 46 54·7 3 42 42·6 3 38 30·1 3 34 17·3 3 30 4·2	1.33	3 45 36·3 3 41 23·1 3 37 9·6 3 32 55·6 3 28 41·3	1·33 1·35 1·37 1·39 1·41	3 44 14·7 3 40 0·4 3 35 45·6 3 31 30·5 3 27 14·8	1.45	3 42 50·0 3 38 34·3 3 34 18·2 3 30 1·6 3 25 44·5	1·46 1·49 1·51	3 41 21·9 3 37 4·8 3 32 47·2 3 28 29·0 3 24 10·2	1·52 1·55 1·58	3 39 50·4 3 35 31·7 3 31 12·4 3 26 52·5 3 22 31·9	1·55 1·58 1·61 1·64 1·67
40	3 25 50·7 3 21 36·8 3 17 22·5 3 13 7·7 3 8 52·5	1.41	3 24 26·6 3 20 11·4 3 15 55·7 3 11 39·4 3 7 22·6	1·43 1·46 1·48 1·51 1·53	3 14 24.7 3 10 6.8	1.52	3 21 26·7 3 17 8·4 3 12 49·4 3 8 29·7 3 4 9·2	1.59	3 19 50·7 3 15 30·6 3 11 9·6 3 6 47·9 3 2 25·3	1·63 1·67 1·70 1·74 1·77	3 18 10·5 3 13 48·3 3 9 25·3 3 5 1·3 3 0 36·3	1·71 1·74 1·78 1·82 1·86
43 44 45	3 4 36·7 3 0 20·4 2 56 3·5 2 51 45·9 2 47 27·7	1·54 1·57	3 3 5·2 2 58 47·2 2 54 28·4 2 50 8·9 2 45 48·6	1.63	2 57 9·0 2 52 48·2 2 48 26·5	1.71	2 59 47.9 2 55 25.8 2 51 2.6 2 46 38.5 2 42 13.3	1·77 1·81 1·85	2 58 1.7 2 53 37.1 2 49 11.5 2 44 44.7 2 40 16.5	1·86 1·90 1·95	2 56 10·2 2 51 43·0 2 47 14·5 2 42 44·7 2 38 13·4	1·90 1·95 2·00 2·05 2·11
48 49 50	2 43 8·7 2 38 48·8 2 34 28·1 2 30 6·5 2 25 43·7	1·68 1·72 1·76	2 41 27·4 2 37 5·2 2 32 41·9 2 28 17·6 2 23 51·9	1·78 1·82 1·87	2 39 40·1 2 35 15·3 2 30 49·3 2 26 21·9 2 21 53·1	1.93 1.93	2 37 46·8 2 33 19·1 2 28 49·8 2 24 19·1 2 19 46·7	1·99 2·05 2·11	2 35 47·0 2 31 16·0 2 26 43·3 2 22 8·9 2 17 32·4	2·17 2·24	2 29 5·9 2 24 29·4	2·17 2·23 2·30 2·37 2·45
		VA	RIATIO	N TO	1' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 0°	A.	L. 1°	Α.	L. 2°	Α.	L. 3°	A.	L. 4°	A.	L. 5°	A.
0 4 8 10	s. ·00 ·08 ·15 ·19 ·24	S. -4·I4 4·I4 4·I4 4·I5	s. - ·07 - ·15 ·23 ·27 ·31	S. -4·14 4·15 4·15 4·15	s. - ·15 - ·23 ·31 ·35 ·39	s. -4·14 4·15 4·15 4·16 4·16	s. - ·22 ·30 ·38 ·43 ·47	s. -4·15 4·15 4·16 4·16 4·17	s. - ·30 ·38 ·46 ·50 ·55	s. -4·15 4·16 4·17 4·17 4·18	s. - ·37 - ·45 ·54 ·58 ·62	s. -4·16 4·17 4·18 4·18 4·19
14 16 18 20 22	·28 ·32 ·36 ·40 ·45	4·15 4·16 4·16 4·16 4·16	·36 ·40 ·44 ·49 ·53	4·16 4·16 4·17 4·17	.43 .48 .52 .57 .62	4·16 4·17 4·17 4·18 4·19	·51 ·56 ·60 ·65 ·70	4·17 4·18 4·18 4·19 4·20	·59 ·64 ·68 ·73 ·78	4·18 4·19 4·20 4·21 4·21	·67 ·72 ·77 ·82 ·87	4·19 4·20 4·21 4·22 4·3
24 26 28 30 32	·50 ·54 ·60 •65 ·70	4·17 4·18 4·18 4·19 4·20	·58 ·63 ·68 ·74 ·80	4·18 4·19 4·20 4·21 4·22	·67 ·72 ·77 ·83 ·89	4·19 4·20 4·21 4·22 4·24	·75 ·81 ·86 ·92 ·98	4·21 4·22 4·23 4·24 4·26	·84 ·89 ·95 I·01 I·08	4·22 4·24 4·25 4·26 4·28	.93 .98 1.04 1.11 1.18	4·24 4·26 4·27 4·29 4·31
34 36 38 40 42	·76 ·82 ·89 ·95 I·03	4·21 4·22 4·23 4·25 4·27	·86 ·92 ·99 I·06 I·14	4·23 4·24 4·26 4·28 4·29	.95 1.02 1.09 1.17 1.25	4·25 4·27 4·28 4·30 4·33	1·05 1·12 1·20 1·28 1·37	4·27 4·29 4·31 4·33 4·36	1·15 1·23 1·31 1·39 1·49	4·30 4·32 4·34 4·37 4·40	1·25 1·33 1·42 1·51 1·61	4·33 4·35 4·38 4·41 4·44
44 46 48 50 51	1·11 1·20 1·29 1·40 1·45	4°29 4°31 4°34 4°37 4°39	1·23 1·32 1·42 1·54 1·60	4·32 4·35 4·38 4·42 4·44	1·35 1·45 1·56 1·68 1·75	4·35 4·39 4·42 4·47 4·49	1 47 1·58 1·69 1·83 1·90	4·39 4·43 4·47 4·53 4·56	1·59 1·71 1·84 1·98 2·06	4:44 4:48 4:53 4:59 4:63	1·72 1·85 1·99 2·14 2·23	4·49 4·53 4·59 4·66 4·70

LATITUDE 15°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 8 10 12	H. M. S. 5 53 32.7 5 20 8.5 5 11 45.7 5 3 22.1 4 54 57.6	1.19	H. M. S. 5 52 27.5 5 18 58.3 5 10 34.0 5 2 8.8 4 53 42.5	S. - I·09 I·18 I·20 I·23 I·26	H. M. S. 5 51 22·0 5 17 47·1 5 9 21·1 5 0 54·1 4 52 25·8	1.19	5 8 7:0 4 59 37:9	1·21 1·25 1·28	H. M. S. 5 49 10·1 5 15 21·6 5 6 51·6 4 58 20·3 4 49 47·6	s. -1·11 1·23 1·27 1·31 1·35	5 14 7.0 5 5 34.8 4 57 1.1	s. -1·11 1·25 1·29 1·33 1·38
16 18 20 22 23	4 46 32·0 4 38 5·4 4 29 37·4 4 21 8·2 4 16 53·0	I·34	4 45 15.0 4 36 4 6 .3 4 28 16.2 4 19 44.6 4 15 28.1	1·33 1·41	4 43 56·3 4 35 25·3 4 26 52·8 4 18 18·6 4 14 0·8	1·37 1·41 1·45	4 42 35.7 4 34 2.3 4 25 27.1 4 16 50.1 4 12 30.8	I·40 I·45 I·50	4 4I 13·3 4 32 37·2 4 23 59·I 4 I5 18·9 4 IO 58·O	1·44 1·49 1·54	4 39 48·8 4 31 9·8 4 22 28·6 4 13 45·1 4 9 22·4	1·42 1·48 1·53 1·59 1·62
24 25 26 27 28	4 12 37·4 4 8 21·4 4 4 4·9 3 59 48·0 3 55 30·5	1·44 1·46 1·48	4 11 .11·2 4 6 53·9 4 2 36·0 3 58 17·6 3 53 58·6	1.48 1.51 1.53		1.58		1.64		1.66		1.65 1.68 1.72 1.75 1.79
29 30 31 32 33	3 51 12·6 3 46 54·1 3 42 35·0 3 38 15·3 3 33 54·9	1.56 1.59 1.62	3 49 39·1 3 45 18:9 3 40 58·1 3 36 36·5 3 32 14·3	1.62 1.65 1.68	3 48 2·2 3 43 40·2 3 39 17·5 3 34 54·0 3 30 29·6		3 41 57·9 3 37 33·1 3 33 7·4	1.74 1.77 1.81	3 44 38·0 3 40 11·9 3 35 44·8 3 31 16·8 3 26 47·7	1.80 1.84 1.88	3 42 50·2 3 38 21·8 3 33 52·3 3 29 21·8 3 24 50·0	1.83 1.87 1.91 1.95 2.00
34 35 36 37 38	3 29 33·8 3 25 12·0 3 20 49·3 3 16 25·8 3 12 1·4	1·71 1·75 1·78	3 27 51·2 3 23 27·3 3 19 2·4 3 14 36·6 3 10 9·8	1.78 1.82 1.86		1.94	3 19 44·5 3 15 14·7 3 10 43·6	1.98 2.03	3 22 17.5 3 17 46.1 3 13 13.4 3 8 39.3 3 4 3.8	2·01 2·12	3 20 17.0 3 15 42.7 3 11 6.9 3 6 29.6 3 1 50.6	2·10 2·15 2·21
39 40 41 42 43	3 7 36·0 3 3 9·6 2 58 42·0 2 54 13·2 2 49 43·1	1.91 1.95 2.00	3 5 41.8 3 1 12.6 2 56 42.2 2 52 10.4 2 47 37.1	1.99 2.04 2.10	2 59 10.2	2.14	2 57 2·I 2 52 25·I	2·19 2·25 2·31	2 59 26·7 2 54 47·8 2 50 7·1 2 45 24·4 2 40 39·5	2·29 2·36 2·42	2 57 9.9 2 52 27.2 2 47 42.4 2 42 55.4 2 38 5.8	2·47 2·55
44 45 46 47 48	2 45 11·5 2 40 38·4 2 36 3·6 2 31 27·0 2 26 48·3	2·16 2·22 2·29	2 43 2·I 2 38 25·4 2 33 46·7 2 29 6·0 2 24 22·9	2·28 2·34 2·42		2·40 2·47 2·55	2 38 22.8 2 33 37.8 2 28 50.1 2 23 59.7 2 19 6.2	2·53 2·61 2·70	2 35 52·2 2 31 2·2 2 26 9·4 2 21 13·4 2 16 13·8	2·66 2·75 2·85	2 33 13·5 2 28 18·2 2 23 19·6 2 18 17·4 2 13 11·1	3.02 3.02
		V	ARIATIO	ON TO	ı' OF	LAT	ITUDE .	AND	ALTITU	DE.		
Alt.	L. 6°	Α.	L. 7	Α.	L. 8°	A.	L. 9°	' A.	L. 10	° A.	L. 11	° A.
0 2 4 6 8	s. - :45 :49 :53 :57 :62	S. -4·17 4·17 4·17 4·18 4·19	s. - ·53 ·57 ·61 ·65 ·69	s. -4·17 4·18 4·19 4·19 4·20	s. - ·60 ·64 ·68 ·73 ·77	S. 4·18 4·19 4·20 4·20 4·21	s. 68 .72 .76 .81 .85	S. -4·19 4·20 4·21 4·22 4·23	s. 76 .80 .84 .88 .93	s. -4·21 4·22 4·23 4·23 4·24	s. - ·83 ·88 ·92 ·96 I·01	S. -4·22 4·23 4·24 4·25 4·26
10 12 14 16 18	-66 -70 -75 -80 -85	4·19 4·20 4·21 4·22 4·23	·74 ·78 ·83 ·88 ·93	4·21 4·21 4·22 4·23 4·24	·82 ·86 ·91 ·96 I·02	4·22 4·23 4·24 4·25 4·26	·90 ·95 I·00 I·05 I·10	4·24 4·25 4·26 4·27 4·28	·98 1·03 1·08 1·13 1·19	4·26 4·27 4·28 4·29 4·31	1·06 1·11 1·16 1·22 1·28	4·27 4·29 4·30 4·32 4·33
20 22 24 26 28	·90 ·96 I·01 I·07 I·14	4·24 4·25 4·26 4·28 4·29	·99 I·04 I·10 I·17 I·23	4·26 4·27 4·29 4·30 4·32	1·07 1·13 1·19 1·26 1·33	4·28 4·29 4·31 4·33 4·35	1·16 1·22 1·29 1·35 1·43	4·30 4·32 4·34 4·36 4·38	1·25 1·31 1·38 1·45 1·53	4·33 4·34 4·36 4·39 4·41	1·34 1·40 1·47 1·55 1·63	4·35 4·37 4·40 4·42 4·45
30 32 34 36 38	1·21 1·28 1·36 1·44 1·53	4·31 4·33 4·36 4·38 4·41	1·30 1·38 1·46 1·55 1·65	4·34 4·36 4·39 4·42 4·46	1·40 1·48 1·57 1·66	4·37 4·40 4·43 4·46 4·50	1·51 1·59 1·68 1·78 1·89	4·41 4·44 4·47 4·51 4·55	1.61 1.70 1.79 1.90 2.02	4·44 4·48 4·51 4·56 4·60	1·72 1·81 1·91 2·02 2·15	4·48 4·52 4·56 4·61 4·66
40 42 44 46 48	1·63 1·74 1·86	4·45 4·49 4·54 4·59 4·66	1·75 1·87 2·00 2·14 2·30	4·50 4·54 4·60 4·66 4·74	1.88 2.00 2.14 2.30 2.48	4·55 4·60 4·66 4·74 4·82	2·01 2·14 2·29 2·46 2·66	4·60 4·66 4·73 4·82 4·93	2·14 2·29 2·45 2·63 2·85	4·66 4·73 4·81 4·91 5·03	2·28 2·44 2·61 2·81 3·05	4·73 4·80 4·90 5·01 5·14

LATITUDE 15°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 6 8 10	H. M. S. 5 46 56·4 5 21 24·6 5 12 51·4 5 4 16·7 4 55 40·4	1·23 1·27 1·31	H. M. S. 5 45 48·8 5 20 10·1 5 11 34·3 5 2 57·0 4 54 17·9	s. -1·13 1·25 1·29 1·34 1·39	H. M. S. 5 44 40·6 5 18 54·5 5 10 16·0 5 1 35·7 4 52 53·6	S. -1·14 1·27 1·32 1·37 1·42	H. M. S. 5 43 31·8 5 17 37·7 5 8 56·2 5 0 12·9 4 51 27·4	s. -1·15 1·29 1·34 1·39 1·45	H. M. S. 5 42 22.4 5 16 19.6 5 7 35.0 4 58 48.3 4 49 59.3	1·31 1·37 1·42	H. M. S. 5 41 12·2 5 15 0·1 5 6 12·1 4 57 21·9 4 48 29·1	s. - 1·18 1·34 1·39 1·46 1·52
14 16 18 19 20	4 47 2·3 4 38 22·3 4 29 40·1 4 25 18·2 4 20 55·6	1·46 1·51 1·54	4 45 36·8 4 36 53·6 4 28 8·0 4 23 44·3 4 19 19·9	1·50 1·56 1·59	4 44 9·3 4 35 22·6 4 26 33·4 4 22 7·8 4 17 41·4		4 42 39·6 4 33 49·3 4 24 56·2 4 20 28·5 4 16 0·0	1·58 1·64 1·68	4 4I 7·8 4 32 I3·5 4 23 I6·2 4 I8 46·3 4 I4 I5·5	1.55 1.62 1.69 1.73 1.77	4 39 33.7 4 30 35.2 4 21 33.4 4 17 1.1 4 12 27.9	1·59 1·66 1·74 1·78 1·82
21 22 23 24 25	4 16 32:4 4 12 8:5 4 7 43:9 4 3 18:5 3 58 52:3	1·60 1·63 1·67 1·70 1·74	4 14 54·8 4 10 28·9 4 6 2·2 4 1 34·7 3 57 6·3	1·69 1·72	4 13 14·2 4 8 46·2 4 4 17·3 3 59 47·6 3 55 16·8	1·70 1·74 1·78 1·82 1·86	4 II 30·6 4 7 0·3 4 2 29·I 3 57 56·8 3 53 23·5	r.88		1·81 1·85 1·89 1·94 1·99	4 7 53.6 4 3 18.3 3 58 41.7 3 54 4.1 3 49 25.1	1.87 1.91 1.96 2.01 2.06
26 27 28 29 30	3 54 25·3 3 49 57·4 3 45 28·5 3 40 58·6 3 36 27·7	1·77 1·81 1·85 1·89 1·94		1.96	3 50 45.0 3 46 12.1 3 41 38.1 3 37 2.8 3 32 26.2	1·94 1·99 2·04	3 48 49·1 3 44 13·4 3 39 36·5 3 34 58·2 3 30 18·4	2·01 2·06	3 46 49·1 3 42 10·4 3 37 30·4 3 32 48·9 3 28 5·7	2.20	3 44 44.7 3 40 2.9 3 35 19.6 3 30 34.6 3 25 47.8	2·11 2·16 2·22 2·28 2·35
31 32 33 34 35	3 31 55·5 3 27 22·2 3 22 47·6 3 18 11·6 3 13 34·1		3 29 54·2 3 25 17·9 3 20 40·2 3 16 0·9 3 11 19·9	2·06 2·11 2·17 2·22 2·28	3 27 48·2 3 23 8·7 3 18 27·6 3 13 44·7 3 9 0·1		3 25 37·2 3 20 54·2 3 16 9·5 3 11 22·8 3 6 34·1		3 23 20·9 3 18 34·2 3 13 45·5 3 8 54·7 3 4 1·6	2·32 2·38 2·45 2·52 2·60	3 20 59·1 3 16 8·4 3 11 15·4 3 6 20·1 3 1 22·3	2·41 2·48 2·56 2·63 2·72
36 37 38 39 40	3 8 54.9 3 4 14.1 2 59 31.4 2 54 46.8 2 49 59.9	2.44	3 6 37·2 3 1 52·5 2 57 5·8 2 52 16·7 2 47 25·4	2.56	3 4 13.4 2 59 24.6 2 54 33.4 2 49 39.7 2 44 43.3	2·45 2·52 2·60 2·68 2·77		2·64 2·72 2·81	2 59 6·0 2 54 7·8 2 49 6·5 2 44 2·1 2 38 54·1	2·76 2·86 2·95	2 56 21·6 2 51 18·0 2 46 11·0 2 41 0·5 2 35 45·9	2·80 2·90 3·00 3·10 3·22
41 42 43 44 45	2 45 10·6 2 40 18·8 2 35 24·1 2 30 26·4 2 25 25·2	2.68 2.77 2.86	2 42 31·2 2 37 34·2 2 32 33·9 2 27 30·1 2 22 22·4	2·81 2·91	2 39 43.7 2 34 41.0 2 29 34.5 2 24 24.1 2 19 9.1	2·86 2·96 3·07 3·19 3·32	2 36 47·7 2 31 38·6 2 26 25·3 2 21 7·4 2 15 44·4	3·01 3·12 3·24 3·37 3·52	2 33 42·3 2 28 26·2 2 23 5·4 2 17 39·3 2 12 7·2		2 30 27·0 2 25 3·2 2 19 33·9 2 13 58·6 2 8 16·3	3·35 3·48 3·63 3·79 3·97
		VA	RIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITUI	DE.		
Alt.	L. 12°	Α.	L. 13°	Α.	L. 14 °	A.	L. 15°	Α.	L. 16 °	A.	L. 17°	A.
0 · 2 4 6 8	s. - '91 - '95 1.00 1.04 1.09	s. -4·24 4·25 4·26 4·27 4·28	s. - '99 - 1'03 1'08 1'13 1'17	s. -4·25 4·27 4·28 4·29 4·30	s. -1.07 - 1.11 1.16 1.21 1.26	s. -4·28 4·29 4·30 4·31 4·33	S. -1·15 - 1·20 1·24 1·29 1·34	s. -4·30 4·31 4·32 4·34 4·35	s. -1·23 - 1·28 1·33 1·37 1·43	s. -4·32 4·33 4·35 4·36 4·38	s. -1·32 - 1·36 1·41 1·46 1·51	s. -4·34 4·36 4·37 4·39 4·41
10 12 14 16 18	1·14 1·19 1·25 1·31 1·37	4·30 4·31 4·32 4·34 4·36	1·22 1·28 1·34 1·39 1·46	4·32 4·33 4·35 4·37 4·39	1·31 1·37 1·42 1·48 1·55	4·34 4·36 4·38 4·40 4·42	1·39 1·45 1·51 1·58 1·64	4·37 4·39 4·41 4·43 4·45	1·48 1·54 1·60 1·67 1·74	4·40 4·42 4·44 4·46 4·49	1·57 1·63 1·70 1·76 1·84	4·43 4·45 4·47 4·50 4·53
20 22 24 26 28	1.43 1.50 1.57 1.65 1.73	4·38 4·40 4·43 4·46 4·49	1·52 1·60 1·67 1·75 1·84	4·41 4·46 4·50 4·53	1·62 1·69 1·77 1·86 1·95	4·45 4·47 4·50 4·54 4·58	1·72 1·79 1·88 1·97 2·06	4·48 4·51 4·55 4·58 4·63	1.81 1.89 1.98 2.08 2.18	4·52 4·55 4·59 4·63 4·68	1·91 2·00 2·09 2·19 2·30	4·56 4·64 4·68 4·74
30 32 34 36 38	1.83 1.92 2.03 2.15 2.28	4·52 4·57 4·61 4·67 4·73	1·94 2·04 2·16 2·28 2·42	4·57 4·62 4·67 4·73 4·80	2·05 2·16 2·28 2·42 2·57	4·62 4·67 4·73 4·80 4·87	2·17 2·29 2·42 2·56 2·72	4·67 4·73 4·79 4·87 4·96	2·29 2·42 2·55 2·71 2·89	4·73 4·79 4·87 4·95 5·05	2·42 2·55 2·70 2·87 3 05	4·80 4·86 4·94 5·04 5·15
40 42 43 44 45	2·43 2·60 2·69 2·79 2·89	4·80 4·89 4·94 4·99 5·05	2·58 2·76 2·86 2·97 3·09	4·88 4·98 5·03 5·10 5·16	2·74 2·94 3·05 3·16 3·29	4·97 5·08 5·14 5·21 5·29	2·91 3·12 3·24 3·37 3·52	5·06 5·19 5·26 5·34 5·43	3.09 3.32 3.45 3.60 3.76	5·16 5·31 5·39 5·48 5·59	3·27 3·53 3·68 3·84 4·02	5·28 5·44 5·54 5·65 5·77

LATITUDE 15°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 40 1·3 5 31 15·9 5 22 28·6 5 13 39·2 5 4 47·6	s. -1·19 1·24 1·30 1·36 1·42		S. - 1·20 1·26 1·32 1·39 1·45	H. M. S. 5 37 36·8 5 28 44·4 5 19 49·8 5 10 52·8 5 1 53·2	s. -1·22 1·28 1·35 1·41 1·48	5 9 27.1	s. -1·24 1·30 1·37 1·44 1·52		S. -1·25 1·32 1·40 1·47 1·55	5 24 47.9 5 15 40.6 5 6 30.3	s. -1·27 1·35 1·42 1·51 1·59
10 12 14 15 16	4 55 53.5 4 46 56.8 4 37 57.1 4 33 26.0 4 28 54.1	1.63 1.67	4 45 22·2 4 36 17·9	1.71	4 52 50·8 4 43 45·2 4 34 36·1 4 30 0·2 4 25 23·2	1·64 1·72 1·76	4 51 16·1 4 42 5·7 4 32 51·5 4 28 12·9 4 23 33·1		4 49 39·I 4 40 23·6 4 3I 3·9 4 26 22·4 4 2I 39·8		4 38 38.6	1·68 1·77 1·87 1·92 1·98
17 18 19 20 21	4 24 21·2 4 19 47·5 4 15 12·7 4 10 36·8 4 5 59·9	1.79		1.85		1.95 2.00	4 9 26.8	1·91 1·96 2·01 2·07 2·12	4 12 10.7	1·97 2·02 2·08 2·14 2·20	4 10 7·2 4 5 17·1	2·03 2·09 2·15 2·21 2·28
22 23 24 25 26	4 I 21.8 3 56 42.4 3 52 I.7 3 47 I9.5 3 42 35.9	2·02 2·08 2·13	3 59 21·4 3 54 38·9 3 49 54·9 3 45 9·4 3 40 22·3	2·09 2·15 2·21	3 57 16·9 3 52 31·1 3 47 43·7 3 42 54·5 3 38 3·6	2·23	3 55 8·1 3 50 18·7 3 45 27·6 3 40 34·6 3 35 39·7	2·31 2·38	3 52 54·8 3 48 1·6 3 43 6·5 3 38 9·4 3 33 10·1	2·33 2·40 2·47		2·34 2·41 2·49 2·56 2·65
27 28 29 30 31	3 37 50·7 3 33 3·7 3 28 14·9 3 23 24·2 3 18 31·4	2·31 2·37 2·44	3 35 33.4 3 30 42.6 3 25 49.8 3 20 54.8 3 15 57.6	2·40 2·47 2·54	3 33 10·8 3 28 15·9 3 23 18·7 3 18 19·2 3 13 17·1	2·57 2·65	3 30 42·6 3 25 43·2 3 20 41·4 3 15 36·9 3 10 29·7				3 20 18·7 3 15 6·4 3 9 50·9	2·73 2·82 2·91 3·01 3·12
32 33 34 35 36	3 13 36·3 3 8 38·8 3 3 38·7 2 58 35·6 2 53 29·5	2·67 2·75 2·84	3 10 57·8 3 5 55·3 3 0 49·8 2 55 41·2 2 50 29·1	2.98	3 8 12·2 3 3 4·3 2 57 53·2 2 52 38·4 2 47 19·8	3.12	3 5 19·3 3 0 5·5 2 54 48·1 2 49 26·6 2 44 0·8	3.28	3 2 18·3 2 56 58·2 2 51 33·9 2 46 5·2 2 40 31·5	3·09 3·20 3·32 3·44 3·58	2 48 10·I 2 42 33·3	3·23 3·35 3·48 3·63 3·78
39	2 48 20·0 2 43 6·8 2 37 49·5 2 32 27·7 2 27 0·8	3·15 3·27	2 45 13·2 2 39 53·1 2 34 28·3 2 28 58·5 2 23 22·9	3.44	2 41 56·8 2 36 29·1 2 30 56·2 2 25 17·4 2 19 32·0	3·64 3·79	2 38 30·2 2 32 54·1 2 27 12·0 2 21 23·3 2 15 26·9	4.02	2 34 52·3 2 29 6·9 2 23 14·8 2 17 14·8 2 11 6·0	3·73 3·90 4·07 4·27 4·50	2 19 3·0 2 12 50·4	3·95 4·13 4·33 4·56 4·82
		VA	RIATIO	N TC	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	Α.	L. 21°	A.	L. 22°	A.	L. 23°	Α.
0 2 4 6 8	s. 1·40 1·44 1 49 1·55 1·60	s. -4·37 4·39 4·40 4·42 4·44	s. -1·48 - 1·53 1·58 1·63 1·69	s. -4·40 4·41 4·43 4·45 4·47	s. -1·57 - 1·62 1·67 1·72 1·78	s. -4·43 4·45 4·47 4·49 4·51	s. -1.65 - 1.70 1.76 1.81 1.87	s. -4·46 4·48 4·50 4·52 4·55	s. -1·74 - 1·79 1·85 1·91 1·97	s. -4·49 4·51 4·53 4·56 4·59	s. -1.83 - 1.88 1.94 2.00 2.06	s. -4·53 4·55 4·57 4·60 4·63
10 12 14 16 18	1·66 1·72 1·79 1·86 1·94	4·46 4·48 4·51 4·54 4·57	1.75 1.82 1.88 1.96 2.04	4·50 4·52 4·55 4·58 4·62	1·84 1·91 1·98 2·06 2·14	4·53 4·56 4·59 4·63 4·66	1·94 2·01 2·08 2·16 2·25	4·57 4·60 4·64 4·67 4·71	2·03 2·11 2·18 2·27 2·36	4·62 4·65 4·68 4·72 4·77	2·13 2·21 2·29 2·38 2·47	4·66 4·69 4·73 4·77 4·82
20 22 24 26 28	2·02 2·11 2·20 2·31 2·42	4·61 4·65 4·69 4·74 4·80	2·12 2·22 2·32 2·43 2·55	4·65 4·70 4·75 4·80 4·86	2·23 2·33 2·44 2·55 2·68	4·70 4·75 4·80 4·86 4·93	2·34 2·44 2·56 2·68 2·82	4·76 4·81 4·87 4·93 5·01	2·46 2·56 2·68 2·82 2·96	4·81 4·87 4·93 5·01 5·09	2·57 2·69 2·81 2·95 3·11	4·88 4·94 5·01 5·09 5·18
30 32 34 35 36	2·55 2·69 2·85 2·93 3·03	4·86 4·94 5·03 5·08 5·13	2·68 2·84 3·01 3·10 3·20	4.93 5.02 5.12 5.17 5.23	2·83 2·99 3·17 3·27 3·38	5·01 5·11 5·22 5·28 5·35	2·97 3·15 3·35 3·46 3·57	5·10 5·20 5·32 5·39 5·47	3·13 3·31 3·53 3·65 3·78	5·19 5·30 5·44 5·52 5·61	3·29 3·49 3·73 3·86 4·00	5·29 5·42 5·57 5·66 5·76
37 38 39 40 41	3·13 3·23 3·35 3·47 3·61	5·19 5·25 5·33 5:41 5·49	3·31 3·42 3·55 3·69 3·84	5·30 5·37 5·45 5·54 5·65	3·50 3·63 3·77 3·92 4·09	5·42 5·50 5·60 5·70 5·82	3·70 3·84 4·00 4·17 4·36	5·56 5·65 5·76 5·88 6·01	3·92 4·08 4·25 4·44 4·66	5.70 5.81 5.93 6.07 6.23	4·16 4·33 4·53 4·74 4·98	5·87 5·99 6·13 6·30 6·48

LATITUDE 16°.

-					-CONTR		NAME	1	LAIIIO			-
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0·0 5 18 22·2 5 10 2·1 5 1 41·6 4 53 20·8	S. -1·15 1·17 1·18 1·19 1·20	H. M. S. 5 58 51·2 5 17 11·8 5 8 51·1 5 0 29·9 4 52 8·3		H. M. S. 5 57 42·3 5 16 0·5 5 7 39·0 4 59 17·0 4 50 54·4	s. -1·15 1·20 1·21 1·23 1·24	H. M. S. 5 56 33.3 5 14 48.3 5 6 25.8 4 58 2.8 4 49 39.0	S. 1·15 1·21 1·23 1·25 1·27	5 5 11·5 4 56 47·2	I·25 I·27	H. M. S. 5 54 15.0 5 12 20.9 5 3 56.0 4 55 30.2 4 47 3.4	s. -1·16 1·25 1·27 1·29 1·32
18 20 22 24 25	4 44 59·5 4 36 37·7 4 28 15·4 4 19 52·3 4 15 40·4	I·25	4 43 46·1 4 35 23·2 4 26 59·6 4 18 35·2 4 14 22·7	1.30	4 42 31·0 4 34 6·9 4 25 41·9 4 17 16·0 4 13 2·6	1·31 1·34	4 41 14·3 4 32 48·7 4 24 22·1 4 15 54·4 4 11 40·1	1.35	4 39 55 8 4 31 28·6 4 23 0·2 4 14 30·5 4 10 15·1	1.38	4 30 6·5 4 21 36·0 4 13 4·1	1·35 1·39 1·42 1·46 1·48
26 27 28 29 30	4 11 28·4 4 7 16·1 4 3 3·6 3 58 50·8 3 54 37·8	1.31			4 4 34.9	1·39 1·40	4 7 25·4 4 3 10·4 3 58 55·0 3 54 39·2 3 50 23·0	1.47		1.52	4 4 30·5 4 0 13·0 3 55 55·1 3 51 36·6 3 47 17·6	1·50 1·52 1·55 1·57 1·60
31 32 33 34 35	3 50 24·5 3 46 10·9 3 41 57·0 3 37 42·7 3 33 28·0	1.39	3 49 1.5 3 44 46.8 3 40 31.8 3 36 16.3 3 32 0.5	1.45	3 47 35·5 3 43 19·6 3 39 3·4 3 34 46·6 3 30 29·3	1.50	3 46 6·3 3 41 49·1 3 37 31·5 3 33 13·2 3 28 54·4	1.50	3 44 33.8 3 40 15.2 3 35 56.0 3 31 36.1 3 27 15.7	1.59 1.62 1.65	3 42 58·0 3 38 37·7 3 34 16·8 3 29 55·2 3 25 32·9	1.63 1.65 1.68 1.71 1.75
36 37 38 39 40	3 29 12·9 3 24 57·4 3 20 41·5 3 16 25·1 3 12 8·1	1·47 1·49 1·52	3 27 44·1 3 23 27·3 3 19 9·9 3 14 51·9 3 10 33·4	1·54 1·56 1·59	3 26 11·5 3 21 53·1 3 17 34·1 3 13 14·5 3 8 54·2	1.63	3 20 14·9 3 15 54·2 3 11 32·6	1.67 1.70		1·74 1·78 1·81		1.90
41 42 43 44 45	3 7 50·6 3 3 32·5 2 59 13·7 2 54 54·2 2 50 34·0	1.66			3 0 11·1 2 55 48·4 2 51 24·6	1.73 1.76 1.80 1.84 1.88	2 53 57 8	1.85	3 0 56·1 2 56 29·5 2 52 1·8 2 47 32·8 2 43 2·4	1·94 1·98 2·03	2 58 59·9 2 54 30·6 2 50 0·0 2 45 27·9 2 40 54·3	
46 47 48 49 50	2 46 13·0 2 41 51·1 2 37 28·2 2 33 4 3 2 28 39·2	1.77 1.81 1.85	2 44 26·4 2 40 2·1 2 35 36·6 2 31 9·9 2 26 41·8	1.87 1.91 1.96	2 42 34.0 2 38 6.9 2 33 38.6 2 29 8.6 2 24 37.4	1.97	2 27 06	2·08 2·14 2·20	2 38 30·6 2 33 57·2 2 29 22·0 2 24 44·9 2 20 5·8	2·20 2·26 2·33	2 36 19·0 2 31 41·9 2 27 2·8 2 22 21·4 2 17 37·6	2·32 2·39 2·46
		V.	ARIATIO	ON TO	ı' OF	LAT	ITUDE .	AND,	ALTITU	DE.		
Alt.	L. 0°	A.	L. 1°	A.	L. 2°	A.	L. 3°	A.	L. 4°	Α.	L. 5°	A.
° 0 4 6 8 10	s. - ·00 ·08 ·12 ·17 ·21	s. -4·16 4·16 4·16 4·16 4·17	s. ·08 ·16 ·20 ·24 ·29	s. -4·16 4·16 4·16 4·17 4·17	s. - ·15 ·23 ·28 ·32 ·36	s. -4·17 4·17 4·17 4·17 4·18	s. - ·23 ·31 ·35 ·40 ·44	s. -4·17 4·17 4·18 4·18 4·18	s. - ·30 ·39 ·43 ·47 ·52	s. -4·17 4·18 4·18 4·19 4·19	s. ·38 ·46 ·51 ·55 ·60	S. -4·18 4·19 4·19 4·20 4·20
12 14 16 18 20	·25 ·30 ·34 ·39 ·44	4·17 4·17 4·17 4·18 4·18	·33 ·38 ·42 ·47 ·52	4·17 4·18 4·18 4·19 4·19	·41 ·46 ·50 ·55 ·60	4·18 4·19 4·19 4·20 4·20	.49 .53 .58 .63	4·19 4·19 4·20 4·21 4·22	·57 ·62 ·66 ·72 ·77	4·20 4·21 4·21 4·22 4·23	·65 ·70 ·75 ·80 ·85	4·21 4·22 4·23 4·24 4·25
22 24 26 28 30	·48 ·53 ·59 ·64 ·70	4·19 4·19 4·20 4·21 4·22	·57 ·62 ·67 ·73 ·79	4·20 4·21 4·21 4·22 4·23	·65 ·71 ·76 ·82 ·88	4·21 4·22 4·23 4·24 4·25	·74 ·79 ·85 ·91 ·98	4·23 4·24 4·25 4·26 4·27	-82 -88 -94 1.00 1.07	4·24 4·25 4·27 4·28 4·30	·91 ·97 I·03 I·10 I·17	4·26 4·27 4·29 4·30 4·32
32 34 36 38 40	·76 ·82 ·89 ·96 I·03	4·23 4·24 4·25 4·27 4·29	·85 ·92 ·99 1·06 1·14	4·25 4·26 4·28 4·29 4·31	95 1·02 1·09 1·17 1·25	4·27 4·28 4·30 4·32 4·34	1·04 1·12 1·19 1·28 1·37	4·29 4·31 4·33 4·35 4·38	1·14 1·22 1·30 1·39 1·48	4·32 4·34 4·36 4·39 4·42	1·24 1·32 1·41 1·50 1·60	4·34 4·37 4·39 4·42 4·46
42 44 46 48 50	1·11 1·20 1·29 1·40 1·51	4·31 4·33 4·36 4·39 4·43	1·23 1·32 1·42 1·53 1·66	4·33 4·37 4·40 4·43 4·47	1·34 1·44 1·55 1·67 1·81	4·37 4·40 4·44 4·49 4·53	1·46 1·57 1·69 1·82 1·96	4·41 4·45 4·49 4·54 4·60	1·58 1·70 1·82 1·97 2·13	4·45 4·49 4·54 4·60 4·67	1·71 1·83 1·97 2·12 2·30	4·50 4·55 4·60 4·67 4·75

LATITUDE 16°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

DECLINATION—CONTRARY NAME TO—LATITUDE.												
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 6 8 10 12	H. M. S. 5 53 5.5 5 27 55.8 5 19 31.1 5 11 5.6 5 2 39.2	1.22		1·23 1·26	H. M. S. 5 50 45.7 5 25 28.0 5 17 0.3 5 8 31.4 5 0 1.5	1·25 1·27 1·30	H. M. S. 5 49 35·3 5 24 12·8 5 15 43·3 5 7 12·5 4 58 40·4	s. -1·18 1·26 1·29 1·33 1·36	5 14 25.1	s. - 1·18 1·28 1·31 1·35 1·39	5 21 39·5 5 13 5·8	S. - I·19 I·29 I·33 I·37 I·42
14 16 18 20 22	4 54 11.8 4 45 43.2 4 37 13.4 4 28 42.2 4 20 9.6	1·35 1·38 1·42	4 52 51.8 4 44 21.2 4 35 49.3 4 27 15.9 4 18 40.7	1·38 1·42 1·46	4 51 30·2 4 42 57·5 4 34 23·2 4 25 47·2 4 17 9·3	1.41 1.45 1.50	4 50 6·9 4 4I 3I·8 4 32 55·0 4 24 I6·3 4 I5 35·4	I·44 I·49 I·54	4 48 42·0 4 40 4·2 4 31 24·6 4 22 42·9 4 13 58·8	1.58	4 47 15·1 4 38 34·6 4 29 51·9 4 21 6·9 4 12 19·4	1.46 1.51 1.56 1.62 1.68
23 24 25 26 27	4 15 52.6 4 11 35.2 4 7 17.3 4 2 59.0 3 58 40.1	1·50 1·53 1·55	4 14 22·4 4 10 3·6 4 5 44·3 4 1 24·5 3 57 4·0	1.55	4 12 49.6 4 8 29.3 4 4 8.5 3 59 47.0 3 55 24.8	1·59 1·62 1·65	4 II I4·I 4 6 52·2 4 2 29·6 3 58 6·4 3 53 42·4	1.70	4 9 35.8 4 5 12.1 4 0 47.7 3 56 22.5 3 51 56.5	1·66 1·69 1·73 1·76 1·79	4 3 28·9 3 59 2·5 3 54 35·2	1.71 1.75 1.78 1.82 1.85
28 29 30 31 32	3 54 20·6 3 50 0·6 3 45 39·9 3 41 18·6 3 36 56·6	1.63 1.69	3 52 43.0 3 48 21.2 3 43 58.8 3 39 35.6 3 35 11.7	1.71	3 51 2·0 3 46 38·4 3 42 14·1 3 37 48·9 3 33 22·8	1·74 1·78 1·81	3 49 17.6 3 44 52.1 3 40 25.6 3 35 58.2 3 31 29.9	1.84 1.88	3 47 29:7 3 43 1.9 3 38 33:2 3 34 3:5 3 29 32:6	1.87 1.91	3 36 36.7	1.89 1.93 1.98 2.02 2.07
33 34 35 36 37	3 32 33.9 3 28 10.3 3 23 45.9 3 19 20.6 3 14 54.3	1·78 1·82 1·86	3 30 46·9 3 26 21·2 3 21 54·6 3 17 27·0 3 12 58·2	1.82 1.85 1.89 1.93 1.98		1.93		2'.00			3 18 19·8 3 13 42·0 3 9 2·7	2·12 2·17 2·22 2·28 2·34
38 39 40 41 42	3 10 27·I 3 5 58·7 3 I 29·0 2 56 58·I 2 52 25·9	1·98 2·03 2·08	3 8 28·3 3 3 57·2 2 59 24·7 2 54 50·7 2 50 15·2	2·02 2·07 2·12 2·17 2·23	3 6 24·4 3 I 50·2 2 57 I4·6 2 52 37·2 2 47 58·I			2.32	3 I 59·9 2 57 I8·8 2 52 36·0 2 47 50·9 2 43 3·6	2·36 2·43 2·50	2 59 38·8 2 54 53·9 2 50 6·7 2 45 17·3 2 40 25·2	2·40 2·47 2·55 2·62 2·71
43 44 45 46 47	2 47 52·1 2 43 16·7 2 38 39·5 2 34 0·4 2 29 19·2	2·18 2·24 2·31 2·37 2·44	2 45 37.9 2 40 58.8 2 36 17.6 2 31 34.4 2 26 48.6	2·43 2·50	2 43 17·0 2 38 33·9 2 33 48·4 2 29 0·4 2 24 9·7	2·55 2·64	2 40 49·I 2 36 I·5 2 3I II·3 2 26 I8·I 2 2I 2I·8	2.61	2 38 13·7 2 33 21·2 2 28 25·6 2 23 26·8 2 18 24·3	2·74 2·84 2·93	2 35 30·4 2 30 32·4 2 25 31·0 2 20 25·9 2 15 16·4	2·79 2·89 2·99 3·10 3·22
		V.	ARIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITUI	DE.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	Α.	L. 9°	Α.	L. 10°	Α.	L. 11°	A.
0 2 4 6 8	S. - ·45 ·50 ·54 ·59 ·63	s. -4·18 4·19 4·20 4·21	s. - '53 - '57 '62 '66 '71	S. -4·19 4·20 4·21 4·21 4·22	s. - ·61 - ·65 ·70 ·74 ·79	S. -4·20 4·21 4·22 4·23 4·24	s. - ·69 - ·73 ·77 ·82 ·87	S. -4·22 4·22 4·23 4·24 4·25	s. ·76 - ·81 ·85 ·90 ·95	s. -4·23 4·24 4·25 4·26 4·27	s. - ·84 ·89 ·93 ·98 1·03	s. -4·24 4·25 4·26 4·28 4·29
10 12 14 16 18	·68 ·73 ·78 ·83 ·88	4·22 4·23 4·24 4·25	·76 ·81 ·86 ·91	4·23 4·24 4·25 4·26 4·27	·84 ·89 ·94 I·00 I·05	4·24 4·25 4·27 4·28 4·29	·92 ·97 I·03 I·08 I·14	4·26 4·27 4·29 4·30 4·31	1.00 1.05 1.11 1.17 1.23	4·28 4·29 4·31 4·32 4·34	1.08 1.14 1.20 1.25 1.32	4·30 4·31 4·33 4·35 4·37
20 22 24 26 28	*94 1.00 1.06 1.12 1.19	4·27 4·28 4·30 4·31 4·33	1·03 1·09 1·15 1·22 1·29	4·29 4·30 4·32 4·34 4·36	1·11 1·18 1·24 1·31 1·39	4·31 4·32 4·34 4·36 4·39	1·20 1·27 1·34 1·41 1·49	4·33 4·35 4·37 4·39 4·42	1·29 1·36 1·43 1·51 1·59	4·36 4·38 4·40 4·43 4·46	1·38 1·45 1·53 1·61 1·70	4·39 4·41 4·43 4·46 4·49
30 32 34 36 38	1·27 1·34 1·43 1·52 1·62	4·35 4·37 4·40 4·43 4·46	1·37 1·45 1·54 1·63 1·74	4·38 4·41 4·44 4·47 4·51	1·47 1·55 1·65 1·75 1·86	4.41 4.44 4.48 4.51 4.56	1·57 1·66 1·76 1·87 1·98	4·45 4·48 4·52 4·56 4·61	1.68 1.77 1.88 1.99 2.12	4·49 4·52 4·56 4·61 4·67	1·79 1·89 2·00 2·12 2·25	4·53 4·57 4·62 4·67 4·73

2.12

2.26

2.42

2.61

2.71

4.67

4.74 4.81

4·91 4·97

2.26

2·41 2·59

2·79 2·91

4.73 4.81

4.90 5.01

5.08

2.40

2·57 2·76

2.98

3.11

4.80

4.89

4·99 5·12

5.20

4.50

4·55 4·60

4.67

40

42

44 46

1·72 1·84

1.97

2.12

2.20

1·85 1·98

2.12

2.27

2.36

4·55 4·61 4·67

4.74

1.98

2.11

2.27

2.44

2.53

4.61

4·67 4·74 4·82

4.87

LATITUDE 16°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 4 6 8 10	H. M. S. 5 46 1.4 5 28 56.0 5 20 21.3 5 11 45.2 5 3 7.4	1.35	H. M. S. 5 44 49.0 5 27 39.1 5 19 2.0 5 10 23.2 5 1 42.7	s. - 1·21 1·29 1·33 1·38 1·42	H. M. S. 5 43 36·1 5 26 21·2 5 17 41·4 5 8 59·8 5 0 16·4	s. -1·22 1·31 1·35 1·40 1·45	H. M. S. 5 42 22.4 5 25 2.3 5 16 19.6 5 7 35.0 4 58 48.3	s. -1·23 1·33 1·37 1·43 1·48	5 23 42·I 5 I4 56·4	s. - 1·25 1·34 1·40 1·45 1·51	5 4 40.5	s. 1·26 1·36 1·42 1·48 1·55
12 14 16 18 19	4 54 27·9 4 45 46·4 4 37 2·8 4 28 16·9 4 23 53·0	1·50 1·55 1·60	4 53 0·2 4 44 15·6 4 35 28·7 4 26 39·3 4 22 13·5	1·53 1·59 1·65	4 51 30.7 4 42 42.8 4 33 52.4 4 24 59.1 4 20 31.3	1.63 1.69	4 49 59·3 4 41 7·8 4 32 13·5 4 23 16·2 4 18 46·3	1·67	4 48 25.8 4 39 30.5 4 30 32.1 4 21 30.4 4 16 58.2	1·64 1·71 1·79	4 46 50·2 4 37 50·7 4 28 48;0 4 19 41·7 4 15 7·0	1.61 1.68 1.76 1.84 1.88
20 21 22 23 24	4 19 28·4 4 15 3·1 4 10 37·0 4 6 10·2 4 1 42·5	1.67 1.70 1.73 1.77 1.80	4 17 47.0 4 13 19.7 4 8 51.6 4 4 22.6 3 59 52.7	1·71 1·75 1·78 1·82 1·86	4 16 2.8 4 11 33.4 4 7 3.0 4 2 31.7 3 57 59.4	1·76 1·80 1·84 1·88 1·92	4 5 II·I 4 0 37·3	1.85 1.89 1.94	4 12 25·I 4 7 50·9 4 3 15·6 3 58 39·2 3 54 1·5	1·91 1·95 2·00	4 10 31·3 4 5 54·5 4 1 16·5 3 56 37·2 3 51 56·6	1·92 1·97 2·02 2·07 2·12
25 26 27 28 29	3 57 13·9 3 52 44·4 3 48 13·9 3 43 42·4 3 39 9·8	1.96	3 55 21.8 3 50 49.9 3 46 16.9 3 41 42.8 3 37 7.4	1.94	3 44 15·8 3 39 38·8	2·01 2·05	3 51 26·4 3 46 49·1 3 42 10·4 3 37 30·4 3 32 48·9	2·08 2·13 2·18	3 49 22.6 3 44 42.3 3 40 0.6 3 35 17.3 3 30 32.3	2·15 2·20 2·26	3 47 14·6 3 42 31·1 3 37 46·0 3 32 59·2 3 28 10·5	2·17 2·23 2·29 2·35 2·41
30 31 32 35 34	3 34 35.9 3 30 0.7 3 25 24.4 3 20 46.4 3 16 7.0	2·10 2·15 2·20	3 32 30.7 3 27 52.5 3 23 12.9 3 18 31.7 3 13 48.8	2.29			3 28 5.7 3 23 20.9 3 18 34.2 3 13 45.5 3 8 54.7	2.35	3 25 45.6 3 20 56.9 3 16 6.3 3 11 13.4 3 6 18.2	2.45	3 23 19·9 3 18 27·2 3 13 32·2 3 8 34·8 3 3 34·8	2·48 2·55 2·62 2·70 2·78
35 36 37 38 39	3 11 25.9 3 6 43.0 3 1 58.2 2 57 11.3 2 52 22.1	2.21	3 9 4·0 3 4 17·2 2 59 28·3 2 54 37·0 2 49 43·2	2.63	2 56 51.6	2·67 2·75	3 4 1.6 2 59 6.0 2 54 7.8 2 49 6.5 2 44 2.1	2.79	3 I 20·4 2 56 I9·8 2 5I I6·2 2 46 9·3 2 40 58·8	2·83 2·93 3·03	2 58 31·9 2 53 25·9 2 48 16·5 2 43 3·4 2 37 46·2	2·87 2·97 3·07 3·18 3·29
40 41 42 43 44	2 47 30·5 2 42 36·2 2 37 38·9 2 32 38·5 2 27 34·6	2.84	2 39 47·0 2 34 44·I 2 29 37·6	2.99	2 41 54.7 2 36 49.3 2 31 40.1 2 26 26.8 2 21 8.9		2 28 26·2 2 23 5·4	3·20 3·32	2 35 44·3 2 30 25·5 2 25 1·7 2 19 32·5 2 13 57·2	3·37 3·51 3·65	2 32 24·5 2 26 57·8 2 21 25·5 2 15 46·9 2 10 1·3	3·42 3·56 3·71 3·87 4·06
		V	ARIATIO	N TO	ı' OF	LAT	ITUDE A	AND	ALTITU	DE.		
Alt.	L. 12	° A.	L. 13°	Α.	L. 14°	А.	L. 15°	Α.	L. 16°	A.	L. 17°	A.
0 2 4 6 8	S. - '92 '97 1.01 1.06 1.11	s. -4·26 4·27 4·28 4·29 4·31	S. -1.00 - 1.05 1.10 1.15 1.20	s. -4·28 4·29 4·30 4·32 4·33	s. -1.08 1.13 1.18 1.23 1.28	s. -4·30 4·31 4·32 4·34 4·35	S. -1·16 · 1·21 1·26 1·31 1·37	s. -4·32 4·33 4·35 4·36 4·38	s. -1·25 1·29 1·34 1·40 1·45	s. -4·35 4·36 4·37 4·39 4·41	s. 1·33 ·- 1·38 ·- 1·43 ·- 1·48 ·- 1·54	s. -4·37 4·38 4·40 4·42 4·44
10 12 14 16 18	1·17 1·22 1·28 1·34 1·41	4·32 4·34 4·35 4·37 4·39	1·25 1·31 1·37 1·43 1·50	4·35 4·36 4·38 4·40 4·42	1·34 1·40 1·46 1·52 1·59	4·37 4·39 4·41 4·43 4·46	1·42 1·49 1·55 1·62 1·69	4·40 4·42 4·44 4·46 4·49	1·51 1·58 1·64 1·71 1·79	4·43 4·45 4·47 4·50 4·53	1.60 1.67 1.74 1.81 1.89	4·46 4·48 4·51 4·54 4·57
26 22 24 26 28	1.48 1.55 1.63 1.71 1.80	4·42 4·44 4·47 4·50 4·53	1·57 1·65 1·73 1·82 1·91	4·45 4·48 4·51 4·54 4·58	1.67 1.75 1.83 1.93 2.02	4·48 4·51 4·55 4·58 4·63	1·77 1·85 1·94 2·04 2·14	4·52 4·55 4·59 4·63 4·68	1·87 1·95 2·05 2·15 2·26	4·56 4·60 4·64 4·68 4·74	1·97 2·06 2·16 2·27 2·38	4·64 4·64 4·69 4·74 4·80
30 32 34 36 38	1.90 2.01 2.12 2.25 2.39	4·58 4·62 4·67 4·73 4·80	2·02 2·13 2·25 2·39 2·54	4·62 4·67 4·73 4·80 4·88	2·13 2·25 2·38 2·53 2·69	4·68 4·73 4·80 4·87 4·96	2·25 2·38 2·52 2·68 2·86	4·73 4·79 4·87 4·95 5·05	2·38 2·52 2·67 2·83 3·03	4·79 4·86 4·94 5·03 5·14	2·51 2·66 2·82 3·00 3·20	4·86 4·94 5·02 5·13 5·25
40 41 42 43 44	2·55 2·64 2·74 2·84 2·95	4·88 4·93 4·98 5·04 5·10	2·71 2·81 2·91 3·02 3·14	4·97 5·02 5·08 5·14 5·21	2·88 2·98 3·10 3·22 3·35	5·06 5·12 5·19 5·26 5·34	3·06 3·17 3·29 3·43 3·57	5·16 5·23 5·31 5·39 5·48	3·25 3·37 3·51 3·65 3·82	5·28 5·35 5·44 5·54 5·64	3.45 3.58 3.73 3.90 4.08	5·40 5·49 5·59 5·70 5·82

LATITUDE 16°.

DECLINATION—CONTRARY NAME TO—LATITUDE. True 100 Decl. 1

Alt.	18°	Var.	19°	Var.	20°	Var.	21°	Var.	22°	Var.	23°	Var.
° 0 2 4 6 8	H. M. S. 5 38 37.0 5 29 48.7 5 20 58.3 5 12 5.7 5 3 10.6	1.39	5 28 28·3 5 19 34·4 5 10 38·0	s. -1·30 1·35 1·41 1·48 1·54	5 27 6.8 5 18 9.0 5 9 8.6	s. -1·31 1·37 1·44 1·50 1·58	H. M. S. 5 34 43'3 5 25 44'0 5 16 42'1 5 7 37'4 4 58 29'7	s. -1·32 1·39 1·46 1·53 1·61	5 24 19·8 5 15 13·6	1.57	5 22 54·2 5 13 43·4	s. -1·36 1·44 1·52 1·60 1·69
10 12 13 14 15	4 54 12·9 4 45 12·3 4 40 40·8 4 36 8·5 4 31 35·2	1.65 1.69	4 52 37·I 4 43 32·I 4 38 58·3 4 34 23·5 4 29 47·9	1.73 1.77	4 50 59.0 4 41 49.3 4 37 13.1 4 32 35.8 4 27 57.5	1.65 1.73 1.78 1.82 1.86	4 49 18.7 4 40 3.9 4 35 25.1 4 30 45.1 4 26 4.1	1.87	4 47 35.9 4 38 15.8 4 33 34.2 4 28 51.4 4 24 7.4	1.83 1.87 1.92	4 45 50·5 4 36 24·8 4 3I 40·2 4 26 54·4 4 22 7·2	1.78 1.88 1.93 1.98 2.03
16 17 18 19 20	4 27 1·1 4 22 25·9 4 17 49·8 4 13 12·5 4 8 34·1	1.85	4 25 II·2 4 20 33·4 4 I5 54·5 4 II I4·5 4 6 33·I	1.90			4 21 21·8 4 16 38·3 4 11 53·5 4 7 7·2 4 2 19·5	1.97 2.02 2.07 2.13 2.18	4 4 57.6	2·08 2·14 2·20	4 17 18.6 4 12 28.6 4 7 36.9 4 2 43.7 3 57 48.7	2·09 2·15 2·21 2·27 2·33
2I 22 23 24 25	4 3 54·4 3 59 13·5 3 54 31·2 3 49 47·4 3 45 2·1	2.19	4 I 50·5 3 57 6·4 3 52 20·8 3 47 33·7 3 42 44·8	2·15 2·21 2·27	3 59 42·5 3 54 55·0 3 50 6·0 3 45 15·2 3 40 22·6	2.35	3 57 30·2 3 52 39·2 3 47 46·4 3 42 51·7 3 37 55·0	2·37 2·44	3 55 13.4 3 50 18.6 3 45 21.7 3 40 22.9 3 35 21.8	2·39 2·45 2·53	3 52 51·8 3 47 52·9 3 42 51·8 3 37 48·5 3 32 42·7	2·40 2·47 2·55 2·62 2·70
26 27 28 29 30	3 40 15·1 3 35 26·4 3 30 35·8 3 25 43·2 3 20 48·4	2.44	3 37 54·I 3 33 I·5 3 28 6·9 3 23 I0·0 3 I8 I0·7	2·53 2·60	3 35 27·9 3 30 31·1 3 25 32·1 3 20 30·6 3 15 26·4	2.63	3 32 56·1 3 27 54·8 3 22 51·0 3 17 44·6 3 12 35·2	2.74	3 25 12·2 3 20 3·4 3 14 51·5	2.77	3 27 34·2 3 22 22·9 3 17 8·6 3 11 50·9 3 6 29·7	2·79 2·88 2·98 3·08 3·18
31 32 33 34 35	3 15 51·3 3 10 51·7 3 5 49·4 3 0 44·1 2 55 35·7	2·65 2·73 2·82 2·91 3·01		2·95	3 10 19·4 3 5 9·4 2 59 55·9 2 54 38·8 2 49 17·7	3.08	3 7 22.6 3 2 6.6 2 56 46.8 2 51 23.0 2 45 54.6	3.23	3 4 17·8 2 58 55·4 2 53 28·7 2 47 57·5 2 42 21·2	3.38	3 I 4.5 2 55 35.0 2 50 0.8 2 44 21.5 2 38 36.4	3·30 3·42 3·55 3·69 3·85
36 37 38 39 40	2 50 23.7 2 45 8.0 2 39 48.1 2 34 23.5 2 28 53.8			3.52	2 43 52·2 2 38 21·8 2 32 46·1 2 27 4·3 2 21 15·9	3·71	2 40 21·3 2 34 42·5 2 28 57·5 2 23 5·7 2 17 6·2	3.92	2 30 51.0 2 24 55.8 2 18 52.7	4.12	2 26 46·2 2 20 39·5 2 14 23·6	4·02 4·20 4·41 4·63 4·89
		V	ARIATIC	ON TO	ı' OF	LAT	ITUDE	AND	ALTITU	DE.		
Alt.	L. 18	A.	L. 19	° A.	L. 20	° A.	L. 21	° А.	L. 22°	A.	L. 23	A.
0 2 4 6 8	s. -1.41 1.46 1.52 1.57 1.63	s. -4·39 4·41 4·43 4·45 4·47	S. -1.50 1.55 1.60 1.66 1.72	s. -4·42 4·44 4·46 4·48 4·50	s. -1.58 1.64 1.69 1.75 1.81	s. -4.45 4.47 4.49 4.51 4.54	S. -1.67 1.73 1.78 1.84 1.91	s. -4.48 4.50 4.53 4.55 4.58	s. -1.76 1.82 1.87 1.94 2.00	s. -4·52 4·54 4·56 4·59 4·62	s. -1.85 1.91 1.97 2.03 2.10	s. -4.55 4.58 4.60 4.63 4.66
10 12 14 16 18	1·69 1·76 1·83 1·91 1·99	4·49 4·52 4·55 4·58 4·61	1·79 1·86 1·93 2·01 2·09	4·53 4·56 4·59 4·62 4·66	1.88 1.95 2.03 2.11 2.20	4·57 4·60 4·63 4·67 4·71	1·98 2·05 2·13 2·22 2·31	4·61 4·64 4·67 4·71 4·76	2·07 2·15 2·23 2·32 2·42	4·65 4·68 4·72 4·77 4·81	2·18 2·26 2·34 2·43 2·54	4·70 4·73 4·77 4·82 4·87
20 22 24 26 28	2·08 2·17 2·27 2·39 2·51	4·65 4·69 4·74 4·80 4·86	2·18 2·28 2·39 2·51 2·64	4·70 4·75 4·80 4·86 4·93	2·30 2·40 2·51 2·64 2·78	4.75 4.80 4.86 4.93 5.00	2·41 2·52 2·64 2·77 2·92	4.81 4.86 4.93 5.00 5.08	2·53 2·64 2·77 2·91 3·07	4·87 4·93 5·00 5·08 5·17	2·65 2·77 2·91 3·06 3·23	4.93 5.00 5.08 5.16 5.27
30 32 33 34 35	2·65 2·80 2·88 2·97 3·07	4.93 5.02 5.06 5.11 5.17	2·79 2·95 3·04 3·14 3·24	5·01 5·10 5·15 5·21 5·27	2·94 3·11 3·21 3·31 3·42	5.09 5.20 5.25 5.32 5.39	3.09 3.28 3.38 3.50 3.62	5·18 5·30 5·36 5·43 5·51	3·25 3·46 3·57 3·69 3·82	5·28 5·41 5·48 5·56 5·65	3·42 3·64 3·77 3·90 4·05	5·39 5·53 5·61 5·70 5·80
36 37 38 39 40	3·17 3·28 3·40 3·52 3·66	5·23 5·30 5·37 5·45 5·54	3·35 3·47 3·60 3·74 3·89	5·34 5·42 5·50 5·59 5·70	3·54 3·67 3·81 3·97 4·14	5.47 5.55 5.65 5.75 5.87	3·75 3·89 4·05 4·22 4·41	5·60 5·70 5·81 5·93 6·07	3·97 4·13 4·30 4·50 4·71	5.75 5.86 5.99 6.13 6.29	4·21 4·38 4·58 4·80 5·05	5·92 6·04 6·19 6·35 6·54

LATITUDE 17°.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0·0 5 18 9·1 5 9 46·3 5 1 23·1 4 52 59·5	1·25 1·26	H. M. S. 5 58 46.6 5 16 54.1 5 8 30.6 5 0 6.6 4 51 42.2	1.27	H. M. S. 5 57 33.2 5 15 38.2 5 7 13.9 4 58 49.0 4 50 23.4		H. M. S. 5 56 19.7 5 14 21.3 5 5 56.0 4 57 30.0 4 49 3.1	1.33	5 13 3.3	s. -1.23 1.31 1.33 1.35 1.38	5 3 16·5 4 54 47·7	s. -1·23 1·32 1·35 1·38 1·41
18 20 22 24 25	4 44 35.4 4 36 10.6 4 27 45.2 4 19 19.0 4 15 5.5	1.32	4 43 17.0 4 34 51.1 4 26 24.4 4 17 56.8 4 13 42.6	1.34 1.36	4 41 57·1 4 33 29·8 4 25 1·6 4 16 32·3 4 12 17·2	1·37 1·40 1·43	4 40 35.4 4 32 6.6 4 23 36.8 4 15 5.6 4 10 49.4	1.43	4 30 41·4 4 22 9·6 4 13 36·3		4 29 14·1 4 20 40·2 4 12 4·6	1.44 1.47 1.51 1.55 1.57
26 27 28 29 30	4 10 51·8 4 6 37·9 4 2 23·7 3 58 9·2 3 53 54·4		4 5 13.3	1.47		1.49	4 6 33.0 4 2 16.0 3 57 58.7 3 53 41.0 3 49 22.7	1·50 1·52 1·54 1·56 1·59	4 0 43·3 3 56 24·7			1·59 1·62 1·64 1·67 1·70
31 32 33 34 35	3 49 39·3 3 45 23·8 3 41 7·9 3 36 51·6 3 32 34·9	1.47 1.49 1.51	3 48 10·6 3 43 54·0 3 39 37·0 3 35 19·5 3 31 1·4	1·52 1·54 1·57	3 46 38·9 3 42 21·0 3 38 2·6 3 33 43·7 3 29 24·2	1.58 1.60 1.63	3 45 4.0 3 40 44.7 3 36 24.7 3 32 4.3 3 27 43.1	1.09	3 43 25.6 3 39 4.7 3 34 43.2 3 30 21.0 3 25 58.0	I·72 I·75	3 41 43.8 3 37 21.2 3 32 57.9 3 28 33.8 3 24 8.8	1·73 1·76 1·79 1·82 1·86
36 37 38 39 40	3 28 17.8 3 24 0.1 3 19 42.0 3 15 23.2 3 11 3.9	1.57	3 26 42·9 3 22 23·7 3 18 4·0 3 13 43·6 3 9 22·5	1.64	3 25 4·I 3 20 43·3 3 16 2I·8 3 II 59·6 3 7 36·6	1.71	3 23 21·2 3 18 58·7 3 14 35·3 3 10 11·0 3 5 45·8	1·75 1·78 1·82 1·85 1·89	3 17 9.6 3 12 44.1 3 8 17.6	1·82 1·85 1·89 1·93 1·97	3 15 16·1 3 10 48·3 3 6 19·3	1·89 1·93 1·97 2·01 2·06
41 42 43 44 45	3 6 43·9 3 2 23·2 2 58 1·8 2 53 39·5 2 49 16·4	1.74 1.78	3 5 0·7 3 0 38·0 2 56 14·5 2 51 50·1 2 47 24·6	1.83 1.87	3 3 12·7 2 58 47·8 2 54 22·0 2 49 55·1 2 45 27·0	1.92	3 I 19·6 2 56 52·4 2 52 24·0 2 47 54·4 2 43 23·4	1·97 2·01	2 59 21.4 2 54 51.5 2 50 20.3 2 45 47.6 2 41 13.5	2·16		2·11 2·16 2·21 2·27 2·33
46 47 48 49 50	2 44 52·3 2 40 27·2 2 36 1·0 2 31 33·6 2 27 4·8	1.90 1.94 1.99	2 42 58·0 2 38 30·2 2 34 I·2 2 29 30·7 2 24 58·6	2·00 2·05 2·11	2 40 57.6 2 36 26.9 2 31 54.7 2 27 20.7 2 22 45.0	2.11	2 38 51·0 2 34 16·9 2 29 41·1 2 25 3·4 2 20 23·6	2·22 2·29 2·35	2 36 37.6 2 31 59.9 2 27 20.1 2 22 38.2 2 17 53.8	2·35 2·41 2·49	2 34 17·2 2 29 35·4 2 24 51·4 2 20 4·7 2 15 15·2	2·40 2·47 2·55 2·63 2·72
		V.	ARIATIC	N TO) 1' OF	LAT	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 0°	A.	L. 1°	A.	L. 2°	Α.	L. 3°	A.	L. 4°	Α.	L. 5°	A.
0 4 6 8 10	s. - ·00 ·09 ·13 ·18 ·22	s. -4·18 4·18 4·18 4·19 4·19	s. - ·08 ·17 ·21 ·26 ·30	s. -4·18 4·19 4·19 4·19	s. - ·i5 ·24 ·29 ·33 ·38	s. -4·19 4·19 4·20 4·20	s. - ·23 ·32 ·37 ·41 ·46	S. -4·19 4·20 4·20 4·20 4·21	s. - ·31 ·40 ·44 ·49 ·54	s. -4·19 4·20 4·21 4·21 4·22	s. - ·38 ·47 ·52 ·57 ·62	S. -4·20 4·21 4·22 4·22 4·23
12 14 16 18 20	·27 ·32 ·37 ·42 ·47	4·19 4·19 4·20 4·20 4·21	·35 ·40 ·45 ·50 ·55	4·20 4·21 4·21 4·22	.43 .48 .53 .58 .63	4·20 4·21 4·22 4·23	·51 ·56 ·61 ·66 ·72	4·21 4·22 4·23 4·24 4·24	·59 ·64 ·69 ·75 ·80	4·22 4·23 4·24 4·25 4·26	·67 ·72 ·78 ·83 ·89	4·24 4·24 4·25 4·27 4·28
22 24 26 28 30	·52 ·57 ·63 ·69 ·75	4·21 4·22 4·23 4·24 4·25	·60 ·66 ·72 ·78 ·84	4·23 4·23 4·24 4·25 4·27	·69 ·75 ·81 ·87 ·94	4·24 4·25 4·26 4·27 4·29	•78 •84 •90 •96 1•03	4·25 4·27 4·28 4·29 4·31	·86 ·92 ·99 I·06 I·13	4·27 4·28 4·30 4·31 4·33	.95 1.02 1.08 1.15 1.23	4·29 4·30 4·32 4·34 4·36
32 34 36 38 40	·81 ·88 ·95 I·03 I·11	4·26 4·27 4·29 4·31 4·33	·91 ·98 I·06 I·14 I·22	4·28 4·30 4·31 4·33 4·36	1.01 1.08 1.16 1.24 1.34	4·30 4·32 4·34 4·36 4·39	1·11 1·18 1·27 1·36 1·45	4·33 4·35 4·37 4·40 4·43	1·21 1·29 1·37 1·47 1·57	4·35 4·38 4·40 4·43 4·47	1·31 1·39 1·49 1·59 1·70	4·38 4·41 4·44 4·47 4·51
42 44 46 48 50	1·20 1·29 1·40 1·51 1·64	4·35 4·38 4·41 4·45 4·49	1·32 1·42 1·53 1·65 1·79	4·38 4·42 4·45 4·50 4·55	1.43 1.54 1.66 1.79 1.94	4·42 4·46 4·50 4·55 4·61	1·56 1·67 1·80 1·94 2·11	4·46 4·50 4·55 4·61 4·68	1.68 1.81 1.95 2.10 2.28	4·51 4·56 4·61 4·68 4·76	1·81 1·95 2·10 2·26 2·46	4·56 4·61 4·68 4·76 4·85

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 191 LATITUDE 17°.

	DECLINATION—CONTRARY NAME TO—LATITUDE.											
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 6 8 10 12	H. M. S. 5 52 38·1 5 27 20·2 5 18 52·7 5 10 24·3 5 1 54·9	1.30	H. M. S. 5 51 23.7 5 26 2.0 5 17 33.0 5 9 3.0 5 0 31.8	1.34 1.36	5 24 43.0 5 16 12.3		H. M. S. 5 48 53.9 5 23 23.0 5 14 50.5 5 6 16.6 4 57 41.4	1·34 1·37 1·41	H. M. S. 5 47 38.4 5 22 2.1 5 13 27.5 5 4 51.4 4 56 13.8		5 20 40.0 5 12 3.2 5 3 24.7	s. -1·27 1·38 1·42 1·46 1·50
14 16 18 20 22	4 53 24·3 4 44 52·5 4 36 19·4 4 27 44·8 4 19 8·4	1.43 1.47 1.51	4 51 59·4 4 43 25·6 4 34 50·2 4 26 13·1 4 17 34·2	1·46 1·50	4 50 32·8 4 41 56·7 4 33 18·9 4 24 39·2 4 15 57·4	1.24	4 49 4·5 4 40 25·9 4 31 45·4 4 23 2·7 4 14 17·9	1.28 1.28	4 47 34·4 4 38 53·1 4 30 9·7 4 21 24·0 4 12 35·8	1.26	4 46 2.4 4 37 18.2 4 28 31.6 4 19 42.5 4 10 50.6	1.55 1.60 1.65 1.71 1.78
23 24 25 26 27	4 14 49.6 4 10 30.2 4 6 10.4 4 1 50.0 3 57 29.0	1.60 1.62 1.64	4 4 31.8	1·64 1·67 1·70	4 II 35.7 4 7 I3.3 4 2 50.3 3 58 26.5 3 54 2.1	1.66 1.69 1.72 1.75 1.78	4 9 54 5 4 5 30 5 4 I 5 6 3 56 40 I 3 52 I3 7	1.80	4 8 10·5 4 3 44·6 3 59 17·8 3 54 50·2 3 50 21·7	1.86		1.81 1.85 1.88 1.92 1.96
28 29 30 31 32	3 53 7.4 3 48 45.1 3 44 22.1 3 39 58.4 3 35 34.0	1·73 1·76 1·79	3 51 23.8 3 46 59.8 3 42 34.9 3 38 9.3 3 33 42.7	1.78 1.82 1.85	3 49 36·9 3 45 10·9 3 40 44·0 3 36 16·2 3 31 47·4	1.81 1.85 1.88 1.92 1.96		1.95	3 45 52·3 3 41 21·9 3 36 50·3 3 32 17·7 3 27 43·8	1·97 2·02 2·06	3 43 54·2 3 39 21·3 3 34 47·2 3 30 11·8 3 25 35·1	2·00 2·04 2·09 2·14 2·19
33 34 35 36 37	3 31 8.6 3 26 42.4 3 22 15.3 3 17 47.1 3 13 17.8	1·89 1·93	3 29 15·2 3 24 46·7 3 20 17·2 3 15 46·6 3 11 14·7	1.96 2.01 2.05	3 27 17.6 3 22 46.6 3 18 14.5 3 13 41.1 3 9 6.3	2.04	3 25 15.5 3 20 41.8 3 16 6.9 3 11 30.4 3 6 52.5	2·07 2·12 2·17 2·22 2·28	3 18 32·1 3 13 54·0 3 9 14·4	2.20	3 II 35.8 3 6 52.7	2·24 2·29 2·35 2·41 2·48
38 39 40 41 42	3 8 47·4 3 4 15·8 2 59 42·7 2 55 8·3 2 50 32·2	2·15	3 6 41·4 3 2 6·8 2 57 30·7 2 52 52·9 2 48 13·3	2·25 2·31	3 4 30·0 2 59 52·1 2 55 12·6 2 50 31·1 2 45 47·7	2·35 2·42	3 2 12·9 2 57 31·5 2 52 48·2 2 48 2·8 2 43 15·1	2·40 2·46 2·53	2 59 49·8 2 55 4·6 2 50 17·1 2 45 27·4 2 40 35·0	2·50 2·58 2·65	2 57 20·3 2 52 30·9 2 47 39·0 2 42 44·4 2 37 46·9	2·55 2·62 2·70 2·78 2·87
43 44 45 46 47	2 45 54·5 2 41 14·9 2 36 33·3 2 31 49·4 2 27 3·2	2·39 2·45 2·53	2 43 31·7 2 38 48·1 2 34 2·2 2 29 13·7 2 24 22·5	2·51 2·58	2 4I 2·0 2 36 I4·0 2 3I 23·3 2 26 29·7 2 2I 33·0	2.63 2.72 2.81	2 38 24·9 2 33 31·9 2 28 36·0 2 23 36·8 2 18 33·9	2·77 2·86 2·96	2 35 39·8 2 30 41·5 2 25 39·8 2 20 34·3 2 15 24·5	2·92 3·02 3·13	2 32 46·2 2 27 42·0 2 22 33·9 2 17 21·4 2 12 4·0	2·97 3·07 3·19 3·31 3·44
		V.	ARIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITU	DE.	•	
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	A.	L. 9°	A.	L. 10	A.	L. 11°	Α.
0 2 4 6 8	s. - ·46 · ·51 ·55 ·60 ·65	S. -4·21 4·21 4·22 4·23 4·23	s. - ·54 ·58 ·63 ·68 ·73	s. -4·21 4·22 4·23 4·24 4·25	s. 62 - .66 .71 .76 .81	s. -4:23 4:23 4:24 4:25 4:26	s. - ·69 ·74 ·79 ·84 ·89	s. -4·24 4·25 4·26 4·27 4·28	s. - ·77 ·82 ·87 ·92 ·97	s. -4·25 4·26 4·27 4·28 4·29	s. - ·85 ·90 ·95 I·00 I·05	s. -4·27 4·28 4·29 4·30 4·31
10 12 14 16 18	•70 •75 •80 •86 •92	4·24 4·25 4·26 4·27 4·28	·78 ·83 ·89 ·94 I·00	4·25 4·26 4·28 4·29 4·30	.86 .92 .97 1.03 1.09	4·27 4·28 4·29 4·31 4·32	.94 1.00 1.06 1.12 1.18	4·29 4·30 4·31 4·33 4·35	1·03 1·08 1·14 1·20 1·27	4·31 4·32 4·34 4·35 4·37	1·11 1·17 1·23 1·29 1·36	4·33 4·34 4·36 4·38 4·40
20 22 24 26 28	•98 1•04 1•11 1•18 1•25	4·30 4·31 4·34 4·37	1.07 1.13 1.20 1.27 1.35	4·32 4·33 4·35 4·37 4·39	1·15 1·22 1·29 1·37 1·45	4·34 4·36 4·38 4·40 4·43	1·25 1·31 1·39 1·47 1·55	4·36 4·38 4·41 4·43 4·46	1·34 1·41 1·49 1·57 1·66	4·39 4·41 4·47 4·50	1·43 1·51 1·59 1·67 1·76	4·42 4·45 4·47 4·50 4·54
30 32 34 36 38	1·33 1·41 · 1·51 1·60 1·71	4·39 4·41 4·48 4·52	1.43 1.52 1.61 1.72 1.83	4·42 4·45 4·48 4·52 4·57	1.54 1.63 1.73 1.84 1.96	4·46 4·49 4·53 4·57 4·62	1.64 1.74 1.85 1.96 2.09	4·49 4·53 4·57 4·62 4·67	1·75 1·85 1·97 2·09 2·22	4·53 4·58 4·62 4·67 4·74	1.86 1.97 2.09 2.22 2.37	4·58 4·62 4·68 4·74 4·80
40 42 44 46 47	1.82 1.95 2.09 2.25 2.34	4·56 4·61 4·68 4·75 4·79	1.95 2.09 2.24 2.42 2.51	4.62 4.68 4.75 4.83 4.88	2·09 2·23 2·40 2·59 2·69	4·67 4·74 4·82 4·92 4·97	2·23 2·39 2·57 2·77 2·89	4·74 4·82 4·91 5·02 5·08	2·37 2·55 2·74 2·96 3·09	4·81 4·90 5·00 5·13 5·20	2·53 2·71 2·92 3·17 3·31	4·89 4·98 5·10 5·25 5·34

LATITUDE 17°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

					-CONTR.		NAME		LATITUI			
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 4 6 8	H. M. S. 5 45 5.8 5 27 54.7 5 19 17.0 5 10 37.6 5 1 56.5	1.36	5 17 52·6 5 9 10·6	s. -1·29 1·37 1·42 1·46 1·51	5 25 10·0 5 16 27·0 5 7 42·2	s. -1·30 1·39 1·44 1·49	H. M. S. 5 41 12·2 5 23 46·0 5 15 0·1 5 6 12·1 4 57 21·9	1.21	5 22 20·9 5 13 31·8	s. -1·33 1·43 1·48 1·54 1·60	H. M. S. 5 38 32·8 5 20 54·5 5 12 2·0 5 3 7·1 4 54 9·5	s. -1·34 1·45 1·51 1·57 1·64
12 14 16 18 19	4 53 13 6 4 44 28 5 4 35 41 0 4 26 51 1 4 22 25 1	1.64	4 42 52·4 4 34 I·5	1·56 1·62 1·68 1·74 1·78	4 50 5.9 4 41 14.2 4 32 19.6 4 23 22.1 4 18 52.0		4 30 35·2 4 21 33·4	1.63 1.70 1.76 1.84 1.87	4 46 50·2 4 37 50·7 4 28 48·0 4 19 41·7 4 15 7·0	1.81	4 45 9·1 4 36 5·3 4 26 58·1 4 17 46·9 4 13 9·7	1·71 1·78 1·86 1·94 1·98
20 21 22 23 24	4 17 58·3 4 13 30·8 4 9 2·4 4 4 33·2 4 0 3·1	1.79 1.83 1.86		1.85 1.88 1.92	4 5 16.4	1.86 1.90 1.94 1.98 2.02	4 3 18·3 3 58 41·7	1.96 2.00 2.04	4 10 31·3 4 5 54·5 4 1 16·5 3 56 37·2 3 51 56·6	1.97 2.02 2.06 2.11 2.16	4 3 51.7 3 59 10.9 3 54 28.6	2·03 2·08 2·13 2·18 2·23
25 26 27 28 29	3 55 31·9 3 50 59·8 3 46 26·5 3 41 52·2 3 37 16·6	1·98 2·03 2·07	3 44 23.0	2.05		2·17 2·22	3 49 25·I 3 44 44·7 3 40 2·9 3 35 I9·6 3 30 34·6	2·19 2·24 2·30	3 47 14·6 3 42 31·1 3 37 46·0 3 32 59·2 3 28 10·5	2·21 2·27 2·32 2·38 2·45	3 35 24.1	2·29 2·35 2·41 2·47 2·54
30 31 32 33 34	3 32 39.6 3 28 1.3 3 23 21.4 3 18 40.0 3 13 56.8	2·22 2·27 2·33	3 25 45.8	2·30 2·36	3 28 10·2 3 23 25·2 3 18 38·4 3 13 49·6 3 8 58·7	2·39 2·45	3 25 47.8 3 20 59.1 3 16 8.4 3 11 15.4 3 6 20.1	2·48 2·55 2·62		2·51 2·58 2·66 2·73 2·82		2.61 2.69 2.77 2.85 2.94
35 36 37 38 39	3 9 11·8 3 4 24·9 2 59 35·6 2 54 44·2 2 49 50·1	2·52 2·59 2·66	3 I 50·6 2 56 57·I 2 52 0·9	2·70 2·78	3 4 5·5 2 59 9·8 2 54 11·4 2 49 10·0 2 44 5·5	2.66 2.74 2.83 2.92 3.01	2 56 21·6 2 51 18·0 2 46 11·0	2·87 2·96 3·05	2 58 31·9 2 53 25·9 2 48 16·5 2 43 3·4 2 37 46·2	3·00 3·10 3·20	2 55 33·8 2 50 21·9 2 45 6·3 2 39 46·5 2 34 21·9	3·04 3·14 3·25 3·37 3·49
40 41 42 43 44	2 44 53.4 2 39 53.5 2 34 50.4 2 29 43.6 2 24 32.8	3.02	2 31 44·8 2 26 31·3	3.07	2 38 57·4 2 33 45·5 2 28 29·3 2 23 8·3 2 17 42·1	3·11 3·23 3·35 3·48 3·62	2 35 45.9 2 30 27.0 2 25 3.2 2 19 33.9 2 13 58.6	3·53 3·68	2 32 24·5 2 26 57·8 2 21 25·5 2 15 46·9 2 10 1·3	3.73	2 11 46.2	3·63 3·79 3·95 4·14 4·35
		V.	ARIATIO	N TO	ı' OF	LAT	ITUDE .	AND	ALTITU	DE.		
Alt.	L. 12	° A.	L. 13	А.	L. 14°	A.	L. 15°	. А.	L. 16°	A.	L. 17°	A.
0 2 4 6 8	s. - ·93 ·98 I·03 I·08 I·14	s. -4·28 4·30 4·31 4·32 4·33	S. -1.01 1.06 1.11 1.17 1.22	s. -4·30 4·32 4·33 4·34 4·36	s. -1.09 1.14 1.20 1.25 1.31	s. -4·32 4·34 4·35 4·36 4·38	s. -1·18 1·23 1·28 1·34 1·39	s. -4·34 4·36 4·37 4·39 4·41	S. -1·26 · 1·31 1·36 1·42 1·48	s. -4·37 4·38 4·40 4·42 4·44	s. -1·34 - 1·40 1·48 1·51 1·57	s. -4·39 4·41 4·43 4·45 4·47
10 12 14 16 18	1·19 1·25 1·32 1·38 1·45	4·35 4·37 4·39 4·41 4·43	1·28 1·34 1·41 1·47 1·55	4·37 4·39 4·41 4·43 4·46	1·37 1·43 1·50 1·57 1·64	4·40 4·42 4·44 4·47 4·49	1·46 1·52 1·59 1·66 1·74	4 · 43 4 · 45 4 · 47 4 · 50 4 · 53	1·55 1·61 1·68 1·76 1·84	4·46 4·48 4·51 4·54 4·57	1·64 1·71 1·78 1·86 1·94	4·49 4·52 4·55 4·58 4·61
20 22 24 26 28	1·53 1·60 1·69 1·78 1·87	4·45 4·48 4·51 4·54 4·58	1·62 1·70 1·79 1·88 1·99	4·49 4·52 4·55 4·59 4·63	1·72 1·81 1·90 2·00 2·10	4·52 4·56 4·59 4·63 4·68	1·82 1·91 2·01 2·11 2·22	4·56 4·60 4·64 4·68 4·74	1·92 2·02 2·12 2·23 2·35	4·60 4·64 4·69 4·74 4·80	2·03 2·13 2·23 2·35 2·47	4·65 4·69 4·74 4·80 4·86
30 32 34 36 38	1·98 2·09 2·22 2·36 2·52	4·63 4·68 4·73 4·80 4·88	2·10 2·22 2·35 2·50 2·67	4·68 4·73 4·85 4·87 4·96	2·22 2·35 2·49 2·65 2·83	4·73 4·80 4·87 4·95 5·05	2·35 2·48 2·63 2·80 3·00	4·80 4·86 4·94 5·04 5·15	2·48 2·62 2·78 2·97 3·18	4·86 4·94 5·02 5·13 5·25	2·61 2·77 2·94 3·14 3·37	4·93 5·01 5·11 5·23 5·37
40 41 42 43 44	2·69 2·78 2·89 3·00 3·12	4·97 5·02 5·08 5·15 5·22	2·86 2·96 3·07 3·19 3·33	5·06 5·12 5·19 5·26 5·34	3·03 3·15 3·27 3·40 3·55	5·1 7 5·23 5·31 5·39 5·49	3·22 3·35 3·48 3·63 3·79	5·28 5·36 5·44 5·54 5·65	3·42 3·56 3·71 3·87 4·06	5·40 5·49 5·59 5·70 5·82	3·63 3·79 3·95 4·14 4·35	5.54 5.64 5.76 5.89 6.03

LATITUDE 17°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 37 11.8 5 28 20.3 5 19 26.7 5 10 30.6 5 1 31.9	I·42 I·47 I·54	5 17 57.5	1.44 1.50 1.57	H. M. S. 5 34 26.7 5 25 28.0 5 16 26.7 5 7 22.7 4 58 15.6	1.23	H. M. S. 5 33 2·5 5 23 59·8 5 14 54·3 5 5 45·9 4 56 34·2	S. - I·41 I·48 I·55 I·63 I·71	5 22 30·2 5 13 20·3	s. -1.43 1.51 1.58 1.66 1.75	H. M. S. 5 30 10·4 5 20 59·0 5 11 44·5 5 2 26·4 4 53 4·6	s. -1·46 1·53 1·61 1·70 1·79
10 12 13 14 15	4 52 30·3 4 43 25·5 4 38 51·8 4 34 17·3 4 29 41·7	1·75 1·78 1·82	4 50 48·8 4 4I 39·5 4 37 3·5 4 32 26·4 4 27 48·4	1.83 1.87	4 49 5·1 4 39 50·9 4 35 12·3 4 30 32·6 4 25 51·9	1.83 1.88 1.92	4 47 18·9 4 37 59·5 4 33 18·3 4 28 35·8 4 23 52·1	I.93	4 45 30·1 4 36 5·3 4 31 21·1 4 26 35·7 4 21 49·0		4 43 38·6 4 34 7·9 4 29 20·7 4 24 32·2 4 19 42·2	1.88 1.98 2.03 2.09 2.14
16 17 18 19 20	4 25 5·2 4 20 27·5 4 15 48·8 4 11 8·9 4 6 27·7	1.95		2.01	4 21 9.9 4 16 26.7 4 11 42.1 4 6 56.1 4 2 8.6	2·07 2·12 2·17	4 19 7·2 4 14 20·8 4 9 33·1 4 4 43·8 3 59 52·8	2·08 2·13 2·18 2·24 2·30	4 2 27.2	2·14 2·19 2·25 2·31 2·38	4 9 57·5 4 5 2·7 4 0 6·0	2·20 2·26 2·33 2·39 2·46
21 22 23 24 25	4 I 45·I 3 57 I·2 3 52 I5·8 3 47 28·7 3 42 39·9	2·25	3 59 34·5 3 54 47·2 3 49 58·4 3 45 7·8 3 40 I5·3	2·37 2·33 2·39	3 57 19·6 3 52 28·8 3 47 36·3 3 42 41·9 3 37 45·4	2·35 2·41 2·48	3 55 0·2 3 50 5·7 3 45 9·2 3 40 10·6 3 35 9·9	2·36 2·43 2·50 2·57 2·64	3 47 37·5 3 42 36·8 3 37 33·9	2.66	3 50 6·9 3 45 4·0 3 39 58·9 3 34 51·2 3 29 40·8	2·53 2·60 2·68 2·76 2·85
26 - 27 28 29 30	3 37 49.4 3 32 56.9 3 28 2.4 3 23 5.6 3 18 6.5	2·50 2·57 2·64	3 35 20·8 3 30 24·3 3 25 25·4 3 20 24·1 3 15 20·1	2·59 2·67 2·75	3 32 46·7 3 27 45·7 3 22 42·2 3 17 36·0 3 12 26·8	2·62 2·69 2·77 2·86 2·95		2·72 2·80 2·89 2·98 3·08	3 22 9.6 3 16 55.6 3 11 38.4			2·94 3·04 3·14 3·25 3·36
31 32 33 34 35	3 13 4·7 3 8 0·2 3 2 52·7 2 57 41·9 2 52 27·5	3.07	3 10 13·3 3 5 3·4 2 59 50·2 2 54 33·2 2 49 12·3	3.22	3 7 14·6 3 1 58·8 2 56 39·3 2 51 15·7 2 45 47·6			3·18 3·29 3·41 3·54 3·68	2 49 49·8 2 44 10·9	3·58 3·72	2 57 28·4 2 51 51·8 2 46 9·8 2 40 21·9 2 34 27·6	3·49 3·62 3·76 3·92 4·09
36 37 38 39 40	2 47 9·2 2 41 46·7 2 36 19·3 2 30 46·8 2 25 8·3	3·41 3·54 3·68	2 43 47.0 2 38 16.8 2 32 41.3 2 26 59.7 2 21 11.5	3·59 3·73 3·89	2 40 14·5 2 34 35·9 2 28 51·3 2 22 59·7 2 17 0·4	3·94 4·12	2 36 30·9 2 30 43·0 2 24 48·1 2 18 45·4 2 12 33·6	4.17	2 26 36·9 2 20 30·6 2 14 15·1	4.22	2 22 16·t 2 15 56·9 2 9 26·9	4·28 4·48 4·71 4·97 5·26
		V.	ARIATIC	N TO	ı' OF	LAT	TUDE A	AND	ALTITU	DE.		
Alt.	L. 18°	Α.	L. 19°	A.	L. 20°	Α.	L. 21°	Α.	L. 22°	Α.	L. 23°	A.
0 2 4 6 8	s. -1·43 - 1·48 1·54 1·60 1·66	s. -4:42 4:44 4:46 4:48 4:50	s. -1·51 - 1·57 1·63 1·69	s. -4·45 4·47 4·49 4·51 4· 54	s. -1.60 - 1.66 1.72 1.78 1.85	s. -4·48 4·50 4·52 4·55 4·57	s. -1.69 - 1.75 1.81 1.87 1.94	s. -4·51 4·53 4·56 4·58 4·61	s. -1.78 - 1.84 1.90 1.97 2.04	s. -4·54 -4·57 -4·60 -4·62 -4·65	s. -1.87 - 1.93 2.00 2.07 2.14	s. -4·58 4·61 4·64 4·67 4·70
10 12 14 16 18	1.73 1.80 1.88 1.96 2.04	4·53 4·55 4·58 4·62 4·65	1·82 1·90 1·98 2·06 2·15	4·56 4·59 4·63 4·66 4·70	1·92 2·00 2·08 2·16 2·26	4·60 4·63 4·67 4·71 4·75	2·02 2·10 2·18 2·27 2·37	4·64 4·68 4·72 4·76 4·81	2·12 2·20 2·29 2·38 2·49	4·69 4·73 4·77 4·81 4·87	2·22 2·31 2·40 2·50 2·61	4·74 4·78 4·82 4·87 4·93
20 22 24 26 28	2·14 2·24 2·35 2·47 2·60	4·70 4·74 4·80 4·86 4·93	2·25 2·36 2·47 2·60 2·74	4.75 4.80 4.86 4.92 5.00	2·36 2·47 2·60 2·73 2·88	4·80 4·86 4·92 5·00 5·08	2·48 2·60 2·73 2·87 3·03	4·86 4·92 4·99 5·07 5·17	2·60 2·73 2·86 3·02 3·19	4·93 4·99 5·07 5·16 5·26	2·73 2·86 3·01 3·17 3·35	4·99 5·07 5·15 5·25 5·36
30 32 33 34 35	2·75 2·92 3·01 3·11 3·21	5·01 5·10 5·15 5·21 5·27	2·90 3·08 3·17 3·28 3·39	5·09 5·19 5·25 5·32 5·38	3·05 3·24 3·35 3·46 3·59	5·18 5·29 5·36 5·43 5·51	3·21 3·42 3·54 3·66 3·79	5·27 5·40 5·48 5·56 5·65	3·38 3·61 3·73 3·87 4·02	5·38 5·52 5·61 5·70 5·80	3·56 3·81 3·94 4·09 4·25	5·49 5·65 5·75 5·85 5·97
36 37 38 39 40	3·32 3·44 3·57 3·71 3·86	5·34 5·42 5·50 5·59 5·70	3·51 3·64 3·79 3·94 4·11	5·46 5·55 5·64 5·75 5·87	3·72 3·86 4·02 4·19 4·39	5.60 5.69 5.80 5.92 6.06	3.94 4.10 4.27 4.47 4.69	5·75 5·86 5·98 6·12 6·28	4·18 4·35 4·55 4·77 5·01	5.91 6.04 6.18 6.35 6.53	4·43 4·63 4·86 5·11 5·39	6·10 6·24 6·41 6·60 6·82

LATITUDE 18°.

${ t DECLINATION}$ — ${ t CONTRARY \ NAME \ TO}$ — ${ t LATITUDE}$.

		DE	CLINAT	HON—	-CONTR.	ARY	NAME	<i>TO</i> —.	LATITUI	DE.		
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 10 12 14 16	H. M. S. 6 0 0.0 5 17 55.1 5 9 29.4 5 1 3.3 4 52 36.6	-1·30 1·32 1·33 1·34	H. M. S. 5 58 42·0 5 16 35·4 5 8 9·0 4 59 42·0 4 51 14·5	1.35	H. M. S. 5 57 24.0 5 15 14.7 5 6 47.4 4 58 19.5 4 49 50.8	1·35 1·37 1·39	H. M. S. 5 56 5.9 5 13 53.1 5 5 24.7 4 56 55.6 4 48 25.6	s. -1·30 1·37 1·39 1·41 1·43		s. 1·31 1·39 1·41 1·43 1·46	5 11 6·6 5 2 35·6	s. 1·31 1·41 1·43 1·46 1·49
18 20 22 24 25	4 44 9.4 4 35 41.5 4 27 12.9 4 18 43.3 4 14 28.1	1·41 1·44	4 42 46·2 4 34 17·0 4 25 47·0 4 17 15·9 4 12 59·9	1·42 1·45 1·48	4 4I 2I·2 4 32 50·7 4 24 I9·I 4 I5 46·2 4 II 29·2	1·45 1·48	4 39 54·6 4 31 22·4 4 22 48·9 4 14 14·1 4 9 56·0	1.46 1.49 1.52 1.56 1.57	4 29 52·0 4 21 16·6 4 12 39·5	1·52 1·56	4 36 55.6 4 28 19.6 4 19 41.8 4 11 2.2 4 6 41.7	1·52 1·56 1·60 1·64 1·66
26 27 28 29 30	4 10 12.7 4 5 56.9 4 1 40.9 3 57 24.5 3 53 7.8	1·48 1·49 1·51		1.54	4 7 11.9 4 2 54.2 3 58 36.0 3 54 17.5 3 49 58.4	1·55 1·57 1·59 1·61 1·63	3 56 59·3 3 52 39·4	1·59 1·62 1·64 1·66 1·68	3 55 19·6 3 50 58·2	1.69	3 57 59·0 3 53 36·7 3 49 13·8	1.69 1.71 1.74 1.77 1.80
31 32 33 34 35	3 48 50·7 3 44 33·2 3 40 15·2 3 35 56·8 3 31 38·0	1·57 1·59 1·61	3 47 16·4 3 42 57·6 3 38 38·4 3 34 18·6 3 29 58·3	I·62	3 45 38·8 3 41 18·8 3 36 58·1 3 32 36·8 3 28 14·9	1.65 1.68 1.70 1.73 1.76	3 35 14.1	1.71 1.74 1.76 1.79 1.82	3 37 50·4 3 33 26·4		3 36 0.7	1.83 1.86 1.89 1.93 1.97
36 37 38 39 40	3 27 18.6 3 22 58.6 3 18 38.0 3 14 16.8 3 9 54.8	1.41	3 25 37·4 3 21 15·8 3 16 53·5 3 12 30·5 3 8 6·7	1.72 1.75 1.78 1.81 1.84	3 23 52·3 3 19 28·9 3 15 4·8 3 10 39·7 3 6 13·8	1.79 1.82 1.85 1.89 1.92	3 17 37·7 3 13 11·4 3 8 44·2	1.89 1.93	3 15 41·9 3 11 13·4 3 6 43·8	1.93 1.97 2.01 2.05 2.10	3 13 41·4 3 9 10·4 3 8·1	2·01 2·05 2·09 2·14 2 19
41 42 43 44 45	3 5 32·2 3 1 8·7 2 56 44·4 2 52 19·1 2 47 52·8	1.87	3 3 42·0 2 59 16·4 2 54 49·8 2 50 22·1 2 45 53·3	1.88 1.91 1.95 2.00 2.04	3 1 46·9 2 57 19·0 2 52 49·8 2 48 19·4 2 43 47·7	2.00	2 59 46·6 2 55 16·0 2 50 44·1 2 46 10·8 2 41 35·9	2·10 2·14 2·20	2 53 7·4 2 48 32·4 2 43 55·8	2·19 2·25	2 55 29·4 2 50 52·8 2 46 14·4 2 41 34·2 2 36 52·0	2·24 2·30 2·35 2·42 2·49
46 47 48 49 50	2 43 25·4 2 38 56·8 2 34 26·9 2 29 55·6 2 25 22·7	2·03 2·08 2·14	2 41 23·1 2 36 51·6 2 32 18·5 2 27 43·8 2 23 7·4	2·09 2·14 2·20 2·26 2·32	2 39 14·5 2 34 39·7 2 30 3·2 2 25 24·7 2 20 44·2	2·26 2·32 2·38	2 36 59·3 2 32 20·9 2 27 40·5 2 22 57·8 2 18 12·7	2·37 2·44 2·52	2 29 54·7 2 25 9·9 2 20 22·7	2·50 2·58 2·66	2 32 7·5 2 27 20·6 2 22 31·1 2 17 38·6 2 12 42·8	2·56 2·64 2·72 2·81 2·91
	VARIATION TO 1' OF LATITUDE AND ALTITUDE.											
Alt.	L. 0°	Α.	L. 1 °	Α.	L. 2°	A.	L. 3°	A.	L. 4°	Α.	L. 5°	A.

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4 ° A.	L. 5° A.
0 4 6 8	S. S. ·00 -4·20 ·09 4·21 ·14 4·21 ·19 4·21 ·24 4·21	s. s. 08 -4.21 .17 4.21 .22 4.21 .27 4.21 .32 4.22	s. s. - ·15 -4·21 ·25 4·21 ·30 4·22 ·33 4·22 ·40 4·22	s. s. - '23 -4'21 '33 4'22 '38 4'22 '43 4'23 '48 4'23	S. S. - '31 - 4'22 '41 4'23 '46 4'23 '51 4'24 '56 4'24	s. s. '39 4'22 '48 4'23 '54 4'24 '59 4'25 '64 4'25
12	'29 4'21	'37 4.22	*45 4*23	*53 4*24	·61 4·25	·69 4·26
14	'34 4'22	'42 4.23	*50 4*24	*58 4*25	·67 4·26	·75 4·27
16	'39 4'22	'48 4.23	*56 4*24	*64 4*25	·72 4·27	·81 4·28
18	'45 4'23	'53 4.24	*61 4*25	*70 4*26	·78 4·28	·87 4·29
20	'50 4'23	'58 4.25	*67 4*26	*76 4*27	·84 4·29	·93 4·31
22	.56 4.24	.64 4.25	773 4·27	·82 4·28	'90 4'30	'99 4'32
24	.61 4.25	.70 4.26	779 4·28	·88 4·30	'97 4'32	1'06 4'34
26	.67 4.26	.76 4.27	·86 4·29	·95 4·31	I*04 4'33	1'13 4'36
28	.74 4.27	.83 4.29	·92 4·31	I·02 4·33	I*II 4'35	1'21 4'38
30	.80 4.28	.90 4.30	·99 4·32	I·09 4·35	I*19 4'37	1'29 4'40
32	·87 4·29	1.05 4.32	1.07 4.34	1·17 4·37	1·27 4·39	1·38 4·43
34	·94 4·31	1.05 4.33	1.15 4.36	1·25 4·39	1·36 4·42	1·47 4·46
36	I·02 4·33	1.13 4.35	1.23 4.38	1·34 4·41	1·45 4·45	1·57 4·49
38	I·10 4·35	1.21 4.38	1.32 4.41	1·44 4·45	1·56 4·48	1·68 4·53
40	I·19 4·37	1.31 4.40	1.42 4.44	1·54 4·48	1·67 4·52	1·79 4·57
42	1·29 4·40	1.41 4.43	1·53 4·48	1.66 4.52	1·79 4·57	1·92 4·62
44	1·39 4·43	1.52 4.47	1·65 4·52	1.78 4.57	1·92 4·62	2·07 4·69
46	1·50 4·47	1.64 4.51	1·78 4·57	1.92 4.62	2·07 4·69	2·23 4·76
48	1·63 4·51	1.77 4.56	1·92 4·62	2.08 4.69	2·24 4·77	2·42 4·85
50	1·77 4·56	1.92 4.62	2·09 4·69	2.26 4.77	2·44 4·86	2·64 4·96

LATITUDE 18°.

	e DECLINATION—CONTRA						NAME	1	LATITU.			<u> </u>
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 6 8 10	H. M. S. 5 52 10·3 5 26 43·8 5 18 13·2 5 9 41·7 5 1 9·1	s. -1·31 1·37 1·40 1·43 1·45	5 16 48·7 5 8 15·5	s. -1·32 1·39 1·42 1·45 1·48	5 23 57·0 5 15 23·2	s. -1·33 1·40 1·43 1·47 1·50	H. M. S. 5 48 12·0 5 22 32·2 5 13 56·5 5 5 19·3 4 56 40·6	1·42 1·46 1·49	H. M. S. 5 46 51·8 5 21 6·3 5 12 28·5 5 3 49·1 4 55 8·0	s. -1·34 1·44 1·48 1·52 1·56	H. M. S. 5 45 30·9 5 19 39·4 5 10 59·2 5 2 17·3 4 53 33·5	s. -1·35 1·46 1·50 1·54
14 16 18 20 21	4 52 35·2 4 44 0·0 4 35 23·3 4 26 44·9 4 22 25·0	1.56	4 51 5·2 4 42 27·9 4 33 48·9 4 25 8·0 4 20 46·7	1.59	4 49 33.6 4 40 53.9 4 32 12.3 4 23 28.6 4 19 5.9	1·54 1·58 1·63 1·68	4 30 33.5	1·62 1·67	4 46 24·9 4 37 39·8 4 28 52·4 4 20 2·4 4 15 36·4		4 44 47.6 4 35 59.5 4 27 8.7 4 18 15.2 4 13 47.4	1.64 1.69 1.75 1.81 1.84
22 23 24 25 26	4 18 4·7 4 13 43·8 4 9 22·4 4 5 0·4 4 0 37·8	1·64 1·66 1·69 1·71 1·74	4 12 2·7 4 7 39·7	1.68 1.71 1.74 1.76 1.79	4 10 18.7	1.73 1.76 1.78 1.81 1.85	4 12 57·6 4 8 31·9 4 4 5·5 3 59 38·3 3 55 10·2	1.78 1.80 1.84 1.87 1.90	4 II 9.6 4 6 42.1 4 2 I3.7 3 57 44.4 3 53 I4.2	1.82 1.86 1.89 1.93	4 9 18·6 4 4 49·0 4 0 18·6 3 55 47·1 3 51 14·6	1.88 1.91 1.95 1.99 2.02
27 28 29 30 31	3 56 14·5 3 51 50·6 3 47 25·9 3 43 0·5 3 38 34·2	1.83 1.86	3 54 26.8 3 50 1.1 3 45 34.5 3 41 7.1 3 36 38.7	1.82 1.85 1.89 1.92 1.96	3 43 39·4 3 39 9·8	1.88 1.91 1.95 1.99 2.03	3 50 41·3 3 46 11·4 3 41 40·5 3 37 8·5 3 32 35·4	2·02 2·06	3 48 43·I 3 44 I0·9 3 39 37·5 3 35 3·0 3 30 27·2	2·04 2·08	3 46 41·0 3 42 6·3 3 37 30·3 3 32 53·1 3 28 14·4	2·07 2·11 2·16 2·20 2·25
32 33 34 35 36	3 34 7·I 3 29 39·0 3 25 10·0 3 20 39·8 3 16 8·6	1·93 1·96 2·00 2·04 2·09	3 23 7.5	2.08	3 30 7·5 3 25 34·6 3 21 0·5 3 16 25·0 3 11 48·1	2·07 2 II 2·16 2·21 2·26	3 28 1·1 3 23 25·5 3 18 48·5 3 14 10·0 3 9 29·9	2.24	3 25 50·I 3 2I II·5 3 16 3I·4 3 II 49·7 3 7 6·I	2·22 2·28 2·33 2·39 2·45		2·31 2·36 2·42 2·48 2·55
37 38 39 40 41	3 II 36·I 3 7 2·3 3 2 27·I 2 57 50·4 2 53 I2·0	2·13 2·18 2·23 2·28 2·34	3 4 48·8 3 0 10·4 2 55 30·3	2·22 2·27 2·33 2·39 2·45	3 2 29·6 2 57 47·8 2 53 4·0	2·31 2·37 2·43 2·49 2·56	3 4 48·I 3 0 4·5 2 55 I8·8 2 50 3I·0 2 45 40·8	2·41 2·47 2·54 2·61 2·68	2 57 33·I 2 52 43·2	2.73	2 59 46·8 2 54 54·9 2 50 0·5 2 45 3·4 2 40 3·3	2·62 2·69 2·77 2·86 2·95
42 43 44 45 46	2 48 31.9 2 43 49.8 2 39 5.6 2 34 19.1 2 29 30.1	2.61		2·59 2·66 2·75	2 43 29·9 2 38 39·2 2 33 45·8 2 28 49·4 2 23 49·7	2·80 2·89	2 40 47·9 2 35 52·3 2 30 53·6 2 25 51·5 2 20 45·5	2·85 2·94 3·05	2 37 58·I 2 32 57·0 2 27 52·4 2 22 43·9 2 17 3I·0	3.00 3.10	2 34 59·8 2 29 52·7 2 24 41·6 2 19 25·9 2 14 5·3	3·05 3·15 3·27 3·39 3·53
		V	ARIATIC	N TO	O I' OF	LAT	ITUDE .	AND	ALTITU	DE.		
14	T CO		T P90		T 00	Λ	T 0°		T 109		T 110	

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
° 0 2 4 6 8	s. s.	S. S.	s. s.	s. s.	s. s.	s. s.
	- ·46 -4·23	- '54 -4'24	- ·62 - 4·25	- '70 - 4'26	- ·78 - 4·28	86 -4.29
	·51 4·24	'59 4'25	·67 4·26	'75 4'27	·83 4·29	.91 4.30
	·56 4·24	'64 4'25	·72 4·27	'80 4'28	·88 4·30	.97 4.32
	·61 4·25	'69 4'26	·78 4·28	'86 4'29	·94 4·31	1.02 4.33
	·67 4·26	'75 4'27	·83 4·29	'91 4'30	·99 4·32	1.08 4.34
10 12 14 16 18	·72 4·27 ·78 4·28 ·83 4·29 ·89 4·30 ·95 4·31	·80 4·28 ·86 4·29 ·92 4·30 ·98 4·32 I·04 4·33	.88 4.30 .94 4.31 1.00 4.32 1.06 4.34 1.13 4.36	1.03 4.33 1.09 4.34 1.15 4.36 1.22 4.38	1.05 4.33 1.11 4.35 1.18 4.37 1.24 4.39 1.31 4.41	1·14 4·36 1·20 4·37 1·26 4·39 1·33 4·41 1·40 4·43
20	1.02 4.33	1·11 4·35	1·20 4·37	1·29 4·40	1·38 4·43	1·48 4·46
22	1.08 4.34	1·18 4·37	1·27 4·39	1·36 4·42	1·46 4·45	1·56 4·49
24	1.16 4.36	1·25 4·39	1·35 4·42	1·45 4·45	1·54 4·48	1·65 4·52
26	1.23 4.38	1·33 4·41	1·43 4·44	1·53 4·47	1·63 4·51	1·74 4·55
28	1.31 4.40	1·41 4·44	1·51 4·47	1·62 4·50	1·73 4·55	1·84 4·59
30	1·39 4·43	1·50 4·46	1.61 .4.50	1.71 4.54	1.83 4.59	1.94 4.63
32	1·48 4·46	1·59 4·50	1.70 4.54	1.82 4.58	1.94 4.63	2.06 4.68
34	1·58 4·49	1·69 4·53	1.81 4.58	1.93 4.63	2.06 4.68	2.19 4.74
36	1·69 4·53	1·81 4·58	1.93 4.63	2.06 4.68	2.19 4.74	2.33 4.81
38	1·80 4·57	1·93 4·63	2.06 4.68	2.20 4.74	2.34 4.81	2.48 4.88
40	1·92 4·63	2.06 4.68	2·20 4·75	2·35 4·82	2·50 4·89	2.66 4.98
42	2·06 4·68	2.21 4.75	2·36 4·82	2·52 4·90	2·69 4·99	2.86 5.09
44	2·22 4·76	2.38 4.83	2·54 4·91	2·72 5·01	2·90 5·11	3.10 5.22
45	2·30 4·80	2.47 4.88	2·64 4·97	2·83 5·07	3·02 5·18	3.23 5.30
46	2·40 4·84	2.57 4.93	2·75 5·03	2·94 5·13	3·15 5·26	3.37 5.39

LATITUDE 18°.

		DECLINATION—CONTRARY NAME TO—LATITUDE.										
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 44 9.6 5 35 31.7 5 26 52.3 5 18 11.3 5 9 28.6	s. -1·36 1·40 1·44 1·48	5 34 7.3	s. -1·37 1·41 1·46 1·50	H. M. S. 5 41 24·8 5 32 42·1 5 23 57·6 5 15 11·3 5 6 22·9			s. -1·40 1·44 1·49 1·55 1·60	5 20 58.3	s. -1.41 1.46 1.52 1.57 1.63	5 28 20·3 5 19 26·7 5 10 30·6	s. -1·43 1·48 1·54 1·60 1·66
10 12 14 16 18	5 0 44·0 4 51 57·3 4 43 8·4 4 34 16·9 4 25 22·6	1.67	4 59 9.0 4 50 19.2 4 41 26.9 4 32 31.8 4 23 33.8	1·60 1·65 1·71 1·77 1·84	4 57 32·2 4 48 39·1 4 39 43·2 4 30 44·3 4 21 42·1	1·63 1·69 1·75 1·81 1·89	4 46 56·8 4 37 57·I 4 28 54·I	1.66 1.72 1.79 1.86 1.94	4 36 8.5	1.76		1·73 1·80 1·88 1·96 2·04
19 20 21 22 23	4 20 54·3 4 16 25·3 4 11 55·4 4 7 24·5 4 2 52·8		4 19 3.5 4 14 32.3 4 10 0.2 4 5 27.1 4 0 53.0	1.87 1.91 1.95 1.98 2.03	4 8 1·8 4 3 26·3	1·92 1·96 2·00 2·04 2·09	4 5 59·9 4 I 21·8	1·98 2·02 2·06 2·11 2·15	4 3 54·4 3 59 13·5	2·03 2·08 2·12 2·17 2·22	4 6 27·7 4 I 45·I 3 57 I·2	2·09 2·14 2·19 2·24 2·29
24 25 26 27 28	3 58 19·9 3 53 46·1 3 49 11·2 3 44 35·0 3 39 57·5	2.05	3 56 17.7 3 51 41.3 3 47 3.7 3 42 24.7 3 37 44.3	2·07 2·11 2·16 2·21 2·26	3 54 II·7 3 49 32·6 3 44 52·0 3 40 I0·0 3 35 26·5	2·13 2·18 2·23 2·28 2·34	3 52 1.7 3 47 19.5 3 42 35.9 3 37 50.7 3 33 3.7	2·20 2·25 2·31 2·36 2·42	3 35 26.4	2·27 2·33 2·39 2·45 2·51	3 42 39.9 3 37 49.4 3 32 56.9	2·35 2·41 2·47 2·54 2·60
29 30 31 32 33	3 35 18·7 3 30 38·5 3 25 56·7 3 21 13·2 3 16 27·9	2·23 2·28 2·34 2·40 2·46	3 33 2·4 3 28 19·0 3 23 33·7 3 18 46·7 3 13 57·7	2·31 2·37 2·43 2·49 2·55	3 30 41·3 3 25 54·3 3 21 5·5 3 16 14·6 3 11 21·5	2·40 2·46 2·52 2·59 2·66	3 28 14·9 3 23 24·2 3 18 31·4 3 13 36·3 3 8 38·8	2·48 2·55 2·62 2·69 2·77	3 20 48·4 3 15 51·3		3 18 6·5 3 13 4·7 3 8 0·2	2.92
34 35 36 37 38	3 II 40·8 3 6 51·6 3 2 0·1 2 57 6·2 2 52 9·8	2·52 2·59 2·66 2·73 2·82	2 59 17·2 2 54 18·6	2·62 2·70 2·77 2·86 2·95	3 6 26·0 3 I 27·9 2 56 27·2 2 5I 23·3 2 46 I6·2	2·73 2·81 2·90 2·99 3·08	3 3 38·7 2 58 35·6 2 53 29·5 2 48 20·0 2 43 6·8	3.03	2 50 23·7 2 45 8·0		2 52 27·5 2 47 9·2 2 41 46·7	3·11 3·21 3·32 3·44 3·57
39 40 41 42 43	2 47 10·4 2 42 7·9 2 37 2·1 2 31 52·5 2 26 38·7	2·90 3·00 3·10 3·20 3·32	2 39 3·9 2 33 51·8 2 28 35·3	3·04 3·14 3·25 3·37 3·50	2 4I 5·5 2 35 50·7 2 30 3I·7 2 25 7·6 2 19 38·2	3·19 3·30 3·42 3·56 3·70	2 32 27·7 2 27 0·8	3.61	2 28 53.8	3.66 3.81 3.98	2 30 46·8 2 25 8·3 2 19 23·3 2 13 30·9 2 7 30·1	4·03 4·2I
		V.	ARIATIC	N TO	ı' OF	LAT	TUDE .	AND	ALTITU	DE.		
Alt.	L. 12°	Α.	L. 13°	Α.	L. 14°	Α.	L. 15°	' A.	L. 16	° A.	L. 17	° A.
° 0 2 4 6	s. - '94 - · '99 1'05 1'10	s. -4·31 4·32 4·33 4·35	s. -1.02 1.08 1.13 1.19	s. -4·33 4·36 4·36 4·37	s. 1·11 1·16 1·22 1·27	s. -4·35 4·36 4·38 4·39	s. -1·19 1·24 1·30 1·36	s. -4·37 4·39 4·40 4·42	s. -1·27 1·33 1·39 1·45	s. 4·39 4·41 4·43 4·45	s. -1·36 1·42 1·47 1·54	s. -4·42 4·44 4·46 4·48

Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.
° 0 2 4 6 8	s. s.	S. S.	S. S.	S. S.	S. S.	s. s.
	'94 -4'31	-1.02 -4.33	-1·11 -4·35	-1·19 -4·37	-1·27 -4·39	-1·36 -4·42
	· '99 4'32	1.08 4.34	1·16 4·36	1·24 4·39	1·33 4·41	1·42 4·44
	1'05 4'33	1.13 4.36	1·22 4·38	1·30 4·40	1·39 4·43	1·47 4·46
	1'10 4'35	1.19 4.37	1·27 4·39	1·36 4·42	1·45 4·45	1·54 4·48
	1'16 4'36	1.25 4.39	1·34 4·41	1·42 4·44	1·51 4·47	1·60 4·50
10	1·22 4·38	1·31 4·41	1.40 4.43	1·49 4·46	1.58 4.49	1.67 4.53
12	1·29 4·40	1·38 4·43	1.47 4.45	1·56 4·48	1.65 4.52	1.75 4.55
14	1·35 4·42	1·44 4·45	1.54 4.48	1·63 4·51	1.73 4.55	1.82 4.58
16	1·42 4·44	1·52 4·47	1.61 4.50	1·71 4·54	1.81 4.58	1.91 4.62
18	1·50 4·46	1·59 4·50	1.69 4.53	1·79 4·57	1.89 4.61	2.00 4.65
20	1·58 4·49	1.67 4.53	1.78 4.57	1.88 4.61	1.98 4.65	2·09 4·70
22	1·66 4·52	1.76 4.56	1.87 4.60	1.97 4.65	2.08 4.69	2·20 4·74
24	1·75 4·56	1.86 4.60	1.96 4.64	2.08 4.69	2.19 4.74	2·31 4·80
26	1·84 4·59	1.96 4.64	2.07 4.69	2.19 4.74	2.31 4.80	2·43 4·86
28	1·95 4·64	2.06 4.69	2.18 4.74	2.31 4.80	2.44 4.86	2·57 4·93
30	2·06 4·68	2·18 4·74	2·31 4·80	2·44 4·86	2·58 4·93	2·72 5·01
32	2·18 4·74	2·31 4·80	2·45 4·87	2·59 4·94	2·73 5·02	2·89 5·10
34	2·32 4·80	2·46 4·87	2·60 4·95	2·75 5·03	2·91 5·11	3·07 5·21
36	2·47 4·88	2·62 4·95	2·77 5·04	2·94 5·13	3·11 5·23	3·29 5·34
38	2·64 4·96	2·80 5·05	2·97 5·15	3·15 5·25	3·34 5·37	3·54 5·50
39	2·73 5·02	2·90 5·11	3·08 5·21	3·27 5·33	3·47 5·45	3.68 5.59
40	2·83 5·07	3·01 5·17	3·20 5·28	3·39 5·41	3·61 5·54	3.84 5.70
41	2·94 5·13	3·12 5·24	3·32 5·36	3·53 5·49	3·76 5·64	4.01 5.81
42	3·05 5·19	3·25 5·31	3·46 5·45	3·69 5·59	3·93 5·76	4.20 5.94
43	3·17 5·27	3·38 5·40	3·61 5·54	3·85 5·70	4·12 5·99	4.41 6.09

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 197 LATITUDE 18°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 35 45.6 5 26 50.8 5 17 53.6 5 8 53.8 4 59 51.2	1·56	H. M. S. 5 34 18·3 5 25 19·9 5 16 19·0 5 7 15·3 4 58 8·5	1·59		1·62	5 22 14·2 5 13 4·9	1.57 1.65 1.72	H. M. S. 5 29 49.6 5 20 39.0 5 11 25.2 5 2 8.0 4 52 46.9	1·68 1·76	H. M. S. 5 28 17·4 5 19 2·2 5 9 43·7 5 0 21·3 4 50 54·9	s. - 1·55 1·63 1·71 1·80 1·89
10 11 12 13 14	4 50 45·4 4 46 II·3 4 4I 36·3 4 37 0·3 4 32 23·3	1·80 1·84 1·88	4 48 58·3 4 44 21·8 4 39 44·4 4 35 5·9 4 30 26·4	1.85 1.89	4 47 8·7 4 42 29·8 4 37 49·8 4 33 8·7 4 28 26·5	1·89 1·93 1·98	4 45 16·6 4 40 35·0 4 35 52·3 4 31 8·4 4 26 23·3	1·94 1·98 2·03	4 43 21·7 4 38 37·4 4 33 51·8 4 29 4·9 4 24 16·7	2·03 2·09	4 4I 24·0 4 36 36·7 4 3I 48·I 4 26 58·I 4 22 6·6	1·98 2·03 2·09 2·14 2·20
15 16 17 18 19	4 27 45·3 4 23 6·2 4 18 25·9 4 13 44·4 4 9 1·6	2·01 2·06 2·10 2·15	4 25 45.8 4 21 3.9 4 16 20.8 4 11 36.4 4 6 50.5	2.07		2·12 2·18 2·23	4 21 36·8 4 16 49·0 4 11 59·6 4 7 8·7 4 2 16·1	2·19 2·24 2·30		2·25 2·31 2·37	4 17 13·5 4 12 18·8 4 7 22·4 4 2 24·1 3 57 23·7	2·26 2·32 2·38 2·45 2·52
23	4 4 17·4 3 59 31·8 3 54 44·7 3 49 55·9 3 45 5·3	2.31	4 2 3·2 3 57 14·3 3 52 23·7 3 47 31·2 3 42 36·9	2·33 2·39 2·45 2·52	3 59 44·7 3 54 52·3 3 49 58·0 3 45 1·7 3 40 3·4	2·41 2·47	3 57 21·7 3 52 25·5 3 47 27·3 3 42 26·9 3 37 24·2	2·49 2·56 2·63	3 54 54·I 3 49 53·8 3 44 5I·3 3 39 46·5 3 34 39·2	2·57 2·65 2·72	3 52 21·4 3 47 16·8 3 42 9·8 3 37 0·2 3 31 47·8	2·59 2·66 2·74 2·82 2·91
27 28	3 40 12·9 3 35 18·5 3 30 22·0 3 25 23·2 3 20 21·9	2·56 2·63 2·70 2·78	3 37 40·6 3 32 42·1 3 27 41·2 3 22 37·8 3 17 31·7	2·73 2·81 2·89	3 35 2·8 3 29 59·8 3 24 54·2 3 19 45·9 3 14 34·6	2·84 2·92	3 32 19·1 3 27 11·3 3 22 0·7 3 16 47·0 3 11 30·0	2·86 2·95	3 29 29·1 3 24 16·2 3 19 0·1 3 13 40·6 3 8 17·5	2·98 3·07	3 26 32·5 3 21 14·0 3 15 52·0 3 10 26·2 3 4 56·4	3.00 3.10 3.30 3.31 3.43
31 32 33	3 15 18·0 3 10 11·3 3 5 1·5 2 59 48·2 2 54 31·4	2·95 3·05 3·14	3 12 22.7 3 7 10.5 3 1 54.9 2 56 35.5 2 51 12.0	3·18 3·29	3 4 I·9 2 58 40·0	3.21	3 6 9.4 3 0 44.8 2 55 16.0 2 49 42.5 2 44 3.8	3·48 3·61	3 2 50·3 2 57 18·6 2 51 42·4 2 46 0·8 2 40 13·3	3·52 3·65	2 59 22·1 2 53 42·9 2 47 58·3 2 42 7·7 2 36 10·4	3·55 3·69 3·83 3·99 4·16
36 37 38	2 49 10·5 2 43 45·3 2 38 15·2 2 32 39·7 2 26 58·2	3·48 3·62 3·76	2 45 44·I 2 40 II·I 2 34 32·7 2 28 48·I 2 22 56·7	3·81 3·97	2 42 7·3 2 36 25·9 2 30 38·2 2 24 43·6 2 18 41·0	3·85 4·02	2 38 19·4 2 32 28·6 2 26 30·6 2 20 24·6 2 14 9·5	4·07 4·25	2 34 19·3 2 28 18·0 2 22 8·5 2 15 49·6 2 9 20·0	4·30 4·50 4·73	2 30 5.8 2 23 52.7 2 17 30.2 2 10 56.7 2 4 10.5	4·35 4·56 4·79 5·05 5·35

VARIATION TO 1' OF LATITUDE AND ALTITUDE.

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
° 0 2 4 6	s. s.					
	-1.45 -4.44	-1·53 -4·47	-1.62 -4.51	-1.71 -4.54	-1.80 -4.57	-1.89 -4.61
	1.50 4.47	1·59 4·50	1.68 4.53	1.77 4.56	1.87 4.60	1.96 4.64
	1.56 4.49	1·65 4·52	1.74 4.55	1.84 4.59	1.93 4.63	2.03 4.67
	1.63 4.51	1·72 4·54	1.81 4.58	1.91 4.62	2.00 4.66	2.10 4.70
8	1.69 4.53	1.79 4.57	1.88 4.61	1.98 4.65	2.08 4.69	2.18 4.74
10	1.76 4.56	1.86 4.60	1.96 4.64	2·06 4·68	2·16 4·73	2·27 4·78
12	1.84 4.59	1.94 4.63	2.04 4.68	2·14 4·72	2·25 4·77	2·36 4·82
14	1.92 4.62	2.02 4.67	2.13 4.71	2·24 4·76	2·34 4·81	2·46 4·87
16	2.01 4.66	2.12 4.71	2.22 4.76	2·33 4·81	2·45 4·87	2·56 4·93
18	2.10 4.70	2.21 4.75	2.32 4.80	2·44 4·86	2·56 4·92	2·68 4·99
20	2·20 4·75	2·32 4·80	2·43 4·86	2·56 4·92	2·68 4·99	2·81 5·06
22	2·31 4·80	2·43 4·86	2·55 4·92	2·68 4·99	2·81 5·06	2·95 5·14
24	2·43 4·86	2·56 4·92	2·69 4·99	2·82 5·06	2·96 5·14	3·11 5·23
26	2·56 4·92	2·69 4·99	2·83 5·07	2·98 5·15	3·13 5·24	3·29 5·34
28	2·70 5·00	2·85 5·08	3·00 5·16	3·15 5·26	3·31 5·35	3·49 5·46
30	2·86 5·09	3·02 5·18	3·18 5·27	3·35 · 5·38	3·53 5·49	3·72 5·61
31	2·95 5·14	3·11 5·23	3·28 5·33	3·46 5·44	3·64 5·57	3·84 5·70
32	3·05 5·19	3·21 5·29	3·39 5·40	3·57 5·52	3·77 5·65	3·98 5·79
33	3·14 5·25	3·32 5·36	3·50 5·47	3·70 5·60	3·91 5·74	4·14 5·90
34	3·25 5·31	3·43 5·43	3·63 5·55	3·84 5·69	4·06 5·85	4·30 6·02
35	3·36 5·38	3·56 5·51	3·76 5·64	3·98 5·79	4·22 5·96	4·48 6·15
36	3·48 5·46	3·69 5·59	3·91 5·74	4·15 5·91	4·40 6·09	4·69 6·30
37	3·62 5·55	3·83 5·69	4·07 5·85	4·33 6·03	4·60 6·24	4·91 6·47
38	3·76 5·64	3·99 5·80	4·25 5·98	4·52 6·18	4·83 6·40	5·16 6·66
39	3·92 5·75	4·17 5·92	4·44 6·12	4·74 6·34	5·07 6·59	5·44 6·89

LATITUDE 19°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 8 10 12	H. M. S. 6 0 0.0 5 26 8.6 5 17 40.2 5 9 11.3 5 0 42.1	I·40 I·41	H. M. S. 5 58 37.3 5 24 44.7 5 16 15.6 5 7 46.1 4 59 15.9	I·42	5 23 20·0 5 14 50·2	I·43	H. M. S. 5 55 51.9 5 21 54.5 5 13 23.8 5 4 52.2 4 56 19.8	I·45 I·47	H. M. S. 5 54 28·9 5 20 28·2 5 11 56·2 5 3 23·4 4 54 49·5	I·47	H. M. S. 5 53 5.7 5 19 0.9 5 10 27.6 5 1 53.2 4 53 17.7	s. -1·39 1·46 1·49 1·51
16 18 20 22 24	4 52 12·3 4 43 41·7 4 35 10·5 4 26 38·3 4 18 5·1	1·46 1·48 1·50	4 50 45·I 4 42 I3·5 4 33 40·9 4 25 7·3 4 I6 32·5	1.23	4 49 16·5 4 40 43·5 4 32 9·4 4 23 34·1 4 14 57·4	1·51 1·54 1·57	4 47 46·3 4 39 11·7 4 30 35·9 4 21 58·7 4 13 19·9	1·54 1·58 1·61	4 46 14·4 4 37 38·1 4 29 0·3 4 20 21·0 4 11 39·8	1·54 1·58 1·61 1·65 1·69	4 36 2·5 4 27 22·6 4 18 40·8	1.69
25 26 27 28 29	4 13 48·1 4 9 30·8 4 5 13·1 4 0 55·1 3 56 36·7	1·55 1·57 1·59	4 12 14·6 4 7 56·3 4 3 37·6 3 59 18·5 3 54 59·0	1.60 1.61	4 10 38·5 4 6 19·1 4 1 59·3 3 57 39·1 3 53 18·3	1.62 1.64 1.66 1.68	4 4 39·2 4 0 18·2	1.73		1·71 1·73 1·76 1·79 1·81	4 I II·0 3 56 47·0 3 52 22·3	1·78 1·81 1·84
30 31 32 33 34	3 52 18·0 3 47 58·8 3 43 39·1 3 39 18·9 3 34 58·2	1.64 1.66 1.69	3 50 39·I 3 46 18·6 3 41 57·6 3 37 36·0 3 33 13·9	1.72	3 44 35·2 3 40 12·7 3 35 49·6	1·75 1·78 1·80	3 47 11·7 3 42 48·3 3 38 24·2 3 33 59·4 3 29 33·8	I·84	3 40 57·9 3 36 32·0 3 32 5·3	1.90	3 43 30·8 3 39 3·8 3 34 36·0 3 30 7·2 3 25 37·4	1.93 1.97 2.00
35 36 37 38 39	3 30 37·0 3 26 15·1 3 21 52·6 3 17 29·4 3 13 5·5	1.49	3 28 51·1 3 24 27·6 3 20 3·4 3 15 38·4 3 11 12·5	1.86 1.89	3 27 1·3 3 22 36·0 3 18 9·8 3 13 42·8 3 9 14·8	1.93	3 20 40·1 3 16 11·8 3 11 42·5		3 18 39·7 3 14 9·1 3 9 37·3		3 16 34·7 3 12 1·5 3 7 27·1	2·12 2·17 2·22
40 41 42 43 44	3 8 40·8 3 4 15·2 2 59 48·7 2 55 21·2 2 50 52·7	1.99	3 2 17·9 2 57 49·0	2.00	2 55 44·1 2 51 11·4	2·13 2·18	3 2 40·5 2 58 7·7 2 53 33·4 2 48 57·7 2 44 20·3	2·13 2·18 2·23 2·28 2·34	2 55 54·2 2 51 16·8 2 46 37·7	2.27	2 58 13·8 2 53 34·8 2 48 54·0 2 44 11·2 2 39 26·3	2.38
45 46 47 48 49	2 46 22.9 2 41 51.9 2 37 19.5 2 32 45.6 2 28 10.1	2·12 2·17 2·23	2 44 15·4 2 39 41·3 2 35 5·7 2 30 28·4 2 25 49·1	2·23 2·29 2·35	2 42 1.6 2 37 24.2 2 32 45.0 2 28 3.8 2 23 20.4	2·34 2·41 2·47	2 39 41·2 2 35 0·1 2 30 17·0 2 25 31·5 2 20 43·4	2·46 2·53 2·61	2 37 13·8 2 32 28·7 2 27 41·1 2 22 50·9 2 17 57·6	2·59 2·67 2·75		2·64 2·72 2·81 2·90 3·00

VARIATION TO I' OF LATITUDE AND ALTITUDE.

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4 ° A.	L. 5° A.
0 4 6 8	S. S. - '00 - 4.23 '10 4.23 '15 4.23 '20 4.23 '26 4.24	S. S. - '08 -4'23 '18 4'23 '23 4'24 '28 4'24 '34 4'24	s. s. - ·16 - 4·23 ·26 4·24 ·31 4·24 ·36 4·25 ·42 4·25	s. s. - ·23 - 4·23 ·34 4·24 ·39 4·25 ·44 4·25 ·50 4·26	s. s. - '31 - 4'24 '42 4'25 '47 4'26 '52 4'26 '58 4'27	s. s. - '39 - 4'25 '50 4'26 '55 4'27 '60 4'27 '66 4'28
12	·31 4·24	39 4·25	·47 4·26	.55 4.27	·64 4·28	.72 4.29
14	·36 4·24	·45 4·25	·53 4·26	.61 4.27	·69 4·29	.78 4.30
16	·42 4·25	·50 4·26	·59 4·27	.67 4.28	·75 4·30	.84 4.31
18	·48 4·26	·56 4·27	·64 4·28	.73 4.29	·82 4·31	.90 4.33
20	·53 4·26	·62 4·28	·71 4·29	.79 4.30	·88 4·32	.97 4.34
22	.59 4.27	·68 4·29	.77 4:30	·86 4·32	'95 4'33	1.04 4.36
24	.66 4.28	·75 4·30	.84 4:31	·93 4·33	1'02 4'35	1.11 4.37
26	.72 4.29	·81 4·31	.90 4:33	I·00 4·35	1'09 4'37	1.19 4.39
28	.79 4.30	·88 4·32	.98 4:34	I·07 4·36	1'17 4'39	1.27 4.42
30	.86 4.31	·96 4·34	1.05 4:36	I·15 4·38	1'25 4'41	1.36 4.44
32	.93 4:33	1.03 4.35	1·13 4·38	1·24 4·41	1·34 4·44	1 45 4·47
34	1.01 4:35	1.11 4.37	1·22 4·40	1·33 4·43	1·44 4·47	1·55 4·50
36	1.09 4:37	1.20 4.40	1·31 4·43	1·42 4·46	1·54 4·50	1·65 4·54
38	1.18 4:39	1.29 4.42	1·41 4·46	1·53 4·50	1·65 4·54	1·77 4·59
40	1.28 4:42	1.39 4.45	1·51 4·49	1·64 4·54	1·77 4·58	1·90 4·64
42	1·38 4·45	1·50 4·49	1.63 4.53	1·76 4 58	1·90 4·64	2·04 4·70
44	1·49 4·49	1·62 4·53	1.76 4.58	1·90 4 64	2·05 4·70	2·20 4·77
46	1·62 4·53	1·76 4·58	1.90 4.64	2·05 4·70	2·21 4·77	2·37 4·85
48	1·75 4·58	1·90 4·64	2.06 4.71	2·22 4·78	2·39 4·86	2·58 4·95
49	1·83 4·61	1·98 4·67	2.15 4.74	2·32 4·82	2·50 4·91	2·69 5·01

LATITUDE 19°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
H. M. S. 5 51 42·3 5 26 6·4 5 17 32·6 5 8 57·8 5 0 21·7	1.51	5 16 3·3 5 7 26·7	1.53	5 5 54.3	s. 1·41 1·49 1·52 1·55	H. M. S. 5 47 29.7 5 21 40.2 5 13 1.1 5 4 20.4 4 55 38.1	1.58	5 2 45.1	1·52 1·56 1·60	5 18 37·5 5 9 53·8 5 1 8·2	s. -1:43 1:54 1:58 1:63 1:68
4 51 44·3 4 43 5·4 4 34 24·9 4 25 42·6 4 21 20·7	1·64 1·69 1·71	4 41 28·2 4 32 45·2 4 24 0·2 4 19 36·9	1·68 1·73 1·75	4 31 3·3 4 22 15·4 4 17 50·5	1·72 1·77 1·80	4 46 53.9 4 38 7.6 4 29 19.0 4 20 28.0 4 16 1.4	1·71 1·76 1·81 1·84	4 36 24·1 4 27 32·4 4 18 37·9	1.74 1.80 1.86	4 34 38·3 4 25 43·2 4 16 45·0	1·73 1·78 1·84 1·91 1·94
4 16 58·2 4 12 35·2 4 8 11·5 4 3 47·2 3 59 22·3	1·76 1·78 1·81	4 10 48·3 4 6 23·1 4 1 57·1	1.83 1.86	4 4 31·7 4 0 3·9	1.82 1.85 1.88 1.91 1.95	4 II 34·I 4 7 6·0 4 2 37·I 3 58 7·3 3 53 36·6	1.94	4 0 39.3	1.96 1.99 2.03	4 3 11·2 3 58 38·0 3 54 3·7	1.98 2.01 2.05 2.09 2.13
3 54 56·6 3 50 30·2 3 46 3·0 3 41 34·8 3 37 5·8	1.96 1.96	3 48 34·6 3 44 5·3 3 39 35·1	1·99	3 42 3·8 3 37 31·3	1.98 2.02 2.06 2.10 2.14	3 49 5.0 3 44 32.2 3 39 58.4 3 35 23.4 3 30 47.1	2·12 2·17	3 37 48·8 3 33 II·0	2·20 2·24	3 35 34·7 3 30 54·0	2·18 2·23 2·27 2·32 2·38
3 32 35·9 3 28 4·8 3 23 32·7 3 18 59·4 3 14 24·8	2·08 2·12 2·16	3 25 58·I 3 2I 23·3 3 I6 47·3	2·15 2·20 2·24	3 23 46·6 3 19 9·1 3 14 30·1	2·18 2·23 2·28 2·33 2·39	3 26 9·5 3 21 30·4 3 16 49·8 3 12 7·5 3 7 23·5	2.42	3 9 39.3	2·40 2·46 2·52	3 16 42·3 3 11 54·7 3 7 5·1	2·43 2·49 2·56 2·62 2·69
3 9 48·9 3 5 11·4 3 0 32·4 2 55 51·7 2 51 9·1	2·31 2·36 2·42	3 2 50.1	2·40 2·46 2·53	3 0 22·9 2 55 36·7 2 50 48·3	2·44 2·51 2·57 2·64 2·72	3 2 37·5 2 57 49·4 2 52 59·1 2 48 6·3 2 43 10·9	2.76	2 45 16.9	2·73 2·81 2·89	2 52 22·I 2 47 22·4 2 42 19·6	2·77 2·85 2·93 3·03 3·13
2 46 24·5 2 4I 37·7 2 36 48·5 2 3I 56·7 2 27 I·9	2·62 2·70 2·78		2·75 2·83 2·92	2 36 8·I 2 3I 8·8 2 26 6·I	2.80 2.88 2.97 3.07 3.18	2 38 12·5 2 33 11·0 2 28 5·8 2 22 56·8 2 17 43·4	3·03 3·13 3·24	2 30 4·9 2 24 53·3 2 19 37·2	3·18 3·42	2 26 49·I 2 2I 30·3 2 I6 6·4	3·23 3·35 3·48 3·62 3·77
	H. M. S. 5 51 423 5 26 6 4 2 3 5 2 4 5 2 3 1 3 5 2 6 6 6 4 2 1 20 7 4 16 5 8 2 4 12 20 7 4 16 5 8 2 4 12 20 7 4 16 5 8 2 2 3 3 5 4 5 6 6 3 5 0 3 0 2 3 3 4 1 3 4 8 3 3 7 5 8 3 3 2 8 4 8 3 3 7 5 8 3 3 2 8 4 8 3 3 2 7 5 8 3 1 4 2 4 8 1 1 3 7 7 2 5 1 9 1 2 4 6 2 4 5 2 2 3 6 4 8 5 2 2 3 1 5 6 7 2 3 1 5 5 6 7 2 2 3 1 5 5 6	Name	H. M. S. 5 1 423 73 5 5 0 18-5	No. No.	No. No.	No. No.	H.M. S. S. H.M. S. S. H.M. S. S. H.M. S. S. F.423 S. S. S. S. S. S. S. S	No. No.	H. M. S. S. H. M.	H. M. S. S. H. M. S. S	N.M. S. S. H.M.

VARIATION TO 1' OF LATITUDE AND ALTITUDE.

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
	- '47 -4'26	55 -4.26	63 -4.28	- '71 - 4'29	- '79 -4'30	- ·87 - 4·32
	'52 4'26	.60 4.27	.68 4.28	'76 4'30	'84 4'31	·93 4·33
	'58 4'27	.66 4.28	.74 4.29	'82 4'31	'90 4'33	·98 4·34
	'63 4'28	.71 4.29	.79 4.30	'87 4'32	'96 4'34	I·04 4·36
	'69 4'28	.77 4.30	.85 4.31	'93 4'33	1'02 4'35	I·10 4·37
10	.74 4.29	.83 4.31	91 433	.99 4.35	1.08 4.37	1·17 4·39
12	.80 4.31	.89 4.32	97 434	1.06 4.36	1.14 4.38	1·23 4·41
14	.86 4.32	.95 4.33	103 435	1.12 4.38	1.21 4.40	1·30 4·43
16	.93 4.33	I.01 4.35	110 437	1.19 4.39	1.28 4.42	1·37 4·45
18	.99 4.34	I.08 4.37	1-17 439	1.26 4.41	1.36 4.44	1·45 4·47
20	1.06 4.36	1·15 4·39	1·24 4·41	1·34 4·44	1·43 4·47	1·53 4·50
22	1.13 4.38	1·23 4·41	1·32 4·43	1·42 4·46	1·52 4·49	1·62 4·53
24	1.21 4.40	1·30 4·43	1·40 4·46	1·50 4·49	1·60 4·52	1·71 4·56
26	1.29 4.42	1·39 4·45	1·49 4·48	1·59 4·52	1·70 4·56	1·81 4·60
28	1.37 4.45	1·47 4·48	1·58 4·52	1·69 4·55	1·80 4·60	1·91 4·64
30	1·46 4·48	1·57 4·51	1·68 4·55	1·79 4·59	1·91 4·64	2·03 4·69
32	1·56 4·51	1·67 4·55	1·79 4·59	1·90 4·64	2·03 4·69	2·15 4·75
34	1·66 4·54	1·78 4·59	1·90 4·64	2·03 4·69	2·15 4·75	2·29 4·81
36	1·78 4·59	1·90 4·64	2·03 4·69	2·16 4·75	2·30 4·81	2·44 4·88
38	1·90 4·64	2·03 4·69	2·17 4·75	2·31 4·82	2·46 4·89	2·61 4·97
40	2·03 4·69	2·18 4·76	2·32 4·83	2·48 4·90	2·64 4·98	2·80 5·08
42	2·19 4·76	2·34 4·83	2·50 4·91	2·66 5·00	2·84 5·09	3·03 5·20
44	2·35 4·84	2·52 4·92	2·70 5·02	2·88 5·12	3·08 5·23	3·29 5·36
45	2·45 4·89	2·62 4·98	2·81 5·08	3·00 5·19	3·21 5·31	3·44 5·45
46	2·55 4·94	2·73 5·03	2·93 5·14	3·13 5·26	3·35 5·40	3·59 5·55

LATITUDE 19°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	12°	Decl. Vár.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 43 12.7 5 34 31.5 5 25 48.8 5 17 4.4 5 8 18.1	S. -1·44 1·48 1·52	5 15 29.9	s. -1.46 1.50	5 13 54.1	S. -1·47 1·51		s. -1.48 1.53 1.58	5 28 28·3 5 19 34·4 5 10 38·0	s. - 1·50	H. M. S. 5 35 49.7 5 26 54.8 5 17 57.5 5 8 57.5 4 59 54.7	s. - 1·51 1·57 1·63 1·69
10 12 14 16 17	4 59 29.7 4 50 39.1 4 41 46.0 4 32 50.2 4 28 21.1	1·66 1·71 1·76 1·82 1·85	4 39 59·0 4 30 59·5	1.69 1.74 1.80 1.87 1.90	4 47 10·0 4 38 9·7 4 29 6·2	1·7·2 1·78 1 84 1·91 1·95	4 27 10.1	1·75 1·82 1 88 1·96 2·00	4 43 32·I 4 34 23·5 4 25 II·2		4 50 48·8 4 4I 39·5 4 32 26·4 4 23 9·2 4 I8 28·8	1·82 1·90 1·98 2·06 2·10
18 19 20 21 22	4 23 51·3 4 19 20·7 4 14 49·1 4 10 16·7 4 5 43·2	1·89 1·92 1·96 1·99 2·03	4 17 23.9 4 12 50.2 4 8 15.4	1.97		1·99 2·02 2·06 2·11 2·15	4 13 20·9 4 8 42·4 4 4 2·5	2·04 2·08 2·12 2·17 2·22	4 11 14·5 4 6 33·1 4 1 50·5	2·09 2·14 2·18 2·23 2·28	4 9 44·4 4 4 20·2 3 59 34·5	2·20 2·25 2·30
23 24 25 26 27	4 I 8·7 3 56 33·1 3 51 56·4 3 47 18·4 3 42 39·0	2·07 2·11 2·16 2·20 2·25		2·13 2·18 2·22 2·27 2·32	3 52 11·8 3 47 29·4 3 42 45·5	2·20 2·25 2·30 2 35 2·40	3 54 38·9 3 49 54·9 3 45 9·4 3 40 22·3 3 35 33·4	2·32 2·37 2·43	3 47 33.7 3 42 44.8 3 37 54.1		3 40 15·3 3 35 20·8	2·47 2·53 2·60
28 29 30 31 32	3 37 58·0 3 33 16·0 3 28 32·2 3 23 46·7 3 18 59·3	2·30 2·35 2·41 2·46 2·52	3 21 16.1	2·38 2·43 2·49 2·56 2·62	3 28 23·9 3 23 32·9 3 18 39·9	2.52	3 25 49·8 3 20 54·8 3 15 57·6	2·62 2·68 2·76	3 23 10·0 3 18 10·7 3 13 8·8	2·71 2·79 2·87	3 15 20·1 3 10 13·3	2·82 2·90 2·99
33 34 35 36 37	3 14 9·9 3 9 18·4 3 4 24·7 2 59 28·4 2 54 29·4	2·59 2·66 2·73 2·81 2·89	3 6 35·8 3 I 37·4	2.93	3 3 46·4 2 58 43·1	3.06	3 0 49·8 2 55 41·2	3·01 3·10	2 57 45.6 2 52 31.1 2 47 12.7	3 14 3·24 3·35	2 54 33·2 2 49 12·3	3·28 3·39 3·51
38 39 40 41 42	2 49 27·5 2 44 22·4 2 39 13·7 2 34 1·2 2 28 44·5	2·98 3·07 3·17 3·28 3·40	2 41 13·8 2 35 58·8	3·22 3·33 3·45	2 32 33.9	3·38 3·50 3·64	2 39 53·1 2 34 28·3 2 28 58·5 2 23 22·9 2 17 40·8	3·55 \3·69 3·84	2 30 49·9 2 25 11·3 2 19 26·2	3·74 3·89 4·06	2 32 41.2 2 26 59.7 2 21 11.5 2 15 15.6 2 9 11.2	3·94 4·11 4·30
41	2 34 I·2	3·28 3·40	2 30 39·4 2 25 15·1	3·45 3·59	2 27 6·8 2 21 34·2	3·64 3·79	2 23 22·9 2 17 40·8	3·84 4·00	2 19 26.2	4·06 4·25	2 15 15.6	i

VARIATION TO 1' OF LATITUDE AND ALTITUDE.

Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.
0 2 4 6 8	S. S. - '95 - 4'34 1'01 4'35 1'07 4'36 1'13 4'38 1'19 4'39	S. S. -1.04 -4.35 1.09 4.37 1.15 4.38 1.21 4.40 1.28 4.42	S. S. -1·12 -4·37 1·18 4·39 1·24 4·41 1·30 4·43 1·36 4·45	S. S. -1·20 -4·40 1·26 4·41 1·32 4·43 1·39 4·45 1·45 4·47	S. S. -1·30 -4·42 1·35 4·44 1·41 4·46 1·48 4·48 1·54 4·50	s. s. -1·38 -4·45 1·44 4·47 1·50 4·49 1·57 4·51 1·64 4·54
10	1·25 4·41	1·34 4·44	1·43 4·47	1·52 4·50	1·62 4·53	1·71 4·56
12	1·32 4·43	1·41 4·46	1·50 4·49	1·60 4·52	1·69 4·56	1·79 4·59
14	1·39 4·45	1·48 4·48	1·58 4·52	1·67 4·55	1·77 4·59	1·87 4·63
16	1·47 4·48	1·56 4·51	1·66 4·54	1·76 4·58	1·86 4·62	1·96 4·66
18	1·55 4·50	1·64 4·54	1·74 4·57	1·85 4·62	1·95 4·66	2·06 4·70
20	1.63 4.53	1·73 4·57	1·83 4·61	1.94 4.65	2·05 4·70	2·16 4·75
22	1.72 4.57	1·82 4·61	1·93 4·65	2.04 4.70	2·15 4·75	2·27 4·80
24	1.81 4.60	1·92 4·65	2·03 4·69	2.15 4.75	2·27 4·80	2·39 4·86
26	1.92 4.64	2·03 4·69	2·15 4·74	2.27 4.80	2·39 4·86	2·52 4·92
28	2.03 4.69	2·15 4·74	2·27 4·80	2.40 4.86	2·53 4·93	2·67 5·00
30	2·15 4·74	2·28 4·80	2·41 4·87	2·54 4·93	2.68 5.01	2·83 5·09
32	2·28 4·81	2·42 4·87	2·56 4·94	2·70 5·02	2.85 5.10	3·01 5·19
34	2·43 4·88	2·57 4·95	2·72 5·03	2·88 5·12	3.04 5.21	3·22 5·32
36	2·59 4·96	2·75 5·04	2·91 5·13	3·08 5·23	3.26 5.34	3·46 5·46
37	2·68 5·01	2·84 5·10	3·01 5·19	3·19 5·30	3.38 5.42	3·59 5·55
38/	2·77 5·06	2·94 5·15	3·12 5·26	3·31 5·37	3·52 5·50	3.73 5.64
39	2·87 5·11	3·05 5·22	3·24 5·33	3·44 5·45	3·66 5·59	3.89 5.75
40	2·98 5·18	3·17 5·29	3·37 5·41	3·59 5·54	3·82 5·70	4.07 5.87
41	3·10 5·24	3·30 5·36	3·51 5·50	3·74 5·65	3·99 5·81	4.26 6.00
42	3·22 5·32	3·44 5·45	3·66 5·59	3·91 5·76	4·18 5·94	4.47 6.16

LATITUDE 19°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 34 18·3 5 25 19·9 5 16 19·0 5 7 15·3 4 58 8·5	s. -1.53 1.59 1.65 1.72 1.79	H. M. S. 5 32 45.8 5 23 43.8 5 14 39.0 5 5 31.2 4 56 20.0	s. -1.55 1.61 1.68 1.75 1.83	H. M. S. 5 31 12·1 5 22 6·2 5 12 57·3 5 3 45·1 4 54 29·4	s. -1.57 1.64 1.71 1.78 1.86	5 20 27.0	s. - 1·59 1·67 1·74 1·82 1·90	H. M. S. 5 28 0.8 5 18 46.3 5 9 28.3 5 0 6.6 4 50 40.9		H. M. S. 5 26 23.0 5 17 3.8 5 7 40.9 4 58 14.0 4 48 42.7	s. -1.64 1.72 1.81 1.90 1.99
10 12 14 16 18	4 48 58·3 4 39 44·4 4 30 26·4 4 21 3·9 4 11 36·4	1.86 1.94 2.02 2.11 2.21	4 47 5·2 4 37 46·5 4 28 23·4 4 18 55·3 4 9 21·8	1·90 1·99 2·08 2·17 2·28	4 45 9·8 4 35 45·9 4 26 17·1 4 16 43·1 4 7 3·1	1·95 2·04 2·13 2·23 2·35	4 33 42·I 4 24 7·5	1.99 2.09 2.19 2.30 2.42	4 4I 10·5 4 3I 35·2 4 2I 54·3 4 I2 7·I 4 2 I2·9	2.25	4 29 25·0 4 19 37·2	2·09 2·20 2·32 2·44 2·58
19 20 21 22 23	4 6 50·5 4 2 3·2 3 57 14·3 3 52 23·7 3 47 31·2	2·26 2·32 2·37 2·43 2·49	4 4 32·7 3 59 42·0 3 54 49·6 3 49 55·4 3 44 59·2	2·33 2·39 2·45 2·51 2·58	4 2 10·6 3 57 16·4 3 52 20·3 3 47 22·2 3 42 21·9	2·40 2·47 2·53 2·60 2·67	3 54 46·1 3 49 46·0 3 44 43·7	2·48 2·55 2·61 2·69 2·76	3 57 12·9 3 52 10·8 3 47 6·5 3 41 59·7 3 36 50·4	2.63	3 44 21·3 3 39 9·7	2·65 2·72 2·80 2·88 2·97
24 25 26 27 28	3 42 36·9 3 37 40·6 3 32 42·1 3 27 41·2 3 22 37·8	2·56 2·62 2·69 2·77 2·85	3 40 0·9 3 35 0·4 3 29 57·5 3 24 52·0 3 19 43·7	2·65 2·72 2·79 2·87 2·96	3 37 19·4 3 32 14·4 3 27 6·7 3 21 56·2 3 16 42·7	2·74 2·82 2·90 2·99 3·08	3 29 22·I 3 24 9·4 3 18 53·5	2·84 2·93 3·01 3·11 3·21		3.04	3 28 38·0 3 23 17·3 3 17 53·1 3 12 25·1 3 6 52·9	3·06 3·16 3·26 3·37 3·49
29 30 31 32 33	3 17 31.7 3 12. 22.7 3 7 10.5 3 1 54.9 2 56 35.5	2·93 3·02 3·11 3·21 3·32	3 14 32·5 3 9 17·9 3 3 59·9 2 58 38·0 2 53 12·0	3·05 3·14 3·25 3·35 3·47	3 11 25·8 3 6 5·3 3 0 40·9 2 55 12·3 2 49 38·9	3·18 3·28 3·39 3·51 3·64	3 2 44·3 2 57 13·0 2 51 36·8	3·31 3·43 3·55 3·68 3·82	3 4 48·2 2 59 14·2 2 53 35·3 2 47 50·9 2 42 0·6	3·72 3·86	3 I 16·1 2 55 34·3 2 49 47·0 2 43 53·6 2 37 53·5	3·62 3·75 3·90 4·06 4·23
34 35 36 37 38	2 51 12·0 2 45 44·1 2 40 11·1 2 34 32·7 2 28 48·1	3·43 3·56 3·69 3·83 3·99	2 47 41·3 2 42 5·6 2 36 24·2 2 30 36·6 2 24 42·0	3·60 3·73 3·88 4·04 4·22	2 44 0·3 2 38 16·0 2 32 25·3 2 26 27·5 2 20 21·6	3·78 3·93 4·09 4·27 4·47	2 28 13·2 2 22 3·9	3·97 4·14 4·32 4·53 4·75	2 36 3.7 2 29 59.3 2 23 46.5 2 17 24.2 2 10 51.0	4·37 4·58	2 19 3·6 2 12 26·5	4·42 4·63 4·88 5·14 5·41
	VARIATION TO 1' OF LATITUDE AND ALTITUDE.											

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
	s. s.	s. s.	s. s.	s. s.	S. S.	S. S.
0	-1.46 - 4.47	-1·55 -4·50	-1.64 -4.54	-I-73 -4·57	-1.83 - 4.61	-1.92 -4.64
2	1.52 4.50	1.61 4.53	1.71 4.56	1.80 4.60	1.89 4.64	1.99 4.68
4	1.59 4.52	1.68 4.55	1.77 4.59	1.87 4.63	1.96 4.67	2.06 4.71
6	1.66 4.54	1.75 4.58	1.85 4.62	1.94 4.66	2.04 4.70	2.14 4.74
8	I·73 4·57	1.83 4.61	1.92 4.65	2.02 4.69	2.12 4.73	2.23 4.78
10	1.81 4.60	1.90 4.64	2.00 4.68	2.11 4.73	2.21 4:77	2.32 4.82
12	1.89 4.63	1.99 4.67	2.09 4.72	2.20 4.77	2.30 4.82	2.41 4.87
14	1.97 4.67	2.08 4.71	2.18 4.76	2.29 4.81	2.40 4.87	2.52 4.93
16	2.07 4.71	2.17 4.76	2.28 4.81	2.40 4.86	2.51 4.92	2.63 4.98
18	2.17 4.75	2.28 4.80	2.39 4.86	2.21 4.92	2.63 4.98	2.76 5.05
19	2.22 4.78	2.33 4.83	2.45 4.89	2.57 4.95	2.70 5.02	2.83 5.09
20	2.27 4.80	2.39 4.86	2.51 4.92	2.63 4.98	2.76 5.05	2.90 5.13
21	2.33 4.83	2.45 4.89	2.57 4.95	2.70 5.02	2.83 5.09	2.97 5.17
22	2.39 4.86	2.51 4.92	2.64 4.99	2.77 5.06	2.91 5.13	3.05 5.22
23	2.45 4.89	2.58 4.95	2.71 5.02	2.84 5.10	2.99 5.18	3.13 5.26
24	2.52 4.92	2.65 4.99	2.78 5.06	2.92 5.14	3.07 5.23	3.22 5.32
25	2.58 4.96	2.72 5.03	2.86 5.11	3.00 5.19	3.15 5.28	3·3I 5·37
26	2.66 4.99	2.79 5.07	2.94 5.15	3.09 5.24	3.25 5.33	3.41 5.43
27	2.73 5.04	2.87 5.11	3.02 5.20	3.18 5.29	3.35 5.39	3.52 5.50
28	2.81 5.08	2.96 5.16	3.11 2.52	3.28 5.35	3.45 5.46	3.63 5.57
29	2.89 5.13	3.05 5.21	3.21 5.31	3.38 5.42	3.56 5.53	3.75 5.65
30	2.98 5.18	3.14 5.27	3.31 5.37	3.49 5.49	3.68 5.61	3.88 5.74
31	3.08 5.23	3.25 5.33	3.42 5.44	3.61 5.56	3.81 5.69	4.02 5.84
32	3.18 5.29	3.35 5.40	3.54 5.52	3.74 5.65	3.95 5.79	4.18 5.95
33	3.29 5.37	3.47 5.47	3.67 5.60	3.88 5.74	4.10 5.89	4.35 6.06
34	3.40 5.43	3.60 5.55	3.81 5.69	4.03 5.84	4.27 6.01	4.53 6.20
35	3.23 2.21	3.73 5.64	3.95 5.79	4.19 5.96	4.45 6.14	4.74 6.35
36	3.66 5.59	3.88 5.74	4.12 5.90	4.38 6.09	4.66 6.29	4.97 6.52
37	3.81 5.69	4.04 5.85	4.30 6.03	4.58 6.23	4.88 6.46	5.22 6.72
38	3.97 5.80	4.22 5.97	4.50 6.18	4.80 6.39	5.13 6.65	5.50 6.96
	33, 300	1 777 397	75- 010	1 4-5 039	1 3-3 003	330 090

LATITUDE 20°.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 8 10 12	H. M. S. 6 0 0·0 5 25 55·9 5 17 24·2 5 8 52·1 5 0 19·5	s. -1·46 1·47 1·48 1·49	H. M. S. 5 58 32·6 5 24 27·2 5 15 54·9 5 7 22·0 4 58 48·4	s. -1.46 1.48 1.50 1.51 1.53	H. M. S. 5 57 5·2 5 22 57·7 5 14 24·6 5 5 50·7 4 57 16·1	s. 1·46 1·50 1·51 1·53 1·55	H. M. S. 5 55 37.7 5 21 27.4 5 12 53.3 5 4 18.3 4 55 42.3	s. -1.46 1.51 1.53 1.55	H. M. S. 5 54 10·0 5 19 56·2 5 11 20·9 5 2 44·5 4 54 7·0	s. -1·46 1·53 1·55 1·57	H. M. S. 5 52 42·1 5 18 24·1 5 9 47·3 5 1 9·4 4 52 30·1	s. 1·47 1·54 1·57 1·60 1·63
16 18 20 22 24	4 51 46·2 4 43 12·2 4 34 37·4 4 26 1·5 4 17 24·5	1·52 1·54 1·56 1·59 1·61	4 50 14·1 4 41 38·9 4 33 2·6 4 24 25·2 4 15 46·4	1·55 1·57 1·59 1·63 1·65	4 48 40·5 4 40 3·8 4 3I 26·0 4 22 46·7 4 I4 5·9	1·57 1·60 1·63 1·66 1·70	4 47 5·2 4 38 26·9 4 29 47·2 4 21 5·9 4 12 22·9	1.60 1.63 1.66 1.70 1.74	4 45 28·2 4 36 48·0 4 28 6·3 4 19 22·7 4 10 37·2	1·63 1·66 1·70 1·74 1·78	4 43 49.5 4 35 7.2 4 26 23.2 4 17 37.1 4 8 48.8	1.66 1.70 1.74 1.78 1.83
25 26 27 28 29	4 13 5.5 4 8 46.1 4 4 26.4 4 0 6.3 3 55 45.8	1·63 1·65 1·66 1·68	4 II 26·5 4 7 6·I 4 2 45·3 3 58 24·I 3 54 2·3	1.67 1.69 1.71 1.73 1.75	4 9 44·8 4 5 23·4 4 I I·4 3 56 38·8 3 52 I5·7	1·72 1·74 1·76 1·78 1·80	4 8 0.6 4 3 37.8 3 59 14.5 3 54 50.5 3 50 26.0	1·76 1·78 1·81 1·83 1·86	4 6 13.6 4 1 49.4 3 57 24.5 3 52 59.0 3 48 32.8	1.81 1.83 1.86 1.88	4 4 23.7 3 59 57.9 3 55 31.5 3 51 4.3 3 46 36.2	1.86 1.88 1.91 1.94 1.97
30 31 32 33 34	3 51 24.8 3 47 3.3 3 42 41.3 3 38 18.7 3 33 55.6	1·72 1·74 1·76 1·79 1·81	3 49 39·9 3 45 17·2 3 40 53·8 3 36 29·7 3 32 5·0	1·77 1·80 1·82 1·85 1·88	3 47 52·I 3 43 27·7 3 39 2·7 3 34 37·I 3 30 I0·5	1.83 1.85 1.88 1.91 1.94	3 46 0.7 3 41 34.7 3 37 8.0 3 32 40.4 3 28 12.0	1.89 1.91 1.94 1.98 2.01	3 44 5.9 3 39 38.1 3 35 9.4 3 30 39.8 3 26 9.3	1.94 1.98 2.01 2.04 2.08	3 42 7·4 3 37 37·6 3 33 6·8 3 28 35·1 3 24 2·2	2·01 2·04 2·08 2·12 2·16
35 36 37 38 39	3 29 31.8 3 25 7.3 3 20 42.1 3 16 16.1 3 11 49.3	1·84 1·87 1·90 1·93 1·96	3 27 39·5 3 23 13·3 3 18 46·2 3 14 18·2 3 9 49·3	1.90 1.94 1.97 2.00 2.04	3 25 43·2 3 21 15·0 3 16 45·9 3 12 15·7 3 7 44·4	1·97 2·01 2·04 2·08 2·12	3 23 42·6 3 19 12·3 3 14 40·9 3 10 8·3 3 5 34·4	2·05 2·08 2·12 2·17 2·21	3 21 37·7 3 17 5·0 3 12 31·0 3 7 55·8 3 3 19·1	2·12 2·16 2·21 2·25 2·30	3 19 28·1 3 14 52·8 3 10 16·1 3 5 37·9 3 0 58·1	2·20 2·25 2·29 2·34 2·40
40 41 42 43 44	3 7 21·5 3 2 52·8 2 58 23·1 2 53 52·1 2 49 20·0	2·00 2·03 2·07 2·12 2·16	3 5 19·3 3 0 48·2 2 56 15·9 2 51 42·3 2 47 7·2	2·08 2·12 2·17 2·21 2·26	3 3 12·0 2 58 38·2 2 54 3·1 2 49 26·5 2 44 48·3	2·17 2·21 2·26 2·31 2·37	3 0 59·2 2 56 22·6 2 51 44·4 2 47 4·5 2 42 22·7	2·26 2·31 2·36 2·42 2·48	2 54 1·1 2 49 19·5	2·35 2·41 2·47 2·53 2·60	2 56 16·6 2 51 33·4 2 46 48·0 2 42 0·5 2 37 10·5	2·46 2·52 2·58 2·65 2·73
45 46 47 48 49	2 44 46·5 2 40 11·5 2 35 34·9 2 30 56·7 2 26 16·5	2·21 2·26 2·32 2·38 2·44	2 42 30·7 2 37 52·4 2 33 12·3 2 28 30·2 2 23 45·9	2·32 2·38 2·44 2·51 2·58	2 40 8·3 2 35 26·4 2 30 42·4 2 25 56·0 2 21 7·1	2·43 2·49 2·56 2·64 2·72	2 37 39.0 2 32 53.0 2 28 4.6 2 23 13.5 2 18 19.5	2·55 2·62 2·70 2·78 2·87	2 35 2·4 2 30 11·9 2 25 18·6 2 20 22·3 2 15 22·5	2·67 2·75 2·84 2·93 3·03	2 32 18·0 2 27 22·5 2 22 23·9 2 17 21·7 2 12 15·5	2·81 2·90 2·99 3·09 3·21
		V	ARIATIC	N TO	ı' OF	LAT	ITUDE .	AND	ALTITU	DE.		
Alt.	L. 0°	Α.	L. 1°	A.	L. 2°	Α.	L. 3°	A	L. 4°	Α.	L. 5°	A.
° 0 4 6 8 10	S. - '00 - 11 16 22 27	s. -4·26 4·26 4·26 4·26 4·26	s. ·08 - ·19 ·24 ·30 ·35	s. -4·26 4·26 4·26 4·27 4·27	s. - ·16 - ·26 ·31 ·36 ·44	s. -4·26 4·26 4·27 4·27 4·28	s. - ·24 ·38 ·40 ·46 ·52	s. -4·26 4·27 4·28 4·28 4·29	s. - ·32 ·43 ·48 ·54 ·60	s. -4·27 4·28 4·28 4·29 4·30	s. - ·40 - ·51 ·56 ·62 ·68	s. -4·27 4·29 4·29 4·30 4·31
12 14 16 18 20	·33 ·39 ·45 ·51 ·57	4·27 4·27 4·28 4·29 4·29	•41 •47 •53 •59 •66	4·28 4·28 4·29 4·30 4·31	·49 ·55 ·61 ·68 ·74	4·28 4·29 4·30 4·31 4·32	·58 ·64 ·70 ·76 ·83	4·30 4·31 4·32 4·34	·66 ·72 ·79 ·85 ·92	4·31 4·32 4·33 4·34 4·36	·74 ·81 ·87 ·94 I·01	4·32 4·33 4·34 4·36 4·38
22 24 26 28 30	·63 ·70 ·77 ·84 ·91	4·30 4·31 4·32 4·34 4·35	·72 ·79 ·86 ·93 I·01	4·32 4·33 4·34 4·36 4·37	.81 .88 .95 1.03 1.11	4·33 4·35 4·36 4·38 4·40	·90 ·97 I·05 I·13 I·22	4·35 4·37 4·38 4·40 4·43	·99 1·07 1·15 1·23 1·32	4·38 4·39 4·41 4·43 4·46	1·09 1·16 1·25 1·33 1·42	4·39 4·41 4·43 4·46 4·49
32 34 36 38 40	·99 1·08 1·17 1·26 1·36	4·37 4·39 4·41 4·44 4·47	1·10 1·18 1·28 1·38 1·49	4·40 4·42 4·44 4·47 4·51	1·20 1·29 1·39 1·50 1·61	4·42 4·45 4·48 4·51 4·55	1·31 1·40 1·51 1·62 1·74	4·45 4·48 4·51 4·55 4·60	1·41 1·51 1·62 1·74 1·87	4·49 4·52 4·56 4·60 4·65	1·52 1·63 1·74 1·87 2·01	4·52 4·56 4·60 4·65 4·71
42 44 46 48 49	1·48 1·60 1·73 1·88 1·96	4·50 4·55 4·60 4·65 4·69	1.60 1.73 1.88 2.04 2.13	4·55 4·60 4·65 4·72 4·76	1·74 1·88 2·03 2·20 2·30	4·60 4·65 4·72 4·79 4·84	1.87 2.02 2.19 2.38 2.48	4·65 4·71 4·79 4·88 4·93	2·01 2·17 2·35 2·56 2·68	4·71 4·78 4·86 4·97 5·03	2·16 2·33 2·53 2·75 2·88	4·77 4·85 4·95 5·07 5·14

LATITUDE 20°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 6 8 10	H. M. S. 5 51 13.8 5 25 28.1 5 16 50.9 5 8 12.5 4 59 32.8	1.59	H. M. S. 5 49 45·2 5 23 55·4 5 15 16·6 5 6 36·4 4 57 54·8	1·58 1·61	5 22 21·8 5 13 41·1		H. M. S. 5 46 46·8 5 20 47·2 5 12 4·4 5 3 20·0 4 54 33·7	1.62 1.66	5 19 11·4 5 10 26·3	s. - 1.50 1.61 1.65 1.69	5 17 34·3 5 8 46·9 4 59 57·4	S. -1·51 1·63 1·67 1·72 1·77
14 16 18 20 21	4 50 51.7 4 42 8.9 4 33 24.3 4 24 37.7 4 20 13.6	1·73 1·78	4 49 II·4 4 40 26·3 4 3I 39·2 4 22 49·8 4 I8 24·2	I·77	4 47 29.4 4 38 41.7 4 29 51.8 4 20 59.4 4 16 32.1			I.80	4 43 59·6 4 35 6·0 4 26 9·8 4 17 10·4 4 12 39·5	1·78 1·84 1·89 1·96 1·99	4 24 14·8 4 15 11·6	1·82 1·88 1·94 2·00 2·04
22 23 24 25 26	4 15 48·9 4 11 23·5 4 6 57·5 4 2 30·8 3 58 3·3	1.83 1.85 1.88 1.91 1.94	4 5 3.3	1.87 1.90 1.93 1.96 1.99	4 12 4·2 4 7 35·5 4 3 5·9 3 58 35·5 3 54 4·1		4 10 7·5 4 5 36·8 4 I 5·3 3 56 32·7 3 51 59·2	1.97 2.00 2.04 2.07 2.11	3 59 1·3 3 54 26·5	2·02 2·06 2·10 2·14 2·18	3 56 53.6 3 52 16.4	2·08 2·12 2·16 2·20 2·25
27 28 29 30 31	3 53 35·I 3 49 6·0 3 44 36·0 3 40 5·I 3 35 33·I	1·97 2·00 2·03 2·07 2·11	3 37 58.8	2·10 2·14	3 49 31·8 3 44 58·4 3 40 24·0 3 35 48·3 3 31 11·4	2·09 2·13 2·17 2·21 2·25	3 47 24·6 3 42 48·8 3 38 11·8 3 33 33·5 3 28 53·8	2·15 2·19 2·24 2·28 2·33	3 40 35·1 3 35 55·3 3 31 14·1	2·31 2·36	3 38 16·9 3 33 34·2	2·29 2·34 2·39 2·45 2·50
32 33 34 35 36	3 31 0·1 3 26 25·9 3 21 50·5 3 17 13·7 3 12 35·5	2·24 2·28	3 28 48·9 3 24 12·1 3 19 33·9 3 14 54·2 3 10 13·0	2.32	3 21 53·5 3 17 12·3 3 12 29·4			2·38 2·44 2·50 2·56 2·62	3 17 0·9 3 12 12·8 3 7 22·7	2·47 2·53 2·59 2·66 2·73	3 4 40.0	2·56 2·63 2·69 2·77 2·84
37 38 39 40 41	3 7 55·8 3 3 14·5 2 58 31·3 2 53 46·2 2 48 59·2	2·50 2·56	3 5 30·0 3 0 45·1 2 55 58·3 2 51 9·2 2 46 17·8	2·48 2·54 2·61 2·67 2·75	3 2 58·2 2 58 9·5 2 53 18·6 2 48 25·2 2 43 29·2	2·58 2·65 2·72 2·79 2·88	3 0 20·2 2 55 27·3 2 50 32·0 2 45 33·9 2 40 32·6	2.69 2.76 2.84 2.92 3.01	2 52 38·2 2 47 37·9 2 42 34·6	2·80 2·88 2·97 3·06 3·16	2 44 35·9 2 39 26·8	2·92 3·01 3·10 3·20 3·31
42 43 44 45 46	2 44 9.6 2 39 17.6 2 34 23.0 2 29 25.3 2 24 24.3	2·86 2·95	2 4I 23·8 2 36 27·0 2 3I 27·I 2 26 23·7 2 2I 16·6	3.10	2 38 30·2 2 33 28·0 2 28 22·3 2 23 12·7 2 17 58·6	3.27	2 35 28·2 2 30 20·1 2 25 8·0 2 19 51·3 2 14 29·6	3.45	2 27 2·6 2 2I 43·3	3·26 3·38 3·51 3·64 3·80	2 18 7·3 2 12 34·0	3·43 3·56 3·70 3·86 4·03
		VA	ARIATIC	N TO	ı' OF	LAT	TUDE A	AND	ALTITU	DE.		
Alt.	L. 6°	A.	L. 7°	Α.	L. 8°	Α.	L. 9°	A.	L. 10°	Α.	L. 11°	A.
° 0 2 4 6 8	s. - ·48 - ·53 ·59 ·65 ·70	5. -4·28 4·29 4·30 4·31 4·32	s. - ·56 ·61 ·67 ·73 ·79	s. -4·29 4·30 4·31 4·32 4·33	s. 64 - .69 .75 .81 .87	s. -4·30 4·31 4·32 4·33 4·35	s. - ·72 - ·78 ·83 ·89 ·96	s. -4·31 4·33 4·34 4·35 4·36	s. - ·80 - ·86 ·92 ·98 I·04	s. -4·33 4·34 4·35 4·37 4·38	s. - ·88 ·94 ·00 ·06 ·113	s. -4·35 4·36 4·37 4·39 4·40
10 12 14 16 18	·77 ·83 ·89 ·96 I·03	4·33 4·34 4·35 4·36 4·38	·85 ·91 ·98 I·05 I·12	4:34 4:35 4:37 4:38 4:40	·94 I·00 I·07 I·14 I·21	4·36 4·37 4·39 4·41 4·43	1.02 1.09 1.16 1.23 1.31	4·38 4·39 4·41 4·43 4·45	1·11 1·18 1·25 1·32 1·40	4·40 4·42 4·44 4·46 4·48	1·19 1·27 1·34 1·42 1·50	4·42 4·44 4·46 4·49 4·51
20 22 24 26 28	1·10 1·18 1·26 1·35 1·44	4·40 4·42 4·44 4·46 4·49	1·20 1·28 1·36 1·45 1·54	4·42 4·44 4·47 4·50 4·53	1·29 1·37 1·46 1·55 1·65	4·45 4·47 4·50 4·53 4·56	1·39 1·47 1·56 1·66 1·76	4·48 4·50 4·53 4·57 4·61	1·48 1·57 1·67 1·77 1·87	4·51 4·54 4·57 4·61 4·65	1·58 1·67 1·77 1·88 1·99	4·54 4·57 4·61 4·65 4·70
30 32 34 36 38	1.53 1.64 1.75 1.87 2.00	4·52 4·56 4·60 4·65 4·70	1.64 1.75 1.87 2.00 2.14	4·56 4·65 4·70 4·76	1.75 1.87 1.99 2.13 2.28	4·60 4·65 4·70 4·76 4·83	1·87 1·99 2·12 2·27 2·43	4·65 4·70 4·76 4·82 4·90	1.99 2.12 2.26 2.41 2.58	4·70 4·75 4·82 4·89 4·98	2·11 2·25 2·40 2·56 2·75	4·75 4·81 4·88 4·97 5·07
40 42 44 45 46	2·15 2·31 2·50 2·60 2·71	4·77 4·85 4·94 4·99 5·05	2·30 2·47 2·67 2·79 2·91	4·84 4·92 5·03 5·09 5·15	2·45 2·64 2·86 2·98 3·11	4.91 5.01 5.13 5.20 5.27	2·61 2·82 3·06 3·19 3·34	4·99 5·10 5·24 5·32 5·41	2·78 3·00 3·27 3·41 3·58	5·08 5·21 5·36 5·46 5·56	2·96 3·20 3·49 3·66 3·84	5·18 5·33 5·50 5·61 5·72

204 HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. LATITUDE 20°.

1		1	LCLINA		-CONTR		NAME	1	LATITU.	1		Ι_
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 42 15·1 5 33 30·5 5 24 44·2 5 15 56·1 5 7 5·9	s. -1.53 1.56 1.60 1.65 1.70	H. M. S. 5 40 43·1 5 31 56·2 5 23 7·4 5 14 16·5 5 5 23·4		H. M. S. 5 39 10·4 5 30 20·8 5 21 29·2 5 12 35·4 5 3 39·2	s. - 1·55 1·60 1·65 1·70 1·75	H, M. S. 5 37 36·8 5 28 44·4 5 19 49·8 5 10 52·8 5 1 53·2	S. - 1·57 1·62 1·67 1·72 1·78	H. M. S. 5 36 2·2 5 27 6·8 5 18 9·0 5 9 8·6 5 0 5·4	s. - 1·58 1·64 1·69 1·75 1·81	5 25 28·0 5 16 26·7 5 7 22·7	s. -1.60 1.66 1.72 1.78 1.85
10 12 14 16 17	4 58 13.6 4 49 18.8 4 40 21.3 4 31 20.9 4 26 49.4	1·75 1·80 1·86 1·92 1·95	4 29 24.4	1.90	4 54 40·4 4 45 38·7 4 36 33·7 4 27 25·2 4 22 49·6	1·87 1·94 2·01	4 52 50·8 4 43 45·2 4 34 36·1 4 25 23·2 4 20 45·2	2.06	4 50 59·0 4 41 49·3 4 32 35·8 4 23 18·1 4 18 37·6	2.11	4 49 5·1 4 39 50·9 4 30 32·6 4 21 9·9 4 16 26·7	1·92 2·00 2·08 2·16 2·21
18 19 20 21 22	4 22 17·1 4 17 43·9 4 13 9·8 4 8 34·6 4 3 58·3	2.02	4 20 16·5 4 15 41·1 4 11 4·7 4 6 27·1 4 1 48·3		4 18 12·9 4 13 35·1 4 8 56·2 4 4 16·0 3 59 34·6		4 16 6·0 4 11 25·7 4 6 44·1 4 2 1·2 3 57 16·9	2·19 2·23	4 13 55.9 4 9 12.8 4 4 28.4 3 59 42.5 3 54 55.0	2·25 2·30 2·35		2·26 2·31 2·36 2·42 2·47
23 24 25 26 27	3 59 20·9 3 54 42·3 3 50 2·4 3 45 21·1 3 40 38·4	2·27 2·32	3 57 8·3 3 52 26·9 3 47 44·2 3 43 0·0 3 38 14·2	2·24 2·29 2·34 2·39 2·44	3 54 51·7 3 50 7·5 3 45 21·7 3 40 34·2 3 35 45·0	2·31 2·36 2·41 2·47 2·53	3 52 31·1 3 47 43·7 3 42 54·5 3 38 3·6 3 33 10·8	2.44	3 50 6·0 3 45 15·2 3 40 22·6 3 35 27·9 3 30 31·1	2·46 2·51 2·58 2·64 2·71	3 47 36·3 3 42 41·9 3 37 45·4 3 32 46·7 3 27 45·7	2·54 2·60 2·66 2·73 2·81
28 29 30 31 32	3 35 54·2 3 31 8·3 3 26 20·6 3 21 31·1 3 16 39·5	2·47 2·53 2·59	3 33 26·6 3 28 37·3 3 23 45·9 3 18 52·5 3 13 56·8	2·50 2·56 2·62 2·69 2·76	3 30 53·9 3 26 0·9 3 21 5·6 3 16 8·0 3 11 7·9	2·59 2·65 2·72 2·79 2·87	3 28 15·9 3 23 18·7 3 18 19·2 3 13 17·1 3 8 12·2	2.83	3 25 32·1 3 20 30·6 3 15 26·4 3 10 19·4 3 5 9·4	2·78 2·86 2·94 3·02 3·11	3 7 14.6	2·88 2·97 3·05 3·15 3·24
33 34 35 36 37	3 II 45.7 3 6 49.5 3 I 50.7 2 56 49.3 2 51 44.7		3 8 58·7 3 3 58·0 2 58 54·4 2 53 47·7 2 48 37·6	2·84 2·92 3·00 3·19	3 6 5·1 3 0 59·4 2 55 50·5 2 50 38·1 2 45 21·8	2·95 3·04 3·13 3·23 3·34	3 3 4·3 2 57 53·2 2 52 38·4 2 47 19·8 2 41 56·8	3·08 3·17 3·27 3·38 3·50	2 59 55·9 2 54 38·8 2 49 17·7 2 43 52·2 2 38 21·8	3·21 3·31 3·42 3·54 3·67	2 51 15·7 2 45 47·6 2 40 14·5	3·35 3·46 3·59 3·72 3·86
38 39 40 41 42	2 46 36·9 2 41 25·5 2 36 10·0 2 30 50·2 2 25 25·5	3·25 3·36 3·48	2 43 23.8 2 38 5.8 2 32 43.4 2 27 16.0 2 21 42.9	3.41 3.53 3.67	2 40 1·4 2 34 36·4 2 29 6·2 2 23 30·3 2 17 47·9	3.87	2 36 29·1 2 30 56·2 2 25 17·4 2 19 32·0 2 13 39·2		2 32 46·1 2 27 4·3 2 21 15·9 2 15 19·9 2 9 15·2		2 22 59·7 2 17 0·4 2 10 52·3	4·02 4·19 4·39 4·60 4·84
		VA	RIATIO	N TO	ı' OF	LAT	ITUDE A	AND	ALTITU	DE.		
Alt.	L. 12°	Α.	L. 13°	Α.	L. 14°	Α.	L. 15 °	Α.	L. 16°	Α.	L. 17°	A.
° 0 2 4 6 8	s. '97 1'02 1'09 1'15 1'22	s. -4·36 4·38 4·39 4·41 4·43	S. -1.05 - 1.11 1.17 1.24 1.30	s. -4·38 4·40 4·41 4·43 4·45	s. -1·13 - 1·19 1·26 1·32 1·39	s. -4·40 4·42 4·44 4·46 4·48	s. -1·22 - 1·28 1·35 1·41 1·48	s. -4·43 4·45 4·47 4·49 4·51	s. - 1·31 - 1·37 1·44 1·50 1·58	s. -4*45 4*47 4*49 4*51 4*54	s. -1·39 - 1·46 1·53 1·60 1·67	s. -4·48 4·50 4·52 4·55 4·57
10 12 14 16 18	1·28 1·36 1·43 1·51 1·59	4·45 4·47 4·49 4·52 4·55	1·37 1·45 1·53 1·61 1·70	4·47 4·50 4·52 4·55 4·58	1·47 1·54 1·62 1·71 1·80	4·50 4·53 4·56 4·59 4·62	1·56 1·64 1·72 1·81 1·90	4·53 4·56 4·59 4·63 4·66	1·65 1·73 1·82 1·91 2·01	4·57 4·60 4·63 4·67 4·71	1.75 1.83 1.92 2.02 2.12	4·60 4·63 4·67 4·71 4·75
20 22 24 26 28	1·68 1·78 1·88 1·99 2·11	4·58 4·61 4·65 4·70 4•75	1·79 1·89 1·99 2·11 2·23	4·62 4·66 4·70 4·75 4·81	1·89 2·00 2·11 2·23 2·36	4·66 4·70 4·75 4·80 4·87	2·00 2·11 2·23 2·35 2·49	4·70 4·75 4·80 4·86 4·93	2·11 2·23 2·35 2·48 2·63	4·75 4·80 4·86 4·93 5·00	2·23 2·35 2·48 2·62 2·77	4·80 4·86 4·92 5·00 5·08
30 32 34 36 37	2·24 2·38 2·54 2·72 2·81	4·81 4·88 4·96 5·05 5·10	2·37 2·52 2·69 2·88 2·99	4·87 4·95 5·04 5·14 5·20	2·51 2·67 2·85 3·05 3·17	4·94 5·02 5·12 5·24 5·31	2·65 2·82 3·01 3·24 3·36	5·01 5·11 5·22 5·35 5·42	2·80 2·98 3·19 3·43 3·56	5·09 5·20 5·32 5·47 5·55	2·95 3·15 3·37 3·63 3·78	5·18 5·29 5·43 5·60 5·69
38 39 40 41 42	2·92 3·03 3·15 3·27 3·41	5·16 5·22 5·29 5·37 5·46	3·10 3·22 3·35 3·49 3·64	5.26 5.34 5.41 5.50 5.60	3·29 3·42 3·56 3·72 3·89	5·38 5·46 5·55 5·65 5·76	3'49 3'64 3'79 3'97 4'16	5·50 5·60 5·70 5·82 5·95	3·71 3·87 4·04 4·24 4·35	5.65 5.75 5.87 6.01 6.16	3·94 4·12 4·32 4·53 4·78	5·80 5·92 6·06 6·22 6·40

LATITUDE 20°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 2 4 6 8	H. M. S. 5 32 50·0 5 23 47·8 5 14 42·8 5 5 34·8 4 56 23·6	s. 1·62 1·68 1·74 1·81 1·88	5 12 57.3	S. 1·64 1·71 1·77 1·85 1·92	5 20 23·0 5 II 9·9	1.80 1.88	5 18 38.3		4 58 3.0	s. 1·71 1·79 1·87 1·96 2·05	5 5 36·0 4 56 4·3	S. -1.74 1.82 1.91 2.00 2.10
10 12 14 16 18	4 47 8·7 4 37 49·8 4 28 26·5 4 18 58·3 4 9 24·5	1·96 2·04 2·13 2·22 2·32	4 35 45·9 4 26 17·1	2·00 2·09 2·18 2·28 2·39	4 24 4·4 4 I4 24·I	2·05 2·14 2·24 2·35 2·46			4 29 15.3	2·15 2·25 2·37 2·49 2·62	4 26 58·3 4 17 4·1	2·20 2·31 2·43 2·56 2·71
19 20 21 22 23	4 4 35.4 3 59 44.7 3 54 52.3 3 49 58.0 3 45 1.7		4 2 10·6 3 57 16·4 3 52 20·3 3 47 22·2 3 42 21·9	2·45 2·51 2·57 2·64 2·71	3 54 43·4 3 49 43·4	2·59 2·66 2·73 2·80	3 57 7·4 3 52 5·5 3 47 1·3 3 41 54·7 3 36 45·5	2.75	3 49 22·3 3 44 13·6 3 39 2·3	2·77 2·84 2·93	3 5I 44.4 3 46 33.6 3 4I 20.0 3 36 3.6 3 30 44.I	2·78 2·86 2·94 3·03 3·13
24 25 26 27 28	3 40 3.4 3 35 2.8 3 29 59.8 3 24 54.2 3 19 45.9		3 32 14·4 3 27 6·7 3 21 56·2	2.94	3 18 51.3	2·96 3·05 3·14	3 31 33.6 3 26 18.7 3 21 0.5 3 15 38.9 3 10 13.6	2·99 3·08 3·17 3·27 3·38	3 23 10·5 3 17 46·5 3 12 18·6	3.20		3·22 3·33 3·44 3·56 3·68
29 30 31 32 33	3 14 34·6 3 9 20·0 3 4 1·9 2 58 40·0 2 53 13·9	3·08 3·18 3·28 3·39 3·50	3 0 40·9 2 55 I2·3	3·21 3·31 3·42 3·54 3·67	3 2 42·3 2 57 11·0 2 51 34·8		2 59 10·3 2 53 31·5 2 47 47·3	3.89	2 55 28·5 2 49 41·4 2 43 48·3	3.78		3·82 3·97 3·13 4·30 4·50
34 35 36 37 38	2 47 43·I 2 42 7·3 2 36 25·9 2 30 38·2 2 24 43·6	3·63 3·76 3·91 4·07 4·25	2 38 16·0 2 32 25·3	3·81 3·95 4·12 4·30 4·50	2 34 12·7 2 28 11·6	4·17 4·35 4·55	2 23 43.4		2 25 24·8 2 18 59·1 2 12 22·2	4·89 5·15	2 20 37·2 2 13 56·6	4·71 4·95 5·20 5·48 5·80

VARIATION TO I' OF LATITUDE AND ALTITUDE.

Alt.	L. 18	A.	L. 19	° A.	L. 20	° A.	L. 21	° A.	L. 22	° A.	L. 23	° A.
	s.	s.	S.	s.	s.	s.	s.	s.	s.	S.	s.	S.
0	-1.48	-4·5I	- I·57	-4·54	-1. 66	-4.57	 1 ⋅76	- 4·60	-r·85	-4.64	- I·95	-4.68
2	1.55	4.53	1.64	4.56	1.73	4.60	1.83	4.63	1.92	4.67	2.02	4.71
4	1.62	4.55	1.71	4.59	1 ⋅80	4.62	1.90	4.66	2.00	4.70	2.10	4.75
6	1.69	4.58	1.78	4.62	r·88	4.65	1.98	4.69	2.08	4.74	2.18	4.78
8	1.77	4.61	r·86	4.65	1.96	4.69	2.06	4.73	2.17	4.78	2.27	4.83
10	1.85	4.64	1.95	4.68	2.05	4.73	2.15	4.77	2.26	4.82	2.37	4.87
12	1.93	4.68	2.04	4.72	2.14	4.77	2.25	4·81	2.36	4.87	2.47	4.92
14	2.03	4.71	2.13	4.76	2.24	4.81	2.35	4.86	2.47	4.92	2.59	4.98
16	2.12	4.76	2.23	4.8r	2.35	4.86	2.47	4.92	2.59	4.98	2.71	5.05
18	2.23	4.80	2.35	4.86	2.46	4.92	2.59	4.98	2.71	5.05	2.84	5.12
19	2.29	4.83	2.40	4.89	2.53	4.95	2.65	5.01	2.78	5.00	2.92	5.16
20	2.35	4.86	2.47	4.92	2.59	4.98	2.72	5.05	2.85	5.12	2.99	5.20
21	2.41	4.89	2.53	4.95	2.66	5.02	2.79	5.09	2.93	5.17	3.07	5.25
22	2.47	4.92	2.60	4.99	2.73	5.06	2.87	5.13	3.01	5.21	3.16	5:30
23	2.54	4.95	2.67	5.02	2.80	5·10	2.94	5.18	3.09	5.26	3.25	5.35
24	2.61	4.99	2.74	5.06	2.88	5.14	3.03	5.22	3.18	5·31	3.34	5.41
25	2.68	5.03	2.82	5.11	2.96	5.10	3.12	5.28	3.27	5:37	3.44	5.47
26	2.76	5.07	2.90	5.15	3.05	5.24	3.21	5.33	3.37	5.43	3.55	5.24
27	2.84	5.12	2.99	5.20	3.14	5.29	3.31	5.39	3.48	5.50	3.66	5.62
28	2.92	5.16	3.08	5.25	3.24	5.35	3.41	5.46	3.59	5.57	3.79	5.70
29	3.01	5.22	3.18	5·3I	3:35	5.4I	3.53	5.23	3.72	5.65	3.92	5.79
30	3.11	5.27	3.28	5.37	3.46	5.48	3.65	5.61	3.85	5.74	4.06	5.88
31	3.21	5.33	3.39	5.44	3.58	5.56	3.78	5.69	3.99	5.83	4.22	5.99
32	3.32	5.40	3.21	5.52	3.71	5.64	3.92	5.79	4.12	5.94	4.39	6.11
33	3.44	5.47	3.64	5.60	3.85	5.74	4.07	5.89	4.35	6.06	4.58	6.25
34	3.57	5.55	3.78	5.69	4.00	5.84	4.24	6.01	4.50	6.20	4.79	6.41
35	3.71	5.64	3.93	5.79	4.17	5.96	4.43	6.14	4.71	6.35	5.02	6.58
36	3.85	5.74	4.09	5.90	4.35	6.09	4.63	6.29	4.94	6.52	5.29	6.79
37	4.03	5.85	4.27	6.03	4.55	6.23	4.86	6.46	5.10	6.72	5.58	7.02
38	4.20	5.98	4.47	6.18	4.78	6.40	5.11	6.66	5.48	6.95	5.91	7.30

LATITUDE 21°.

		D.	ECLINA	ION-	CONTR	ARY	NAME	10-	LATITU	DE.		
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 8 10 12 14	H. M. S. 6 0 0.0 5 25 42.4 5 17 7.3 5 8 31.7 4 59 55.5	s. - 1·53 1·55 1·56 1·58 1·59	H.M. S. 5 58 27.9 5 24 8.8 5 15 33.0 5 6 56.6 4 58 19.5	s. 1·54 1·57 1·58 1·59 1·61	H. M. S. 5 56 55.7 5 22 34.5 5 13 57.8 5 5 20.4 4 56 42.1	s. 1·54 1·58 1·59 1·61 1·64	5 3 42.9	s. 1·54 1·59 1·61 1·64	H. M. S. 5 53 50·8 5 19 23·3 5 10 44·2 5 2 4·1 4 53 22·8	s. 1·54 1·61 1·63 1·66 1·69	H. M. S. 5 52 18·1 5 17 46·1 5 9 5·6 5 0 23·9 4 51 40·8	s. -1·55 1·63 1·65 1·68
16 18 20 22 24	4 51 18·6 4 42 40·9 4 34 2·2 4 25 22·4 4 16 41·2	1.61 1.63 1.65 1.68 1.71	4 49 41·4 4 41 2·4 4 32 22·2 4 23 40·7 4 14 57·6	1·63 1·66 1·68 1·71 1·75	4 29 22·I	1·66 1·69 1·72 1·75 1·79	4 46 22·2 4 37 39·9 4 28 56·1 4 20 10·5 4 11 23·0	1·69 1·72 1·75 1·79 1·83	4 35 55.8 4 27 9.8 4 18 21.8	I·75	4 42 56·1 4 34 9·6 4 25 21·2 4 16 30·5 4 7 37·4	1·75 1·79 1·83 1·88
25 26 27 28 29	4 12 20·1 4 7 58·6 4 3 36·7 3 59 14·3 3 54 51·5	1·72 1·74 1·76 1·78 1·80	4 6 12·9 4 1 49·9 3 57 26·3	1·76 1·78 1·80 1·83 1·85	4 8 48·3 4 4 24·5 4 0 0·2 3 55 35·2 3 51 9·6	1.81 1.83 1.85 1.88 1.90	4 6 58·4 4 2 33·2 3 58 7·4 3 53 41·0 3 49 13·8	1.86 1.88 1.91 1.93 1.96				1·95 1·98 2·01 2·05 2·08
30 31 32 33 34	3 50 28·1 3 46 4·2 3 41 39·7 3 37 14·6 3 32 48·8			1·90 1·92 1·95	3 46 43.4 3 42 16.4 3 37 48.7 3 33 20.2 3 28 50.8	1·96 1·99 2·02	3 44 45.8 3 40 17.1 3 35 47.5 3 31 17.1 3 26 45.6	1·99 2·02 2·05 2·09 2·12	3 42 44.7 3 38 14.1 3 33 42.4 3 29 9.8 3 24 36.0	2.12	3 40 39·8 3 36 7·0 3 31 33·2 3 26 58·1 3 22 21·9	2·11 2·15 2·19 2·23 2·27
35 36 37 38 39	3 28 22·3 3 23 55·0 3 19 26·9 3 14 57·9 3 10 27·9	1.95 1.98 2.01 2.04 2.08	3 21 54·3 3 17 24·1 3 12 52·9	2.05	3 24 20·5 3 19 49·2 3 15 16·8 3 10 43·2 3 6 8·4	2·09 2·12 2·16 2·20 2·25	3 22 13·1 3 17 39·4 3 13 4·6 3 8 28·4 3 3 50·9	2·16 2·20 2·25 2·29 2·34	3 20 1·1 3 15 24·9 3 10 47·3 3 6 8·3 3 1 27·7	2·24 2·28 2·33 2·38 2·43	3 17 44·4 3 13 5·3 3 8 24·8 3 3 42·7 2 58 58·7	2·32 2·37 2·42 2·48 2·53
40 41 42 43 44	3 5 56·9 3 1 24·8 2 56 51·4 2 52 16·8 2 47 40·8	2·12 2·16 2·20 2·25 2·30	2 54 36.5		3 I 32·3 2 56 54·8 2 52 I5·6 2 47 34·8 2 42 52·I	2·30 2·35 2·40 2·46 2·52	2 54 31·1 2 49 48·6 2 45 4·2	2·39 2·45 2·50 2·57 2·63	2 56 45·4 2 52 1·2 2 47 15·0 2 42 26·7 2 37 35·9	2·55 2·62	2 54 12·8 2 49 24·8 2 44 34·6 2 39 41·8 2 34 46·3	2·60 2·66 2·73 2·81 2·89
45 46 47 48 49	2 43 3·2 2 38 23·9 2 33 42·8 2 28 59·7 2 24 14·4	2·41 2·47 2·54		2.67	2 38 7.4 2 33 20.5 2 28 31.2 2 23 39.2 2 18 44.2	2·73 2·81	2 35 28·8 2 30 37·5 2 25 43·3 2 20 46·1 2 15 45·4	2·71 2·79 2·87 2·96 3·06	2 32 42·4 2 27 46·1 2 22 46·6 2 17 43·6 2 12 36·5	2·84 2·93 3·02 3·13 3·24	2 29 47·8 2 24 46·0 2 19 40·6 2 14 31·0 2 9 16·8	2·98 3·08 3·19 3·30 3·43
		V.	ARIATIO	N TO	ı' OF	LAT	ITUDE A	AND	ALTITU:	DE.	,	
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	A.	L. 3°	Α.	L. 4 °	A.	L. 5°	A.
0 4 6 8 10	s. - '00 - ·11 ·17 ·23 ·29	s. -4·28 4·28 4·29 4·29 4·29	s. 08 .20 .25 .31 .37	s. -4·28 4·29 4·29 4·30 4·30	s. - ·16 - ·28 ·33 ·39 ·45	S. -4·29 4·29 4·30 4·30 4·31	s. - ·24 - ·36 ·42 ·48 ·54	s. -4·29 4·30 4·30 4·31 4·32	s. - ·32 - ·44 ·50 ·56 ·62	s. -4·29 4·31 4·31 4·32 4·33	s. - :40 - :52 :58 :64 :71	s. -4·30 4·32 4·32 4·33 4·34
12 14 16 18 20	·35 ·41 ·47 ·54 ·60	4·30 4·30 4·31 4·32 4·33	·43 ·50 ·56 ·62 ·69	4·31 4·32 4·33 4·34	·52 ·58 ·65 ·71 ·78	4·32 4·32 4·33 4·34 4·35	·60 ·67 ·73 ·80 ·87	4·33 4·34 4·35 4·36 4·37	·69 ·75 ·82 ·89 ·96	4·34 4·35 4·36 4·38 4·39	·77 ·84 ·91 ·98 1·06	4·35 4·36 4·39 4·41
22 24 26 28 30	·67 ·74 ·82 ·89 ·97	4·34 4·35 4·36 4·37 4·39	·76 ·84 ·91 ·99 1· 07	4·35 4·36 4·38 4·40 4·42	·85 ·93 I·01 I·09 I·18	4·37 4·38 4·40 4·42 4·44	·95 1·02 1·10 1·19 1·28	4·39 4·40 4·42 4·45 4·47	1·04 1·12 1·20 1·29 1·39	4·41 4·43 4·45 4·47 4·50	1·13 1·22 1·30 1·40 1·50	4·43 4·45 4·48 4·51 4·54
32 34 36 38 40	1.06 1.15 1.24 1.35 1.46	4·41 4·43 4·46 4·49 4·52	1·16 1·26 1·36 1·47 1·58	4·44 4·46 4·49 4·53 4·57	1·27 1·37 1·47 1·59 1·71	4·47 4·50 4·53 4·57 4·61	1·38 1·48 1·57 1·71 1·84	4·50 4·53 4·59 4·61 4·66	1·49 1·60 1·71 1·84 1·98	4·54 4·57 4·61 4·66 4·72	1·60 1·71 1·84 1·97 2·12	4·57 4·61 4·66 4·72 4·78
42 44 46 48 49	1·58 1·71 1·86 2·02 2·11	4.57 4.61 4.67 4.74 4.78	1·71 1·85 2·01 2·19 2·28	4·61 4·67 4·73 4·81 4·85	1·85 2·00 2·17 2·36 2·47	4·67 4·73 4·80 4·89 4·94	1·99 2·15 2·33 2·54 2·66	4·72 4·79 4·88 4·98 5·04	2·14 2·31 2·51 2·74 2·86	4·79 4·87 4·96 5·08 5·15	2·29 2·48 2·69 2·94 3·08	4·86 4·95 5·06 5·20 5·28

LATITUDE 21°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	6°	Decl. Var.	70	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 6 8 10	H. M. S. 5 50 45·I 5 24 48·8 5 16 8·0 5 7 25·8 4 58 42·3		H. M. S. 5 49 11·6 5 23 11·1 5 14 28·6 5 5 44·6 4 56 59·0	s. -1.56 1.63 1.67 1.70	H. M. S. 5 47 37.8 5 21 32.6 5 12 48.1 5 4 2.0 4 55 14.1	s. -1·57 1·65 1·69 1·72 1·76	H. M. S. 5 46 3·5 5 19 52·9 5 11 6·3 5 2 17·9 4 53 27·5	s. -1.58 1.67 1.71 1.75 1.79	H. M. S. 5 44 28·5 5 18 12·0 5 9 23·1 5 0 32·2 4 51 39·1	s. -1·59 1·69 1·73 1·78 1·82	H. M. S. 5 42 53.0 5 16 29.8 5 7 38.4 4 58 44.8 4 49 48.7	S. -1.60 1.71 1.76 1.80 1.86
14 16 18 19 20	4 49 57·1 4 41 10·2 4 32 21·3 4 27 56·0 4 23 30·2	1·74 1·78 1·82 1·85 1·87	4 48 11.6 4 39 22.3 4 30 30.7 4 26 4.0 4 21 36.6	1.89	4 46 24·3 4 37 32·2 4 28 37·7 4 24 9·5 4 19 40·5	1.93	4 44 35.0 4 35 40.0 4 26 42.3 4 22 12.3 4 17 41.6	1·84 1·89 1·94 1·97 2·01	4 20 12.5	1.87 1.93 1.99 2.02 2.06		1·91 1·97 2·04 2·07 2·11
21 22 23 24 25	4 19 3.7 4 14 36.6 4 10 8.8 4 5 40.3 4 1 11.0	1·90 1·92 1·95 1·98 2·01	4 17 8.6 4 12 39.9 4 8 10.4 4 3 40.0 3 59 8.9	2·00 2·03	4 15 10·8 4 10 40·2 4 6 8·9 4 ·1 36·6 3 57 3·3	1·99 2·02 2·05 2·08 2·12	4 4 4.2	2·04 2·07 2·11 2·14 2·18	4 II 6.2 4 6 31.7 4 I 56.1 3 57 19.4 3 52 41.6	2·09 2·13 2·16 2·20 2·24	4 8 59·2 4 4 22·4 3 59 44·4 3 55 5·3 3 50 24·9	2·14 2·18 2·22 2·27 2·31
26 27 28 29 30	3 56 40·8 3 52 9·8 3 47 37·9 3 43 5·0 3 38 31·0	2·04 2·07 2·11 2·14 2·18	3 54 36·7 3 50 3·7 3 45 29·5 3 40 54·3 3 36 18·0	2·17 2·21	3 52 29·1 3 47 53·8 3 43 17·3 3 38 39·6 3 34 0·7	2·16 2·20 2·24 2·28 2·33	3 50 17·7 3 45 40·0 3 41 1·0 3 36 20·6 3 31 38·8	2·22 2·26 2·31 2·35 2·40	3 48 2·5 3 43 22·1 3 38 40·3 3 33 57·0 3 29 12·1	2·29 2·33 2·38 2·43 2·49	3 36 15 0 3 31 28 6	2·36 2·41 2·46 2·51 2·57
31 32 33 34 35	3 33 55.8 3 29 19.5 3 24 42.0 3 20 3.0 3 15 22.5	2.36	3 31 40·3 3 27 1·4 3 22 21·0 3 17 39·0 3 12 55·4	2·39 2·44	3 29 20·3 3 24 38·4 3 19 54·9 3 15 9·8 3 10 22·7	2·37 2·42 2·48 2·53 2·59	3 12 34.9	2·46 2·51 2·57 2·63 2·69	3 24 25·5 3 19 37·1 3 14 46·7 3 9 54·2 3 4 59·3	2·54 2·60 2·66 2·73 2·80	3 21 50·3 3 16 58·2 3 12 3·8 3 7 7·2 3 2 7·9	2·63 2·70 2·77 2·84 2·92
36 37 38 39 40	3 10 40·5 3 5 56·7 3 1 11·1 2 56 23·5 2 51 33·7	2·46 2·52 2·58 2·64 2·71	3 8 10·0 3 3 22·8 2 58 33·4 2 53 41·7 2 48 47·6	2·56 2·62 2·68 2·75 2·83	3 5 33.7 3 0 42.5 2 55 49.0 2 50 53.0 2 45 54.2	2.66 2.72 2.80 2.87 2.96	3 2 51·2 2 57 55·8 2 52 57·8 2 47 56·9 2 42 52·9	2·76 2·84 2·92 3·00 3·09	3 0 2.0 2 55 2.0 2 49 59.1 2 44 52.9 2 39 43.3	2·88 2·96 3·04 3·14 3·24	2 57 5.9 2 52 0.8 2 46 52.5 2 41 40.5 2 36 24.5	3·00 3·09 3·18 3·28 3·39
41 42 43 44 45	2 46 41·5 2 41 46·8 2 36 49·2 2 31 48·5 2 26 44·4	3.04	2 43 50·9 2 38 51·2 2 33 48·3 2 28 41·8 2 23 31·5	3.19	2 30 38.5	3·04 3·14 3·24 3·36 3·48	2 37 45·5 2 32 34·4 2 27 19·1 2 21 59·1 2 16 34·0	3·19 3·29 3·41 3·53 3·67	2 34 29·7 2 29 11·9 2 23 49·3 2 18 21·4 2 12 47·5	3.59	2 31 4·2 2 25 38·9 2 20 8·2 2 14 31·4 2 8 4·7	3·51 3·64 3·79 3·95 4·12
		V	ARIATIC	N TO	ı' OF	LATI	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 6°	A.	L. 7°	Α.	L. 8°	Α.	L. 9°	Α.	L. 10°	Α.	L. 11°	Α.
0 2 4 6 8	s. - '48 - '54 '60 '66 '73	s. -4·31 4·32 4·33 4·34 4·35	s. *56 *62 *68 *75 *81	s. -4·32 4·33 4·34 4·35 4·36	s. 65 - .71 .77 .83 .89	s. -4·33 4·34 4·35 4·36 4·38	s. - '73 - '79 - 85 -92 -98	s. -4·35 4·36 4·37 4·38 4·39	s. 81 .87 .93 1.00 1.07	s. -4·36 4·37 4·39 4·40 4·42	s, ·89 - ·96 I·02 I·09 I·16	s. -4·37 4·39 4·40 4·42 4·44
10 12 14 16 18	·79 ·86 ·93 I·00 I·07	4·37 4·37 4·38 4·40 4·42	·88 ·94 I·01 I·09 I·16	4:37 4:39 4:40 4:42 4:44	•96 1•03 1•10 1•18 1•26	4·39 4·41 4·42 4·44 4·46	1.05 1.12 1.19 1.27 1.35	4·4I 4·43 4·45 4·47 4·49	1·14 1·21 1·29 1·36 1·45	4·43 4·45 4·47 4·50 4·52	1·23 1·30 1·38 1·46 1·55	4·46 4·48 4·50 4·53 4·56
20 22 24 26 28	1·15 1·23 1·32 1·41 1·50	4·44 4·46 4·48 4·51 4·54	1·24 1·33 1·42 1·51 1·61	4·46 4·48 4·51 4·54 4·58	1·34 1·43 1·52 1·62 1·72	4·49 4·52 4·55 4·58 4·62	1.44 1.53 1.62 1.73 1.84	4·52 4·55 4·58 4·62 4·66	1·54 1·63 1·73 1·84 1·95	4·55 4·58 4·62 4·66 4·71	1·64 1·74 1·84 1·95 2·07	4·59 4·62 4·66 4·71 4·76
30 32 34 36 38	1·61 1·72 1·84 1·97 2·11	4·58 4·61 4·66 4·71 4·78	1·72 1·84 1·96 2·10 2·26	4·62 4·66 4·71 4·77 4·84	1.84 1.96 2.09 2.24 2.40	4·66 4·71 4·77 4·83 4·91	1.95 2.08 2.23 2.38 2.56	4·71 4·76 4·83 4·90 4·99	2·08 2·22 2·37 2·53 2·72	4·76 4·82 4·89 4·98 5·08	2·20 2·35 2·51 2·69 2·89	4·82 4·89 4·97 5·06 5·17

2·59 2·80

2.91

3.04

3.17

5.00

5·12 5·18

5.25

5.33

2·94 3·18

3·32 3·47

3.64

5.19

5.34

5·42 5·51

5.62

5.09

5.22

5·29 5·38

5.47

2.76

2.98

3.11

3.25

3.40

3.12

3.39

3·55 3·72

3.90

5.30 5·47 5·56 5·67

5.79

4.85

4·94 4·98

5.04

5.10

2·43 2·62

2·73 2·84

2.96

4.92

5.02 5.08

5.14

5.21

2.27

2.45

2·55 2·65

2.77

40

42

43

45

LATITUDE 21°.

		DI	ECLINAT	'ION-	-CONTR	ARY	NAME	TO-	LATITUI	DE.		
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
o 2 4 6 8	H. M. S. 5 41 16·7 5 32 28·6 5 23 38·5 5 14 46·4 5 5 52·2	s. - 1·61 1·65 1·69 1·74 1·78	H. M. s. 5 39 39.7 5 30 49.0 5 21 56.4 5 13 1.5 5 4 4.3	s. 1·62 1·67 1·71 1·76 1·81	H. M. S. 5 38 1·9 5 29 8·6 5 20 13·0 5 11 15·1 5 2 14·7			1.81	5 25 44.0 5 16 42.1	1.78 1.84	5 23 59·8 5 14 54·3	s. 1·69 1·75 1·81 1·87 1·94
10 12 14 15 16	4 56 55.6 4 47 56.3 4 38 54.1 4 34 21.9 4 29 48.8	1·84 1·89 1·95 1·98 2·02	4 46 1.8	1·87 1·93 1·99 2·03 2·06	4 53 11·4 4 44 4·9 4 34 55·0 4 30 18·7 4 25 41·3	1·97 2·04 2·07	4 51 16·1 4 42 5·7 4 32 51·5 4 28 12·9 4 23 33·1	2·08	4 49 18.7 4 40 3.9 4 30 45.1 4 26 4.1 4 21 21.8	2·05 2·13 2·17	4 47 18·9 4 37 59·5 4 28 35·8 4 23 52·1 4 19 7·2	2·02 2·10 2·18 2·23 2·27
17 18 19 20 21	4 25 14·8 4 20 39·9 4 16 3·9 4 11 26·9 4 6 48·9	2·05 2·09 2·12 2·16 2·20	4 18 33·2 4 13 54·9 4 9 15·6	2·10 2·14 2·18 2·22 2·26	4 2I 2·9 4 16 23·4 4 II 42·7 4 7 0·7 4 2 I7·4	2·19 2·23 2·28	4 18 52·3 4 14 10·2 4 9 26·8 4 4 42·0 3 59 55·9	2·25 2·30 2·34		2·31 2·36 2·41		2·32 2·37 2·43 2·48 2·54
22 23 24 25 26	4 2 9.6 3 57 29.1 3 52 47.3 3 48 4.1 3 43 19.3	2·24 2·29 2·33 2·38 2·43	3 55 9·8 3 50 25·2 3 45 38·9	2·31 2·35 2·40 2·46 2·51	3 57 32·6 3 52 46·5 3 47 58·7 3 43 9·2 3 38 17·9	2·43 2·48 2·54	3 55 8·1 3 50 18·7 3 45 27·6 3 40 34·6 3 35 39·7	2·56 2·62	3 52 39·2 3 47 46·4 3 42 51·7 3 37 55·0 3 32 56·1			2·60 2·66 2·73 2·80 2·87
27 28 29 30 31	3 38 33·0 3 33 45·0 3 28 55·2 3 24 3·2 3 19 9·5	2·49 2·54 2·60 2·66 2·73	3 31 9.9 3 26 16.4 3 21 20.7		3 33 24·7 3 28 29·4 3 23 31·9 3 18 32·0 3 13 29·5	2·72 2·79 2·86	3 30 42·6 3 25 43·2 3 20 41·4 3 15 36·9 3 10 29·7	2.82	3 17 44.6	2.92	3 14 40·9 3 9 26·2	2·95 3·03 3·12 3·21 3·31
32 33 34 35 36	3 14 13·3 3 9 14·7 3 4 13·5 2 59 9·4 2 54 2·3	2·80 2·87 2·95 3·04 3·13	3 6 18·9 3 1 12·8 2 56 3·4	2·91 2·99 3·07 3·17 3·27	3 8 24·3 3 3 16·0 2 58 4·5 2 52 49·4 2 47 30·3		3 5 19·3 3 0 5·5 2 54 48·1 2 49 26·6 2 44 0·8	3.46	3 2 6.6 2 56 46.8 2 51 23.0 2 45 54.6 2 40 21.3	3·38 3·50 3·62	2 58 45.7 2 53 19.4 2 47 48.5 2 42 12.5 2 36 30.9	3·42 3·54 3·66 3·79 3·94
37 38 39 40 41	2 48 51.7 2 43 37.4 2 38 18.9 2 32 56.1 2 27 28.2	3·22 3·33 3·44 3·56 3·70	2 40 13·1 2 34 47·6 2 29 17·0	3·37 3·49 3·61 3·75 3·90	2 42 7·0 2 36 38·9 2 31 5·7 2 25 26·5 2 19 40·7	3.95	2 38 30·2 2 32 54·1 2 27 12·0 2 21 23·3 2 15 26·9	3·84 4·00 4·17	2 34 42·5 2 28 57·5 2 23 5·7 2 17 6·2 2 10 57·8	4·05 4·22	2 30 43·0 2 24 48·1 2 18 45·4 2 12 33·6 2 6 11·5	4·10 4·27 4·47 4·69 4·93
		V	ARIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTIT U	DE.		
Alt.	L. 12°	Α.	L. 13°	Α.	L. 14°	Α.	L. 15°	Α.	L. 16°	Α.	L. 17°	Α.
0 2 4 6	s. - ·98 - 1·04 1·11 1·17 1·24	s. -4·39 4·41 4·43 4·44 4·46	s. -1.06 - 1.13 1.19 1.26 1.33	s. -4·41 4·43 4·45 4·47 4·49	s. -1·15 - 1·21 1·28 1·35 1·42	s. -4·43 4·45 4·47 4·49 4·51	s. -1·24 - 1·30 1·37 1·44 1·52	s. -4·46 4·48 4·50 4·52 4·55	s. -1·31 - 1·39 1·46 1·53 1·61	s, -4·48 4·50 4·53 4·55 4·58	s. - 1·41 - 1·48 1·55 1·63 1·71	s. -4·51 4·53 4·56 4·58 4·61
10 12	1·32 1·39	4·48 4·51	1·41 1·49	4·51 4·54	1·50 1·58	4·54 4·57	1.60 1.68	4·57 4·60	1·69 1·78	4·61 4·64	I·79 I·88	4·64 4·68

Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.
0 2 4 6 8	s. s. - ·98 -4·39 i·04 4·41 i·11 4·43 i·17 4·44 i·24 4·46	S. S. -1.06 -4.41 1.13 4.43 1.19 4.45 1.26 4.47 1.33 4.49	S. S. -1·15 -4·43 1·21 4·45 1·28 4·47 1·35 4·49 1·42 4·51	S. S. -1·24 -4·46 1·30 4·48 1·37 4·50 1·44 4·52 1·52 4·55	s. s. -1·31 -4·48 1·39 4·50 1·46 4·53 1·53 4·55 1·61 4·58	s. s. -1.41 -4.51 1.48 4.53 1.55 4.56 1.63 4.58 1.71 4.61
10	1·32 4·48	1.41 4.51	1·50 4·54	1.60 4.57	1.69 4.61	1·79 4·64
12	1·39 4·51	1.49 4.54	1·58 4·57	1.68 4.60	1.78 4.64	1·88 4·68
14	1·47 4·53	1.57 4.56	1·67 4·60	1.77 4.64	1.87 4.67	1·97 4·72
16	1·56 4·56	1.66 4.59	1·76 4·63	1.86 4.67	1.97 4.71	2·08 4·76
18	1·65 4·59	1.75 4.63	1·85 4·67	1.96 4.71	2.07 4.76	2·18 4·81
20	1·74 4·62	1·85 4·67	1.96 4.71	2·07 4·76	2·18 4·81	2·30 4·86
22	1·84 4·66	1·95 4·71	2.07 4.76	2·18 4·81	2·30 4·86	2·43 4·92
24	1·95 4·71	2·07 4·76	2.19 4.81	2·31 4·87	2·44 4·93	2·57 4·99
26	2·07 4·76	2·19 4·81	2.32 4.87	2·45 4·93	2·58 5·00	2·72 5·07
28	2·20 4·81	2·33 4·87	2.46 4.94	2·60 5·01	2·74 5·08	2·89 5·17
30	2·34 4·88	2·47 4·95	2·61 5·02	2·76 5·10	2·92 5·18	3·08 5·27
32	2·49 4·96	2·64 5·03	2·79 5·11	2·95 5·20	3·12 5·30	3·29 5·40
34	2·66 5·04	2·82 5·13	2·99 5·22	3·16 5·32	3·34 5·43	3·54 5·56
35	2·75 5·09	2·92 5·18	3·09 5·28	3·28 5·39	3·47 5·51	3·68 5·65
36	2·85 5·15	3·03 5·25	3·21 5·35	3·40 5·47	3·61 5·60	3·83 5·75
37	2·96 5·21	3·14 5·31	3:33 5:43	3·54 5·56	3·76 5·70	3·99 5·86
38	3·07 5·27	3·26 5·39	3:47 5:51	3·68 5·65	3·92 5·81	4·17 5·98
39	3·19 5·34	3·40 5·47	3:61 5:60	3·84 5·76	4·10 5·93	4·37 6·12
40	3·32 5·42	3·54 5·56	3:77 5:71	4·02 5·88	4·29 6·07	4·59 6·28
41	3·47 5·51	3·70 5·66	3:95 5:83	4·22 6·01	4·51 6·22	4·84 6·47

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 209 LATITUDE 21°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 2 4 6 8	H. M. S 5 31 20·5 5 22 14·2 5 13 4·9 5 3 52·5 4 54 36·5	1.01	H. M. S. 5 29 37.1 5 20 27.0 5 11 13.8 5 1 57.0 4 52 36.4	1.87	H. M. S. 5 27 52.5 5 18 38.3 5 9 20.7 4 59 59.3 4 50 33.8	s. -1.76 1.83 1.90 1.98 2.06	5 7 25·6 4 57 59·4	1.94	H. M. S. 5 24 18·7 5 14 55·5 5 5 28·4 4 55 56·9 4 46 20·7	S. - 1.81 1.89 1.97 2.06 2.16	5 3 28.9	S. -1.84 1.92 2.01 2.11 2.21
10 12 14 16 17	4 45 16·6 4 35 52·3 4 26 23·3 4 16 49·0 4 11 59·6		4 33 42·1 4 24 7·5 4 14 27·1	2·20 2·29 2·40	4 41 3.8 4 31 28.7 4 21 48.1 4 12 1.2 4 7 5.2	2·15 2·25 2·35 2·47 2·52		2·20 2·31 2·42 2·54 2·60		2·26 2·37 2·48 2·61 2·68	4 24 28·0 4 14 26·8	2·32 2·43 2·56 2·69 2·77
18 19 20 21 22	4 7 8·7 4 2 16·1 3 57 21·7 3 52 25·5 3 47 27·3	2·44 2·59 2·56 2·62 2·68	4 4 40.2 3 59 44.1 3 54 46.1 3 49 46.0 3 44 43.7	2·63	4 2 7·3 3 57 7·4 3 52 5·5 3 47 1·3 3 41 54·7		3 54 25·9 3 49 19·7 3 44 11·0	2.67 2.74 2.81 2.89 2.97	3 51 39.1	2·75 2·83 2·90 2·99 3·07	3 48 46·7 3 43 31·1 3 38 12·6	2·84 2·92 3·01 3·09 3·19
23 24 25 26 27	3 42 26·9 3 37 24·2 3 32 19·1 3 27 11·3 3 20 0·7	2.00	3 39 39.1 3 24 9.4 3 39 39.1	3.00	3 36 45.5 3 31 33.6 3 26 18.6 3 21 0.5 3 15 38.9		3 28 28·6 3 23 8·2 3 17 44·3		3 30 39·3 3 25 16·6 3 19 50·3 3 14 20·1 3 8 45·6	3·16 3·26 3·36 3·47 3·59	3 21 57·I 3 16 24·4	3·29 3·39 3·50 3·62 3·75
28 29 30 31 32	3 16 47.0 3 11 30.0 3 6 9.4 3 0 44.8 2 55 16.0	3·25 3·35	3 2 44.3 2 57 13.0	3.28 3.38 3.49 3.61 3.74	3 10 13.6 3 4 44.2 2 59 10.3 2 53 31.5 2 47 47.3	3·41 3·53 3·65 3·78 3·92	3 I 8·0 2 55 26·5 2 49 39·5				2 41 20 6	3.89 4.04 4.20 4.38 4.57
33 34 35 36 37	2 49 42·5 2 44 3·8 2 38 19·4 2 32 28·6 2 26 30·6	3·70 3·84 3·98 4·15 4·33	2 45 55.4 2 40 8.1 2 34 14.3 2 28 13.2 2 22 3.9	3·88 4·03 4·19 4·38 4·58	2 36 0·3 2 29 56·0	4·24 4·43 4·63	2 37 46·6 2 31 39·2 2 25 23·2 2 18 57·6 2 12 20 8	4·29 4·47 4·68 4·91 5·18	2 27 3·3 2 20 34·1 2 13 53·7	4·52 4·73 4·97 5·24 5·54	2 22 11·1 2 15 26·8 2 8 29·3	4·78 5·02 5·29 5·59 5·92

VARIATION TO 1' OF LATITUDE AND ALTITUDE.

Alt.	L. 18	° A.	L. 19	° A.	L. 20	° A.	L. 21	° A.	L. 22	° A.	L. 23	° A.
	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
0		-4.24		-4·57		-4 ·60		- 4·64	-1.88	-4 ·67	-1.97	-4.72
2	1.57	4.56	1.67	4.60	1.76	4.63	1.86	4.67	1.95	4.71	2.05	4.75
4	1.65	4.59	1.74	4.63	1.84	4.66	1.94	4.70	2.04	4.74	2.14	4.79
6	1.72	4.62	1.82	4.66	1.92	4.69	2.02	4.74	2.13	4.78	2.23	4.83
8	1.81	4.65	1.90	4.69	2.01	4.73	2.11	4.78	2.21	4.82	2.32	4 87
10	1.89	4.68	1.99	4.73	2.10	4.77	2.20	4.82	2.31	4.87	2.43	4.92
12	1.98	4.72	2.09	4.77	2.20	4.81	2.31	4.87	2.42	4.92	2.54	4.98
14	2.08	4.76	2.19	4·81	2.30	4.86	2.42	4.92	2.24	4.98	2.66	5.04
16	2.19	4·81	2.30	4.86	2.42	4.92	2.24	4.98	2.66	5.04	2.79	5.11
17	2.24	4.84	2.36	4.89	2.48	4.95	2.60	5.01	2.73	5.08	2.86	5.12
18	2.30	4.86	2.42	4.92	2.54	4.98	2.67	5.05	2.80	5.12	2.93	5.19
19	2.36	4.89	2.48	4.95	2.61	5.01	2.74	5.08	2.87	5.16	3.01	5.24
20	2.42	4.92	2.55	4.98	2.68	5.05	2.81	5.12	2.95	5.20	3.09	5.28
21	2.49	4.95	2.61	5.02	2.75	5.09	2.89	5.17	3.03	5.25	3.18	5.33
22	2.56	4.99	2.69	5.06	2.82	5.13	2.97	5.21	3.11	5.30	3.27	5*39
23	2.63	5.03	2.76	5.10	2.90	5.18	3.05	5.26	3.20	5.35	3.37	5.45
24	2.70	5.06	2.84	5.14	2.99	5.22	3.14	5.3I	3.30	5.41	3.47	5.21
25	2.78	5.11	2.93	5.19	3.08	5.27	3.24	5.37	3.40	5.47	3.58	5.58
26	2.86	5.12	3.01	5.24	3.17	5.33	3.34	5.43	3.21	5.24	3.69	5 66
27	2.95	5.20	3.11	5.29	3.27	5.39	3.44	5.20	3.63	5·61	3.81	5.74
28	3.04	5.26	3.51	5.35	3.38	5.46	3.56	5.57	3.75	5.69	3.06	5.83
29	3.14	5.3I	3.31	5.42	3.49	5.23	3.68	5.65	3.88	5.78	4.10	5.93
30	3.25	5.38	3.43	5.49	3.61	5.61	3.82	5.24	4.03	5.88	4.26	6.04
31	3.36	5.44	3.22	5.56	3.75	5.69	3.96	5.83	4.10	5.99	4.43	6.17
32	3.48	5.2	3.68	5.65	3.89	5.79	4.13	5.94	4.36	6.11	4.63	6.31
33	3.61	5·60	3.82	5.74	4.04	5.89	4.29	6.06	4.55	6.25	4.84	6.46
34	3.75	5.69	3.97	5.84	4.31	6.01	4.47	6.10	4.76	6.40	5.07	6.64
35	3.90	5.79	4.14	5.96	4.40	6.14	4.68	6.35	4.99	6.58	5.34	6.85
36	4.07	5.91	4.32	6.09	4.60	6.29	4.91	6.52	5.26	6.78	5.65	7.09
37	4.25	6.03	4.23	6.23	4.83	6.46	5.18	6.72	5.56	7.02	6.00	7:37

LATITUDE 22°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
° 0 8 10 12 14	H. M. S. 6 0 0.0 5 25 28·1 5 16 49·4 5 8 10 0 4 59 30·1	s. -1.62 1.63 1.65 1.66	H. M. S. 5 58 23.0 5 23 49.6 5 15 10.1 5 6 29.9 4 57 48.9	s. -1.62 1.65 1.66 1.68 1.70	5 22 10·4 5 13 30·0 5 4 48·6	s. -1.62 1.66 1.68 1.70 1.72	H.M. s. 5 55 8.8 5 20 30.2 5 11 48.7 5 3 6.1 4 54 22.4	s. -1.62 1.68 1.70 1.72 1.75	H. M. S. 5 53 31.4 5 18 49.1 5 10 6.2 5 1 22.2 4 52 36.8	s. - 1.62 1.69 1.72 1.74 1.77	H. M. S. 5 51 53.9 5 17 7.0 5 8 22.6 4 59 36.9 4 50 49.6	s. -1.63 1.71 1.74 1.77 1.80
16 18 20 22 23	4 50 49·3 4 42 7·6 4 33 24·8 4 24 40·8 4 20 18·2	1.74	4 49 6·9 4 40 23·9 4 31 39·5 4 22 53·6 4 18 30·1	1·72 1·74 1·77 1·80 1·82	4 38 38·3 4 29 52·1 4 21 4·2	1·75 1·78 1·81 1·84 1·86	4 45 37.4 4 36 50.8 4 28 2.6 4 19 12.4 4 14 46.5	1·78 1·81 1·84 1·88 1·91	4 43 49.9 4 35 1.3 4 26 10.7 4 17 18.0 4 12 50.8	1.81 1.84 1.88 1.93	4 42 0.6 4 33 9.6 4 24 16.5 4 15 21.0 4 10 52.2	1 84 1·88 1·92 1·97 2·00
24 25 26 27 28	4 15 55·2 4 11 31·9 4 7 8·1 4 2 43·9 3 58 19·1	1·82 1·83 1·85	4 14 6·1 4 9 41·6 4 5 16·7 4 0 51·2 3 56 25·1		4 7 48.7	1.88 1.90 1.93 1.95 1.98	4 10 20·0 4 5 53·0 4 1 25·3 3 56 56·8 3 52 27·7	1·93 1·95 1·98 2·01 2·03	4 8 22·9 4 3 54·3 3 59 25·0 3 54 54·8 3 50 24·0	1.98 2.00 2.03 2.06 2.09	4 6 22.8 4 I 52.5 3 57 21.4 3 52 49.5 3 48 I6.7	2·03 2·06 2·09 2·12 2·15
29 30 31 32 33	3 53 53·8 3 49 27·9 3 45 1·4 3 40 34·1 3 36 6·3	1.92	3 51 58·4 3 47 31·1 3 43 3·0 3 38 34·2 3 34 4·6	1·95 1·98 2·00 2·03 2·06	3 45 30·8 3 41 1·1 3 36 30·4	2·01 2·03 2·06 2·10 2·13	3 47 57·7 3 43 27·0 3 38 55·3 3 34 22·7 3 29 49·1	2·06 2·09 2·13 2·16 2·20	3 45 52·1 3 41 19·4 3 36 45·6 3 32 10·8 3 27 34·9	2·12 2·16 2·19 2·23 2·27	3 43 42·8 3 39 7·9 3 34 31·9 3 29 54·7 3 25 16·2	2·19 2·23 2·26 2·31 2·35
34 35 36 37 38	3 31 37·7 3 27 8·2 3 22 37·9 3 18 6·7 3 13 34·4	2.12	3 29 34·I 3 25 2·7 3 20 30·3 3 I5 56·9 3 II 22·3	2·09 2·13 2·16 2·20 2·24	3 22 52·8 3 18 18·2	2·16 2·20 2·24 2·28 2·33	3 25 14·3 3 20 38·4 3 16 1·3 3 11 22·7 3 6 42·7	2·24 2·28 2·32 2·37 2·42	3 22 57·7 3 18 19·2 3 13 39·3 3 8 57·8 3 4 14·8	2·32 2·36 2·41 2·46 2·51	3 6 27.4	2·40 2·45 2·50 2·55 2·61
39 40 41 42 43	3 9 1·1 3 4 26·5 2 59 50·7 2 55 13·6 2 50 34·9	2·20 2·24 -2·29 2·34 2·39	3 6 46·4 3 2 9·3 2 57 30·7 2 52 50·5 2 48 8·6	2·29 2·33 2·38 2·44 2·49	2 50 21.3	2·38 2·43 2·48 2·54 2·60	3 2 1·2 2 57 17·9 2 52 32·8 2 47 45·6 2 42 56·3	2·47 2·53 2·59 2·65 2·72	2 59 29·9 2 54 43·1 2 49 54·2 2 45 3·0 2 40 9·4	2·57 2·63 2·70 2·77 2·85	2 56 52·5 2 52 1·8 2 47 8·8 2 42 13·1 2 37 14·7	2·68 2·75 2·82 2·90 2·98
44 45 46 47 48	2 45 54·6 2 41 12·6 2 36 28·6 2 31 42·6 2 26 54·2	2.63	2 43 24·9 2 38 39·2 2 33 51·2 2 29 0·9 2 24 7·8			2·67 2·74 2·82 2·90 2·99	2 38 4·5 2 33 10·1 2 28 12·8 2 23 12·4 2 18 8·4	2·80 2·87 2·96 3·05 3·16	2 35 12·9 2 30 13·5 2 25 10·8 2 20 4·4 2 14 53·9	2·93 3·02 3·11 3·22 3·33		3·07 3·17 3·28 3·39 3·52
		VA	ARIATIO	N TC	ı' OF	LATI	TUDE A	ND .	ALTITUI	Œ.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	Α.	L. 3°	Α.	L. 4°	Α.	L. 5°	Α.
0 2 4 6 8	s. 000 06 12 18 24	s. -4·31 4·31 4·32 4·32	\$. 08 - .14 .20 .26 .33	s. -4·31 4·32 4·32 4·32 4·33	s. - ·16 - ·22 ·28 ·35 ·41	s. -4·32 4·32 4·32 4·33 4·34	s. - ·24 - ·31 ·37 ·43 ·49	s. -4·32 4·32 4·33 4·34	s. - ·32 - ·39 ·45 ·51 ·58	s. -4·32 4·33 4·34 4·34 4·35	s. - ·41 - ·47 ·53 ·60 ·66	s. -4·33 4·34 4·35 4·36 4·37
10 12 14 16 18	·31 ·37 ·44 ·50 ·57	4·32 4·33 4·34 4·34 4·35	·39 ·46 ·52 ·59 ·66	4·33 4·34 4·35 4·35 4·36	.47 .54 .61 .68 .75	4·34 4·35 4·36 4·37 4·38	•56 •63 •69 •76 •84	4·35 4·36 4·37 4·38 4·39	·64 ·71 ·78 ·85 ·93	4·36 4·37 4·38 4·40 4·41	.73 .80 .87 .94 1.02	4·38 4·39 4·40 4·42 4·43
20 22 24 26 28	·64 ·71 ·79 ·87 ·95	4·36 4·37 4·39 4·40 4·42	.73 .81 .88 .96 1.05	4·38 4·39 4·40 4·42 4·44	·82 ·90 ·98 I·06 I·15	4·39 4·41 4·42 4·44 4·46	·91 ·99 1·07 1·16 1·25	4·41 4·43 4·45 4·47 4·49	1·01 1·09 1·17 1·26 1·36	4·43 4·45 4·47 4·50 4·52	1·10 1·18 1·27 1·37 1·46	4°45 4°47 4°50 4°53 4°56
30 32 34 36 38	1·03 1·12 1·22 1·32 1·44	4·44 4·46 4·48 4·51 4·55	1·14 1·23 1·33 1·44 1·56	4·46 4·49 4·52 4·55 4·59	1·24 1·34 1·45 1·56 1·68	4·49 4·52 4·55 4·59 4·63	1·35 1·45 1·56 1·68 1·81	4·52 4·55 4·59 4·63 4·68	1·46 1·57 1·68 1·81 1·95	4·55 4·59 4·63 4·68 4·73	1·57 1·68 1·80 1·94 2·08	4·59 4·63 4·68 4·73 4·79
40 42 44 46 48	1.55 1.68 1.83 1.99 2.17	4·59 4·63 4·69 4·75 4·83	1.68 1.82 1.98 2.15 2.34	4·63 4·68 4·74 4·82 4·91	1.82 1.96 2.13 2.32 2.53	4·68 4·74 4·81 4·90 5·00	1.96 2.11 2.29 2.49 2.72	4.74 4.80 4.88 4.98 5.10	2·10 2·27 2·46 2·67 2·93	4·80 4·87 4·97 5·08 5·21	2·25 2·43 2·63 2·87 3·15	4·86 4·95 5·05 5·18 5·34

LATITUDE 22°.

True Alt.	6°	Decl. Var.	ngo	Decl. Var.	8°	Decl. Var.	6.	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 6 8 10 12	H. M. S. 5 50 15.9 5 24 8.5 5 15 23.8 5 6 37.7 4 57 50.0	1·70 1·73 1·76	H. M. S. 5 48 37.5 5 22 25.9 5 13 39.3 5 4 51.3 4 56 1.5	s. -1.64 1.72 1.75 1.78 1.82	H. M. S. 5 46 58·8 5 20 42·2 5 II 53·7 5 3 3·5 4 54 II·3	1.77 1.81	H. M. S. 5 45 19·5 5 18 57·3 5 10 6·7 5 1 14·1 4 52 19·3	1.80	H. M. S. 5 43 39.5 5 17 11.3 5 8 18.2 4 59 23.0 4 50 25.5	1.78 1.82 1.87	H. M. S. 5 41 58.9 5 15 23.9 5 6 28.2 4 57 30.2 4 48 29.5	s. -1.68 1.80 1.85 1.90 1.95
14 16 18 19 20	4 49 0.6 4 40 9.3 4 31 15.8 4 26 48.1 4 22 19.9	1·87 1·92 1·94	4 47 9.8 4 38 15.9 4 29 19.6 4 24 50.5 4 20 20.6	1.86 1.91 1.96 1.98 2.01	4 27 21.0	1.94 2.00 2.03	4 43 22.2 4 34 22.5 4 25 19.8 4 20 47.2 4 16 13.8	2·04 2·07	4 4I 25·3 4 32 22·2 4 23 I5·9 4 I8 4I·4 4 I4 6·0	2·03 2·09 2·12	4 39 26.0 4 30 19.3 4 21 9.1 4 16 32.5 4 11 54.9	2·01 2·07 2·14 2·17 2·21
21 22 23 24 25	4 17 50·9 4 13 21·3 4 8 50·9 4 4 19·6 3 59 47·6	2·02 2·05 2·08		2·04 2·07 2·10 2·13 2·17			4 II 39.4 4 7 4.1 4 2 27.8 3 57 50.4 3 53 II.8		4 9 29.5 4 4 52.0 4 0 13.3 3 55 33.5 3 50 52.4	2.31		2·25 2·29 2·33 2·38 2·43
26 27 28 29 30	3 55 14·6 3 50 40·6 3 46 5·6 3 41 29·6 3 36 52·3	2.22	3 48 28·0 3 43 50·7 3 39 12·2	2·20 2·24 2·28 2·32 2·37	3 50 50·0 3 46 11·5 3 41 31·7 3 36 50·6 3 32 8·0	2.35	3 48 32·0 3 43 50·9 3 39 8·4 3 34 24·4 3 29 38·9	2.38	3 46 10·0 3 41 26·1 3 36 40·6 3 31 53·5 3 27 4·7	2·45 2·50 2·56	3 43 43.6 3 38 56.7 3 34 8.0 3 29 17.6 3 24 25.2	2·48 2·53 2·58 2·64 2·70
31 32 33 34 35	3 32 13.8 3 27 34.0 3 22 52.8 3 18 10.0 3 13 25.5	2·43 2·48	3 29 51·2 3 25 8·6 3 20 24·3 3 15 38·3 3 10 50·5	2·42 2·47 2·52 2·57 2·63	3 27 23.9 3 22 38.1 3 17 50.6 3 13 1.2 3 8 9.7	2.61	3 24 51·5 3 20 2·4 3 15 11·3 3 10 18·1 3 5 22·6	2·58 2·64 2·70 2·77 2·84	3 22 13·9 3 17 21·1 3 12 26·2 3 7 28·9 3 2 29·0	2·74 2·80 2·88	3 19 30·7 3 14 33·9 3 9 34·8 3 4 32·9 2 59 28·4	2·77 2·84 2·91 2·99 3·07
36 37 38 39 40	3 8 39·3 3 3 51·2 2 59 1·0 2 54 8·5 2 49 13·6	2·59 2·65 2·72 2·79 2·86		2.69 2.76 2.83 2.91 2.99	3 3 16·0 2 58 19·8 2 53 21·1 2 48 19·5 2 43 14·7	2.95	3 0 24·6 2 55 23·9 2 50 20·3 2 45 13·4 2 40 3·0	2·91 2·99 3·08 3·17 3·27	2 41 59.0	3.12	2 54 20·5 2 49 9·3 2 43 54·4 2 38 35·4 2 31 11·9	3·16 3·26 3·36 3·47 3·59
41 42 43 44 45	2 44 16·0 2 39 15·5 2 34 11·8 2 29 4 5 2 23 53·3	3·03 3·12 3·22	2 4I 15·5 2 36 9·5 2 3I 9·9 2 25 46·3 2 20 28·2	3·08 3·17 3·28 3·39 3·51	2 22 17.9	3·33 3·44 3·57	2 34 48·8 2 29 30·3 2 24 7·0 2 18 38·4 2 13 3·7	3·38 3·49 3·62 3·76 3·92	2 20 24·I 2 I4 46·6	3.67 3.82	2 27 43.4 2 22 9.3 2 16 28.9 2 10 41.4 2 4 45.8	3.73 3.87 4.03 4.21 4.41
		V.	ARIATIO	N TO	O 1' OF	LAT	ITUDE .	AND	ALTITU	DE.		
Alt.	L. 6°	Α.	L. 7°	A.	L. 8°	A.	L. 9°	Α.	L. 10°	A.	L. 11	A.
0 2 4 6 8	s. - '49 '55 '62 '68 '75	s. -4·34 4·35 4·36 4·37 4·38	s. 57 .63 .70 .76 .83	s. -4·35 4·36 4·37 4·38 4·39	s. 65 .72 .78 .85 .92	s. -4·36 4·37 4·38 4·40 4·41	s. - ·74 ·80 ·87 ·94 I·01	s. -4·38 4·39 4·40 4·41 4·43	s. 82 .89 .95 1.02 1.09	s. -4·39 4·40 4·42 4·43 4·45	s. - ·91 ·97 I·04 I·11 I·18	s. -4·41 4·42 4·44 4·46 4·47
10 12 14 16 18	·81 ·89 ·96 I·03 I·II	4·39 4·40 4·42 4·44 4·46	· ·90 ·97 I·05 I·13 I·21	4·41 4·42 4·44 4·46 4·48	1.06 1.14 1.22 1.30	4·43 4·44 4·46 4·48 4·51	1.08 1.15 1.23 1.31 1.40	4·45 4·47 4·49 4·51 4·54	1·17 1·25 1·33 1·41 1·50	4·47 4·49 4·51 4·54 4·57	1·26 1·34 1·42 1·51 1·60	4·49 4·52 4·54 4·57 4·60
20 22 24 26 28	1·20 1·28 1·37 1·47 1·57	4·48 4·50 4·53 4·56 4·59	1·29 1·38 1·48 1·58 1·68	4·50 4·53 4·56 4·59 4·63	1·39 1·48 1·58 1·69 1·80	4·53 4·56 4·60 4·63 4·67	1·49 1·59 1·69 1·80 1·92	4·57 4·60 4·63 4·67 4·72	1·59 1·69 1·80 1·91 2·04	4·60 4·63 4·67 4·72 4·77	1.70 1.80 1.91 2.03 - 2.16	4·64 4·67 4·72 4·77 4·83
30 32 34 36 38	1.68 1.80 1.93 2.07 2.23	4·63 4·67 4·73 4·79 4·86	1·80 1·93 2·06 2·21 2·38	4·67 4·72 4·78 4·85 4·93	1·92 2·05 2·20 2·36 2·53	4·72 4·78 4·84 4·92 5·00	2·04 2·18 2·34 2·51 2·70	4·77 4·83 4·91 4·99 5·09	2·17 2·32 2·48 2·66 2·87	4·83 4·90 4·98 5·07 5·18	2·30 2·46 2·63 2·83 3·05	4·89 4·97 5·05 5·16 5·28
40 42 43 44 45	2·40 2·60 2·70 2·82 2·94	4.94 5.03 5.09 5.15 5.22	2·56 2·77 2·89 3·02 3·15	5·02 5·13 5·19 5·26 5·34	2·73 2·96 3·09 3·23 3·38	5·11 5·23 5·31 5·39 5·48	2·91 3·16 3·30 3·45 3·62	5·20 5·35 5·43 5·53 5·63	3·10 3·37 3·53 3·70 3·89	5·31 5·48 5·57 5·68 5·81	3·30 3·60 3·77 3·96 4·18	5·43 5·56 5·73 5·86 5·99

LATITUDE 22°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 40 17.6 5 31 25.5 5 22 31.4 5 13 35.2 5 4 36.6	1·73 1·78 1·82	H. M. S. 5 38 35.5 5 29 40.9 5 20 44.1 5 11 45.0 5 2 43.3	s. - 1·71 1·75 1·80 1·85 1·90	H. M. S. 5 36 52·5 5 27 55·1 5 18 55·4 5 9 53·2 5 0 48·2	s. -1.73 1.77 1.82 1.88 1.93	H. M. S. 5 35 8.4 5 26 8.1 5 17 5.3 5 7 59.7 4 58 51.1	s. -1.74 1.79 1.85 1.91	H. M. S. 5 33 23·3 5 24 19·8 5 15 13·6 5 6 4·4 4 56 51·9	s. -1.76 1.82 1.87 1.94 2.00	H. M. S. 5 31 37·1 5 22 30·2 5 13 20·3 5 4 7·2 4 54 50·6	s. - 1·78 1·84 1·90 1·97 2·04
10 12 14 15 16	4 55 35.5 4 46 31.6 4 37 24.5 4 32 49.6 4 28 13.8	1·98 2·05 2·08	4 53 38·9 4 44 31·3 4 35 20·3 4 30 43·4 4 26 5·5	2·02 2·09	4 51 40·1 4 42 28·7 4 33 13·5 4 28 34·4 4 23 54·2	2·00 2·06 2·14 2·17 2·21	4 49 39·1 4 40 23·6 4 31 3·9 4 26 22·4 4 21 39·8	2·03 2·11 2·18 2·22 2·27	4 38 15.8 4 28 51.4 4 24 7.4	2·07 2·15 2·23 2·28 2·32	4 45 30·I 4 36 5·3 4 26 35·7 4 2I 49·0 4 I7 0·8	2·12 2·20 2·29 2·34 2·38
17 18 19 20 21	4 23 37·1 4 18 59·4 4 14 20·6 4 9 40·6 4 4 59·4	2.19	4 21 26.6 4 16 46.5 4 12 5.3 4 7 22.8 4 2 38.9	2·20 2·24 2·28 2·33 2·37	4 19 12·9 4 14 30·3 4 9 46·5 4 5 1·3 4 0 14·6	2·26 2·30 2·34 2·39 2·44	4 16 55·9 4 12 10·7 4 7 24·0 4 2 35·9 3 57 46·2	2·31 2·36 2·41 2·46 2·51	4 9 47·3 4 4 57·6	2·37 2·42 2·47 2·53 2·58	4 12 11·2 4 7 20·0 4 2 27·2 3 57 32·5 3 52 36·0	2·44 2·49 2·54 2·60 2·66
22 23 24 25 26	4 0 16·9 3 55 33·2 3 50 47·9 3 46 1·1 3 41 12·7	2·40 2·45 2·50	3 57 53.7 3 53 7.0 3 48 18.7 3 43 28.7 3 38 36.9	2·47 2·52 2·58	3 55 26·4 3 50 36·6 3 45 45·0 3 40 51·6 3 35 56·2	2·49 2·54 2·60 2·66 2·72	3 52 54·8 3 48 1·6 3 43 6·5 3 38 9·4 3 33 10·1	2·56 2·62 2·68 2·75 2·82	3 45 21·7 3 40 22·9	2·64 2·71 2·77 2·84 2·91	3 47 37·5 3 42 36·8 3 37 33·9 3 32 28·5 3 27 20·5	2·73 2·79 2·86 2·94 3·02
27 28 29 30 31	3 36 22·5 3 31 30·4 3 26 36·4 3 21 40·1 3 16 41·6	2·67 2·73 2·80	3 33 43.2 3 28 47.5 3 23 49.5 3 18 49.1 3 13 46.1	2·70 2·76 2·83 2·90 2·98	3 30 58·7 3 25 58·9 3 20 56·6 3 15 51·8 3 10 44·0	2·79 2·86 2·93 3·01 3·09	3 28 8·5 3 23 4·3 3 17 57·5 3 12 47·7 3 7 34·7	2·89 2·96 3·04 3·13 3·22	3 14 51·5 3 9 36·4	2·99 3·07 3·16 3·25 3·35	3 22 9.6 3 16 55.6 3 11 38.4 3 6 17.5 3 0 52.7	3·10 3·19 3·28 3·38 3·49
32 33 34 35 36	3 II 40·5 3 6 36·8 3 I 30·0 2 56 20·1 2 51 6·8	3·20 3·11	3 8 40·4 3 3 31·7 2 58 19·6 2 53 4·0 2 47 44·5	3·06 3·15 3·24 3·34 3·45	3 5 33·2 3 0 18·9 2 55 1·1 2 49 39·2 2 44 13·0	3·18 3·28 3·38 3·49 3·61	3 2 18·3 2 56 58·2 2 51 33·9 2 46 5·2 2 40 31·5	3·31 3·42 3·53 3·65 3·78	2 53 28·7 2 47 57·5 2 42 21·2	3·46 3·57 3·69 3·82 3·97	2 55 23.6 2 49 49.8 2 44 10.9 2 38 26.2 2 32 35.1	3.61 3.73 3.87 4.02 4.18
37 38 39 40 41	2 45 49.6 2 40 28.2 2 35 2.2 2 29 31.0 2 23 54.1	3·52 3·64 3·78	2 42 20·7 2 36 52·1 2 31 18·3 2 25 38·6 2 19 52·3	3·69 3·83 3·98	2 38 41.8 2 33 5.4 2 27 22.8 2 21 33.6 2 15 36.8	3·74 3·88 4·03 4·20 4·39	2 34 52·3 2 29 6·9 2 23 14·8 2 17 14·8 2 11 6·0	3·92 4·08 4·25 4·44 4·66	2 24 55·8 2 18 52·7 2 12 40·6	4·13 4·30 4·50 4·96	2 26 36·9 2 20 30·6 2 14 15·1 2 7 49·1 2 1 10·9	4·35 4·55 4·77 5·01 5·28
		V	ARIATIO	N TO	ı' OF	LAT	ITUDE A	AND	ALTITU	DE.		
Alt.	L. 12°	A.	L. 13°	A.	L. 14°	Α.	L. 15°	Α.	L. 16°	A.	L. 17°	Α.
0 2 4 6 8	s. - '99 - 1'06 1'13 1'20 1'27	s. -4·43 4·44 4·46 4·48 4·50	s. -1.08 1.15 1.22 1.29 1.37	s. -4:44 4:46 4:48 4:50 4:53	s. -1·17 1·24 1·31 1·38 1·46	s. -4.47 4.49 4.51 4.53 4.55	s. -1.25 1.32 1.40 1.47 1.55	s. -4.49 4.51 4.53 4.56 4.59	s. -1·34 - 1·41 1·49 1·57 1·65	s. -4.52 4.54 4.56 4.59 4.62	s. -1·43 - 1·51 1·58 1·66 1·75	s. -4·54 4·57 4·60 4·62 4·65
10 12 14 16 18	1·35 1·43 1·52 1·61 1·70	4.53 4.55 4.57 4.60 4.64	1.44 1.53 1.62 1.71 1.81	4.55 4.58 4.61 4.64 4.68	1·54 1·63 1·72 1·81 1·91	4·58 4·61 4·64 4·68 4·72	1.64 1.73 1.82 1.92 2.02	4.62 4.65 4.68 4.72 4.77	1.73 1.83 1.92 2.03 2.14	4.65 4.68 4.72 4.77 4.81	1.84 1.93 2.03 2.14 2.25	4·69 4·73 4·77 4·81 4·87
20 22 24 26 28	1.80 1.91 2.03 2.15 2.29	4.68 4.72 4.77 4.82 4.88	1.91 2.03 2.15 2.28 2.42	4·72 4·77 4·82 4·88 4·95	2·02 2·14 2·27 2·41 2·56	4.77 4.82 4.87 4.94 5.02	2·14 2·26 2·40 2·54 2·70	4.81 4.87 4.93 5.01 5.09	2·26 2·39 2·53 2·68 2·85	4·87 4·93 5·00 5·08 5·17	2·38 2·51 2·66 2·83 3·01	4·93 4·99 5·07 5·16 5·26
30 32 34 35 36	2.44 2.61 2.79 2.89 3.00	4.96 5.04 5.14 5.19 5.25	2·58 2·76 2·96 3·07 3·18	5.03 5.12 5.23 5.29 5.36	2·73 2·92 3·13 3·25 3·38	5·10 5·21 5·33 5·40 5·48	2.88 3.09 3.32 3.44 3.58	5·19 5·30 5·44 5·52 5·61	3.05 3.26 3.51 3.65 3.80	5·28 5·41 5·56 5·65 5·75	3·22 3·45 3·72 3·87 4·04	5·38 5·52 5·70 5·80 5·91
37 38 39 40 41	3·12 3·24 3·37 3·52 3·68	5·32 5·39 5·48 5·57 5·67	3·31 3·44 3·59 3·75 3·93	5.44 5.52 5.61 5.72 5.83	3.51 3.66 3.82 4.00 4.20	5·56 5·66 5·76 5·88 6·02	3.73 3.90 4.07 4.27 4.50	5.70 5.81 5.93 6.07 6.24	3.97 4.15 4.35 4.57 4.82	5·86 5·99 6·13 6·29 6·47	4·22 4·43 4·65 4·91 5·20	6.04 6.18 6.35 6.53 6.74

LATITUDE 22°.

		DE	CLINAT	ION—	-CONTRA	4RY	NAME	TO	LATITUI	Œ.		
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 29 49.6 5 20 39.0 5 11 25.2 5 2 8.0 4 52 46.9	s. - 1.80 1.87 1.93 2.00 2.08	H. M. s. 5 28 0.8 5 18 46.3 5 9 28.3 5 0 6.6 4 50 40.9	1.89 1.96 2.04	H. M. S. 5 26 10·5 5 16 51·8 5 7 29·4 4 58 3·0 4 48 32·2	s. - 1.85 1.92 2.00 2.08 2.17	H. M. S. 5 24 18·7 5 14 55·5 5 5 28·4 4 55 56·9 4 46 20·7	s. - 1.88 1.95 2.04 2.12 2.21		s. - 1·91 1·99 2·07 2·17 2·26	5 10 57·0 5 1 19·5	2.02 2.02 2.11 2.21 2.32
10 12 14 15 16	4 43 21·7 4 33 51·8 4 24 16·7 4 19 27·1 4 14 35·9	2·34 2·40	4 41 10·5 4 31 35·2 4 21 54·3 4 17 1·5 4 12 7·1	2·21 2·30 2·40 2·46 2·51	4 38 56·4 4 29 15·3 4 19 28·1 4 14 32·0 4 9 34·1	2·26 2·36 2·47 2·53 2·59			4 24 24·8 4 14 23·8 4 9 20·3			2·43 2·55 2·68 2·75 2·83
17 18 19 20 21	4 9 43·I 4 4 48·6 3 59 52·3 3 54 54·I 3 49 53·8	2·50 2·56 2·62 2·68 2·75	4 7 10·9 4 2 12·9 3 57 12·9 3 52 10·8 3 47 6·5	2·57 2·63 2·70 2·76 2·83		2·65 2·71 2·78 2·85 2·93	3 56 47·3 3 51 39·1 3 46 28·3	2·73 2·80 2·87 2·95 3·03	3 53 56·8 3 48 44·0 3 43 28·5	2·81 2·89 2·97 3·05 3·14	3 51 0·8 3 45 43·1 3 40 22·5	2·90 2·98 3·07 3·16 3·25
22 23 24 25 26	3 44 51·3 3 39 46·5 3 34 39·2 3 29 29·1 3 24 16·2	2.96	3 41 59.7 3 36 50.4 3 31 38.3 3 26 23.3 3 21 5.0	2·91 2·99 3·07 3·15 3·25	3 33 48·1 3 28 30·9 3 23 10·5 3 17 46·5	3.00	3 25 16·6 3 19 50·3	3·11 3·20 3·30 3·40 3·51	3 21 54·8 3 16 22·1	3·23 3·33 3·43 3·54 3·66	3 18 25·0 3 12 45·4	3.35 3.46 3.57 3.69 3.82
27 28 29 30 31	3 19 0·1 3 13 40·6 3 8 17·5 3 2 50·3 2 57 18·6	3.53	3 15 43·3 3 10 17·8 3 4 48·2 2 59 14·2 2 53 35·3	3·35 3·45 3·56 3·68 3·81	3 I 10·0 2 55 28·5	3·48 3·59 3·7- 3·85 3·99	2 57 22·2 2 51 32·3	3.63 3.75 3.88 4.03 4.19		4·07 4·23	3 I II·3 2 55 I5·8 2 49 I3·9 2 43 4·8 2 36 47·7	3·96 4·11 4·27 4·45 4·64
32 33 34 35 36	2 51 42.4 2 46 0.8 2 40 13.3 2 34 19.3 2 28 18.0	3·91 4·06 4·22	2 47 50·9 2 42 0·6 2 36 3·7 2 29 59·3 2 23 46·5	4·10 4·27 4·45		4.71	2 39 33·3 2 33 22·7 2 27 3·3 2 20 34·1 2 13 53·7	4.99	2 28 42·3 2 22 9·6 2 15 25·4	4.81		4·86 5·10 5·37 5·68 6·05
		V.	ARIATIO	ON TO	1' OF	LAT	ITUDE .	AND	ALTITU	DE.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	A.	L. 21°	A.	L. 22°	Α.	L. 23°	Α.
0 2 4 6 8	s. -1.52 1.60 1.68 1.76 1.85	s. -4.57 4.60 4.63 4.66 4.69	s. -1.62 1.69 1.77 1.86 1.95	s. -4·61 4·64 4·67 4·70 4·73	s. -1.71 - 1.79 1.87 1.96 2.05	s. -4·64 4·67 4·70 4·74 4·78	s. -1.81 - 1.89 1.97 2.06 2.16	s. -4·67 4·71 4·74 4·78 4·82	s. -1.91 - 1.99 2.07 2.17 2.26	s. -4·71 4·75 4·79 4·83 4·87	s. -2.00 - 2.09 2.18 2.27 2.38	s. -4.75 4.79 4.83 4.88 4.95
10 12 14	1.94 2.03 2.14	4.73 4.77 4.81	2·04 2·14 2·25	4·77 4·82 4·87	2·15 2·25 2·37	4·82 4·87 4·92	2·26 2·37 2·48	4·87 4·92 4·98	2:37 2:48 2:61	4·92 5·00 5·04	2.49 2.60 2.73	4·98 5·04 5·11

	2. 10 11.	D. 10 11.	D. 20 11.	D. N. 11.	D. NO 11.	D. 20 11.
٥	s. s.	s. s.	S. S.	S. S.	S. S.	s. s.
0	-1.52 -4.57	-1.62 -4.61	-1.71 -4.64	-1.81 -4.67	-1.91 -4.71	-2.00 -4.75
2	1.60 4.60	1.69 4.64	1.79 4.67	1.89 4.71	1.99 4.75	2.09 4.79
4	1.68 4.63	1.77 4.67	1.87 4.70	1.97 4.74	2.07 4.79	2.18 4.83
6	1.76 4.66	1.86 4.70	1.96 4.74	2.06 4.78	2.17 4.83	2.27 4.88
8	1.85 4.69	1.95 4.73	2.05 4.78	2.16 4.82	2.26 4.87	2.38 4.95
10	1.94 4.73	2.04 4.77	2.15 4.82	2.26 4.87	2.37 4.92	2.49 4.98
12	2.03 4.77	2.14 4.85	2.25 4.87	2.37 4.92	2.48 5.00	2.60 5.04
14	2.14 4.81	2.25 4.87	2.37 4.92	2.48 4.98	2.61 5.04	2.73 5.11
15	2.19 4.84	2.31 4.89	2.43 4.95	2.55 5.01	2.67 5.07	2.80 5.14
16	2.25 4.87	2.37 4.92	2.49 4.98	2.61 5.04	2.74 5.11	2.87 5.18
17	2.31 4.89	2.43 4.95	2.55 5.01	2.68 5.08	2.81 5.15	2.95 5.22
18	2.37 4.92	2.49 4.98	2.62 5.05	2.75 5.12	2.89 5.19	3.03 5.27
19	2.44 4.95	2.56 5.02	2.69 5.09	2.83 5.16	2.07 2.24	3.11 2.32
20	2.20 4.99	2.63 5.05	2.77 5.12	2.00 5.20	3.02 2.58	3.20 5.37
21	2.22 2.03	2.71 5.00	2.84 5.17	2.99 2.52	3.14 2.33	3'29 5'43
	2 37 3 02	2/1 309	204 317	2 99 5 25	3 14 3 33	3 29 3 43
22	2.65 5.06	2.78 5.13	2.93 2.21	3.07 5.30	3.23 5.39	3'39 5'49
23	2.72 5.10	2.86 5.18	3.01 2.26	3.16 2.32	3'33 5'45	3.49 5.55
24	2.80 5.14	2.95 5.23	3.10 2.31	3.26 2.41	3.43 2.21	3.61 5.62
25	2.89 5.19	3.04 5.28	3.20 5.37	3.36 5.47	3.24 2.28	3.73 5.70
26	2.98 5.24	3.14 2.33	3.30 2.43	3.47 5.24	3.66 5.66	3·85 5·78
27	3.07 5.30	3.24 5.39	3.41 5.20	3.59 5.61	3.79 5.74	3.99 5.88
28	3.17 2.32	3.34 5.46	3.53 5.57	3.72 5.69	3.92 5.83	4.14 5.98
29	3.28 5.42	3.46 5.23	3.65 5.65	3.85 5.78	4.07 5.93	4.30 6.09
30	3.39 2.49	3.58 5.61	3.78 5.74	4.00 5.88	4.23 6.04	4.48 6.22
31	3.52 5.57	3.72 5.69	3.93 5.83	4.16 5.99	4.40 6.12	4.67 6.36
	0.65 5.65	3.86 5.79	4.00 5.04	4.33 6.11	4,60 6,00	4.89 6.52
32	3.65 5.65		4.09 5.94 4.26 6.06		4·60 6·30 4·81 6·46	
33	3.79 5.74			4.52 6.25		
34	3.94 5.85	1 ' '		4.73 6.40		
35	4.11 5.96	4.37 6.14	4.66 6.35	4.97 6.58 5.24 6.78		
36	4.30 6.09	4.58 6.29	4.89 6.52	5.24 6.78	5.62 7.08	6.07 7.45

LATITUDE 23°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

				1								
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 8 10 12 14	H. M. S. 6 0 0.0 5 25 13.0 5 16 30.3 5 7 47.1 4 59 3.1	S. -1.70 1.72 1.73 1.74 1.76	H. M. S. 5 58 18·1 5 23 29·5 5 14 46·1 5 6 1·9 4 57 16·8	I.74	H. M. S. 5 56 36·2 5 21 45·2 5 13 0·9 5 4 15·5 4 55 29·1	s. -1·70 1·74 1·76 1·78 1·81		s. -1.70 1.76 1.78 1.81 1.83		s. -1.71 1.78 1.80 1.83 1.86	H. M. S. 5 51 29·2 5 16 26·6 5 7 38·1 4 58 48·1 4 49 56·4	s. -1·71 1·80 1·82 1·86 1·89
16 18 20 22 23	4 50 18·2 4 4I 32·3 4 32 45·2 4 23 56·7 4 I9 3I·8	1.80 1.83 1.86	4 48 30·6 4 39 43·2 4 30 54·4 4 22 4·0 4 17 38·1	1.81 1.83 1.86 1.90 1.92	4 46 41.4 4 37 52.3 4 29 1.6 4 20 9.0 4 15 41.9	1.94		1.90 1.94 1.98	4 42 57.6 4 34 4.4 4 25 9.0 4 16 11.3 4 11 41.4	1.90 1.93 1.98 2.02 2.05	4 32 7·2 4 23 9·1 4 14 8·4	1.93 1.97 2.02 2.07 2.10
24 25 26 27 28	4 15 6.5 4 10 40.8 4 6 14.5 4 1 47.8 3 57 20.4	1.93 1.95			4 II I4·2 4 6 46·0 4 2 I7·I 3 57 47·5 3 53 I7·2		4 4 44.3	2.11	4 7 10·9 4 2 39·5 3 58 7·4 3 53 34·4 3 49 0·5	2·08 2·10 2·14 2·17 2·20	4 0 31·7 3 55 57·6	2·13 2·16 2·19 2·23 2·26
29 30 31 32 33	3 52 52·5 3 48 23·9 3 43 54·6 3 39 24·6 3 34 53·8	2·02 2·05 2·08	3 50 51·0 3 46 20·8 3 41 49·9 3 37 18·1 3 22 45·4	2·08 2·11 2·14	3 48 46·2 3 44 14·2 3 39 41·5 3 35 7·7 3 30 33·0	2.31	3 37 29.1	2·24 2·28	3 44 25.6 3 39 49.7 3 35 12.7 3 30 34.5 3 25 55.0	2·23 2·27 2·31 2·35 2·39	3 42 9.7 3 37 31.5 3 32 52.0 3 28 11.2 3 23 29.0	2·30 2·34 2·38 2·43 2·47
34 35 36 37 38	3 30 22·I 3 25 49·5 3 2I I6·0 3 I6 4I·3 3 I2 5·5	2.17	3 28 11·7 3 23 37·1 3 19 1·3 3 14 24·3 3 9 46·0	2·24 2·28	3 25 57·I 3 21 20·I 3 16 41·9 3 12 2·3 3 7 21·2	2.32		2.40		2·49 2·54 2·59		2·52 2·58 2·63 2·69 2·76
39 40 41 42 43	3 7 28·5 3 2 50·2 2 58 10·5 2 53 29·1 2 48 46·1	2.47	3 5 6·3 3 0 25·1 2 55 42·3 2 50 57·7 2 46 11·1	2·47 2·52 2·58	3 2 38·5 2 57 54·2 2 53 8·0 2 48 19·8 2 43 29·4	2·63 2·69		2.67 2.74 2.81	2 57 25·2 2 52 33·6 2 47 39·5 2 42 42·9 2 37 43·5	2·78 2·85 2·93		2·83 2·90 2·98 3·06 3·16
44 45 46 47 48	2 44 I·3 2 39 I4·4 2 34 25·3 2 29 33·8 2 24 39·6	2·65 2·72 2·80	2 41 22·5 2 36 31·6 2 31 38·1 2 26 41·8 2 21 42·5	2·78 2·86 2·94	2 38 36·5 2 33 41·1 2 28 42·6 2 23 41·2 2 18 36·1	3.00 3.00	2 35 42·8 2 30 42·4 2 25 38 6 2 20 31·2 2 15 19·6	3·05 3·15 3·25	2 32 41.0 2 27 34.9 2 22 25.1 2 17 11.1 2 11 52.3	3·20 3·31 3·43	2 29 30·2 2 24 18·1 2 19 1·5 2 13 40·1 2 8 13·1	
		V	ARIATIO	ON TO	o r' OF	LAT	ITUDE	AND	ALTITU	DE.		•
Alt.	L. 0°	A.	L. 1°	A.	L. 2°	A.	L. 3°	Α.	L. 4	° A.	L. 5°	A.
0 2 4 6 8	s. 00 .06 .13 .19 .26	s. -4·34 4·35 4·35 4·35 4·35	s. - ·08 ·15 ·21 ·28 ·34	s. -4.35 4.35 4.35 4.35 4.36	s. - ·16 ·23 ·30 ·36 ·43	s. -4·35 4·35 4·36 4·37	s. - ·25 ·31 ·38 ·44 ·51	s. -4·35 4·36 4·36 4·37 4·38	s '33 '40 '46 '53 '60	s. -4:36 4:36 4:37 4:38 4:39	s. - :41 :48 :55 :61 :68	s. -4·36 4·37 4·38 4·39 4·40
10 12 14 16 18	*33 *39 *46 *53 *60	4·36 4·36 4·37 4·38 4·39	•41 •48 •55 •62 •69	4·37 4·37 4·38 4·39 4·40	•50 •56 •64 •71 •78	4·37 4·38 4·39 4·40 4·42	•58 •65 •72 •80 •88	4·38 4·39 4·41 4·42 4·43	·67 ·74 ·81 ·89 ·97	4·40 4·41 4·42 4·43 4·45	•75 •83 •90 •98 ••96	4·41 4·42 4·44 4·45 4·47
20 22 24 26 28	·68 ·76 ·84 ·92 I·01	4.40 4.41 4.42 4.44 4.46	.77 .85 .93 I.02 I.II	4.41 4.43 4.44 4.46 4.48	•86 •94 1•03 1•12 1•21	4.43 4.45 4.47 4.49 4.51	.96 1.04 1.13 1.22 1.32	4.45 4.47 4.49 4.51 4.54	1.05 1.14 1.23 1.32 1.43	4·47 4·49 4·52 4·54 4·57	1·15 1·24 1·33 1·43 1·53	4.49 4.52 4.54 4.57 4.61
30 32 34 36 38	1·10 1·19 1·30 1·41 1·53	4.48 4.50 4.53 4.57 4.61	1·20 1·31 1·41 1·53 1·65	4.51 4.54 4.57 4.61 4.65	1·31 1·42 1·53 1·65 1·78	4.54 4.57 4.61 4.65 4.70	1.42 1.53 1.65 1.78 1.92	4.57 4.61 4.65 4.69 4.75	1.53 1.65 1.77 1.91 2.06	4.61 4.65 4.69 4.75 4.81	1.65 1.77 1.90 2.04 2.20	4.65 4.69 4.74 4.80 4.87
40 42 44 46 48	1.66 1.80 1.95 2.13 2.32	4·65 4·70 4·76 4·84 4·93	1.79 1.94 2.11 2.30 2.50	4·70 4·76 4·83 4·91 5·02	1.93 2.09 2.27 2.47 2.70	4.75 4.82 4.90 5.00 5.12	2.07 2.24 2.44 2.66 2.91	4·81 4·89 4·98 5·09 5·23	2·22 2·41 2·61 2·85 3·13	4·88 4·97 5·07 5·20 5·36	2·38 2·57 2·80 3·06 3·37	4.95 5.05 5.17 5.32 5.50

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 215 LATITUDE 23°.

	DECLINATION—CONTRAI					ARY	NAME	TO	LATITU:	DE.		
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 4 6 8	H. M. S. 5 49 46·3 5 32 14·7 5 23 27 2 5 14 38·3 5 5 48·0		H. M. s. 5 48 3.0 5 30 28.7 5 21 39.3 5 12 48.7 5 3 56.4	1·78 1·81	H. M. S. 5 46 19·2 5 28 41·5 5 19 50·5 5 10 57·8 5 2 3·3	s. -1·73 1·79 1·82 1·86 1·90	H. M. S. 5 44 54·8 5 26 53·5 5 18 0·5 5 9 5·5 5 0 8·5	1.88	H. M. S. 5 42 49.8 5 25 4.6 5 16 9.2 5 7 11.7 4 58 12.0		H. M. S. 5 41 4·1 5 23 14·4 5 14 16·5 5 5 16·3 4 56 13·6	s. -1.77 1.85 1.89 1.94 1.99
12 14 16 18 19	4 56 56·0 4 48 2·0 4 39 6·0 4 30 7·7 4 25 37·5	1.92 1.96 2.01	4 55 2·I 4 46 5·8 4 37 7·I 4 28 5·8 4 23 34·0	1.95 2.00 2.05	4 53 6·5 4 44 7·5 4 35 5·9 4 26 1·4 4 21 27·9	1·99 2·04	4 51 9·1 4 42 7·1 4 33 2·3 4 23 54·2 4 19 18·9	2.02 2.08 2.14	4 49 9.6 4 40 4.5 4 30 56.2 4 21 44.4 4 17 7.0	2·12 2·19	4 47 8·1 4 37 59·5 4 28 47·4 4 19 31·5 4 14 51·9	2.04 2.10 2.17 2.24 2.28
20 21 22 23 24	4 21 6.7 4 16 35.1 4 12 2.7 4 7 29.5 4 2 55.4	2.09	4 5 18.9	2·14 2·17 2·20	4 16 53.6 4 12 18.3 4 7 42.2 4 3 5.0 3 58 26.7	2·19 2·22 2·26	4 14 42.7 4 10 5.4 4 5 27.1 4 0 47.6 3 56 7.0	2·24 2·28 2·32	4 12 28·7 4 7 49·2 4 3 8·5 3 58 26·6 3 53 43·4	2·30 2·34 2·38	4 10 11·2 4 5 29·4 4 0 46·3 3 56 1·7 3 51 15·6	2·32 2·36 2·40 2·45 2·50
25 26 27 28 29	3 58 20·4 3 53 44·4 3 49 7·3 3 44 29·1 3 39 49·6	2·25 2·29 2·33	3 56 5.7 3 51 27.5 3 46 48.0 3 42 7.4 3 37 25.4	2·31 2·35 2·40	3 53 47.3 3 49 6.7 3 44 24.7 3 39 41.4 3 34 56.6	2·38 2·42 2·47	3 51 25·1 3 46 41·9 3 41 57·2 3 37 11·0 3 32 23·1	2·45 2·50 2·55	3 48 58·9 3 44 12·8 3 39 25·1 3 34 35·8 3 29 44·6	2·52 2·57 2·63	3 46 28·3 3 41 39·2 3 36 48·3 3 31 55·6 3 27 0·9	2·55 2·60 2·65 2·71 2·78
30 31 32 33 34	3 35 8·9 3 30 26·8 3 25 43·2 3 20 58·1 3 16 11·2	2·46 2·51 2·56	3 32 41.9 3 27 56.9 3 23 10.3 3 18 21.9 3 13 31.6	2·54 2·59 2·65	3 30 10·2 3 25 22·0 3 20 32·1 3 15 40·2 3 10 46·2	2·62 2·68	3 27 33.5 3 22 41.9 3 17 48.4 3 12 52.7 3 7 54.6	2.71		2.81		2.84 2.91 2.98 3.36 3.15
35 36 37 38 39	3 11 22·5 3 6 31·8 3 1 38·8 2 56 43·7 2 51 46·0	2.87	3 8 39 2 3 3 44 6 2 58 47 6 2 53 48 1 2 48 45 6		3 5 49·8 3 0 51·0 2 55 49·5 2 50 45·1 2 45 37·4	3.03	3 2 53.9 2 57 50.5 2 52 44.0 2 47 34.2 2 42 20.9	3·07 3·16 3·25	2 59 51 0 2 54 42·5 2 49 30·6 2 44 15·0 2 38 55·3	3·20 3·29 3·40	2 56 40·7 2 51 26·6 2 46 8·7 2 40 46·7 2 35 19·9	3·24 3·34 3·44 3·55 3·68
40 41 42 43 44	2 46 45.5 2 41 42.0 2 36 35.1 2 31 24.7 2 26 10.1	3·11 3·21 3·31	2 43 40.0 2 38 31.0 2 33 18.2 2 28 1.3 2 22 39.7	3·26 3·36 3·47	2 40 26·2 2 35 11·1 2 29 51·8 2 24 27·7 2 18 58·2	3·41 3·53 3·65	2 37 3.4 2 31 41.7 2 26 15.0 2 20 42.9 2 15 4.5	3.58 3.71 3.85	2 33 31·1 2 28 1·8 2 22 26·9 2 16 45·8 2 10 57·5	3·76	2 29 48·1 2 24 10·5 2 18 26·5 2 12 35·2 2 6 35·6	3.81 3.96 4.12 4.30 4.51
	•	V	ARIATIO	ON TO	o i' OF	LAT	ITUDE .	AND	ALTITU	DE.		
Alt.	L. 6°	A.	L. 7°	A.	L. 8°	Α.	L. 9°	A.	L. 10°	Α.	L. 11	A.
0 2 4 6 8	s. - '50 - '56 '63 '70 '77	s. -4;37 4:38 4:39 4:40 4:41	s. - *58 *65 *72 *79 *86	s. 4·38 4·39 4·40 4·41 4·43	s. 66 .73 .80 .87 .94	s. -4·39 4·41 4·42 4·43 4·45	s. - '75 - '82 '89 '96 1'03	s. -4·41 4·42 4·44 4·45 4·47	s. 83 .90 .97 1.05 1.12	s. -4·42 4·44 4·45 4·47 4·49	s. - ·92 ·99 I·06 I·14 I·21	s. -4.44 4.46 4.47 4.49 4.51
10 12 14 16 18	·84 ·92 ·99 I·07 I·16	4.43 4.44 4.46 4.48 4.50	*93 1.01 1.09 1.17 1.25	4.44 4.46 4.48 4.50 4.52	1.02 1.10 1.18 1.26 1.35	4·46 4·48 4·50 4·52 4·55	1·11 1·19 1·27 1·36 1·45	4.49 4.51 4.53 4.55 4.58	1·20 1·28 1·37 1·46 1·55	4.51 4.56 4.58 4.61	1·29 1·38 1·46 1·56 1·65	4.53 4.56 4.59 4.62 4.65
20 22 24 26 28	1·24 1·34 1·43 1·54 1·65	4.52 4.55 4.58 4.61 4.65	1·34 1·44 1·54 1·65 1·76	4.55 4.58 4.61 4.65 4.69	1.44 1.54 1.65 1.76 1.88	4.58 4.61 4.65 4.69 4.73	1.55 1.65 1.76 1.87 2.00	4.61 4.65 4.69 4.73 4.78	1.65 1.76 1.87 1.99 2.13	4·65 4·69 4·73 4·78 4·84	1.76 1.87 1.99 2.12 2.25	4·69 4·73 4·78 4·83 4·89
30 32 34 36 38	1.76 1.89 2.03 2.18 2.35	4.69 4.74 4.80 4.86 4.94	1·89 2·02 2·17 2·33 2·51	4.74 4.79 4.86 4.93 5.02	2·01 2·15 2·31 2·48 2·67	4.79 4.85 4.92 5.00 5.10	2·14 2·29 2·45 2·64 2·84	4·84 4·91 4·99 5·08 5·19	2·27 2·43 2·60 2·80 3·02	4.90 4.98 5.07 5.17 5.29	2·41 2·57 2·76 2·97 3·22	4.97 5.05 5.15 5.27 5.41
40 41 42 43 44	2·54 2·64 2·75 2·87 3·00	5.03 5.09 5.14 5.21 5.28	2·71 2·82 2·94 3·07 3·21	5·12 5·18 5·25 5·32 5·40	2·89 3·01 3·14 3·28 3·44	5·22 5·29 5·36 5·45 5·54	3.08 3.21 3.36 3.51 3.68	5·33 5·40 5·49 5·59 5·70	3·28 3·43 3·58 3·76 3·95	5.45 5.53 5.63 5.74 5.87	3.50 3.66 3.83 4.03 4.24	5.58 5.68 5.79 5.92 6.07

LATITUDE 23°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 39 17·6 5 30 21·4 5 21 23·0 5 12 22·4 5 3 19·3	s. -1.78 1.82 1.87 1.91 1.97	5 19 30·3 5 10 26·7	1.89 1.94	H. M. S. 5 35 42.0 5 26 40.3 5 17 36.3 5 8 29.4 4 59 19.6	s. -1.81 1.86 1.91 1.97 2.03	5 15 40.6	2.00	5 22 54·2 5 13 43·4	1.91 1.97 2.03		s. -1.87 1.93 2.00 2.07 2.14
10 12 13 14 15	4 54 13·4 4 45 4·4 4 40 28·6 4 35 52·0 4 31 14·4	2·02 2·08 2·11 2·15 2·18	4 42 58·3 4 38 20·6	2.06 2.12 2.15 2.19 2.23	4 40 49 8 4 36 10 0 4 31 29 0	2·09 2·16 2·20 2·24 2·28	4 38 38·6 4 33 56·5 4 29 13·2	2·2I 2·25 2·29	4 45 50·5 4 36 24·8 4 31 40·2 4 26 54·4 4 22 7·2	2·26 2·30 2·34	4 43 38.6 4 34 7.9 4 29 20.7 4 24 32.2 4 19 42.2	2·22 2·31 2·35 2·40 2·45
16 17 18 19 20	4 26 35.9 4 21 56.2 4 17 15.5 4 12 33.6 4 7 50.5	2·22 2·25 2·29 2·33 2·38	4 24 21.4 4 19 39.4 4 14 56.3 4 10 11.8 4 5 26.0		4 17 19·3 4 12 33·6 4 7 46·4	2·32 2·36 2·41 2·46 2·50	4 10 7·2 4 5 17·1	2·42 2·47 2·52	4 17 18.6 4 12 28.6 4 7 36.9 4 2 43.7 3 57 48.7	2.49 2.54 2.59	4 5 2.7	2·50 2·55 2·61 2·67 2·73
21 22 23 24 25	4 3 6·0 3 58 20·2 3 53 32·8 3 48 43·9 3 43 53·3	2·47 2·52 2·57	4 0 38·8 3 55 50·0 3 50 59·6 3 46 7·5 3 41 13·5	2·54 2·59 2·65	3 58 7.5 3 53 15.6 3 48 21.9 3 43 26.3 3 38 28.7	2·61 2·67 2·73	3 55 31·9 3 50 36·6 3 45 39·4 3 40 40·0 3 35 38·5	2·69 2·75 2·81	3 52 51·8 3 47 52·9 3 42 51·8 3 37 48·5 3 32 42·7	2·77 2·84 2·91	3 50 6·9 3 45 4·0 3 39 58·9 3 34 51·2 3 29 40·8	2·79 2·86 2·93 3·01 3·08
26 27 28 29 30	3 39 0·9 3 34 6·5 3 29 10·1 3 24 11·5 3 19 10·5	2·74 2·80 2·87	3 36 17·5 3 31 19·4 3 26 19·1 3 21 16·3 3 16 10·8	2·83	3 33 28·8 3 28 26·7 3 23 22·1 3 18 14·7 3 13 4·4	2·93	3 30 34·5 3 25 28·0 3 20 18·7 3 15 6·4 3 9 50·9	3.11 3.03	3 27 34·2 3 22 22·9 3 17 8·6 3 11 50·9 3 6 29·7	3.14		3·17 3·26 3·35 3·45 3·56
31 *32 33 34 35	3 14 6·9 3 9 0·6 3 3 51·2 2 58 38·6 2 53 22·4	3.58		3·31 3·42	3 7 50·9 3 2 34·1 2 57 13·4 2 51 48·7 2 46 19·4	3·45 3·56	3 4 31.8 2 59 8.9 2 53 41.8 2 48 10.1 2 42 33.3	3.60 3.73	3 I 4.5 2 55 35.0 2 50 0.8 2 44 21.5 2 38 36.4	3.64 3.77 3.90	2 57 28·4 2 51 51·8 2 46 9·8 2 40 21·9 2 34 27·6	3.68 3.81 3.94 4.09 4.25
36 37 38 39 40	2 48 2·2 2 42 37·8 2 37 8·6 2 31 34·2 2 25 53·8	3·59 3·72 3·86	2 44 28·7 2 38 56·9 2 33 19·9 2 27 36·8 2 21 47·0	3·77 3·91 4·06	2 40 45.2 2 35 5.4 2 29 19.6 2 23 26.9 2 17 26.3	3·95 4·11 4·28	2 36 50·9 2 31 2·3 2 25 6·6 2 19 3·0 2 12 50·4	4·16	2 32 44.9 2 26 46.2 2 20 39.5 2 14 23.6 2 7 57.2	4.38		4·43 4·63 4·86 5·11 5·39
		VA	RIATIO	N TO	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 12°	A.	L. 13°	A.	L. 14°	Α.	L. 15°	A	L. 16°	Α.	L. 17°	Α.
0 2 4 6 8	s. -1.00 - 1.08 1.15 1.23 1.31	s. -4·46 4·48 4·50 4·52 4·54	s. -1.09 - 1.17 1.24 1.32 1.40	s. -4·48 4·50 4·52 4·54 4·56	s. -1·18 - 1·26 1·33 1·41 1·49	s. -4·50 4·52 4·54 4·57 4·60	s. -1·27 - 1·35 1·42 1·51 1·59	s. -4.53 4.55 4.57 4.60 4.63	s. -1·36 - 1·44 1·52 1·60 1·69	s. -4·55 4·58 4·60 4·63 4·66	s. 1·46 - 1·53 1·61 1·70 1·79	s. -4·58 4·61 4·64 4·67 4·70
10 12 14 16 18	1·39 1·47 1·56 1·66 1·76	4.56 4.59 4.62 4.65 4.69	1·48 1·57 1·66 1·76 1·87	4.59 4.62 4.65 4.69 4.73	1·58 1·67 1·77 1·87 1·98	4.63 4.66 4.69 4.73 4.77	1.68 1.77 1.87 1.98 2.09	4·66 4·69 4·73 4·77 4·82	1.78 1.88 1.98 2.09 2.21	4.70 4.73 4.77 4.82 4.87	1.88 1.98 2.09 2.20 2.33	4.74 4.78 4.82 4.87 4.93
20 22 24 26 28	1·87 1·98 2·11 2·24 2·39	4.73 4.78 4.83 4.89 4.96	1·98 2·10 2·23 2·37 2·53	4.77 4.83 4.88 4.95 5.03	2·09 2·22 2·36 2·51 2·67	4.82 4.88 4.94 5.02 5.10	2·21 2·34 2·49 2·65 2·82	4.88 4.94 5.01 5.09 5.18	2·33 2·47 2·62 2·72 2·98	4.93 5.00 5.08 5.16 5.27	2·46 2·60 2·76 2·94 3·14	4.99 5.07 5.15 5.25 5.36
30 32 33 34 35	2·55 2·73 2·83 2·93 3·04	5.04 5.13 5.18 5.24 5.30	2·70 2·89 2·99 3·10 3·22	5·11 5·22 5·28 5·34 5·41	2.85 3.06 3.17 3.29 3.42	5·20 5·31 5·38 5·45 5·53	3.01 3.23 3.35 3.48 3.63	5.29 5.42 5.49 5.57 5.66	3·18 3·42 3·55 3·69 3·85	5:39 5:53 5:61 5:70 5:80	3·36 3·62 3·76 3·92 4·09	5.49 5.65 5.75 5.85 5.97
36 37 38 39 40	3·16 3·28 3·42 3·57 3·73	5.37 5.45 5.53 5.62 5.73	3·35 3·49 3·64 3·80 3·98	5.49 5.57 5.67 5.77 5.89	3·56 3·71 3·87 4·05 4·25	5.62 5.71 5.82 5.94 6.08	3·78 3·95 4·13 4·33 4·56	5·76 5·87 5·99 6·13 6·30	4.02 4.20 4.41 4.63 4.89	5·92 6·04 6·19 6·35 6·54	4·28 4·48 4·71 4·97 5·26	6·10 6·24 6·41 6·60 6·82

LATITUDE 23°.

		DE	ECLINAT	CION-	-CONTR	ARY	NAME	<i>TO</i> —	LATITU	DE.		
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 28 17.4 5 19 2.2 5 9 43.7 5 0 21.3 4 50 54.9	1.96 2.03 2.10	H. M. S. 5 26 23.0 5 17 3.8 5 7 40.9 4 58 14.0 4 48 42.7		H. M. S. 5 24 27.0 5 15 3.5 5 5 36.0 4 56 4.3 4 46 27.7	s. -1.95 2.02 2.10 2.18 2.27	H. M. S. 5 22 29.4 5 13 1.3 5 3 28.9 4 53 52.0 4 44 9.9	2·05 2·14 2·23	H. M. S. 5 20 30.0 5 10 57.0 5 1 19.5 4 51 36.9 4 41 48.9	2.27	H. M. S. 5 18 28.8 5 8 50.6 4 59 7.5 4 49 19.1 4 39 24.8	s. -2.04 2.13 2.22 2.32 2.43
10 12 14 15 16	4 41 24.0 4 31 48.1 4 22 6.6 4 17 13.5 4 12 18.8	2.46	4 29 25.0 4 19 37.2 4 14 41.0	2.41	4 26 58·3 4 17 4·1 4 12 4·3	2·37 2·47 2·59 2·65 2·71	4 34 22·I 4 24 28·0 4 I4 26·8 4 9 23·3 4 4 I7·6	2·54 2·66 2·72	4 31 54·8 4 21 53·8 4 11 45·1 4 6 37·6 4 1 27·8	2.60 2.73 2.80	4 29 23.8 4 19 15.5 4 8 58.8 4 3 47.1 3 58 32.8	2·55 2·68 2·81 2·89 2·96
17 18 19 20 21	4 7 22.4 4 2 24.1 3 57 23.7 3 52 21.4 3 47 16.8	2·74 2·81	4 4 42·8 3 59 40·8 3 54 36·7 3 49 30·2 3 44 21·3	2.83	4 I 58·8 3 56 52·7 3 5I 44·4 3 46 33·6 3 4I 20·0	2·77 2·84 2·92 2·99 3·07	3 59 9.8 3 53 59.5 3 48 46.7 3 43 31.1 3 38 12.6	3.00	3 56 15.6 3 51 0.8 3 45 43.1 3 40 22.5 3 34 58.6	3.11	3 53 15·9 3 47 56·2 3 42 33·3 3 37 7·2 3 31 37·6	3.04 3.13 3.22 3.31 3.41
22 23 24 25 26	3 42 9·8 3 37 0·2 3 31 47·8 3 26 32·5 3 21 14·0	3.03 3.11 3.50	3 39 9.7 3 33 55.4 3 28 38.0 3 23 17.3 3 17 53.1	3.31	3 36 3.6 3 30 44.1 3 25 21.2 3 19 54.8 3 14 24.4	3·16 3·25 3·34 3·44 3·55	3 32 50·9 3 27 25·9 3 21 57·1 3 16 24·4 3 10 47·3	3·37 3·47	3 29 31·3 3 24 0·2 3 18 25·0 3 12 45·4 3 7 1·0		3 26 4·I 3 20 26·5 3 I4 44·3 3 8 57·3 3 3 4·9	3.52 3.63 3.75 3.88 4.02
27 28 29 30 31	3 15 52·0 3 10 26·2 3 4 56·4 2 59 22·1 2 53 42·9	3·49 3·60		3·52 3·63 3·75 3·88 4·02		3.66 3.79 3.92 4.06 4.22	3 5 5.5 2 59 18.4 2 53 25.7 2 47 26.6 2 41 20.6	3.96 4.10 4.26	3 I II·3 2 55 I5·8 2 49 I3·9 2 43 4·8 2 36 47·7	3.99 4.14 4.30 4.48 4.67	2 57 6.6 2 51 1.7 2 44 49.5 2 38 29.3 2 31 59.9	4·18 4·34 4·52 4·72 4·94
32 33 34 35 36	2 47 58·3 2 42 7·7 2 36 10·4 2 30 5·8 2 23 52·7	4·14 4·30	2 43 53.6 2 37 53.5 2 31 45.8 2 25 29.5 2 19 3.6	4·18 4·35 4·53 4·74 4·97	2 33 26.0 2 27 6.5 2 20 37.2	4·39 4·58 4·79 5·02 5·29	2 35 6·7 2 28 43·9 2 22 11·1 2 15 26·8 2 8 29·3	4.63 4.84 5.07 5.34 5.65		5·13 5·40 5·71	2 25 20·1 2 18 28·5 2 11 23·2 2 4 1·7 1 56 21·2	5·18 5·46 5·77 6·13 6·56
		VA	ARIATIC	N TO	ı' OF	LAT	TUDE .	AND	ALTITU	DE.		
Alt.	L. 18	° A.	L. 19	² A	L. 20	° A.	L. 21	° A.	L. 22	° A.	L. 23	° A.
° 0 2 4 6 8	s. -1.55 1.63 1.71 1.80 1.89	s. -4.61 4.64 4.67 4.70 4.74	s. -1.64 1.72 1.81 1.90 1.99	s. -4·64 4·68 4·71 4·74 4·78	s. -1.74 1.82 1.91 2.00 2.10	s. -4.68 4.71 4.75 4.78 4.83	s. -1.84 1.92 2.01 2.11 2.21	s. -4.72 4.75 4.79 4.83 4.87	s. -1.94 2.02 2.11 2.21 2.32	s. -4·75 4·79 4·83 4·88 4·95	s. -2·04 2·13 2·22 2·32 2·43	s. -4.80 4.84 4.88 4.93 4.98
10 12	1·99 2·09	4·78 4·82	2·09 2·20	4·82 4·87	2·20 2·31	4·87 4·92	2·32 2·43	4·92 4·98	2·43 2·55	4·98 5·04	2·55 2·68	5·04 5·10

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۰	s. s.		s. s.	s.	s.	s.	s.	s.	s.	s.	s.
0	-1.55 -4.6			-1.74	-4.68	-1.84	-4.72	-1.94	-4.75	-2.04	-4.80
2	1.63 4.6		•72 4.68	1.82	4.71	1.92	4.75	2.02	4.79	2.13	4.84
4	1.71 4.6	57 I	·81 4·71	1.01	4.75	2.01	4.79	2.11	4.83	2.22	4.88
6	1.80 4.7	70 I	·90 4·74	2.00	4.78	2.11	4.83	2.21	4.88	2.32	4.93
8	1.89 4.7	74 I	.99 4.78	2.10	4.83	2.21	4.87	2.32	4.95	2.43	4.98
1						ł					
10	1.99 4.7	78 2	.09 4.82	2.20	4.87	2.32	4.92	2.43	4.98	2.55	5.04
12	2.09 4.8	82 2	.20 4.87	2.31	4.92	2.43	4.98	2.55	5.04	2.68	5.10
14	2.20 4.8	87 2	.32 4.93	2.43	4.98	2.56	5.04	2.68	5.11	2.81	5.18
15	2.26 4.0		.38 4.95	2.50	5.01	2.62	5.08	2.75	5.14	2.80	5.22
16	2.32 4.0		44 4.98	2.56	5*05	2.60	5.11	2.83	5.18	2.96	5.26
	- 3- +.	-	11 12		5 - 5		•	- 3	3		J
17	2.38 4.0	06 2	:51 5:01	2.63	5.08	2.77	5.15	2.90	5.22	3.04	5.30
18	2.45 4.9		.58 5.05	2.71	5.13	2.84	5.10	2.98	5.27	3.13	5.32
19	2.52 5.0		65 5.00			2.92	5.24	3.07	5.32	3.22	5.41
20	2.59 5.0		.72 5.13	2.86		3.01	5.28	3.16	5·37	3.31	5.46
21			.80 5.1	1	5.25	3.00	5.33	3.25			
41	200 5	10 2	5.00 5.17	2 94	5.45	3.09	2.33	3.72	5.43	3.41	5.23
22	2.74 5	74	.88 5.22	3.03	5.30	3.10	5:39	2.25	5.49	3.2	5.59
23		- 1 -						3.35		3.63	5.66
						3.29	5.45	3 46	5.55		
24			3.06 5.32			3:39	5.21	3.22	5.62	3.75	5.74
25			1.16 2.3			3.20	5.28	3.69	5.70	3.88	5.83
26	3.10 2.	34 3	3.26 2.43	3.44	5.24	3.62	5.66	3.82	5.78	4.03	5.92
					a.6-		a. a		- 00		
27			3.32 2.20			3.75	5.74	3.96	5.88	4.18	6.03
28			3.49 2.2			3.89	5.83	4.11	5.98	4.34	6.14
29			3.62 5.65			4.04	5.93	4.27	6.09	4.2	6.27
30			3.75 5.74		5.88	4.20	6.04	4.45	6.22	4.72	6.41
31	3.69 5.	70 3	3·90 5·8 <i>i</i>	4.13	5.99	4.38	6.17	4.64	6.36	4.94	6∙5 8
1		1			_		_				
32			.•o6 5•9;			4.57	6.31	4.86	6.52	5.18	6.76
33		90 4	1.23 6.00			4.78	6.46	5.10	6.70	5.46	6.97
34			1.42 6.20			5.02	6.64	5.37	6.91	5.77	7.22
35	4.35 6.	15 4	.63 6.3	4.95	6.58	5.29	6.85	5.69	7.16	6.13	7.52
36	4.55 6.	30 4	.86 6.5	5.20	6.79	5.59	7.09	6.05	7.45	6.56	7.87
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LATITUDE 24°.

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True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 6 8 10 12	H. M. S. 6 0 0.0 5 33 43.2 5 24 57.0 5 16 10.2 5 7 22.8	s. -1·78 1·79 1·80 1·81 1·83	H. M. S. 5 58 13·1 5 31 55·3 5 23 8·4 5 14 20·9 5 5 32·4	1.82	H. M. S. 5 56 26·2 5 30 6·8 5 21 19·1 5 12 30·5 5 3 40·8	s. -1.78 1.81 1.83 1.85 1.87	H. M. S. 5 54 39°I 5 28 17°6 5 19 28.8 5 10 38.9 5 1 47°9	I.85	5 26 27·5 5 17 37·4	s. -1.79 1.84 1.86 1.89 1.92	H. M. S. 5 51 4.2 5 24 36.6 5 15 45.0 5 6 52.1 4 57 57.6	s. -1.80 1.86 1.88 1.91 1.95
14 16 18 20 22	4 58 34.5 4 49 45.3 4 40 55.0 4 32 3.2 4 23 10.0	1.87 1.89	4 56 43.0 4 47 52.5 4 39 0.5 4 30 6.9 4 21 11.6		4 54 50.0 4 45 57.8 4 37 4.1 4 28 8.5 4 19 10.9	1.00 1.03	4 52 55.4 4 44 I.4 4 35 5.6 4 26 7.7 4 I7 7.5	1.03	4 50 59 ² 4 42 3 ¹ 4 33 5 ⁰ 4 24 4 ⁵ 4 15 1 ⁵	2.03 2.03	4 49 1.2 4 40 2.8 4 31 2.1 4 21 58.9 4 12 52.7	1.98 2.02 2.07 2.12 2.17
23 24 25 26 27	4 18 42.7 4 14 14.9 4 9 46.7 4 5 17.8 4 0 48.3	2.03 5.01		2.01 2.03 2.06 2.08 2.10	4 14 41·2 4 10 10·9 4 5 39·9 4 1 8·2 3 56 35·8	2·13 2·10 2·13	4 12 36.4 4 8 4.6 4 3 32.1 3 58 58.8 3 54 24.6	2·13 2·16 2·18		2·15 2·18 2·21 2·24 2·27	3 59 7.0 3 54 29.9	2·20 2·23 2·26 2·30 2·34
28 29 30 31 32	3 56 18·2 3 51 47·5 3 47 16·0 3 42 43·8 3 8 10·7	2·10 2·13 2·16	3 54 12·0 3 49 39·7 3 45 6·5 3 40 32·5 3 35 57·5	2·16 2·19	3 52 2.6 3 47 28.4 3 42 53.5 3 38 17.5 3 33 40.4	2·22 2·25 2·28	3 49 49.6 3 45 13.5 3 40 36.5 3 35 58.3 3 31 18.9	2·28 2·32 2·35	3 47 32.9 3 42 54.7 3 38 15.5 3 33 34.9 3 28 53.0	2·35 2·39 2·43	3 45 12·5 3 40 32·0 3 35 50·2 3 31 7·1 3 26 22·4	2·37 2·41 2·46 2·50 2·55
33 34 35 36 37	3 33 36·7 3 29 1·8 3 24 25·9 3 19 48·8 3 15 10·6	2·25 2·29 2·33	3 31 21.6 3 26 44.5 3 22 6.3 3 17 26.8 3 12 46.0	2·29 2·33 2·37 2·41 2·45	3 29 2·2 3 24 22·7 3 19 42·0 3 14 59·9 3 10 16·3	2.40	3 26 38·3 3 21 56·3 3 17 12·9 3 12 27·8 3 7 41·0		3 19 24·9 3 14 38·4 3 9 50·2	2.57		2·60 2·66 2·71 2·77 2·84
38 39 40 41 42	3 10 31·0 3 5 50·1 3 1 7·7 2 56 23·6 2 51 37·8	2·41 2·46 2·51 2·56 2·62	3 8 3.7 3 3 19.9 2 58 34.3 2 53 46.9 2 48 57.5	2·50 2·55 2·61 2·66 2·73	3 5 31·0 3 0 43·9 2 55 55·0 2 51 3·8 2 46 10·5	2·59 2·65 2·71 2·77 2·84	2 53 9·1 2 48 14·0	2·82 2·89	3 0 7·8 2 55 13·4 2 50 16·4 2 45 16·6 2 40 14·3	2·87 2·94 3·02	2 57 16·7 2 52 18·0 2 47 16·5 2 42 11·9 2 37 4·1	2·91 2·98 3·06 3·15 3·24
43 44 45 46 47	2 46 50·0 2 42 0·1 2 37 8·0 2 32 13·3 2 27 15·8	2·68 2·74 2·81 2·89 - 2·97	2 44 6·0 2 39 12·0 2 34 15·3 2 29 15·8 2 24 13·0		2 41 14.7 2 36 16.1 2 31 14.5 2 26 9.5 2 21 1.0	3.00 3.00	2 38 15·7 2 33 12·0 2 28 4·9 2 22 54·0 2 17 38·8	3·14 3·24 3·34	2 24 45.9	3·29 3·40 3·52	2 31 52·5 2 26 37·0 2 21 16·8 2 15 51·7 2 10 20·8	3·34 3·46 3·58 3·71 3·85
		V.	ARIATIC	N TO	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 0°	Α.	L. 1 °	Α.	L. 2°	Α.	L. 3°	Α.	L. 4°	A.	L. 5°	Α.
0 2 4 6 8	s. '00 '07 '14 '20 '28	s. -4·38 4·38 4·38 4·38 4·38	s. - ·08 - ·15 ·22 ·30 ·36	s. -4·38 4·38 4·38 4·39 4·39	s. ·17 ·24 ·30 ·37 ·44	s. -4·38 4·38 4·39 4·39 4·40	s. - ·25 - ·32 ·39 ·46 ·53	s. -4·38 4·39 4·39 4·40 4·41	s. - ·34 - ·40 ·47 ·54 ·62	s. -4·39 4·40 4·41 4·41	s. - ·42 - ·49 ·56 ·63 ·70	s. -4.40 4.41 4.41 4.42 4.43
10 12 14 16 18	·34 ·42 49 ·56 ·64	4·39 4·40 4·41 4·42	·43 ·50 ·58 ·65 ·73	4·40 4·41 4·42 4·43 4·44	·52 ·59 ·67 ·74 ·82	4·41 4·42 4·43 4·44 4·45	·60 ·68 ·76 ·83 ·92	4·42 4·43 4·44 4·46 4·47	·69 ·77 ·85 ·93 I·01	4·43 4·44 4·46 4·47 4·49	·78 ·86 ·94 I 02 I·II	4.45 4.46 4.48 4.50 4.52
20 22 24 26 28	·72 ·80 ·89 ·98 I·07	4:44 4:45 4:47 4:48 4:51	·81 ·90 ·98 I·08 I·17	4·45 4·47 4·49 4·51 4·53	·91 ·99 I·08 I·18 I·28	4·47 4·49 4·51 4·53 4·56	1.00 1.09 1.18 1.28 1.38	4·49 4·51 4·54 4·56 4·59	1·10 1·19 1·29 1·39 1·50	4.51 4.54 4.56 4.59 4.63	1·20 1·29 1·39 1·50 1·61	4.54 4.57 4.59 4.63 4.66
30 32 34 36 38	1·17 1·27 1·38 1·50 1·62	4.53 4.56 4.59 4.63 4.67	1.27 1.38 1.50 1.62 1.76	4·56 4·59 4·63 4·67 4·72	1·38 1·50 1·62 1·75 1·89	4·59 4·63 4·67 4·71 4·77	1.50 1.61 1.74 1.88 2.03	4.63 4.67 4.71 4.76 4.83	1.61 1.73 1.87 2.01 2.18	4.66 4.71 4.76 4.82 4.89	1.73 1.86 2.00 2.15 2.33	4.71 4.76 4.81 4.88 4.96
40 42 44 46 47	1.76 1.92 2.09 2.28 2.38	4·72 4·78 4·85 4·93 4 98	1.90 2.07 2.25 2.45 2.57	4·77 4·84 4·92 5·02 5·07	2.05 2.22 2.42 2.64 2.76	4·83 4·91 5·00 5·11 5·17	2·20 2·38 2·59 2·84 2·97	4.90 4.99 5.09 5.22 5.29	2·35 2·55 2·78 3·05 3·20	4.97 5.07 5.19 5.33 5.42	2·52 2·73 2·98 3·27 3·44	5.05 5.16 5.30 5.47 5.57

LATITUDE 24°.

DECLINATION CONTRARY NAME TO LATITUDE

		DI	ECLINAT	ION-	-CONTR.	ARY	NAME	TO-	LATITU	DE.		
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 4 6 8 10	H. M. S. 5 49 16·3 5 31 36·4 5 22 44·6 5 13 51·4 5 4 56·6	1.85 1.87	H. M. S. 5 47 27'9 5 29 45'1 5 20 51'6 5 11 56'6 5 2 59'7	s. -1.81 1.86 1.89 1.92 1.96	H. M. S. 5 45 39.0 5 27 53.0 5 18 57.6 5 10 0.4 5 I I.I	1.95	H. M. s. 5 43 49.5 5 25 59.7 5 17 2.2 5 8 2.7 4 59 0.9	1.97	H. M. S. 5 41 59.4 5 24 5.5 5 15 5.6 5 6 3.5 4 56 58.9	2.00	5 22 10·0 5 13 7·5	s. 1·86 1·93 1·98 2·03 2·08
12 14 16 18 19	4 56 0.0 4 47 1.4 4 38 0.4 4 28 56.9 4 24 24.1	2.01	4 54 0.7 4 44 59.5 4 35 55.8 4 26 49.1 4 22 14.6	2.00 2.05 2.10 2.15 2.18	4 51 59.6 4 42 55.6 4 33 48.7 4 24 38.8 4 20 2.5	2·14 2·19	4 49 56.6 4 40 49.5 4 31 39.3 4 22 25.7 4 17 47.4	2·12 2·18 2·24	4 47 51.5 4 38 41.1 4 29 27.2 4 20 9.6 4 15 29.2	2·16 2·22 2·29	4 45 44.2 4 36 30.2 4 27 12.4 4 17 50.5 4 13 7.8	2·14 2·20 2·27 2·35 2·39
20 21 22 23 24	4 19 50·5 4 15 16·1 4 10 40·8 4 6 4·7 4 1 27·6	2·19 2·22 2·25	4 17 39.3 4 13 3.1 4 8 26.0 4 3 47.7 3 59 8.5	2·21 2·24 2·27 2·31 2·35	4 15 25·3 4 10 47·0 4 6 7·8 4 1 27·4 3 56 45·8	2·26 2·29 2·33 2·37 2·41	4 13 8·1 4 8 27·7 4 3 46·2 3 59 3·5 3 54 19·4		4 10 47.7 4 6 5.0 4 1 21.0 3 56 35.7 3 51 48.9	2.20		2·43 2·47 2·52 2·56 2·62
25 26 27 28 29	3 56 49.4 3 52 10.1 3 47 29.7 3 42 48.0 3 38 5.0	2·32 2·36 2·40 2·44 2·49	3 54 28·1 3 49 46·5 3 45 3·6 3 40 19·3 3 35 33·5	2.25	3 52 3.0 3 47 18.9 3 42 33.3 3 37 46.1 3 32 57.2	2·54 2·59	3 49 33.9 3 44 47.0 3 39 58.5 3 35 8.3 3 16.3	2.62	3 47 0.6 3 42 10.7 3 37 19.0 3 32 25.5 3 27 30.0	2.64 2.70 2.76	3 44 22·8 3 39 29·7 3 34 34·6 3 29 37·4 3 24 38·1	2.67 2.72 2.78 2.85 2.91
30 31 32 33 34	3 33 20·5 3 28 34·6 3 23 46·9 3 18 57·5 3 14 6·2	2.69	3 30 46·1 3 25 57·1 3 21 6·2 3 16 13·4 11 18·4	2.61 2.67 2.72 2.78 2.85	3 28 6.8 3 23 14.4 3 18 20.0 3 13 23.3 3 8 24.4		3 20 26·2 3 15 27·9 3 10 27·2		3 17 32·2 3 12 29·7 3 7 24·5	3.02 3.10		2·98 3·06 3·14 3·22 3·31
35 36 37 38 39	3 9 12·9 3 4 17·4 2 59 19·4 2 54 18·8 2 49 15·4	3.03	3 6 21·1 3 1 21·4 2 56 18·9 2 51 13·6 2 46 5·0	2·92 2·99 3·07 3·15 3·24	3 3 22.8 2 58 18.5 2 53 11.1 2 48 0.5 2 42 46.2	3.10	3 0 17.6 2 55 8.3 2 49 55.5 2 44 39.0 2 39 18.5	3·15 3·24 3·33 3·43 3·54	2 51 50·1 2 46 31·5 2 41 8·6	3·37 3·48 3·59	2 53 44.5 2 48 23.6 2 42 58.4 2 37 28.4 2 31 53.2	3.41 3.52 3.63 3.76 3.89
40 41 42 43 44	2 44 8.8 2 38 58.8 2 33 45.0 2 28 27.1 2 23 4.5	3·29 3·40 3·51	2 40 52.8 2 35 36.8 2 30 16.5 2 24 51.4 2 19 21.0	3·34 3·45 3·56 3·69 3·83	2 21 4.6	3.88	2 33 53'4 2 28 23'3 2 22 47'6 2 17 5'5 2 11 16'4	3.79 3.94 4.10	2 30 8·5 2 24 30·1 2 18 45·2 2 12 53·1 2 6 52·6	3.99 4.15 4.33	2 26 12·1 2 20 24·5 2 14 29·3 2 8 25·7 2 12·3	4.39 4.39 4.59
		V	ARIATIC	N TO	ı' OF	LAT	TUDE .	AND	ALTITU	DE.	•	
Alt.	L. 6°	A.	L. 7°	A.	L. 8°	A.	L. 9°	Α.	L. 10°	A.	L. 11	° A.
° 0 2 4 6 8	s. - ·50 ·57 ·65 ·72 ·79	s. -4·40 4·42 4·43 4·44 4·45	s. - *59 - *66 *73 *80 *88	s. -4·42 4·43 4·44 4·45 4·47	s. 68 .75 .82 .89 .97	s. -4.43 4.44 4.45 4.47 4.48	s. - ·76 · ·83 ·91 ·98 1·06	s. -4.44 4.46 4.47 4.49 4.51	s. - ·85 · ·92 I·00 I·07 I·15	s. -4·46 4·47 4·49 4·51 4·53	s. '93 1'01 1'08 1'16 1'24	- s. -4.48 4.49 4.51 4.53 4.55
10 12 14 16 18	·87 ·95 I·03 I·11 I·20	4.46 4.48 4.50 4.52 4.54	·96 1·04 1·12 1·21 1·30	4·48 4·50 4·52 4·54 4·57	1.05 1.13 1.22 1.31 1.40	4.50 4.52 4.54 4.57 4.60	1·14 1·23 1·31 1·41 1·50	4.53 4.55 4.57 4.60 4.63	1·24 1·32 1·41 1·51 1·61	4.55 4.57 4.60 4.63 4.66	1·33 1·42 1·51 1·61 1·71	4·58 4·61 4·63 4·66 4·70
20 22 24 26 28	1·30 1·39 1·50 1·61 1·72	4.57 4.59 4.63 4.66 4.71	1.40 1.50 1.61 1.72 1.84	4·60 4·63 4·66 4·70 4·75	1·50 1·61 1·72 1·84 1·96	4.63 4.66 4.70 4.75 4.80	1.61 1.71 1.83 1.96 2.09	4.66 4.70 4.75 4.79 4.85	1.71 1.83 1.94 2.08 2.22	4.70 4.74 4.79 4.85 4.91	1.82 1.94 2.07 2.20 2.35	4.74 4.79 4.84 4.90 4.97
30 32 34 36 38	1·85 1·99 2·14 2·30 2·48	4.75 4.81 4.87 4.95 5.03	1.97 2.12 2.28 2.45 2.65	4.80 4.86 4.94 5.02 5.12	2·10 2·26 2·43 2·61 2·82	4.86 4.93 5.00 5.10 5.21	2·24 2·40 2·58 2·78 3·00	4.92 4.99 5.08 5.18 5.31	2·37 2·54 2·73 2·95 3·19	4.98 5.06 5.16 5.28 5.42	2·52 2·70 2·90 3·13 3·40	5.05 5.14 5.25 5.38 5.54

5·34 5·42 5·50 5·60

5.72

3.06

3.19

3°34 3°50

3.67

5·46 5·55 5·65 5·76 5·89

3·26 3·41 3·57 3·74

3.93

5.59 5.69 5.81

5°94 6°08

3·48 3·64 3·82

4.01

4.23

3.71 3.89 4.09 4.31

4.22

5.74 5.86 5.99 6.14

6.32

5·23 5·30 5·38 5·46

5.22

2.87

2·99 3·12

3.27

3.42

40 41 42

43

2·69 2·80

2.92

3.02

3.19

5.14 5·20 5·26

5°34 5°42

LATITUDE 24°.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 38 16·7 5 29 16·1 5 20 13·3 5 11 7·9 5 1 59·9	2.01	H. M. S. 5 36 24·1 5 27 20·8 5 18 15·1 5 9 6·8 4 59 55·4	s. - 1.89 1.93 1.98 2.03 2.09	5 25 24·3 5 16 15·7 5 7 3·8	s. -1.90 1.95 2.01 2.06 2.13	H. M. S. 5 32 35.6 5 23 26.4 5 14 14.3 5 4 59.0 4 55 40.3	s. - 1.92 1.98 2.04 2.10 2.16	5 21 27·1 5 12 11·4 5 21 27·1	s. -1.94 2.00 2.06 2.13 2.20	H. M. S. 5 28 42.4 5 19 26.2 5 10 6.7 5 0 43.4 4 51 16.1	s. - 1.97 2.03 2.09 2.17 2.24
10 11 12 13 14	4 52 48·9 4 48 12·3 4 43 34·7 4 38 56·2 4 34 16·8	2·15 2·18 2·21	4 50 40.9 4 46 2.2 4 41 22.7 4 36 42.1 4 32 0.5	2·19 2·22 2·26	4 48 30·5 4 43 49·8 4 39 8·1 4 34 25·4 4 29 41·4	2·19 2·23 2·27 2·30 2·34	4 32 5.6	2.32		2·32 2·36 2·41	4 4I 44.2 4 36 56.5 4 32 7.4 4 27 16.9 4 22 25.0	2·33 2·37 2·41 2·46 2·51
15 16 17 18 19	4 29 36·3 4 24 54·7 4 20 12·0 4 15 28·1 4 10 42·9	2·32 2·36	4 27 17·8 4 22 33·9 4 17 48·8 4 13 2·3 4 8 14·5	2·37 2·42	4 24 56·3 4 20 9·9 4 15 22·1 4 10 32·9 4 5 42·2	2·39 2·43 2·47 2·52 2·57	4 12 51.8		4 15 11·3 4 10 17·7 4 5 22·4	2·55 2·60 2·66	4 17 31.6 4 12 36.4 4 7 39.6 4 2 40.8 3 57 40.1	2·56 2·61 2·67 2·73 2·79
20 21 22 23 24	4 5 56·4 4 1 8·5 3 56 18·9 3 51 27·9 3 46 35·0	2·59 2·64	4 3 25.2 3 58 34.3 3 53 41.7 3 48 47.3 3 43 51.1	2.66 2.71	4 0 49.9 3 55 55.8 3 50 59.9 3 46 2.1 3 41 2.2	2.62 2.68 2.74 2.80 2.86	3 58 10·3 3 53 12·8 3 48 13·4 3 43 11·8 3 38 7·9	2.76 2.82 2.88	3 45 21.8	2.90	3 52 37·3 3 47 32·3 3 42 24·9 3 37 14·9 3 32 2·1	2·86 2·92 3·00 3·07 3·15
25 26 27 28 29	3 41 40·3 3 36 43·7 3 31 44·9 3 26 43·8 3 21 40·3	2.87	3 38 52·8 3 33 52·4 3 28 49·6 3 23 44·3 3 18 36·3	2·90 2·97 3·04	3 36 0.0 3 30 55.5 3 25 48.4 3 20 38.5 3 15 25.6	2·93 3·00 3·07 3·15 3·24	3 33 1.6 3 27 52.6 3 22 40.8 3 17 25.9 3 12 7.8	3.18	3 29 57·2 3 24 43·4 3 19 26·6 3 14 6·3 3 8 42·3	3.30	3 21 27·5 3 16 5·1 3 10 38·9	3·24 3·33 3·42 3·52 3·63
30 31 32 33 34	3 16 34·2 3 11 25·2 3 6 13·1 3 0 57·6 2 55 38·5		3 8 11.3	3·29 3·39 3·49	3 10 9.5 3 4 49.9 2 59 26.4 2 53 58.7 2 48 26.4	3·33 3·42 3·53 3·64 3·76	3 6 46·0 3 1 20·3 2 55 50:3 2 50 15·6 2 44 35·7	3.68 3.80		3.72 3.84 3.98	2 59 33.9 2 53 54.3 2 48 9.3 2 42 18.3 2 36 20.6	3.75 3.88 4.02 4.17 4.33
35 36 37 38 39	2 50 15.4 2 44 47.9 2 39 15.5 2 33 37.7 2 27 53.9	3.80 3.80	2 46 37·2 2 41 2·3 2 35 21·9 2 29 35·4 2 23 42·0	3.85 3.99 4.14	2 42 49.0 2 37 6.0 2 31 16.8 2 25 20.4 2 19 16.2	4'37	2 38 49.9 2 32 58.0 2 26 58.8 2 20 51.5 2 14 35.0	4.42 4.42	2 34 39·3 2 28 37·1 2 22 26·8 2 16 7·0 2 9 36·6	4.47 4.66 4.89	2 30 15.5 2 24 2.0 2 17 39.0 2 11 5.1 2 4 18.5	4·52 4·72 4·94 5·20 5·49
		V.A	RIATIO	N TC	ı' OF	LAT	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 12°	A.	L. 13	° A.	L. 14	Α.	L. 15°	° A.	L. 16°	Α.	L. 17°	A.
0 2 4 6 8	S. -1.02 1.10 1.18 1.26 1.34	s. -4.50 4.51 4.53 4.56 4.58	s. -1·11 1·19 1·27 1·35 1·43	s. -4.52 4.54 4.56 4.58 4.61	s. -1·20 1·28 1·36 1·44 1·53	s. -4.54 4.56 4.58 4.61 4.64	s. -1·29 1·37 1·45 1·54 1·63	s. 4.56 4.59 4.61 4.64 4.67	s. -1·39 1·47 1·55 1·64 1·73	s. -4·59 4·62 4·64 4·67 4·71	s. -1.48 1.56 1.65 1.74 1.83	s. -4.62 4.65 4.68 4.71 4.75
10 12 14 16 18	1.43 1.52 1.61 1.71 1.82	4·60 4·63 4·67 4·70 4·74	1·52 1·62 1·72 1·82 1·93	4·64 4·67 4·70 4·74 4·79	1·62 1·72 1·82 1·93 2·05	4.67 4.70 4.74 4.78 4.83	1·72 1·82 1·92 2·04 2·16	4.71 4.74 4.78 4.83 4.88	1.83 1.93 2.04 2.16 2.28	4·74 4·78 4·83 4·88 4·94	1.93 2.04 2.15 2.27 2.40	4.79 4.83 4.88 4.93 5.00
20 22 24 26 28	1.94 2.06 2.19 2.33 2.49	4.79 4.84 4.90 4.96 5.04	2.05 2.18 2.32 2.47 2.64	4·83 4·89 4·95 5·03 5·11	2·17 2·30 2·45 2·61 2·79	4·89 4·95 5·02 5·10 5·19	2·29 2·43 2·59 2·75 2·94	4.94 5.01 5.08 5.17 5.27	2·42 2·56 2·73 2·91 3·11	5.00 5.07 5.16 5.25 5.37	2.55 2.70 2.87 3.06 3.28	5.06 5.14 5.24 5.34 5.47
30 31 32 33 34	2·67 2·70 2·86 2·96 3·08	5·13 5·18 5·23 5·29 5·35	2·82 2·92 3·03 3·14 3·26	5.21 5.26 5.32 5.39 5.46	2·98 3·09 3·21 3·33 3·46	5·30 5·36 5·43 5·50 5·58	3·15 3·27 3·39 3·53 3·67	5.40 5.46 5.54 5.62 5.71	3·33 3·46 3·59 3·74 3·89	5.50 5.58 5.66 5.76 5.86	3.52 3.66 3.80 3.96 4.13	5.62 5.70 5.80 5.91 6.02
35 36 37 38 39	3·20 3·33 3·47 3·62 3·78	5.42 5.50 5.58 5.68 5.79	3·39 3·53 3·69 3·85 4·05	5.54 5.63 5.72 5.83 5.95	3·60 3·76 3·92 4·11 4·32	5.67 5.77 5.88 6.00 6.14	3·82 3·99 4·18 4·39 4·62	5.81 5.93 6.05 6.20 6.36	4.06 4.25 4.46 4.69 4.95	5.97 6.10 6.25 6.42 6.61	4·33 4·53 4·77 5·03 5·33	6·15 6·30 6·47 6·67 6·90

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 221 LATITUDE 24°.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 26 43.7 5 17 23.7 5 8 0.0 4 58 32.3 4 49 0.2	2·13	H. M. S. 5 24 43.6 5 15 19.4 5 5 51.3 4 56 18.9 4 46 41.7	s. -2.02 2.09 2.16 2.24 2.33	H. M S. 5 22 41.8 5 13 13.2 5 3 40.3 4 54 2.9 4 44 20.3	2·20 2·20	H. M. S. 5 20 38·3 5 II 4·9 5 I 27·I 4 5I 44·2 4 4I 55·9	2.33	H. M. S. 5 18 32·9 5 8 54·5 4 59 11·3 4 49 22·7 4 39 28·2	s. -2·11 2·19 2·28 2·38 2·49	4 56 52·9 4 46 58·2	s. -2·14 2·23 2·33 2·43 2·55
10 12 13 14 15	4 39 23.3 4 29 40.9 4 24 47.6 4 19 52.6 4 14 55.9	2·52 2·57 2·63	4 36 59·3 4 27 11·1 4 22 14·5 4 17 16·3 4 12 16·2	2.64	4 34 32·1 4 24 37·5 4 19 37·6 4 14 35·9 4 9 32·1	2·48 2·59 2·65 2·71 2·77	4 32 1.4 4 22 0.1 4 16 56.6 4 11 51.2 4 6 43.5		4 29 27·1 4 19 18·6 4 14 11·3 4 9 1·8 4 3 50·0	2.60 2.73 2.79 2.86 2.93	4 26 48·9 4 16 32·7 4 11 21·4 4 6 7·6 4 0 51·3	2.67 2.80 2.87 2.95 3.02
16 17 18 19 20	4 9 57·5 4 4 57·1 3 59 54·7 3 54 50·2 3 49 43·4	2.81	4 7 14·2 4 2 10·1 3 57 3·8 3 51 55·2 3 46 44·0	2.89	4 4 26·3 3 59 18·2 3 54 7·7 3 48 54·7 3 43 38·9	2.84 2.91 2.98 3.06 3.14	4 I 33.6 3 56 21.2 3 51 6.2 3 45 48.4 3 40 27.6	3.00 3.02 3.02		3.01 3.09 3.17 3.26 3.36	3 50 IO·3 3 44 45·2	3·11 3·19 3·28 3·38 3·48
25	3 44 34'I 3 39 22'2 3 34 7'5 3 28 49'8 3 23 28'7	3.00	3 4I 30·2 3 36 I3·5 3 30 53·7 3 25 30·6 3 20 3·8	3·20 3·29 3·38	3 38 20·2 3 32 58·3 3 27 33·0 3 22 4·0 3 16 31·1	3.31 3.41 3.21	3 35 3.6 3 29 36.1 3 24 4.8 3 18 29.6 3 12 49.8	3.43 3.23	3 31 40·0 3 26 6·5 3 20 28·8 3 14 46·6 3 8 59·5	3.46 3.56 3.67 3.79 3.92	3 22 28.8	3.58 3.70 3.82 3.95 4.09
27 28 29	3 18 4·2 3 12 35·8 3 7 3·3 3 1 26·1 2 55 44·0	3·56 3·67 3·79		3·70 3·82 3·95	3 10 53.7 3 5 11.7 2 59 24.5 2 53 31.5 2 47 32.2	3.73 3.86 3.99 4.14 4.29	2 49 17.7	3.89 4.03 4.17 4.33 4.51		4.06 4.21 4.37 4.55 4.75	2 52 50.2	4·24 4·41 4·59 4·79 5·01
32 33 34	2 49 56·3 2 44 2·6 2 38 2·1 2 31 54·0 2 25 37·4	4·21 4·38 4·56	2 45 47·3 2 39 43·9 2 33 32·8 2 27 13·0 2 20 43·4	4·42 4·61 4·82	2 41 25.9 2 35 11.8 2 28 48.8 2 22 15.8 2 15 31.3	4:47 4:66 4:87 5:10 5:37	2 23 48·6 2 17 0·5	4.92		4.97 5.21 5.48 5.79 6.16	2 12 50·7 2 5 25·1	5·26 5·53 5·85 6·22 6·64
		VA	RIATIO	N TO	ı' OF	LAT	TUDE	AND	ALTITU	DE.		

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
° 0 2 4 6 8	s. s.					
	-1.57 -4.65	-1.67 -4.68	-1.77 -4.72	-1.87 -4.76	-1.97 -4.80	-2.07 -4.84
	1.66 4.68	1.76 4.72	1.86 4.75	1.96 4.80	2.06 4.84	2.17 4.88
	1.75 4.71	1.85 4.75	1.95 4.79	2.05 4.84	2.16 4.88	2.27 4.93
	1.84 4.75	1.94 4.79	2.05 4.83	2.15 4.88	2.26 4.93	2.38 4.98
	1.93 4.79	2.04 4.82	2.15 4.88	2.26 4.93	2.37 4.98	2.49 5.04
10	2.04 4.83	2·15 4·88	2·26 4·93	2·38 4·98	2.49 5.04	2·62 5·10
12	2.15 4.88	2·26 4·93	2·38 4·98	2·50 5·04	2.62 5.11	2·75 5·17
13	2.21 4.90	2·32 4·96	2·44 5·01	2·56 5·07	2.69 5.14	2·82 5·21
14	2.27 4.93	2·38 4·99	2·51 5·05	2·63 5·11	2.76 5.18	2·90 5·25
15	2.33 4.96	2·45 5·02	2·58 5·08	2·70 5·15	2.84 5.22	2·98 5·29
16	2·39 4·99	2·52 5·05	2.65 5.12	2.78 5.19	2·92 5·26	3.06 5.34
17	2·46 5·02	2·59 5·09	2.72 5.15	2.86 5.23	3·00 5·31	3.15 5.39
18	2·53 5·06	2·66 5·12	2.80 5.20	2.94 5.27	3·09 5·36	3.24 5.44
19	2·69 5·09	2·74 5·16	2.88 5.24	3.02 5.32	3·18 5·41	3.33 5.50
20	2·68 5·13	2·82 5·21	2.96 5.29	3.11 5.37	3·27 5·47	3.44 5.57
21	2·76 5·18	2·90 5·25	3°05 5°34	3.21 5.43	3·37 5·53	3.54 5.63
22	2·85 5·22	2·99 5·30	3°15 5°39	3.31 5.49	3·48 5·59	3.66 5.71
23	2·93 5·27	3·09 5·36	3°25 5°45	3.42 5.55	3·60 5·67	3.78 5.79
24	3·03 5·32	3·19 5·42	3°35 5°52	3.53 5.62	3·72 5·74	3.92 5.87
25	3·13 5·38	3·29 5·48	3°47 5°58	3.65 5.70	3·85 5·83	4.05 5.97
26	3·23 5·44	3.40 5.55	3·59 5·66	3.78 5.79	3'99 5'92	4.21 6.07
27	3·34 5·51	3.52 5.62	3·72 5·74	3.92 5.88	4'14 6'03	4.38 6.19
28	3·46 5·58	3.65 5.70	3·86 5·83	4.07 5.98	4'31 6'14	. 4.56 6.32
29	3·59 5·66	3.79 5.79	4·01 5·94	4.24 6.09	4'49 6'27	4.76 6.47
30	3·72 5·75	3.94 5.89	4·17 6·05	4.42 6.22	4'69 6'41	4.98 6.63
31	3·87 5·84	4·10 6·00	4·35 6·17	4.62 6.36	4·91 6·58	5·23 6·82
32	4·03 5·95	4·28 6·12	4·54 6·31	4.83 6.52	5·15 6·76	5·51 7·04
33	4·21 6·07	4·47 6·26	4·76 6·47	5.08 6.70	5·43 6·98	5·83 7·29
34	4·40 6·21	4·68 6·41	5·00 6·65	5.35 6.91	5·75 7·22	6·20 7·59
35	4·60 6·36	4·92 6·59	5·27 6·85	5.66 7.16	6·11 7·51	6·61 7·94

LATITUDE 25°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 6 8 10	H. M. S. 6 0 0.0 5 33 30.5 5 24 40.0 5 15 49.0 5 6 57.1	1.88 1.89	H ₄ M. S. 5 58 8·1 5 31 37·5 5 22 46·3 5 13 54·4 5 5 1·5	1.80	5 20 51·8 5 11 58·8	- 1·87	5 18 56·3 5 10 2·0	1.96	5 25 54·3 5 16 59·7	1.98 1.93	5 15 2.1	s. -1.88 1.94 1.97 2.00 2.04
14 16 18 20 22	4 58 4.4 4 49 10.6 4 40 15.5 4 31 18.9 4 22 20.5	1.08	4 56 7.5 4 47 12.2 4 38 15.5 4 29 16.9 4 20 16.4	2.02 2.05	4 54 9·1 4 45 12·2 4 36 13·5 4 27 12·8 4 18 9·8	1.99 2.02 2.05 2.09 2.13	4 43 10·2 4 34 9·3 4 25 6·2	2.13	4 4I 6·3 4 32 3·0	2.17	4 48 3.9 4 39 0.4 4 29 54.4 4 20 45.5 4 II 33.5	2·07 2·12 2·16 2·22 2·27
23 24 25 26 27	4 17 50·7 4 13 20·2 4 8 49·2 4 4 17·6 3 59 45·3	2·13 2·11	4 15 45·3 4 11 13·6 4 6 41·3 4 2 8·2 3 57 34·4	2·13 2·16 2·18		2·16 2·18 2·21 2·23 2·26	4 2 16·4 3 57 40·0	2.29	4 4 36·5 3 59 59·I	2.35	4 6 56·1 4 2 17·8 3 57 38·5 3 52 58·1 3 48 16·5	2·31 2·34 2·37 2·41 2·45
28 29 30 31 32	3 55 12·3 3 50 38·6 3 46 4·1 3 41 28·7 3 36 52·3	2·21 2·24 2·27	3 52 59·8 3 48 24·4 3 43 48·0 3 39 10·7 3 34 32·3	2.33		2·36	3 48 24·3 3 43 44·9 3 39 4·4 3 34 22·6 3 29 39·5	2·36 2·39 2·43 2·47 2·52	3 41 19·3 3 36 36·4	2·42 2·46 2·50 2·55 2·59	3 38 49·5 3 34 3·9 3 29 16·8	2·49 2·53 2·58 2·63 2·68
33 34 35 36 37	3 32 15·0 3 27 36·6 3 22 57·0 3 18 16·2 3 13 34·1	2·37 2·41 2·45	3 29 52·8 3 25 12·1 3 20 30·1 3 15 46·7 3 11 1·8		3 22 43.0 3 17 58.3 3 13 12.0	2·48 2·53 2·57 2·62 2·68	3 10 31.9	2.56 2.61 2.66 2.72 2.77	3 17 29·8 3 12 38·9 3 7 46·0	2.64 2.70 2.75 2.81 2.88		2·73 2·79 2·85 2·92 2·99
38 39 40 41 42	3 8 50·5 3 4 5·3 2 59 18·5 2 54 29·8 2 49 39·1	2.70		2.81	2 58 42·4 2 53 48·4	2·73 2·79 2·86 2·93 3·01	2 55 51.5 2 50 53.4 2 45 52.6	2.84 2.90 2.98 3.06 3.14	2 52 53·8 2 47 51·1 2 42 45·4	3.10	2 54 53·3 2 49 48·8 2 44 41·1 2 39 30·0 2 34 15·2	3.06 3.15 3.23 3.33 3.43
43 44 45 46 47	2 44 46·2 2 39 50·9 2 34 52·9 2 29 52·1 2 24 48·0	2·91 2·98 3·07	2 41 52.6 2 36 52.7 2 31 49.9 2 26 43.6 2 21 33.8	3.04 3.12 3.22	2 38 51·3 2 33 46·4 2 28 38·1 2 23 25·9 2 18 9·5				2 21 45.7	3.61 3.4	2 28 56·1 2 23 32·4 2 18 3·5 2 12 28·7 2 6 47·3	3.54 3.67 3.80 3.95 4.12
		V.	ARIATIC	N TO	ı' OF	LAT	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	Α.	L. 3°	Α.	L. 4°	Α.	L. 5°	Α.
0 2 4 6 8	s. - '00 - '07 '14 '21 '29	S. -4.41 4.41 4.42 4.42 4.42	s. 08 .16 .23 .30 .38	s. -4.41 4.42 4.42 4.43	s. - ·17 ·24 ·31 ·39 ·46	s. -4·42 4·42 4·43 4·44	s. - •26 •33 •40 •48 •55	s. -4.42 4.42 4.43 4.44 4.45	s. - '34 '41 '49 '56 '64	s. -4.42 4.43 4.44 4.45 4.46	s. - *43 *50 *57 *65 *73	s. -4·43 4·44 4·45 4·46 4·47
10 12 14 16 18	•36 •44 •52 •60 •68	4.43 4.44 4.45 4.46	•41 •48 •55 •62 •69	4·44 4·45 4·47 4·48	*54 *62 *70 *78 *86	4°45 4°46 4°47 4°48 4°50	•63 •71 •79 •87 •96	4·46 4·47 4·48 4·50 4·52	•72 •80 •88 •97 1•05	4.47 4.48 4.50 4.52 4.54	.81 .89 .97 1.06 1.15	4.49 4.50 5.52 4.54 4.56
20 22 24 26 28	•76 •85 •94 ••03 ••13	4·48 4·49 4·51 4·53 4·56	.77 .85 .93 1.02 1.11	4.50 4.51 4.56 4.58	*95 1.04 1.14 1.24 1.35	4.51 4.53 4.56 4.58 4.61	1.05 1.14 1.24 1.35 1.46	4.54 4.56 4.58 4.61 4.65	1·15 1·24 1·35 1·46 1·57	4.56 4.59 4.61 4.65 4.68	1·25 1·35 1·45 1·57 1·69	4.59 4.61 4.65 4.68 4.72
30 32 34 36 38	1·23 1·35 1·46 1·59 1·73	4.58 4.61 4.65 4.69 4.74	1·20 1·31 1·41 1·53 1·65	4·61 4·65 4·69 4·74 4·79	1.46 1.58 1.71 1.85 2.00	4.65 4.69 4.73 4.79 4.85	1.57 1.70 1.84 1.99 2.15	4.69 4.73 4.78 4.84 4.91	1.69 1.83 1.97 2.13 2.30	4.73 4.78 4.83 4.90 4.98	1.81 1.95 2 11 2.27 2.46	4.77 4.83 4.89 4.96 5.05
40 42 44 46 47	1.88 2.04 2.23 2.44 2.56	4·80 4·86 4·94 5·04 5·10	1.79 1.94 2.40 2.62 2.74	4·85 4·93 5·02 5·13 5·20	2·17 2·36 2·58 2·82 2·95	4.92 5.01 5.11 5.24 5.31	2·33 2·53 2·76 3·03 3·18	4.99 5.09 5.21 5.36 5.44	2·49 2·71 2·96 3·26 3·42	5.07 5.18 5.32 5.49 5.59	2.67 2.90 3.18 3.50 3.68	5·16 5·28 5 44 5·63 5·75

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 223 LATITUDE 25°.

			CCLINA	1011	-CONTR	11111	NAME	10	LATITU	DE.		
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 48 45.8 5 39 52.1 5 30 57.2 5 22 0.9 5 13 3.2	1.99 1.93	H. M. S. 5 46 52·2 5 37 57·1 5 29 0·7 5 20 2·7 5 11 2·9	1.92 1.95	5 27 3·2 5 18 3·2	1.97	H. M. S. 5 43 3.5 5 34 5.0 5 25 4.7 5 16 2.5 5 6 58.1	1.08	5 32 7.6 5 23 5.1 5 14 0.4	1.97 2.00	H. M. S. 5 39 11.9 5 30 9.1 5 21 4.2 5 11 56.9 5 2 46.9	s. -1.94 1.98 2.03 2.07 2.12
10 12 14 16 18	5 4 3.6 4 55 2.1 4 45 58.4 4 36 52.2 4 27 43.3	2·15	5 2 1.2 4 52 57.3 4 43 50.9 4 34 41.8 4 25 29.5	2·10 2·14	4 59 57·I 4 50 50·6 4 4I 4I·3 4 32 28·9 4 23 I3·I	2.18	4 57 51·3 4 48 41·9 4 39 29·3 4 30 13·4 4 20 53·8	2·16 2·22 2·28	4 55 43.7 4 46 31.0 4 37 15.0 4 27 55.3 4 18 31.5	2·20 2·26 2·33	4 53 34.0 4 44 17.9 4 34 58.1 4 25 34.2 4 16 5.9	2·18 2·24 2·30 2·38 2·45
19 20 21 22 23	4 23 7.6 4 18 31.1 4 13 53.8 4 9 15.4 4 4 36.1	2·26 2·29 2·33	4 20 52·2 4 16 13·8 4 11 34·5 4 6 54·2 4 2 12·7	2·31 2·35 2·38	4 18 33.8 4 13 53.5 4 9 12.1 4 4 29.5 3 59 45.8	2·37 2·40 2·44	4 16 12.4 4 11 29.9 4 6 46 2 4 2 1.3 3 57 15.0	2·42 2·46 2·50		2·48 2·52 2·57	4 II 19·9 4 6 32·5 4 I 43·7 3 56 53·3 3 52 I·4	2.50 2.54 2.59 2.63 2.69
24 25 26 27 28	3 59 55.8 3 55 14.3 3 50 31.5 3 45 47.5 3 41 2.1	2·44 2·48	3 57 30·1 3 52 46·2 3 48 1·0 3 43 14·4 3 38 26·2	2·50 2·54 2·59	3 55 0.7 3 50 14.2 3 45 26.1 3 40 36.8 3 35 45.6	2·57 2·61	3 37 54.6	2.64 2.69	3 49 49.7 3 44 57.5 3 40 3.4 3 35 7.4 3 30 9.4	2·71 2·77 2·83	3 47 7.7 3 42 12.2 3 37 14.7 3 32 15.1 3 27 13.2	2.74 2.80 2.86 2.92 2.99
29 30 31 32 33	3 36 15·3 3 31 26·8 3 26 36·7 3 21 44·8 3 16 50·9	2.71	3 33 36·4 3 28 44·9 3 23 51·4 3 18 56·0 3 13 58·3	2·74 2·80 2·86	3 30 52.6 3 25 57.7 3 21 0.6 3 16 1.4 3 10 59.7	2.89	3 28 3.7 3 23 5.0 3 18 4.1 3 13 0.7 3 7 54.5		3 20 6.6 3 15 1.4 3 9 53.4	3.03	3 22 8.8 3 17 1.9 3 11 52.1 3 6 39.2 3 1 22.9	3.06 3.13 3.21 3.30 3.39
	3 II 54.8 3 6 56.5 3 I 55.7 2 56 52.2 2 51 45.8	3·03 3·11	3 8 58·3 3 3 55·8 2 58 50·4 2 53 42·1 2 48 30·4	3.00 3.07 3.15 3.23 3.33	3 5 55·3 3 0 48·1 2 55 37·8 2 50 24·1 2 45 6·7	3.27	3 2 45.4 2 57 33.2 2 52 17.4 2 46 57.8 2 41 34.0	3.31 3.41 3.21	2 59 28·2 2 54 10·3 2 48 48·6 2 43 22·5 2 37 51·7	3.45 3.56 3.67	2 56 2.9 2 50 39.0 2 45 10.6 2 39 37.4 2 33 58.8	3.49 3.60 3.71 3.84 3.98
40 41 42	2 46 36·1 2 41 22·9 2 36 5·8 2 30 44·5 2 25 18·3	3·38 3·48 3·60	2 43 15·1 2 37 55·8 2 32 32·1 2 27 3·4 2 21 29·3	3·53 3·65	2 39 45·I 2 34 19·I 2 28 48·0 2 23 11·3 2 17 28·2	3·70 3·83 3·97	2 36 5.6 2 30 32.0 2 24 52.6 2 19 6.9 2 13 13.7	3·88 4·02	2 32 15.6 2 26 33.6 2 20 45.0 2 14 48.9 2 8 44.4	4.08 4.24	2 28 14·2 2 22 22·8 2 16 23·7 2 10 16·1 2 3 58·4	4·13 4·29 4·48 4·69
		VA	ARIATIO	N TO	ı' OF	LAT	TUDE A	AND	ALTITU	DE.		
Alt.	L. 6°	Α.	L. 7°	A.	L. 8°	Α.	L. 9°	Α.	L. 10°	A.	L. 11°	Α.
° 0 2 4 6 8	s. - '51 - '59 '66 '74 '82	s. -4.44 4.45 4.46 4.47 4.49	s. - ·60 - ·67 ·75 ·83 ·91	s. -4.46 4.46 4.48 4.49 4.51	s. *69 *76 *84 *92 I*00	s. -4.47 4.48 4.49 4.51 4.53	s. - *77 - *85 *93 1.01 1.09	s. -4.48 4.49 4.51 4.53 4.55	s. - ·86 - ·94 1·02 1·10 1·18	s. -4.50 4.51 4.53 4.55 4.57	s. - '95 - 1'03 1'11 1'19 1'28	s. -4.51 4.53 4.55 4.57 4.59
10 12 14 16 18	*90 *98 1*07 1*16 1*25	4·50 4·52 4·54 4·56 4·59	*99 1*07 1*16 1*26 1*35	4.54 4.56 4.59 4.62	1.08 1.17 1.26 1.35 1.45	4.55 4.57 4.59 4.62 4.65	1·18 1·27 1·36 1·46 1·56	4.57 4.59 4.62 4.65 4.68	1·27 1·36 1·46 1·56 1·67	4.59 4.62 4.65 4.68 4.72	1·37 1·46 1·56 1·66	4.62 4.65 4.68 4.72 4.76
20 22 24 26 28	1·35 1·45 1·56 1·68 1·81	4.61 4.65 4.68 4.72 4.77	1.45 1.56 1.68 1.80 1.93	4.65 4.68 4.72 4.76 4.82	1.56 1.67 1.79 1.92 2.05	4.68 4.72 4.76 4.81 4.87	1.67 1.78 1.91 2.04 2.18	4.72 4.76 4.81 4.86 4.92	1.78 1.90 2.03 2.17 2.32	4.76 4.80 4.86 4.92 4.98	1·89 2·02 2·15 2·30 2·46	4·80 4·85 4·91 4·98 5·05
30 32 34 36 38	1.94 2.09 2.25 2.43 2.62	4·82 4·88 4·95 5·04 5·13	2.07 2.22 2.39 2.58 2.80	4·87 4·94 5·02 5·11 5·22	2·20 2·37 2·55 2·75 2·98	4.93 5.01 5.10 5.20 5.32	2·34 2·51 2·71 2·92 3·17	5.00 5.08 5.18 5.29 5.43	2:48 2:67 2:87 3:11 3:38	5.06 5.16 5.27 5.40 5.56	2.63 2.83 3.05 3.30 3.60	5·14 5·24 5·37 5·51 5·69
39 40 41 42 43	2.73 2.85 2.97 3.10 3.25	5·19 5·25 5·32 5·40 5·48	2·91 3·04 3·17 3·32 3·48	5·29 5·36 5·44 5·52 5·62	3·11 3·24 3·39 3·55 3·73	5·40 5·48 5·56 5·66 5·78	3·31 3·46 3·62 3·80 4·00	5·52 5·61 5·71 5·82 5·96	3.53 3.69 3.87 4.07 4.29	5.65 5.75 5.87 6.00 6.16	3·76 3·95 4·15 4·37 4·62	5.80 5.92 6.06 6.21 6.39

LATITUDE 25°.

		DE	ECLINAT	ION-		ARY		TO-	LATITU	DE.		
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 2 4 6 8	H. M. S. 5 37 14.8 5 28 9.6 5 19 1.9 5 9 51.7 5 0 38.6	2.00 2.05 2.10	H. M. S. 5 35 16·7 5 26 8·8 5 16 58·2 5 7 44·9 4 58 28·3	2·02 2·07 2·13	H. M. S. 5 33 17.7 5 24 6.7 5 14 53.0 5 5 36.2 4 56 15.9	s. -1.99 2.05 2.10 2.16 2.22	H. M. S. 5 31 17·3 5 22 3·3 5 12 46·1 5 3 25·6 4 54 1·3	s. -2.02 2.07 2.13 2.19 2.26	H. M. S. 5 29 15.8 5 19 58.3 5 10 37.4 5 1 12.9 4 51 44.3	s. -2.04 2.10 2.16 2.23 2.30	5 17 51.7	s. -2.06 2.12 2.19 2.27 2.35
10 11 12 13 14	4 51 22·2 4 46 42·8 4 42 2·3 4 37 20·9 4 32 38·5	2·28 2·31	4 49 8·2 4 44 26·8 4 39 44·3 4 35 0·7 4 30 16·0	2·29 2·32 2·36	4 46 51.8 4 42 8.2 4 37 23.5 4 32 37.6 4 27 50.5	2.41	4 44 32.9 4 39 47.0 4 34 59.9 4 30 11.5 4 25 21.8		4 42 11·3 4 37 22·9 4 32 33·3 4 27 42·2 4 22 49·7	2·47 2·52	4 39 46·8 4 34 55·9 4 30 3·4 4 25 9·5 4 20 14·0	2·43 2·48 2·53 2·57 2·63
15 16 17 18 19	4 27 54·9 4 23 10·2 4 18 24·2 4 13 36·9 4 8 48·3	2·43 2·47	4 25 30·I 4 20 42·9 4 I5 54·4 4 II 4·5 4 6 I2·9	2.48		2.54				2·67 2·72 2·78		2.68 2.74 2.80 2.86 2.92
20 21 22 23 24	4 3 58·2 3 59 6·5 3 54 13·1 3 49 18·0 3 44 20·9	2·65 2·71 2·76	4 I 19·9 3 56 25·1 3 51 28·5 3 46 29·9 3 41 29·3	2.84	3 58 37.4 3 53 39.3 3 48 39.1 3 43 36.9 3 38 32.3	2.75 2.80 2.86 2.93 3.00	3 55 50·4 3 50 48·7 3 45 44·7 3 40 38·5 3 35 29·7		3 52 58.6 3 47 53.1 3 42 45.1 3 37 34.5 3 32 21.2		3 50 1.9 3 44 52.1 3 39 39.7 3 34 24.5 3 29 6.3	2·99 3·06 3·14 3·22 3·31
25 26 27 28 29	3 39 21·9 3 34 20·7 3 29 17·1 3 24 11·1 3 19 2·3	2·95 3·01	3 36 26·4 3 31 21·2 3 26 13·3 3 21 2·7 3 15 49·1	3.04	3 23 3.3	3.07 3.14 3.22 3.31 3.40	3 30 18·3 3 25 3·9 3 19 46·5 3 14 25·6 3 9 1·0	3.34	3 27 4.9 3 21 45.5 3 16 22.5 3 10 55.8 3 5 25.0	3.37		3·40 3·49 3·60 3·71 3·83
30 31 32 33 34	3 13 50·6 3 8 35·8 3 3 17·5 2 57 55·4 2 52 29·2	3·33 3·43 3·53	3 10 32·3 3 5 11·9 2 59 47·7 2 54 19·3 2 48 46·3		3 7 6.4 3 I 40.1 2 56 9.4 2 50 34.0 2 44 53.5	3.50 3.60 3.72 3.84 3.97	2 52 21.8	4.01	2 59 49.7 2 54 9.6 2 48 24.0 2 42 32.4 2 36 34.2	3.92 4.05	2 55 57.6 2 50 9.5 2 44 15.2 2 38 14.2 2 32 5.7	3·95 4·09 4·25 4·41 4·60
35 36 37 38 39	2 46 58·6 2 41 22·9 2 35 41·7 2 29 54·4 2 24 0·2	3·88 4·02 4·18	2 43 8·2 2 37 24·5 2 31 34·5 2 25 37·4 2 19 32·5	4·07 4·23 4·40	2 39 7·1 2 33 14·4 2 27 14·5 2 21 6·6 2 14 49·4	4·27 4·45	2 34 54·3 2 28 51·5 2 22 40·5 2 16 20·1 2 9 49·0	4·50 4·70	2 30 28·6 2 24 14·5 2 17 50·9 2 11 16·3 2 4 29·2	4.75 4.97 5.23	2 25 48·5 2 19 21·7 2 12 43·7 2 5 52·8 1 58 46·9	4·80 5·03 5·28 5·57 5·92
		VA	ARIATIC	N TO	ı' OF	LAT	TUDE .	AND	ALTITU	DE.		
Alt.	L. 12°	Α.	L. 13°	Α.	L. 14°	Α.	L. 15°	A.	L. 16°	A.	L. 17°	Α.
0 2 4 6 8	s. - 1.04 - 1.12 1.20 1.29 1.37	s. -4·53 4·55 4·57 4·60 4·62	s. -1·13 · 1·21 1·29 1·38 1·47	s. -4·56 4·58 4·60 4·62 4·65	s. - 1·22 1·30 1·39 1·48 1·57	s. -4·58 4·60 4·63 4·65 4·68	s. 1·32 1·40 1·49 1·58 1·67	s. -4·60 4·63 4·66 4·69 4·72	s. -1:41 1:49 1:58 1:67 1:77	s. -4·63 4·66 4·69 4·72 4·76	s. -1·50 - 1·59 1·68 1·78 1·88	s. -4·66 4·69 4·72 4·77 4·80
10 12 14 16 18	1.46 1.56 1.66 1.77 1.88	4.65 4.68 4.72 4.76 4.80	1.57 1.66 1.77 1.88 2.00	4·68 4·72 4·75 4·80 4·85	1.67 1.77 1.88 1.99 2.12	4·72 4·75 4·80 4·84 4·89	1.77 1.88 1.99 2.11 2.24	4·76 4·80 4·84 4·89 4·95	1.88 1.98 2.10 2.22 2.36	4·80 4·84 4·89 4·94 5·00	1.98 2.10 2.22 2.35 2.49	4.84 4.89 4.94 5.00 5.07
20 22 24 26 28	2·01 2·14 2·28 2·43 2·60	4.85 4.90 4.97 5.04 5.12	2·13 2·26 2·41 2·57 2·75	4.90 4.96 5.03 5.11 5.20	2·25 2·39 2·55 2·72 2·91	4.95 5.02 5.10 5.18 5.29	2·37 2·52 2·69 2·87 3·07	5.01 5.08 5.17 5.26 5.38	2·50 2·66 2·84 3·03 3·25	5.07 5.15 5.25 5.35 5.48	2·64 2·81 2·99 3·20 3·43	5·14 5·23 5·33 5·45 5·59
30 31 32 33 34	2·79 2·89 3·00 3·11 3·24	5·22 5·28 5·34 5·40 5·47	2·95 3·06 3·18 3·30 3·43	5·31 5·37 5·44 5·51 5·59	3·12 3·24 3·37 3·50 3·65	5.41 5.47 5.55 5.63 5.72	3·30 3·43 3·56 3·71 3·87	5·51 5·59 5·67 5·77 5·87	3:49 3:63 3:78 3:94 4:11	5·63 5·71 5·81 5·91 6·03	3.69 3.84 4.01 4.18 4.37	5.76 5.85 5.96 6.08 6.21
35 36 37 38 39	3·37 3·51 3·67 3·83 4·02	5.55 5.64 5.74 5.85 5.97	3·58 3·73 3·90 4·09 4·30	5.68 5.78 5.89 6.02 6.16	3.80 3.97 4.16 4.37 4.60	5·83 5·94 6·06 6·21 6·37	4.04 4.23 4.44 4.67 4.93	5.99 6.11 6.26 6.43 6.62	4·30 4·51 4·75 5·02 5·31	6·16 6·31 6·48 6·68 6·90	4·59 4·83 5·09 5·40 5·74	6·37 6·54 6·74 6·97 7·24

LATITUDE 25°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	H. M. S. 5 25 8·5 5 15 43·3 5 6 14·2 4 56 40·8 4 47 2·7	2.23	5 13 33.0 5 3 59.3 4 54 21.1	2·27 2·35	H. M. S. 5 20 54.8 5 11 20.8 5 1 42.2 4 51 58.7 4 42 9.8	2.40	H. M. S. 5 18 45.2 5 9 6.3 4 59 22.6 4 49 33.6 4 39 38.6	2·26 2·35 2·44	H. M. S. 5 16 33.7 5 6 49.6 4 57 0.4 4 47 5.4 4 37 3.9	s. -2·21 2·30 2·39 2·50 2·61	4 54 35.3 4 44 34.0	s. -2·24 2·34 2·44 2·55 2·67
10 11 12 13 14	4 37 19.4 4 32 25.6 4 27 30.2 4 22 33.2 4 17 34.6	2·53 2·58	4 34 48·7 4 29 51·9 4 24 53·4 4 19 53·1 4 14 51·0	2.59	4 32 14·6 4 27 14·6 4 22 12·7 4 17 8·9 4 12 3·2	2.65	4 29 36·9 4 24 33·5 4 19 28·0 4 14 20·5 4 9 10·8	2·72 2·78	4 26 55.5 4 21 48.3 4 16 39.0 4 11 27.4 4 6 13.5		4 18 58·7 4 13 45·3 4 8 29·5	2·80 2·86 2·93 3·01 3·09
15 16 17 18 19	4 12 34.0 4 7 31.6 4 2 27.0 3 57 20.3 3 52 11.3	2.94		2·82 2·89 2·96 3·03 3·10	4 1 45.0	2·90 2·97 3·04 3·12 3·20			3 55 37·8 3 50 15·8	3·15 3·24 3·33	3 57 49·8 3 52 25·7 3 46 58·4 3 41 27·6 3 35 53·2	3°17 3°25 3°34 3°44 3°54
20 21 22 23 24	3 46 59.7 3 41 45.5 3 36 28.3 3 31 8.1 3 25 44.5	3·16 3·24 3·33	3 43 51.8 3 38 32.8 3 33 10.5 3 27 44.9 3 22 15.5	3·27 3·35 3·45	3 40 37.9 3 35 13.5 3 29 45.8 3 24 14.2 3 18 38.6	3·29 3·38 3·47 3·58 3·68	3 26 13·6 3 20 35·7	3.20 3.20	3 33 49.8 3 28 13.8 3 22 33.5 3 16 48.7 3 10 58.8	3·63	3 30 14·8 3 24 32·2 3 18 44·9 3 12 52·4 3 6 54·4	3.65 3.76 3.89 4.02 4.16
25 26 27 28 29	3 20 17·4 3 14 46·3 3 9 11·0 3 3 31·0 2 57 45·9	3.63 3.74 3.86	3 16 42·2 3 11 4·5 3 5 22·1 2 59 34·5 2 53 41·2	3·77 3·89 4·03	3 I 23·6	3.80 3.93 4.06 4.21 4.37	3 3 13.2	4.41 4.41	2 59 2·I 2 52 54·I	4·45 4·63	3 0 50·3 2 54 39·5 2 48 21·1 2 41 54·3 2 35 18·1	4·31 4·48 4·66 4·87 5·09
30 31 32 33 34	2 51 55·2 2 45 58·3 2 39 54·4 2 33 42·9 2 27 22·7	4·46 4·64	2 47 41.6 2 41 34.9 2 35 20.4 2 28 57.0 2 22 23.7	4.50 4.69 4.90	2 43 15.7 2 36 58.2 2 30 31.7 2 23 54.9 2 17 6.5	4.95 5.19	2 38 36·4 2 32 6·7 2 25 26·6 2 18 34·7 2 11 29·0	5°00 5°24	2 33 42·1 2 26 58·6 2 20 3·1 2 12 53·7 2 5 27·9	5·29 5·56 5·88	2 28 31·2 2 21 32·0 2 14 18·8 2 6 48·9 1 58 59·4	5.34 5.62 5.94 6.32 6.75

VARIATION TO 1' OF LATITUDE AND ALTITUDE.

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
° 0 2 4 6	s. s.	s. s.	S. S.	s. s.	s. s.	s. s.
	-1.60 -4.70	-1.70 -4.73	-1.80 -4.76	-1.90 -4.80	-2.00 -4.85	-2·11 -4·89
	1.69 4.73	1.79 4.76	1.89 4.80	1.99 4.84	2.10 4.89	2·21 4·94
	1.78 4.76	1.88 4.80	1.99 4.84	2.10 4.88	2.21 4.93	2·32 4·98
	1.88 4.80	1.99 4.84	2.09 4.88	2.20 4.93	2.32 4.98	2·43 5·04
8 10 11 12 13 14	1.98 4.84 2.09 4.89 2.15 4.91 2.21 4.94 2.27 4.96 2.34 4.99	2·09 4·88 2·21 4·93 2·27 4·96 2·33 4·99 2·39 5·02 2·46 5·05	2·32 4·99 2·38 5·02 2·45 5·05 2·51 5·08 2·59 5·11	2·32 4·99 2·44 5·04 2·50 5·07 2·57 5·11 2·64 5·14 2·71 5·18	2.43 5.04 2.56 5.10 2.63 5.14 2.69 5.17 2.77 5.21 2.85 5.25	2.55 5.10 2.69 5.17 2.76 5.20 2.83 5.24 2.91 5.28 2.99 5.33
15	2·40 5·02	2·53 5·09	2.66 5.15	2·79 5·22	2·93 5·30	3.07 5.38
16	2·47 5·06	2·60 5·12	2.73 5.19	2·87 5·26	3·01 5·34	3.16 5.43
17	2·54 5·09	2·67 5·16	2.81 5.23	2·95 5·31	3·10 5·39	3.25 5.48
18	2·62 5·13	2·75 5·20	2.89 5.28	3·04 5·36	3·19 5·45	3.35 5.54
19	2·70 5·17	2·84 5·25	2.98 5.33	3·13 5·41	3·29 5·51	3.46 5.61
20	2·78 5·21	2·92 5·29	3.07 5.38	3°23 5°47	3'40 5'57	3.57 5.67
21	2·86 5·26	3·01 5·34	3.17 5.43	3°33 5°53	3'50 5'64	3.68 5.75
22	2·95 5·31	3·11 5·40	3.27 5.49	3°44 5°60	3'62 5'71	3.81 5.83
23	3·05 5·36	3·21 5·46	3.38 5.56	3°56 5°67	3'75 5'79	3.95 5.92
24	3·15 5·42	3·32 5·52	3.50 5.63	3°68 5°75	3'88 5'88	4.09 6.02
25	3·26 5·48	3'43 5'59	3·62 5·71	3·81 5·83	4.02 5.97	4·25 6·12
26	3·37 5·55	3'56 5'67	3·75 5·79	3·96 5·93	4.18 6.08	4·42 6·24
27	3·49 5·63	3'69 5'75	3·89 5·88	4·11 6·03	4.35 6.19	4·60 6·38
28	3·62 5·71	3'83 5'84	4·04 5·99	4·28 6·15	4.53 6.32	4·81 6·52
29	3·76 5·80	3'98 5'94	4·21 6·10	4·46 6·27	4.73 6.47	5·03 6·69
30	3.91 5.90	4·14 6·05	4·39 6·23	4·66 6·42	4·96 6·64	5·28 6·88
31	4.07 6.01	4·32 6·18	4·59 6·37	4·88 6·58	5·21 6·82	5·57 7·10
32	4.25 6.13	4·52 6·32	4·81 6·53	5·13 6·77	5·49 7·04	5·89 7·36
33	4.45 6.26	4·73 6·47	5·05 6·71	5·41 6·98	5·81 7·29	6·26 7·66
34	4.66 6.42	4·98 6·65	5·33 6·92	5·72 7·23	6·17 7·59	6·70 8·02

LATITUDE 26°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

2.64 2.88

3.16 3·32 3·49 5.18

5.30

5·46 5·55 5·66

2.83

3.00

3.39 3.26

5.27

5.42 5.60 5.70 5.82

2.47 2.69

2.95

3.00

3.25

5.09

5.20

5.34 5.42 5.51

4.88

4.95

5.02

5.16

1.99

2.17

2.38

2.50

2.61

2.15

2·34 2·56 2·67

2.80

4°94 5°03

5·13

5.26

2.31

2.21

2·75 2·88

3.02

5.01

5.11

5·38 5·38

40

42 44

45 46

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
° 0 6 8 10 12	H. M. S. 6 0 0.0 5 33 17.2 5 24 22.1 5 15 26.5 5 6 30.0	s. -1.95 1.96 1.98 1.99 2.01	H. M. S. 5 58 2.9 5 31 19.0 5 22 23.2 5 13 26.6 5 4 29.0	s. -1.95 1.98 1.99 2.01 2.03	H. M. S. 5 56 5.8 5 29 20.1 5 20 23.4 5 11 25.7 5 2 26.8	s. -1.95 1.99 2.00 2.02 2.05	H. M. S. 5 54 8.4 5 27 20.5 5 18 22.6 5 9 23.6 5 0 23.0	2.02	H. M. S. 5 52 10·9 5 25 20·0 5 16 20·7 5 7 20·1 4 58 17·8	2·02 2·04 2·07	H. M. S. 5 50 13·1 5 23 18·5 5 14 17·7 5 5 15·3 4 56 10·9	s. -1.97 2.03 2.06 2.09 2.13
14 16 18 20 21	4 57 32.6 4 48 33.8 4 39 33.7 4 30 32.0 4 26 0.4	2·03 2·05 2·08 2·11 2·13	4 55 30·2 4 46 30·0 4 37 28·1 4 28 24·3 4 23 51·6	2·05 2·08 2·11 2·15 2·17	4 53 26.4 4 44 24.4 4 35 20.4 4 26 14.3 4 21 40.3	2.11	4 51 20.9 4 42 16.8 4 33 10.5 4 24 1.9 4 19 26.5	2.18	4 49 13.6 4 40 7.2 4 30 58.4 4 21 46.8 4 17 9.9	2.18	4 47 4.4 4 37 55.5 4 28 43.6 4 19 29.1 4 14 50.4	2·17 2·21 2·26 2·32 2·35
22 23 24 25 26	4 21 28·3 4 16 55·7 4 12 22·4 4 7 48·5 4 3 14·0	2.17	4 19 18·3 4 14 44·4 4 10 9·8 4 5 34·4 4 0 58·3	2·23 2·26		2·23 2·26 2·28 2·31 2·34	4 14 50·3 4 10 13·4 4 5 35·6 4 0 56·9 3 56 17·3	2·31 2·34 2·37		2·36 2·39 2·43		2·38 2·41 2·45 2·49 2·52
27 28 29 30 31	3 58 38·7 3 54 2·6 3 49 25·7 3 44 47·9 3 40 9·1	2.29	3 56 21.4 3 51 43.6 3 47 4.9 3 42 25.1 3 37 44.3	2.41	3 54 0.8 3 49 21.1 3 44 40.3 3 39 58.4 3 35 15.3	2·37 2·41 2·44 2·48 2·52	3 37 27.5	2·47 2·51 2·55	3 49 8.6 3 44 24.5 3 39 39.1 3 34 52.2 3 30 3.9	2·54 2·58 2·63	3 46 36.7 3 41 50.1 3 37 2.0 3 32 12.4 3 27 21.0	2·57 2·61 2·66 2·70 2·76
32 33 34 35 36	3 35 29·3 3 30 48·4 3 26 6·2 3 21 22·8 3 16 38·0	2.49	3 33 2·3 3 28 19·0 3 23 34·4 3 18 48·3 3 14 0·7	2·53 2·57 2·62	3 30 30·8 3 25 45·0 3 20 57·6 3 16 8·7 3 11 17·9	2.61	3 27 54.8 3 23 6.1 3 18 15.8 3 13 23.6 3 8 29.5	2.69	3 25 13·9 3 20 22·2 3 15 28·5 3 10 32·9 3 5 35·0	2·72 2·78 2·83 2·90 2·96	3 17 32·8 3 12 35·6 3 7 36·1	2·81 2·87 2·93 3·00 3·07
37 38 39 40 41	3 11 51.7 3 7 3.7 3 2 14.0 2 57 22.4 2 52 28.6	2·63 2·68 2·73 2·79 2·86		2.90	3 6 25·3 3 1 30·5 2 56 33·6 2 51 34·2 2 46 32·1	3.05	3 3 33.2 2 58 34.5 2 53 33.4 2 48 29.5 2 43 22.5	3.06	3 0 34.7 2 55 31.8 2 50 26.0 2 45 17.1 2 40 4.8	3.11		3·15 3·23 3·32 3·42 3·52
42 43 44 45 46	2 47 32.6 2 42 34.1 2 37 32.9 2 32 28.6 2 27 21.0	3.08	2 39 30·5 2 34 24·2 2 29 14·5	3·13 3·22 3·31	2 4I 27.0 2 36 18.7 2 3I 6.9 2 25 5I.1 2 20 30.9	3.47	2 27 40.2	3.42 3.53 3.65	2 34 48.7 2 29 28.4 2 24 3.4 2 18 33.2 2 12 57.2	3.70	2 20 15·6 2 14 36·8	3·63 3·76 3·89 4·04 4·22
		V	ARIATIO	N TO	ı' OF	LAT	TUDE A	AND	ALTITU	DE.		
Alt.	L. 0°	Α.	L. 1°	A.	L. 2°	Α.	L. 3°	Α.	L. 4°	Α.	L. 5°	A.
0 2 4 6 8	s. - ·00 ·08 ·15 ·22 ·31	s. -4·45 4·45 4·46 4·46	s. - '09 - '16 '24 '32 '39	s. -4*45 4*45 4*46 4*46 4*47	s. - ·17 - ·25 ·33 ·40 ·48	s. -4·45 4·46 4·46 4·47 4·48	s. - ·26 - ·34 ·41 ·49 ·57	s. -4·46 4·46 4·47 4·48 4·49	s. - '35 - '42 '50 '58 '66	s. -4·46 4·47 4·48 4·49 4·50	s. - :43 - :51 :59 :67 :75	s. -4.47 4.48 4.49 4.50 4.51
10 12 14 16 18	*39 *46 *54 *63 *72	4.47 4.47 4.48 4.49 4.51	*47 *55 *64 *72 *81	4.48 4.49 4.50 4.51 4.52	.56 .64 .73 .82	4.49 4.50 4.51 4.52 4.54	·65 ·74 ·82 ·91 I·00	4.50 4.51 4.52 4.54 4.56	.74 .83 .92 1.01 1.10	4.51 4.53 4.54 4.56 4.58	*84 *92 1*01 1*10 1*20	4.53 4.55 4.56 4.59 4.61
20 22 24 26 28	·80 ·89 ·99 1·09	4.52 4.54 4.56 4.58 4.61	'90 '99 1'09 1'20 1'30	4.54 4.56 4.58 4.61 4.64	1.00 1.10 1.20 1.30 1.42	4.56 4.58 4.61 4.64 4.67	1·10 1·20 1·30 ·1·41 1·53	4.58 4.61 4.64 4.67 4.71	1·20 1·30 1·41 1·53 1·65	4.61 4.64 4.67 4.70 4.75	1·30 1·41 1·52 1·64 1·77	4·64 4·67 4·70 4·74 4·79
30 32 34 36 38	1·31 1·42 1·55 1·68 1·83	4·63 4·67 4·71 4·76 4·81	1.42 1.54 1.68 1.82 1.98	4.67 4.71 4.76 4.81 4.87	1.54 1.67 1.81 1.96 2.12	4.71 4.75 4.80 4.86 4.93	1.66 1.79 1.94 2.10 2.27	4.75 4.80 4.85 4.92 5.00	1.78 1.92 2.08 2.26 2.43	4·79 4·85 4·91 4·98 5·07	1·91 2·05 2·22 2·40 2·60	4·84 4·90 4·97 5·06 5·15

LATITUDE 26°.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 48 14·8 5 39 16·5 5 30 17·0 5 21 16·0 5 12 13·4	2.00 2.02 2.05	H. M. S. 5 46 16·0 5 37 16·4 5 28 15·2 5 19 12·4 5 10 7·7	s. -1.98 2.01 2.04 2.07 2.11	5 35 15·3 5 26 12·4 5 17 7·5	s. -1.99 2.02 2.06 2.09 2.13	5 15 1.3	2.04 2.08	5 12 53.7		H. M. S. 5 38 14.4 5 29 6.8 5 19 56.9 5 10 44.5 5 1 29.2	s. -2.03 2.07 2.12 2.17 2.22
10 12 14 16 17	5 3 8·9 4 54 2·2 4 44 53·2 4 35 41·5 4 31 4·5	2·20 2·25	5 I 0.9 4 5I 5I.7 4 42 39.9 4 33 25.1 4 28 46.4	2·19 2·24 2·29	4 58 51·2 4 49 39·3 4 40 24·4 4 31 6·1 4 26 25·7	2.22		2.38		2·30 2·36 2·43	4 52 10·7 4 42 48·8 4 33 22·9 4 23 52·7 4 19 5·8	2·28 2·34 2·41 2·48 2·52
18 19 20 21 22	4 26 26·7 4 21 48·0 4 17 8·5 4 12 28·0 4 7 46·4	2.37	4 24 6·9 4 19 26·4 4 14 44·9 4 10 2·3 4 5 18·6	2.39		2·40 2·44 2·47 2·51 2·55	4 5 0.8	2·49 2·53 2·57	4 7 14.3	2·55 2·59 2·64		2·56 2·61 2·66 2·70 2·76
23 24 25 26 27	4 3 3.7 3 58 19.9 3 53 34.8 3 48 48.5 3 44 0.6	2·51 2·55 2·59	4 0 33.7 3 55 47.4 3 50 59.9 3 46 10.8 3 41 20.2	2·57 2·62 2·66	3 57 59.8 3 53 11.0 3 48 20.7 3 43 28.8 3 38 35.1	2·64 2·69 2·74	3 55 22·I 3 50 30·5 3 45 37·2 3 40 42·2 3 35 45·2	2·71 2·76 2·82	3 52 40·2 3 47 45·6 3 42 49·1 3 37 50·7 3 32 50·1	2·79 2·84 2·90	3 49 53.9 3 44 56.0 3 39 56.0 3 34 53.9 3 29 49.4	2·81 2·87 2·93 2·99 3·06
28 29 30 31 32	3 39 11·3 3 34 20·3 3 29 27·6 3 24 33·0 3 19 36·4	2·73 2·79 2·84	3 36 27·9 3 31 33·8 3 26 37·7 3 21 39·8 3 16 39·2	2·82 2·88 2·94	3 33 39.6 3 28 42.1 3 23 42.4 3 18 40.4 3 13 36.0	3.04	3 30 46·1 3 25 44·9 3 20 41·3 3 15 35·1 3 10 26·1	3.00	3 22 42·0 3 17 34·0 3 12 23·3	3.10	3 24 42·5 3 19 32·8 3 14 20·2 3 9 4·4 3 3 45·2	3·13 3·21 3·29 3·38 3·47
33 34 35 36 37	3 14 37.7 3 9 36.5 3 4 32.8 2 59 26.3 2 54 16.8	3.04 3.11 3.10	3 6 31.0	3.31	3 8 28.7 3 3 18.7 2 58 5.3 2 52 48.5 2 47 27.8	3·18 3·27 3·35 3·45 3·55	2 59 58·9 2 54 40·1 2 49 17·3	3·49 3·59	3 I 52·2 2 56 31·3 2 51 6·4 2 45 37·1 2 40 2·9	3·53 3·64 3·75	2 58 22·3 2 52 55·2 2 47 23·6 2 41 47·1 2 36 4·9	3·57 3·68 3·79 3·92 4·06
38 39 40 41 42	2 49 4.0 2 43 47.6 2 38 27.1 2 33 2.2 2 27 32.5	3.46 3.57 3.69	2 45 38·0 2 40 15·3 2 34 48·2 2 29 15·9 2 23 38·1	3.62 3.73 3.86	2 42 3.0 2 36 33.5 2 30 58.9 2 25 18.4 2 19 31.5	3·92 4·06	2 38 18·4 2 32 41·3 2 26 58·2 2 21 8·6 2 15 11·5	3.97 4.11 4.28	2 34 23·3 2 28 37·6 2 22 45·3 2 16 45·3 2 10 36·5	4·16 4·33 4·16	2 30 16·7 2 24 21·6 2 18 18·6 2 12 6·8 2 5 44·8	4·21 4·38 4·57 4·78 5·02
		V	ARIATIO	N TO	ı' OF	LAT	ITUDE .	AND	ALTITU:	DE.		

A 14	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	T 100 A	T 110 A
Alt.	L. 6 ° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
0	52 -4.48	- ·61 -4·49	- ·70 -4·51	79 -4.52	88 -4.54	- '97 -4'55
2	·60 4·49	•69 4.50	·78 4·52 ·86 4·53	·87 4·53	•96 4·55 1·04 4·57	I·05 4·57
6	·68 4·51	·77 4·52 ·85 4·53	·86 4·53	'95 4'55 1'03 4'57	1.04 4.22 1.13 4.20	I·13 4·59 I·22 4·61
8	•84 4.53	93 4.55	1.03 4.22	1.15 4.20	1.52 4.61	1.31 4.63
ı o	04 4 33	93 433	103 437	1 1 4 39		- 32 4 03
10	.93 4.55	1.02 4.57	1.12 4.59	1.21 4.61	1.31 4.64	1.41 4.67
12	1.02 4.57	1.11 4.20	1.51 4.61	1.31 4.64	1.41 4.67	1.21 4.40
14	1.11 4.29	1.50 4.61	1.30 4.64	1.40 4.67	1.21 4.40	1.61 4.73
16	1.50 4.61	1.30 4.64	1.40 4.67	1.21 4.40	1.61 4.73	1.72 4.77
18	1.30 4.64	1.40 4.67	1.21 4.40	1.62 4.73	1.73 4.77	1.84 4.81
20	1.41 4.67	1.51 4.70	1.62 4.74	1.73 4.78	1.85 4.82	1.96 4.86
22	1.52 4.70	1.63 4.74	1.74 4.78	1.86 4.82	1.97 4.87	2.10 4.92
24	1.63 4.74	1.75 4.78	1.87 4.83	1.99 4.87	5.11 4.93	2.24 4.98
26	1.76 4.78	1.88 4.83	2.00 4.88	2.13 4.93	2.26 4.99	2.40 2.02
28	1.89 4.84	2.02 4.89	2.12 4.94	2.28 5.00	2.42 2.02	2.27 2.14
30	2.04 4.89	2.17 4.95	2.31 2.01	2.45 5.08	2.60 5.16	2.76 5.24
32	2.19 4.96	2.34 5.03	2.48 5.10	2.64 5.17	2.80 5.26	2.97 5.35
34	2.37 5.04	2.25 2.11	2.68 2.19	2.85 5.28	3.03 2.38	3.21 5.49
36	2.26 2.13	2.42 2.55	5.30 2.31	3.09 5.42	3.58 2.23	3.49 5.66
37	2.66 5.19	2.84 5.28	3.02 5.38	3.22 5.49	3.42 5.61	3.65 5.75
38	2.77 5.24	2.96 5.34	3.12 2.42	3.36 5.57	3.58 5.71	3.81 5.86
39	2.89 5.31	3.00 2.41	3.29 5.23	3.21 2.62	3.75 5.82	4.00 5.98
40	3.02 5.38	3.22 5.49	3.44 5.63	3.68 5.77	3.93 5.94	4.31 6.13
41	3.19 *2.42	3.37 2.28	3.61 5.73	3.86 5.89	4.13 6.02	4.43 6.28
42	3.30 2.24	3.23 2.68	3.79 5.84	4.06 6.02	4.36 6.23	4.69 6.47

LATITUDE 26°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 36 11·9 5 27 1·7 5 17 49·1 5 8 33·6 4 59 15·1	s. -2.05 2.09 2.14 2.20 2.25	5 24 55.4 5 15 39.7 5 6 21.0	2·12 2·17 2·23	5 22 47.7 5 13 28.8 5 4 6.5	s. -2.09 2.14 2.20 2.26 2.33	5 20 38·6 5 11 16·0	S. -2·11 2·17 2·23 2·29 2·37	5 18 27·8 5 9 1·4 4 59 31·2	S. -2·13 2·19 2·26 2·33 2·41	5 16 15·3 5 6 44·9 4 57 10·2	s. -2·16 2·22 2·29 2·37 2·45
10 12 14 16 18	4 49 53°I 4 40 27°2 4 30 57°I 4 21 22°2 4 II 4I°9	2·31 2·38 2·46 2·54 2·63	4 28 28·2 4 18 48·2	2·43 2·51	4 35 35.8 4 25 56.1 4 16 10.8	2·40 2·48 2·56 2·66 2·76	4 33 5.7 4 23 20.7 4 13 29.5	2.23	4 40 17·2 4 30 32·5 4 20 41·7 4 10 44·3 4 0 39·3	2·58 2·68 2·79	4 17 59.0 4 7 54.9	2·54 2·64 2·74 2·86 2·99
19 20 21 22 23	4 6 49.5 4 1 55.6 3 56 59.9 3 52 2.5 3 47 3.0		3 59 10·1 3 54 11·1 3 49 10·2	2.74 2.80 2.85 2.91 2.98	3 56 20·1 3 51 17·6 3 46 12·9	2·81 2·87 2·93 3·00 3·07	3 53 25.4 3 48 19.1 3 43 10.4	3.03 3.03	3 40 2.3	3.18 3.11	3 47 20.7	3.21
24 25 26 27 28	3 42 1.5 3 36 57.8 3 31 51.7 3 26 42.9 3 21 31.5	3.00	3 33 53 ⁹ 3 28 43 ⁵	3.13	3 30 44.2 3 25 29.1 3 20 10.9			3.41	3 24 5.5 3 18 39.8 3 13 10.3 3 7 36.6	3.44 3.53 3.64 3.75	3 20 35.5 3 15 3.9 3 9 28.0 3 3 47.4	3·67 3·78
29 30 31 32 33	3 16 17·1 3 10 59·4 3 5 38·2 3 0 13·1 2 54 43·9	3·32 3·41 3·50 3·61 3·72	3 2 3·9 2 56 32·4	3.64	3 3 54.7 2 58 21.0 2 52 42.5	3.68 3.79 3.92	3 0 9.6 2 54 28.7 2 48 42.5	3·83 3·95 4·09	2 56 15·1 2 50 26·4 2 44 31·5	3.99 4.13 4.28		4·17 4·32 4·49
34 35 36 37 38	2 49 10·0 2 43 31·0 2 37 46·4 2 31 55·6 2 25 57·7	3.97 4.11 4.26	2 45 14·9 2 39 27·7 2 33 34·2 2 27 33·5 2 21 24·7	4·15 4·31 4·48	2 35 12.7	4·36 4·53 4·73		4·58 4·78 5·01	2 12 56.7	4·83 5·06 5·32		5·11 5·37 5·67

VARIATION TO 1' OF LATITUDE AND ALTITUDE.

VIRGINITION TO T OF BRITISHE METHODE.										
Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.				
0	s. s.									
0	-1.06 -4.57	-1.15 -4.60	-1.24 -4.62	-1.34 -4.65	-1.43 -4.67	-1.23 -4.70				
2	1.14 4.20	1.24 4.62	1.33 4.64	1.43 4.67	1.52 4.70	1.62 4.74				
6	1.23 4.62	1.32 4.64	1.42 4.67	1.52 4.70 1.61 4.73	1·62 4·74 1·72 4·77	1.72 4.77 1.82 4.81				
8	1·32 4·64 1·41 4·67	1.42 4.67 1.51 4.70	1.51 4.70		1·72 4·77 1·82 4·81					
Ů	1.41 4.67	1.21 4.40	1.61 4.73	1.71 4.77	1.02 4.01	1.93 4.85				
10	1.21 4.40	1.61 4.73	1.71 4.77	1.82 4.80	1.93 4.85	2.04 4.90				
12	1.61 4.73	1.72 4.77	1.82 4.81	1.93 4.85	2.04 4.00	2.16 4.04				
14	1.72 4.77	1.83 4.81	1.94 4.85	2.02 4.00	2.17 4.95	2.29 5.00				
16	1.83 4.81	1.94 4.86	2.06 4.90	2.18 4.96	2.30 2.01	2.42 5.07				
18	1.95 4.86	2.07 4.91	2.10 4.96	2.31 2.05	2.44 5.07	2.22 2.14				
19	2.02 4.89	2.14 4.04	2.26 4.99	2.39 2.02	2.22 2.11	2.65 5.18				
20	2.08 4.01	2.20 4.97	2.33 2.05	2.46 5.09	2.60 5.15	2.74 5.22				
21	2.12 4.94	2.58 2.00	2.41 5.06	2.24 2.15	2.68 5.10	2.82 5.27				
22	2.23 4.97	2.32 2.03	2.48 2.10	2.62 5.17	2·77 5·24 2·86 5·20	5.05 2.35				
23	2.30 2.01	2.43 5.07	2.27 2.14	2.71 5.21	2.86 5.29	3.01 2.32				
24	2.37 5.04	2.21 2.11	2.65 5.18	2.80 5.26	2.95 5.34	3.11 2.43				
25	2.45 5.08	2.59 5.15	2.74 5.23	2.90 5.31	3.05 5.40	3.22 5.49				
26	2.24 2.13	2.68 5.20	2.84 5.28	3.00 5.36	3.16 2.46	3.34 5.26				
27	2.63 5.17	2.78 5.25	2.94 2.33	3.10 5.43	3.28 5.23	3.46 5.64				
28	2.72 5.21	2.88 5.30	3.04 2.39	3.22 5.49	3.40 2.60	3.59 5.72				
29	2.82 5.27	2.98 5.36	3.12 2.42	3.34 5.56	3.53 5.68	3·73 5·81				
30	2.02 2.32	3.00 2.45	3°15 5°45 3°27 5°52	3·34 5·56 3·47 5·64	3.67 5.77	3.88 2.01				
31	3.03 2.30	3.51 2.45	3.40 5.60	3.60 5.73	3.82 5.86	4.02 6.03				
32	3.12 2.42	3.34 2.26	3.24 2.69	3.75 5.82	3.98 5.97	4.53 6.14				
33	3.28 5.53	3.47 5.65	3.69 5.78	3.91 2.93	4.16 6.00	4.42 6.27				
33	3 333] 37' 303	309 370	3 9- 3 93	7 -5 0 09	772 02/				
34	3.41 5.61	3.62 5.74	3.85 5.88	4.09 6.04	4.35 6.22	4.64 6.43				
35	3.26 2.40	3.78 5.84	4.03 6.00	4.58 6.18	4.57 6.38	4.88 6.61				
36	3.71 5.79	3.95 5.95	4.51 6.13	4.20 6.33	4.81 6.55	5.16 6.81				
37	3.88 5.90	4.14 6.08	4.42 6.27	4.73 6.50	5.08 6.75	5.46 7.05				
38	4.06 6.03	4.35 6.22	4.66 6.44	5.00 6.69	5.38 6.98	5.81 7.33				
		,	1	1	1	,				

LATITUDE 26°.

		DI	ECLINAT	NOI.	-CONTR	ARY	NAME	TO—	LATITU	DE.		
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 23 31.6 5 14 1.0 5 4 26.1 4 54 46.7 4 45 2.2	s. -2·18 2·26 2·33 2·41 2·50	H. M. S. 5 21 19.7 5 11 44.6 5 2 5.1 4 52 20.6 4 42 30.6	s. -2·21 2·29 2·37 2·46 2·55	H. M. S. 5 19 5.9 5 9 26.1 4 59 41.6 4 49 51.7 4 39 55.9	s. -2·25 2·33 2·41 2·51 2·61	H. M. S. 5 16 50·2 5 7 5·5 4 57 15·5 4 47 19·8 4 37 17·7	s. -2·28 2·36 2·46 2·56 2·67	H. M. S. 5 14 32.4 5 4 42.3 4 54 46.6 4 44 44.8 4 34 36.0	s. -2·31 2·41 2·51 2·61 2·73	H. M. S. 5 12 12·4 5 2 16·6 4 52 14·8 4 42 6·4 4 31 50·5	s. -2·35 2·45 2·56 2·67 2·79
10 11 12 13 14	4 35 12·1 4 30 14·7 4 25 15·7 4 20 14·9 4 15 12·3	2·60 2·65 2·70 2·76 2·81	4 32 34·6 4 27 34·1 4 22 31·7 4 17 27·5 4 12 21·3	2.77	4 29 53·5 4 24 49·6 4 19 43·7 4 14 35·9 4 9 25·7	2·72 2·77 2·83 2·90 2·97	4 22 1·1 4 16 51·5	2·78 2·84 2·91 2·98 3·05	4 24 19·6 4 19 8·3 4 13 54·7 4 8 38·5 4 3 19·9	2.99	4 21 26.4 4 16 10.9 4 10 52.9 4 5 32.3 4 0 8.9	2·93 2·99 3·07 3·15 3·23
15 16 17 18 19	4 10 7.6 4 5 0.9 3 59 51.9 3 54 40.6 3 49 26.7	2·87 2·94 3·01 3·08 3·15	4 2 2·2 3 56 49·I	2·95 3·02 3·09 3·17 3·25	4 4 13·3 3 58 58·3 3 53 40·8 3 48 20·3 3 42 56·8	3.04 3.11 3.19 3.27 3.35	3 50 26.7	3·12 3·20 3·29 3·37 3·47	3 57 58·5 3 52 34·1 3 47 6·5 3 41 35·5 3 36 0·9	3·22 3·30 3·39 3·49 3·59	3 54 42.5 3 49 12.8 3 43 39.7 3 38 2.9 3 32 21.9	3·32 3·41 3·51 3·61 3·72
20 21 22 23 24	3 44 10·0 3 38 50·4 3 33 27·7 3 28 1·5 3 22 31·7	3.49	3 40 53·3 3 35 28·5 3 30 0·3 3 24 28·3 3 18 52·3	3.62	3 37 30.0 3 31 59.7 3 26 25.6 3 20 47.3 3 15 4.5	3.44 3.54 3.64 3.75 3.87	3 33 59.9 3 28 23.5 3 22 42.9 3 16 57.8 3 11 7.7	3·56 3·67 3·78 3·90 4·03	3 30 22·2 3 24 39·4 3 18 51·8 3 12 59·2 3 7 0·9	3.69 3.81 3.93 4.06 4.20	3 26 36·7 3 20 46·7 3 14 51·5 3 8 50·6 3 2 43·5	3.83 3.95 4.09 4.23 4.39
25 26 27 28 29	3 16 57·9 3 11 19·7 3 5 36·8 2 59 48·6 2 53 54·9			4.25	3 9 16·8 3 3 23·7 2 57 24·7 2 51 19·1 2 45 6·3	4.00 4.13 4.28 4.44 4.62	2 59 10·3 2 53 2·0 2 46 46·3	4·48 4·66	3 0 56·6 2 54 45·5 2 48 26·9 2 41 59·9 2 35 23·4	4·52 4·70 4·90	2 56 29.6 2 50 8.0 2 43 37.9 2 36 58.2 2 30 7.7	4·56 4·74 4·94 5·17 5·42
30 31 32 33 34	2 47 54·7 2 41 47·5 2 35 32·5 2 29 8·6 2 22 34·6	4.54 4.72 4.93	2 43 26·7 2 37 8·7 2 30 41·8 2 24 4·6 2 17 15·6	4·77 4·98 5·22	2 38 45·3 2 32 15·2 2 25 34·7 2 18 42·4 2 11 36·3		2 33 49°1 2 27 5°3 2 20 9°4 2 12 59°6 2 5 33°5		2 28 36·2 2 21 36·9 2 14 23·3 2 6 53·2 1 59 3·4	5.65 5.97 6.34	2 23 4.7 2 15 47.4 2 8 13.3 2 0 19.2 1 52 0.8	5.70 6.02 6.39 6.83 7.36
		VA	ARIATIO	N TC	1' OF	LATI	TUDE A	AND	ALTITUI	DE.		
Alt.	L. 18°	A.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α.	L. 22°	Α.	L. 23°	Α.
0 2 4 6 8	s. -1.63 - 1.72 1.82 1.92 2.03	s. -4.74 4.77 4.81 4.85 4.89	s. -1.73 - 1.83 1.93 2.03 2.15	s. -4.76 4.81 4.85 4.89 4.94	s. -1.83 - 1.93 2.03 2.14 2.26	s. -4·81 4·85 4·89 4·94 4·99	s. -1.93 - 2.04 2.14 2.26 2.38	s. -4.85 4.89 4.94 4.99 5.04	s. -2.04 2.14 2.25 2.37 2.50	s. -4·89 4·94 4·99 5·04 5·10	s. -2·15 - 2·26 2·37 2·49 2·62	s. -4*94 4*99 5*04 5*17
10 11 12 13 14	2·15 2·21 2·28 2·34 2·41	4.94 4.97 5.00 5.03 5.06	2·27 2·33 2·40 2·46 2·53	5.00 5.02 5.05 5.09 5.12	2·39 2·45 2·52 2·59 2·67	5.05 5.08 5.11 5.15 5.19	2·51 2·58 2·65 2·72 2·80	5·11 5·14 5·18 5·22 5·26	2·63 2·71 2·78 2·86 2·94	5·17 5·21 5·25 5·29 5·33	2·76 2·84 2·92 3·00 3·09	5·24 5·28 5·32 5·37 5·41
15 16 17 18 19	2.48 2.55 2.63 2.71 2.79	5.09 5.13 5.17 5.21 5.25	2.61 2.69 2.77 2.85 2.94	5·16 5·20 5·24 5·29 5·33	2.74 2.82 2.91 3.00 3.09	5·23 5·27 5·32 5·37 5·42	2.88 2.97 3.06 3.15 3.25	5·30 5·35 5·40 5·45 5·51	3.03 3.12 3.31 3.42	5·38 5·43 5·49 5·55 5·61	3·18 3·27 3·37 3·48 3·59	5·47 5·52 5·58 5·65 5·72
20 21 22 23 24	2.88 2.97 3.07 3.17 3.28	5·30 5·35 5·41 5·47 5·53	3.03 3.13 3.23 3.34 3.46	5°39 5°44 5°50 5°57 5°64	3·19 3·29 3·41 3·52 3·65	5.48 5.54 5.60 5.68 5.75	3'35 3'47 3'58 3'71 3'85	5.57 5.64 5.71 5.79 5.88	3.53 3.65 3.77 3.91 4.06	5.68 5.75 5.83 5.92 6.02	3.71 3.84 3.98 4.12 4.28	5.79 5.88 5.97 6.07 6.17

5.60

5.68

5·76 5·85

.5·95

6.06

6.18

6·32 6·48 6·66

3.40

3·52 3·65

3.80

3.95

4.11

4.30 4.49 4.71

4.96

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27 28

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32

33

34

3.28

3·72 3·86

4.01

4.18

4·36 4·56 4·78

5.03

2.31

5.71 5.80

5.89

5.99

6.23

6·37 6·53 6·72

6.93

3.78

3.93 4.08

4.25

4.43

4.63 4.86 5.11

5·39 5·71 5.84

5.93 6.04

6.15

6·43 6·59 6·77

6.99 7.24 5.98 6.08

6.20

6·33 6·48

6.64

6.83

7.05 7.30 7.60

3.99

4·15 4·32 4·50 4·70

4.93 5.18 5.46 5.79 6.16 6.13

6·25 6·38 6·53 6·70

6.89

7·11 7·36 7·67 8·02

4.31

4·38 4·57 4·78

5.00

5.26

5.54 5.87 6.24 6.68 6.30

6·43 6·58 6·75

6.95

7·17 7·43 7·73 8·10

8.55

4.45 4.64 4.85 5.08

5.33

5.62

5.95 6.33 6.77 7.30

LATITUDE 27°.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 6 8 10	H. M. S. 6 0 0.0 5 33 3.1 5 24 3.3 5 15 2.8 5 6 1.4	s. -2.04 2.05 2.07 2.08 2.10	5 30 59·6 5 21 59·1 5 12 57·6	2.08	H. M. S. 5 55 55·3 5 28 55·5 5 19 53·9 5 10 51·2 5 1 47·2	s. -2.04 2.08 2.09 2.12 2.14	H. M. S. 5 53 52.8 5 26 50.5 5 17 47.7 5 8 43.6 4 59 38.0	2·14 2·14	5 15 40.4	s. -2.05 2.11 2.13 2.16 2.20	H. M. S. 5 49 46·8 5 22 37·7 5 13 31·9 5 4 24·2 4 55 14·5	s. -2.06 2.12 2.15 2.19 2.22
14 16 18 20 21	4 56 58·9 4 47 55·1 4 38 49·7 4 29 42·5 4 25 8·1	2·14 2·17 2·21	4 54 51·1 4 45 45·6 4 36 38·3 4 27 28·9 4 22 53·3	2·17 2·21 2·25	4 52 41.7 4 43 34.3 4 34 24.8 4 25 13.0 4 20 36.0	2·17 2·21 2·24 2·29 2·31	4 50 30.5 4 41 20.9 4 32 9.0 4 22 54.4 4 18 16.0	2·24 2·28	4 29 50·9 4 20 33·2	2.38	4 46 2.5 4 36 47.9 4 27 30.3 4 18 9.3 4 13 27.4	2·27 2·31 2·37 2·42 2·46
22 23 24 25 26	4 20 33.2 4 15 57.6 4 11 21.4 4 6 44.5 4 2 6.8	2·27 2·29 2·27	4 18 17·1 4 13 40·2 4 9 2·5 4 4 24·0 3 59 44·7	2·31 2·34 2·37			4 13 36.8 4 8 5 6 .6 4 4 15.6 3 59 33.5 3 54 50.3	2·38 2·41 2·44 2·48 2·51	4 6 30·2 4 I 47·2		4 8 44.5 4 4 0.4 3 59 15.3 3 54 28.9 3 49 41.2	2·49 2·52 2·56 2·60 2·64
27 28 29 30 31	3 57 28·3 3 52 48·9 3 48 8·6 3 43 27·3 3 38 44·9	2·40 2·43 2·46	3 55 4.4 3 50 23.2 3 45 41.0 3 40 57.5 3 36 12.9	2.23		2·52 2·56 2·60	3 50 6·1 3 45 20·6 3 40 33·8 3 35 45·5 3 30 55·8	2.59	3 47 31·1 3 42 43·2 3 37 53·8 3 33 2·8 3 28 10·1	2.62 2.66 2.70 2.75 2.80	3 44 52·1 3 40 1·4 3 35 9·2 3 30 15·2 3 25 19·3	2.69 2.73 2.78 2.84 2.89
32 33 34 35 36	3 34 1.4 3 29 16.6 3 24 30.5 3 19 42.9 3 14 53.7	2·58 2·62 2·66	3 31 27·0 3 26 39·7 3 21 50·9 3 17 0·5 3 12 8·3	2.12	3 28 48·2 3 23 58·1 3 19 6·3 3 14 12·7 3 9 17·2	2·74 2·79	3 26 4·4 3 21 11·3 3 16 16·4 3 11 19·3 6 20·1	2.82	3 13 20·7 3 8 19·9	2.92		2·95 3·01 3·08 3·15 3·23
37 38 39 40 41	3 10 2·9 3 5 10·3 3 0 15·6 2 55 18·8 2 50 19·6	2.94		3.06 3.00	3 4 19·5 2 59 19·5 2 54 16·9 2 49 11·6 2 44 3·2	2·96 3·03 3·10 3·18 3·27	3 I 18·4 2 56 14·2 2 51 7·0 2 45 56·8 2 40 43·1	3·15 3·23 3·31	2 58 10·6 2 53 1·6 2 47 49·5 2 42 33·8 2 37 14·2	3·27 3·36 3·46	2 54 55.5 2 49 41.4 2 44 23.7 2 39 2.0 2 33 35.8	3·32 3·41 3·50 3·61 3·72
42 43 44 45 46	2 45 17·8 2 40 13·2 2 35 5·5 2 29 54·3 2 24 39·3	3·17 3·26 3·35	2 42 8·8 2 36 59·1 2 31 45·8 2 26 28·6 2 21 6·9	3.31 3.41 3.21	2 38 51.6 2 33 36.2 2 28 16.7 2 22 52.8 2 17 23.7		2 35 25.6 2 30 3.9 2 24 37.6 2 19 6.0 2 13 28.6	3·62 3·74	2 20 47·5 2 15 7·4	3·80 3·94 4·09	2 28 4.7 2 22 28.1 2 16 45.3 2 10 55.5 2 4 57.8	3.85 3.99 4.14 4.32 4.51
		V	ARIATIC	N TO	ı' OF	LATI	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	A.	L. 3°	Α.	L. 4°	Α.	L. 5°	Α.
0 2 4 6 8	s. - '00 - '08 '16 '24 '32	s. -4·49 4·49 4·49 4·50	s. - '09 · 17 ·25 '33 · 41	s. -4:49 4:49 4:50 4:51	s. - ·18 - ·26 ·34 ·42 ·50	s. -4·49 4·50 4·51 4·52	s. - ·26 · ·35 ·43 ·51 ·59	s. -4·50 4·51 4·51 4·52 4·53	s. - '35 '43 '52 '60 '68	s. -4·50 4·51 4·52 4·53 4·54	s. - '44 - '52 '61 '69 '78	s. -4·51 4·52 4·53 4·54 4·56
10 12 14 16 18	*40 *49 *57 *66 *75	4.51 4.52 4.54 4.55	.50 .58 .67 .76 .85	4.52 4.53 4.54 4.55 4.57	.59 .67 .76 .85 .95	4.53 4.54 4.55 4.57 4.59	·68 ·77 ·86 ·95 ɪ·06	4.54 4.55 4.57 4.59 4.61	.77 .86 .95 1.05	4.55 4.57 4.59 4.61 4.63	·87 ·96 I·05 I·1 5 I·25	4.57 4.59 4.61 4.63 4.66
20 22 24 26 28	·85 ·94 ·1·05 ·1·15 ·1·26	4.57 4.59 4.61 4.63 4.66	.95 1.05 1.15 1.26 1.38	4·59 4·61 4·63 4·66 4·69	1.05 1.15 1.26 1.37 1.49	4.61 4.63 4.66 4.69 4.73	1·15 1·25 1·37 1·48 1·61	4.63 4.66 4.69 4.73 4.77	1·25 1·36 1·48 1·60 1·73	4·66 4·69 4·73 4·77 4·81	1·36 1·47 1·59 1·72 1·85	4·69 4·72 4·76 4·81 4·86
30 32 34 36 38	1·38 1·51 1·64 1·79 1·95	4·69 4·73 4·78 4·83 4·89	1·50 1·63 1·77 1·93 2·10	4.73 4.78 4.83 4.89 4.95	1·62 1·76 1·91 2·07 2·25	4.77 4.82 4.88 4.94 5.02	1·74 1·89 2·05 2·22 2·41	4.82 4.87 4.93 5.01 5.09	1.87 2.02 2.19 2.37 2.58	4.86 4.92 4.99 5.08 5.18	2.00 2.16 2.34 2.53 2.75	4·92 4·98 5·06 5·15 5·26
40 42 44 45 46	2·12 2·32 2·54 2·66 2·79	4.96 5.05 5.16 5.22 5.29	2·28 2·49 2·72 2·85 2·99	5.04 5.13 5.25 5.32 5.40	2.45 2.67 2.93 3.08 3.23	5·11 5·23 5·36 5·44 5·52	2·62 2·87 3·15 3·31 3·49	5·20 5·33 5·48 5·57 5·68	2·81 3·07 3·38 3·55 3·75	5·29 5·44 5·62 5·73 5·85	3.00 3.29 3.63 3.82 4.02	5·40 5·56 5·77 5·90 6·03

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 231 LATITUDE 27°.

		D.	ECLINAT	rion-	-CONTR	ARY	NAME	TO-	LATITU	DE.		
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 2 4 6 8	H. M. S. 5 47 43.2 5 38 40.2 5 29 35.8 5 20 29.8 5 11 22.1	s. -2.06 2.08 2.11 2.14 2.18	H. M. s. 5 45 39°1 5 36 34°6 5 27 28°5 5 18 20°7 5 9 10°8	S. -2.07 2.10 2.13 2.16 2.20	5 25 20·2 5 16 10·2	s. - 2.08 2.11 2.15 2.19 2.23	H. M. S. 5 4I 29·I 5 32 20·9 5 23 I0·8 5 I3 58·4 5 4 43·6	2.13	H. M. S. 5 39 22.9 5 30 12.7 5 21 0.1 5 11 45.2 5 2 27.4	s. -2·11 2·15 2·19 2·23 2·29	5 28 3·2 5 18 48·1 5 9 30·2	S. -2·13 2·17 2·21 2·26 2·32
10 12 14 16 17	5 2 12·3 4 53 0·2 4 43 45·5 4 34 27·9 4 29 47·9		4 50 43.9 4 41 26.3 4 32 5.4	2·34 2·40	4 48 25.6 4 39 4.8	2·27 2·32 2·38 2·44 2·47	4 46 5°1 4 36 40°7	2·36 2·42 2·49	4 34 14.1	2·40 2·47 2·54	4 50 45°I 4 4I 17°0 4 3I 44°6 4 22 7°7 4 17 17°2	2·38 2·44 2·51 2·59 2·64
18 19 20 21 22	4 25 7.0 4 20 25.2 4 15 42.3 4 10 58.4 4 6 13.4	2.44			4 5 50.5	2·51 2·55 2·58 2·63 2·67	4 8 2.0 4 3 II.0	2.60 2.64 2.69	4 15 4·3 4 10 13·6 4 5 21·4 4 0 27·7 3 55 32·4	2·66 2·71 2·76		2.68 2.73 2.78 2.83 2.88
23 24 25 26 27	4 I 27.2 3 56 39.7 3 51 50.9 3 47 0.6 3 42 8.7	2·62 2·67 2·71	3 58 50·3 3 54 0·3 3 49 8·7 3 44 15·6 3 39 20·7	2·69 2·74 2·79	3 56 9.5 3 51 16.7 3 46 22.2 3 41 26.0 3 36 27.9	2·71 2·76 2·81 2·87 2·92		2·89 2·95	3 50 35.2 3 45 36.2 3 40 35.2 3 35 32.0 3 30 26.5	2·98	3 47 41·3 3 42 38·8 3 37 34 I 3 32 27·0 3 27 17·3	3.00 3.00 3.13 3.13
28 29 30 31 32	3 37 15·1 3 32 19·8 3 27 22·5 3 22 23·1 3 17 21·6	2·87 2·92 2·98	3 34 24.0 3 29 25.3 3 24 24.4 3 19 21.3 3 14 15.6	3.02 3.08	3 31 27.7 3 26 25.3 3 21 20.6 3 16 13.3 3 11 3.2	2·98 3·05 3·11 3·19 3·26	3 23 19·6 3 18 10·6 3 12 58·8	3·08 3·14 3·22 3·30 3·38	3 20 7.9 3 14 54.2 3 9 37.4	3.33	3 16 49·5 3 11 30·8 3 6 8·6	3·2 3·3 3·4 3·5 3·6
34 35 36	3 12 17·5 3 7 10·9 3 2 1·4 2 56 48·7 2 51 32·7		3 3 55.9 2 58 41.4 2 53 23.4	3·23 3·31 3·40 3·49 3·59	3 0 33.6 2 55 13.7 2 49 49.8	3·53 3·64	3 2 25.5 2 57 3.6 2 51 37.6 2 46 7.1 2 40 31.9	3.57 3.68 3.79	2 58 53·2 2 53 25·1 2 47 52·4 2 42 14·8 2 36 31·6	3·72 3·83 3·96		3·76 3·88 4·06 4·14
39 40 41	2 46 12·9 2 40 49·1 2 35 20·6 2 29 47·2 2 24 8·1	3.66 3.22 3.66	2 42 35.6 2 37 4.8 2 31 29.0 2 25 47.3 2 19 59.2	3.82 3.95 4.10	2 38 48·6 2 33 10·3 2 27 26·1 2 21 35·3 2 15 37·0	4.00 4.12 4.00	2 34 51.0 2 29 4.4 2 23 10.9 2 17 9.7 2 10 59.9	4.37	2 30 42·3 2 24 46·1 2 18 42·1 2 12 29·1 2 6 6·0		2 20 14·1 2 13 58·1 2 7 31·8	4.4 4.6 4.8 5.3
		VA	RIATIO	N TC	ı' OF	LATI	TUDE A	ND .	ALTITUI	DE.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	Α.	L. 9°	A.	L. 10°	Α.	L. 11°	A.
0 2 4 6 8	s. - *53 - *61 *70 *78 *87	s. -4·52 4·53 4·54 4·56 4·57	s. •62 •70 •79 •87 •96	s. -4·53 4·54 4·56 4·57 4·59	s. - ·71 - ·79 ·88 ·97 1·06	s. -4·54 4·56 4·57 4·59 4·61	s. *80 *89 *97 1.06 1.15	s. -4·56 4·58 4·59 4·61 4·63	s. - ·89 - ·98 1·07 1·16 1·25	s. -4·58 4·59 4·61 4·64 4·66	s. - ·98 - 1·07 1·16 1·25 1·35	s. -4·59 4·62 4·64 4·66 4·69
10 12 14 16 18	•96 1•05 1•15 1•25 1•36	4.59 4.61 4.63 4.66 4.69	1.05 1.15 1.25 1.35 1.46	4.61 4.63 4.66 4.69 4.72	1·15 1·25 1·35 1·46 1·57	4.63 4.66 4.69 4.72 4.75	1·25 1·35 1·45 1·56 1·68	4.66 4.69 4.72 4.75 4.79	1·35 1·45 1·56 1·67 1·79	4·69 4·72 4·75 4·79 4·83	1.45 1.55 1.66 1.78 1.91	4·72 4·75 4·79 4·83 4·88
20 22 24 26 28	1·47 1·58 1·71 1·84 1·98	4.72 4.76 4.80 4.85 4.91	1·58 1·70 1·82 1·96 2·11	4.76 4.80 4.85 4.90 4.96	1.69 1.81 1.95 2.09 2.25	4.80 4.84 4.89 4.95 5.02	1.80 1.93 2.07 2.22 2.39	4.84 4.89 4.94 5.01 5.09	1.92 2.05 2.20 2.36 2.54	4.88 4.94 5.00 5.07 5.15	2.04 2.18 2.33 2.50 2.69	4.93 4.99 5.06 5.14 5.23
30 32 34 36 37	2·14 2·31 2·49 2·70 2·81	4.97 5.05 5.13 5.24 5.30	2·28 2·45 2·65 2·88 3·00	5.03 5.12 5.33 5.40	2·42 2·61 2·82 3·06 3·19	5·10 5·19 5·43 5·51	2.57 2.77 3.00 3.26 3.40	5·17 5·28 5·40 5·55 5·63	2·73 2·94 3·19 3·47 3·63	5·25 5·37 5·51 5·67 5·77	2·89 3·12 3·39 3·69 3·86	5°34 5°47 5°62 5°81 5°92

5·59 5·69

5·79 5·91

6.04

3.34

3.49 3.66 3.84

4.04

5·73 5·83 5·96 6·09

6.25

3.80

3.98 4.19 4.42 4.68

5·88 6·00

6.14

6·30 6·48

6.04

6.19

6·35 6·54 6·75

4.05 4.26 4.49 4.76 5.05

3·56 3·73 3·91 4·12

4.35

5.47

5.55 5.65 5.75 5.86

3.13

3.27

3·42 3·59 3·77

38

39 40

42

2·93 3·07

3.20

3.36

3.23

5.36

5.44 5.52 5.60

5.70

LATITUDE 27°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	H. M. S. 5 35 7·8 5 25 52·5 5 16 34·6 5 7 13·6 4 57 49·2	2.29	5 14 19.4	2.32	H. M. S. 5 30 48.4 5 21 27.1 5 12 2.6 5 2 34.6 4 53 2.6	s. -2·18 2·24 2·29 2·36 2·43	H. M. 9. 5 28 36.7 5 19 12.1 5 9 44.0 5 0 11.9 4 50 35.6	s. -2·21 2·26 2·33 2·40 2·47	H. M. s. 5 26 23.7 5 16 55.4 5 7 23.3 4 57 47.0 4 48 6.1	s. -2·23 2·29 2·36 2·43 2·51	H. M. S. 5 24 9·1 5 14 36·9 5 5 0·6 4 55 19·7 4 45 33·8	s. -2·26 2·32 2·40 2·48 2·56
10 12 14 16 17	4 48 21·3 4 38 49·1 4 29 12·3 4 19 30·4 4 14 37·3	2·49 2·56 2·65	4 45 55.0 4 36 18.4 4 26 36.8 4 16 49.6 4 11 53.7	2.62	4 33 44.8 4 23 58.1 4 14 5.1	2·50 2·59 2·68 2·77 2·83	4 40 54.5 4 31 8.1 4 21 15.7 4 11 16.7 4 6 14.4	2·55 2·64 2·74 2·84 2·90	4 18 29.7 4 8 24.0	2.70		2.66 2.76 2.87 2.99 3.06
18 19 20 21 22	4 9 42·6 4 4 46·3 3 59 48·3 3 54 48·4 3 49 46·5	2.90	4 6 56·0 4 1 56·6 3 56 55·3 3 51 51·9 3 46 46·3	2·81 2·86 2·92 2·98 3·05	3 59 2·5 3 53 57·6	2·88 2·94 3·00 3·07 3·14	4 1 10·1 3 56 3·6 3 50 54·9 3 45 43·7 3 40 29·9		3 52 59·8 3 47 47·0 3 42 3I·5	3·11 3·18 3·11	3 55 5.3 3 49 50.8 3 44 33.4 3 39 13.2 3 33 49.8	3·13 3·20 3·28 3·36 3·44
23 24 25 26 27	3 44 42.5 3 39 36.2 3 34 27.5 3 29 16.1 3 24 1.9	3.53 3.19 3.00	3 41 38·5 3 36 28·1 3 31 15·0 3 25 59·0 3 20 39·9	3·18 3·26 3·34	3 38 28·9 3 33 14·1 3 27 56·3 3 22 35·3 3 17 10·8	3·21 3·29 3·37 3·45 3·55	3 35 13.4 3 29 53.8 3 24 30.8 3 19 4.4 3 13 34.2	3.94	3 20 58·3 3 15 25·9	3.21 3.61	3 28 23.0 3 22 52.5 3 17 18.0 3 11 39.2 3 5 55.7	3·54 3·63 3·74 3·85 3·97
31	3 18 44.7 3 13 24.1 3 7 59.9 3 2 31.8 2 56 59.4	3.49 3.58 3.68	3 15 17·4 3 9 51·2 3 4 21·0 2 58 46·4 2 53 7·0	3.52 3.61 3.72 3.83 3.96	3 0 33·5 2 54 51·8	3·65 3·75 3·87 3·99 4·13	3 7 59·7 3 2 20·6 2 56 36·6 2 50 47·1 2 44 51·4	3.79 3.91 4.03 4.17 4.32	2 58 21.6 2 52 29.7 2 46 31.4	4.07 4.31	2 42 3.7	4·10 4·25 4·40 4·57 4·76
34 35 36	2 51 22·3 2 45 39·9 2 39 51·8 2 33 57·4 2 27 55·6	4.05 4.19 4.35	2 47 22·3 2 41 31·8 2 35 34·6 2 29 30·2 2 23 17·4	4·23 4·39 4·57	2 43 11.6 2 37 11.8 2 31 4.6 2 24 48.9 2 18 23.7	4.44 4.62 4.82	2 38 49.0 2 32.38.9 2 26 20.3 2 19 52.0 2 13 12.5	4.67	2 21 20·4 2 14 37·5	4.71 4.92 5.15 5.41 5.71	2 29 23.4 2 22 48.8 2 16 2.6 2 9 3.1 2 1 48.0	4.97 5.20 5.46 5.77 6.12

Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.
° 0 2 4 6 8	s. s.					
	-1.08 -4.62	-1·17 -4·64	-1·27 -4·66	-1·36 -4·69	-1:46 -4:72	-1.56 -4.75
	1.17 4.63	1·26 4·66	1·36 4·69	1·46 4·72	1:56 4:75	1.66 4.78
	1.26 4.66	1·35 4·69	1·45 4·72	1·55 4·75	1:65 4:78	1.76 4.82
	1.35 4.69	1·45 4·72	1·55 4·75	1·65 4·78	1:76 4:82	1.86 4.86
	1.45 4.72	1·55 4·75	1·65 4·78	1·76 4·82	1:87 4:86	1.98 4.91
10	1.55 4.75	1.66 4.79	1.76 4.82	1·87 4·86	1.98 4.91	2·10 4·96
12	1.66 4.79	1.77 4.83	1.88 4.87	1·99 4·91	2.11 4.96	2·22 5·01
14	1.77 4.83	1.89 4.87	2.00 4.91	2·12 4·96	2.24 5.02	2·36 5·07
16	1.90 4.87	2.01 4.91	2.13 4.97	2·25 5·02	2.38 5.08	2·51 5·14
17	1.96 4.90	2.08 4.95	2.20 5.00	2·32 5·05	2.45 5.11	2·59 5·18
18	2·02 4·92	2·14 4·98	2·27 5·03	2·40 5·09	2·53 5·15	2·67 5·22
19	2·09 4·95	2·22 5·01	2·34 5·06	2·47 5·13	2·61 5·19	2·75 5·27
20	2·16 4·98	2·29 5·04	2·42 5·10	2·56 5·16	2·70 5·24	2·84 5·31
21	2·23 5·01	2·37 5·07	2·50 5·14	2·64 5·21	2·78 5·28	2·94 5·36
22	2·31 5·05	2·45 5·11	2·58 5·18	2·73 5·25	2·88 5·33	3·03 5·42
23	2·39 5·09	2·53 5·15	2·67 5·22	2·82 5·30	2·98 5·39	3·14 5·48
24	2·47 5·12	2·62 5·20	2·76 5·27	2·92 5·35	3·08 5·44	3·25 5·54
25	2·56 5·17	2·71 5·24	2·86 5·32	3·02 5·41	3·19 5·51	3·37 5·61
26	2·65 5·21	2·80 5·29	2·96 5·38	3·13 5·47	3·30 5·57	3·49 5·69
27	2·74 5·26	2·90 5·35	3·07 5·44	3·24 5·54	3·43 5·65	3·62 5·77
28	2·85 5·31	3.01 5.41	3·18 5·50	3·37 5·61	3.56 5.73	3·77 5·86
29	2·95 5·37	3.12 5.47	3·31 5·58	3·50 5·69	3.70 5.82	3·92 5·96
30	3·06 5·44	3.25 5.54	3·44 5·65	3·64 5·78	3.86 5.92	4·09 6·07
31	3·18 5·50	3.37 5.62	3·58 5·74	3·79 5·88	4.02 6.03	4·27 6·20
32	3·31 5·58	3.51 5.70	3·73 5·83	3·96 5·98	4.20 6.15	4·47 6·34
33	3:45 5:66	3.66 5.79	3·89 5·94	4·14 6·10	4·40 6·29	4·69 6·49
34	3:60 5:75	3.82 5.90	4·07 6·06	4·33 6·24	4·62 6·44	4·94 6·67
35	3:76 5:85	4.00 6.01	4·26 6·19	4·55 6·39	4·86 6·62	5·21 6·88
36	3:93 5:97	4.19 6.14	4·48 6·34	4·79 6·56	5·14 6·82	5·53 7·12
37	4:12 6:09	4.41 6.29	4·72 6·51	5·06 6·76	5·45 7·06	5·89 7·40

LATITUDE 27°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 2 4 6 8	H. M. S. 5 21 52.9 5 12 16.5 5 2 35.6 4 52 49.8 4 42 58.6	2.25	H. M. S. 5 19 34.9 5 9 53.9 5 0 8.2 4 50 17.1 4 40 20.2		H. M. S. 5 17 15.0 5 7 29.2 4 57 38.2 4 47 41.5 4 37 38.5	s. -2·35 2·43 2·52 2·62 2·72	H. M. S. 5 14 53°0 5 5 2°0 4 55 5°5 4 45 2°8 4 34 53°2	s. -2·38 2·47 2·57 2·67 2·79		2·62 2·73	H. M. S. 5 10 2·2 4 59 59·8 4 49 51·0 4 39 35·0 4 29 11·1	s. -2.46 2.56 2.68 2.79 2.92
10 11 12 13 14	4 33 1.2 4 28 0.1 4 22 57.1 4 17 52.3 4 12 45.5		4 30 16·6 4 25 12·2 4 20 5·8 4 14 57·4 4 9 46·8	2·77 2·83 2·89 2·95 3·02	4 27 28·3 4 22 20·3 4 17 10·3 4 11 57·9 4 6 43·2		4 19 24·2 4 14 10·2 4 8 53·7	2.97				3.30 3.31 3.31 3.31
15 16 17 18 19	4 7 36·5 4 2 25·2 3 57 11·4 3 51 55·1 3 46 36·0	3·14 3·22	4 4 33.7 3 59 18.3 3 54 0.2 3 48 39.2 3 43 15.2	3.16	4 I 26·0 3 56 6·0 3 50 43·2 3 45 17·2 3 39 47·9	3.25	3 58 12·8 3 52 48·0 3 47 20·1 3 41 48·7 3 36 13·7	3.32	3 54 53.9 3 49 23.9 3 43 50.4 3 38 13.3 3 32 32.0	3.46 3.25 3.65	3 51 28·7 3 45 53·1 3 40 13·8 3 34 30·3 3 28 42·4	3.47 3.57 3.67 3.78 3.90
20 21 22 23 24	3 41 13.9 3 35 48.5 3 30 19.7 3 24 47.2 3 19 10.6	3.47 3.56	3 37 47.9 3 32 17.0 3 26 42.4 3 21 3.6 3 15 20.2		3 28 38·2 3 22 57·I	3.41 3.82	3 30 34.7 3 24 51.4 3 19 3.5 3 13 10.4 3 7 11.8	3.74 3.85 3.97 4.10 4.24	3 15 0·6 3 8 59·5	4.00 4.13 4.24	3 22 49.6 3 16 51.6 3 10 47.8 3 4 37.8 2 58 20.7	4.02 4.16 4.30 4.46 4.63
25 26 27 28 29	3 13 29.5 3 7 43.6 3 1 52.4 2 55 55.4 2 49 52.0	3.88 4.01 4.14 4.28 4.44	3 3 38·4 2 57 38·8 2 51 32·7		2 59 22.7	4·21 4·36 4·52 4·70 4·89		4·56 4·74 4·94	2 43 45.5	4·78 4·98 5·20	2 51 55.9 2 45 22.4 2 38 39.2 2 31 44.9 2 24 38.1	4.82 5.02 5.24 5.50 5.78
30 31 32 33 34	2 43 41.4 2 37 22.8 2 30 55.2 2 24 17.4 2 17 27.8	4·80 5·01 5·25	2 38 57·8 2 32 27·2 2 25 46·2 2 18 53·2 2 11 46·5	5.06 5.30 5.57	2 20 18·9 2 13 8·6	5·11 5·35 5·63 5·94 6·30		5.68 6.00 6.37			2 9 38.3	6·11 6·49 6·93 7·47 8·13

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
0 2 4 6 8	S. S. -1.66 -4.78 1.76 4.82 1.86 4.86 1.97 4.90 2.09 4.95	s. s. -1.76 -4.82 1.86 4.86 1.97 4.90 2.08 4.95 2.20 5.00	s. s. -1.87 -4.86 1.97 4.90 2.08 4.95 2.20 5.00 2.32 5.05	s. s. -1.97 -4.90 2.08 4.95 2.19 4.99 2.31 5.05 2.44 5.11	s. s. -2.08 -4.94 2.19 4.99 2.31 5.05 2.43 5.11 2.57 5.17	s. s. -2·19 -5·00 2·30 5·05 2·43 5·10 2·55 5·17 2·69 5·24
10	2·21 5·00	2·33 5·06	2.45 5.12	2·58 5·18	2·71 5·25	2·84 5·32
11	2·28 5·03	2·40 5·09	2.52 5.15	2·65 5·21	2·79 5·28	2·92 5·36
12	2·34 5·06	2·47 5·12	2.60 5.19	2·73 5·25	2·87 5·33	3·01 5·40
13	2·41 5·10	2·54 5·16	2.67 5.23	2·81 5·30	2·95 5·37	3·10 5·45
14	2·49 5·13	2·62 5·20	2.75 5.27	2·89 5·34	3·04 5·42	3·19 5·51
15	2·56 5·17	2·70 5·24	2·84 5·31	2·98 5·39	3°13 5°47	3·29 5·56
16	2·64 5·21	2·78 5·28	2·92 5·36	3·07 5·44	3°23 5°53	3·39 5·62
17	2·72 5·25	2·87 5·33	3·01 5·41	3·17 5·49	3°33 5°59	3·50 5·69
18	2·81 5·29	2·96 5·37	3·11 5·46	3·27 5·55	3°44 5°65	3·61 5·76
19	2·90 5·34	3·05 5·43	3·21 5·52	3·38 5·62	3°55 5°72	3·73 5·84
20	2·99 5·40	3·15 5·48	3·32 5·58	3°49 5°68	3.67 5.80	3·86 5·92
21	3·09 5·45	3·26 5·55	3·43 5·65	3°61 5°76	3.80 5.88	4·00 6·01
22	3·20 5·51	3·37 5·61	3·55 5·72	3°74 5°84	3.94 5.97	4·15 6·11
23	3·31 5·58	3·49 5·68	3·68 5·80	3°87 5°93	4.09 6.07	4·31 6·23
24	3·43 5·65	3·61 5·76	3·81 5·89	4°02 6°03	4.25 6.18	4·49 6·35
25	3.55 5.72	3.75 5.85	3.96 5.98	4·18 6·13	4·42 6·30	4.68 6.49
26	3.69 5.81	3.89 5.94	4.12 6.09	4·35 6·25	4·61 6·44	4.89 6.64
27	3.83 5.90	4.05 6.05	4.29 6.21	4·54 6·39	4·82 6·59	5.12 6.81
28	3.99 6.00	4.22 6.16	4.47 6.34	4·75 6·53	5·05 6·76	5.38 7.01
29	4.16 6.12	4.41 6.29	4.68 6.48	4·98 6·70	5·31 6·95	5.67 7.23
30	4·34 6·24	4·61 6·43	4.91 6.65	5·23 6·89	5.60 7.17	6.01 7.50
31	4·54 6·38	4·83 6·60	5.16 6.84	5·52 7·11	5.93 7.43	6.39 7.81
32	4·76 6·54	5·09 6·78	5.44 7.05	5·85 7·37	6.31 7.74	6.84 8.18
33	5·01 6·73	5·37 7·00	5.76 7.31	6·22 7·67	6.75 8.11	7.37 8.64
34	5·29 6·94	5·69 7·24	6.14 7.60	6·65 8·04	7.25 8.57	7.38 9.22

LATITUDE 28°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 6 8 10 12	H. M. S. 6 0 0.0 5 32 48.2 5 23 43.5 5 14 37.9 5 5 31.3	2·14 2·15 2·17	H. M. S. 5 57 52.4 5 30 39.4 5 21 33.8 5 12 27.1 5 3 19.3	2.15	H. M. S. 5 55 44.7 5 28 29.8 5 19 23.2 5 10 15.3 5 1 5.9	2·17 2·19 2·17	5 17 11.5	2·18 2·20 2·23	5 24 8·0 5 14 58·6	s. -2·14 2·20 2·22 2·26 2·29	5 12 44·5 5 3 31·4	s. -2·15 2·21 2·25 2·28 2·32
14 16 18 19 20	4 56 23.5 4 47 14.3 4 38 3.3 4 33 27.1 4 28 50.3	2·24 2·27 2·29	4 54 10.0 4 44 59.0 4 35 46.0 4 31 8.6 4 26 30.7			2·30 2·34 2·37	4 49 38.0 4 40 22.6 4 31 4.8 4 26 24.7 4 21 43.9	2·34 2·38 2·41	4 47 19·1 4 38 1·3 4 28 40·5 4 23 58·9 4 19 16·4	2·33 2·37 2·43 2·45 2·48	4 21 30.3	2·36 2·41 2·47 2·50 2·53
2I 22 23 24 25	4 24 12·9 4 19 35·0 4 14 56·3 4 10 16·9 4 5 36·8	2.32		2.39	4 IO 5.9 4 5 23.2	2·44 2·47 2·50		2·49 2·52 2·56	4 5 3.1	2·51 2·55 2·58 2·62 2·65	4 7 14·2 4 2 26·6 3 57 37·7	2·57 2·60 2·64 2·68 2·72
26 27 28 29 30	4 0 55.7 3 56 13.8 3 51 31.0 3 46 47.0 3 42 2.0	2·48 2·51 2·54	3 58 27.0 3 53 43.3 3 48 58.4 3 44 12.4 3 39 25.1	2·54 2·57 2·61	3 55 54.9 3 51 9.1 3 46 22.0 3 41 33.7 3 6 43.9	2.60 2.64 2.68	3 53 19·1 3 48 31·0 3 43 41·6 3 38 50·7 3 33 58·2	2.67 2.71 2.75	3 50 39.4 3 45 48.9 3 40 56.8 3 36 3.1 7.7	2·69 2·74 2·78 2·83 2·88	3 43 2·4 3 38 7·5 3 30 10·8	2·76 2·81 2·86 2·91 2·97
31 32 33 34 35	3 37 15.8 3 32 28.3 3 27 39.4 3 22 49.0 3 17 57.0	2·66 2·70 2·75	3 34 36·5 3 29 46·4 3 24 54·8 3 20 1·5 3 15 6·4	2.74	3 31 52·7 3 26 59·8 3 22 5·2 3 17 8·7 3 12 10·2	2.93	3 29 4·1 3 24 8·1 3 19 10·3 3 14 10·3 3 9 8·0	2.96	3 26 10·4 3 21 11·1 3 16 9·7 3 11 5·8 3 5 59·5	2·94 3·Q0 3·06 3·13 3·20	3 7 55.0	3.03 3.09 3.16 3.24 3.32
36 37 38 39 40	3 13 3·2 3 8 7·5 3 3 9·8 2 58 9·8 2 53 7·4	2·97	3 10 9·3 3 5 10·1 3 0 8·5 2 55 4·5 2 49 57·6		3 2 6·3 2 57 0·6 2 51 52·0	3.10	3 4 3.3 2 58 55.8 2 53 45.5 2 48 31.8 2 43 14.7	3·32 3·40	3 0 50·3 2 55 38·1 2 50 22·6 2 45 3·5 2 39 40·4	3·28 3·36 3·45 3·54 3·65	2 46 51·6 2 41 26·4	3.40 3.49 3.59 3.70 3.81
41 42 43 44 45	2 48 2·3 2 42 54·3 2 37 43·0 2 32 28·1 2 27 9·3	3·26 3·35 3·45	2 44 47.7 2 39 34.5 2 34 17.6 2 28 56.6 2 23 31.1	3·40 3·50	2 30 42·9 2 25 15·1	3:55 3:66 3:78	2 37 53.6 2 32 28.3 2 26 58.1 2 21 22.6 2 15 40.9	3.71 3.84 3.98	2 34 12·8 2 28 40·3 2 23 2·3 2 17 18·0 2 11 26·8	3.77 3.89 4.03 4.19 4.36	2 18 54·4 2 13 0·3	3.94 4.08 4.24 4.42 4.62
		V.	ARIATIO	N TO	ı' OF	LAT	TUDE A	AND	ALTITU:	DE.		
Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	Α.	L. 3°	Α.	L. 4°	Α.	L. 5°	A.
0 2 4 6 8	s. - '00 - '09 '17 '25 '34	s. -4·53 4·53 4·54 4·54	s. - '09 '17 '26 '34 '43	s. -4·53 4·53 4·54 4·54 4·55	s. - ·18 - ·26 ·35 ·44 ·52	s. -4·53 4·54 4·54 4·55 4·56	s. - '27 - '35 '44 '53 '62	s. -4.53 4.54 4.55 4.56 4.57	s. - ·36 - ·44 ·53 ·62 ·71	s. -4·54 4·55 4·56 4·57 4·58	s. - '45 - '54 '62 '71 '80	s. -4·55 4·56 4·57 4·59 4·60
10 12 14 16 18	*43 *51 *60 *70 *79	4.55 4.56 4.57 4.58 4.60	·52 ·61 ·70 ·80 ·89	4.56 4.57 4.58 4.60 4.62	·61 ·70 ·80 ·89 ·99	4.57 4.58 4.60 4.62 4.64	•71 •80 •89 •99 ••10	4.58 4.60 4.62 4.64 4.66	·80 ·89 ·99 I·09 I·20	4·60 4·62 4·64 4·66 4·69	.90 .99 1.30 1.30	4·62 4·64 4·66 4·69 4·72
20 22 24 26 28	.89 I.00 I.10 I.22 I.33	4.62 4.64 4.66 4.69 4.72	1.00 1.10 1.33 1.45	4.64 4.66 4.69 4.72 4.76	1·10 1·21 1·32 1·44 1·57	4.66 4.69 4.72 4.75 4.79	1·20 1·32 1·43 1·56 1·69	4.69 4.72 4.75 4.79 4.84	1.31 1.43 1.55 1.68 1.82	4·72 4·75 4·79 4·83 4·88	1.42 1.54 1.66 1.80 1.94	4.75 4.78 4.83 4.87 4.93
30 32 34 36 38	1.46 1.60 1.74 1.90 2.07	4.76 4.80 4.85 4.91 4.98	1.58 1.72 1.88 2.04 2.22	4.80 4.85 4.90 4.97 5.05	1.71 1.86 2.01 2.19 2.38	4·84 4·90 4·96 5·03 5·12	1.84 1.99 2.16 2.35 2.55	4.89 4.95 5.02 5.10 5.20	1.97 2.13 2.31 2.51 2.73	4.94 5.01 5.08 5.18 5.29	2·10 2·28 2·46 2·68 2·91	4.99 5.07 5.16 5.26 5.39
40 42 43 44 45	2·26 2·47 2·59 2·71 2·85	5.06 5.16 5.22 5.28 5.35	2.43 2.66 2.78 2.92 3.06	5·14 5·25 5·32 5·39 5·47	2.60 2.85 2.98 3.13 3.29	5.22 5.35 5.42 5.51 5.60	2·79 3·05 3·20 3·36 3·54	5·32 5·46 5·55 5·64 5·75	2·98 3·27 3·44 3·61 3·81	5.42 5.59 5.69 5.80 5.92	3·19 3·50 3·89 4·11	5.54 5.73 5.84 5.97 6.11

LATITUDE 28°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
0 2 4 6 8	H. M. S., 5 47 11·1 5 38 3·0 5 28 53·4 5 19 42·2 5 10 29·1	2.20	5 35 52.0 5 26 40.7 5 17 27.5	s. -2·16 2·19 2·22 2·26 2·30	H. M. S. 5 42 51.5 5 33 40.1 5 24 26.8 5 15 11.4 5 5 53.6	s. -2·17 2·21 2·24 2·28 2·32	5 31 27·2 5 22 11·8	s. -2·19 2·22 2·26 2·30 2·35	H. M. S. 5 38 28.9 5 29 13.3 5 19 55.4 5 10 34.8 5 1 11.3	2.33	H. M. S. 5 36 16·2 5 26 58·2 5 17 37·6 5 8 14·0 4 58 47·2	s. -2·22 2·26 2·31 2·36 2·42
10 12 14 15 16	5 I 13.7 4 51 55.9 4 42 35.3 4 37 53.8 4 33 II.5	2·35 2·40 2·43	4 58 54·3 4 49 33·7 4 40 10·0 4 35 26·8 4 30 42·7	2·44 2·47	4 56 33.0 4 47 9.4 4 37 42.3 4 32 57.3 4 28 11.3		4 54 9.7 4 44 42.8 4 35 12.0 4 30 25.1 4 25 37.0	2.56	4 32 39.0 4 27 49.9 4 22 59.6	2·57 2·61	4 49 16·8 4 39 42·2 4 30 3·1 4 25 11·6 4 20 18·8	2·48 2·55 2·62 2·66 2·71
17 18 19 20 21	4 28 28·2 4 23 44·0 4 18 58·8 4 14 12·6 4 9 25·1	2.52	4 25 57·7 4 21 11·5 4 16 24·3 4 11 35·8 4 6 46·1	2.57	4 23 24·2 4 18 36·0 4 13 46·4 4 8 55·6 4 4 3·4	2·62 2·66 2·70	4 20 47.7 4 15 57.1 4 11 5.2 4 6 11.8 4 1 16.9	2·64 2·68 2·72 2·76 2·81	4 13 14.8	2·74 2·78 2·83	4 15 24.6 4 10 28.8 4 5 31.4 4 0 32.3 3 55 31.3	2·75 2·80 2·85 2·90 2·95
	4 4 36·4 3 59 46·5 3 54 55·1 3 50 2·2 3 45 7·7	2·74 2·79	4 I 55.0 3 57 2.4 3 52 8.4 3 47 12.6 3 42 15.1	2·77 2·81	3 59 9.7 3 54 14.4 3 49 17.4 3 44 18.5 3 39 17.7	2·79 2·84 2·89 2·94 3·00	3 41 19.6	3·02	3 53 26.6 3 48 25.0 3 43 21.4 3 38 15.5 3 33 7.3	3·11 3·05 3·11	3 50 28·3 3 45 23·2 3 40 15·8 3 35 6·0 3 29 53·6	3.01 3.07 3.14 3.21 3.28
28	3 40 II·5 3 35 I3·4 3 30 I3·4 3 25 II·2 3 20 6·7	2·94 3·06 3·06	3 37 15·7 3 32 14·2 3 27 10·6 3 22 4·5 3 16 55·9	3.16	3 34 14·8 3 29 9·7 3 24 2·1 3 18 51·8 3 13 38·7		3 25 59·3 3 20 47·5	3.22		3.33		3·36 3·44 3·53 3·62 3·73
33 34 35	3 14 59.7 3 9 50.0 3 4 37.4 2 59 21.6 2 54 2.3	3·27 3·35 3·44		3.57	3 3 3·1 2 57 39·8	3.43 3.52 3.61 3.72 3.83	2 59 28·1 2 53 58·8 2 48 25·0	3.87		3·80 3·92 4·04	2 57 30·4 2 51 52·2 2 46 8·8 2 40 19·6 2 34 23·9	3.84 3.96 4.09 4.23 4.39
38 39 40	2 48 39·1 2 43 11·8 2 37 39·7 2 32 2·6 2 26 19·5	3·74 3·86 3·99	2 44 56·6 2 39 22·3 2 33 42·8 2 27 57·3 2 22 5·0	4.04 4.01	2 41 4·5 2 35 22·5 2 29 34·5 2 23 39·7 2 17 37·3		2 31 11.3	4.46	2 26 47.6 2 20 39.6 2 14 22.4	4.21		4·56 4·76 4·97 5·21 5·49

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
0 2 4 6 8	s. s. - '54 -4'56 '63 4'57 '71 4'59 '80 4'60 '90 4'62	s. s. 63 -4.57 .72 4.59 .81 4.60 .90 4.62 .99 4.64	s. s. - '72 -4'59 '81 4'60 '90 4'62 '99 4'64 1'09 4'66	S. S. - ·82 - 4·60 ·90 4·62 I·00 4·64 I·09 4·66 I·19 4·68	s. s. - '91 - 4·62 1·00 4·64 1·09 4·66 1·19 4·68 1·29 4·71	s. s. -1.00 -4.64 1.09 4.66 1.19 4.68 1.29 4.71 1.39 4.74
10	.99 4.64	1.09 4.66	1·19 4·68	1·29 4·71	1·39 4·74	1.49 4.77
12	1.09 4.66	1.19 4.68	1·29 4·71	1·39 4·74	1·50 4·77	1.61 4.81
14	1.19 4.69	1.30 4.71	1·40 4·74	1·50 4·77	1·61 4·81	1.72 4.85
16	1.30 4.71	1.40 4.74	1·51 4·78	1·62 4·81	1·73 4·85	1.85 4.89
18	1.41 4.74	1.52 4.78	1·63 4·81	1·74 4·85	1·86 4·90	1.98 4.94
20	1.53 4.78	1.64 4.82	1.75 4.86	1·87 4·90	1.99 4.95	2·12 5·00
22	1.65 4.82	1.77 4.86	1.89 4.91	2·01 4·96	2.14 5.01	2·27 5·07
24	1.78 4.87	1.91 4.91	2.03 4.97	2·16 5·02	2.30 5.08	2·43 5·14
26	1.93 4.92	2.05 4.97	2.19 5.03	2·32 5·09	2.47 5.16	2·61 5·23
28	2.08 4.98	2.21 5.04	2.36 5.11	2·50 5·17	2.65 5.25	2·81 5·33
30	2·24 5·06	2·39 5·12	2·54 5·19	2·70 5·27	2·86 5·36	3.04 5.45
32	2·43 5·14	2·58 5·21	2·75 5·30	2·92 5·39	3·10 5·49	3.29 5.60
34	2·63 5·24	2·80 5·32	2·97 5·42	3·16 5·53	3·36 5·64	3.58 5.77
35	2·74 5·29	2·91 5·39	3·10 5·49	3·30 5·60	3·51 5·73	3.74 5.87
36	2·85 5·35	3·04 5·46	3·24 5·57	3·45 5·69	3·67 5·83	3.91 5.99
37	2·98 5·42	3·17 5·53	3·38 5·65	3.61 5.79	3.85 5.94	4·11 6·11
38	3·11 5·49	3·32 5·61	3·54 5·75	3.78 5.90	4.04 6.07	4·32 6·26
39	3·25 5·58	3·47 5·71	3·71 5·86	3.97 6.02	4.25 6.21	4·56 6·42
40	3·41 5·67	3·64 5·81	3·90 5·98	4.18 6.16	4.48 6.37	4·82 6·62
41	3·57 5·77	3·83 5·94	4·11 6·11	4.41 6.32	4.74 6.56	5·12 6·83

LATITUDE 28°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 34 2.6 5 24 41.8 5 15 18.3 5 5 51.5 4 56 21.1	2·34 2·39	H. M. S. 5 31 47.7 5 22 24.1 5 12 57.2 5 3 26.9 4 53 52.7	s. -2.26 2.31 2.36 2.43 2.49	H. M. S. 5 29 31.7 5 20 4.8 5 10 34.5 5 1 0.3 4 51 21.9	2·34 2·40 2·46		2·43 2·50	H. M. S. 5 24 55°2 5 15 21°1 5 5 42°9 4 56 0°2 4 46 12°5		5 12 56.5	s. -2·36 2·43 2·50 2·58 2·67
10 12 14 16 17	4 46 46·7 4 37 7·9 4 27 24·1 4 17 34·7 4 12 37·7	2.60 2.68 2.77	4 44 14·1 4 34 30·7 4 24 41·9 4 14 46·9 4 9 46·8	2.73	4 41 38·8 4 31 50·4 4 21 56·1 4 11 55·2 4 6 51·9	2·61 2·70 2·79 2·90 2·95	4 29 6·8 4 19 6·7 4 8 59·3	2.75		2·81 2·92 3·04	4 33 34.7 4 23 29.0 4 13 15.8 4 2 54.0 3 57 39.5	2.77 2.88 3.00 3.12 3.19
18 19 20 21 22	4 7 38·9 4 2 38·5 3 57 36·1 3 52 31·7 3 47 25·1	2·97	4 4 45.0 3 59 41.2 3 54 35.3 3 49 27.2 3 44 16.7	3.02 3.02	4 I 46.7 3 56 39.3 3 51 29.6 3 46 17.5 3 41 2.9	3 07 3.14 3.21	3 58 43.6 3 53 32.4 3 48 18.7 3 43 2.3 3 37 43.0	3·16 3·23 3·30	3 55 35.7 3 50 20.3 3 45 2.2 3 39 41.2 3 34 16.9	3.32 3.41	3 52 22.4 3 47 2.6 3 41 39.7 3 36 13.6 3 30 44.1	3·27 3·35 3·43 3·52 3·61
23 24 25 26 27	3 42 16·2 3 37 4·8 3 31 50·7 3 26 33·7 3 21 13·5	3·33 3·31	3 39 3.7 3 33 47.9 3 28 29.1 3 23 7.2 3 17 41.8	3.41	3 35 45 3 3 30 24 8 3 25 1 0 3 19 33 6 3 14 2 5	3.44 3.53 3.62	3 32 20.7 3 26 55.0 3 21 25.7 3 15 52.5 3 10 15.0	3.47 3.56 3.65 3.75 3.86	3 23 18·1 3 17 42·8 3 12 3·2	3.58 3.68 3.78 3.90 4.02	3 8 5.0	3.51 3.81 3.93 4.05 4.18
28 29 30 31 32	3 15 50·0 3 10 22·8 3 4 51·6 2 59 16·0 2 53 35·6	3.66 3.76 3.87	3 1 1.2	4.04	3 8 27·I 3 2 47·I 2 57 2·2 2 5I II·7 2 45 I5·I	3.83 3.95 4.07 4.21 4.36	2 58 45.6 2 52 52.8 2 46 53.6		2 54 33.9	4.61		4·32 4·48 4·65 4·84 5·05
33 34 35 36 37	2 47 49.8 2 41 58.2 2 35 59.9 2 29 54.5 2 23 40.7	4·27 4·43 4·61	2 43 36.7 2 37 35.9 2 31 27.6 2 25 10.9 2 18 44.7	4·48 4·66 4·86	2 39 11.7 2 33 0.7 2 26 41.2 2 20 11.8 2 13 31.4	4·70 4·91 5·13	2 21 38·9 2 14 55·2	4·95 5·18 5·44	2 16 19·1 2 9 18·7	5·24 5·50 5·80	2 24 33.4 2 17 43.1 2 10 39.2 2 3 19.4 1 55 40.7	5.29 5.55 5.86 6.22 6.63

	VARIABLE TO THE PROPERTY OF TH										
Alt.	L. 12° A.	L. 13° A.	L. 14° A.	L. 15° A.	L. 16° A.	L. 17° A.					
0	s. s.	S. S.	s. s.	s. s.	s. s.	S. S.					
0	-1·10 -4·66	-1.19 -4.68	-1.29 -4.71	-1.39 -4.74	-1.49 -4.77	-1.59 -4.80 1.69 4.84					
4	1·19 4·68	1.39 4.71	I·39 4·74 I·49 4·77	1.49 4.78 1.59 4.80	1·59 4·80 1·69 4·84	1.80 4.87					
6	1.39 4.74	1.49 4.77	1.59 4.80	1.70 4.83	1.80 4.87	1.01 4.01					
8	1.49 4.77	1.59 4.80	1.70 4.84	1.81 4.88	1.92 4.92	2.03 4.97					
10	1.60 4.80	1.71 4.84	1.82 4.87	7400 4400	410.7	2.16 2.01					
12	1.71 4.84	1.82 4.88	1.94 4.93	1.93 4.92 2.05 4.97	2.04 4.97 2.17 5.02	2.29 5.08					
14	1.83 4.89	1.95 4.93	2.07 4.98	2.10 2.03	2.31 2.00	2.44 2.12					
16	1.96 4.94	2.08 4.99	2.20 2.04	2.33 2.10	2.46 2.16	2.59 5.22					
17	2.03 4.96	2.12 2.03	2.28 5.07	2.41 2.13	2.24 2.10	2.68 5.26					
	7 - 3 - 7 - 7	1 - 3 3 3 - 2	1 20 30,	~ 7~ 3~3	7 57 5 - 9]					
18	2.10 4.99	2.22 5.05	2.35 5.10	2.49 5.17	2.62 5.23	2.77 5.31					
19	2.17 5.02	2.30 5.08	2.43 2.14	2.57 5.21	2.71 5.28	2.86 5.36					
20	2.25 5.06	2.38 5.12	2.21 2.18	2.65 5.25	2.80 5.33	2.95 5.41					
21	2.32 5.09	2.46 5.15	2.60 5.22	2.74 5.30	2.90 5.38	3.05 5.46					
22	2.41 2.13	2.24 2.50	2.69 5.27	2.84 5.35	3.00 2.43	3.16 2.25					
23	2.49 5.17	2.63 5.24	2.78 5.32	2.94 5.40	3.10 2.49	3.27 5.59					
24	2.58 5.21	2.73 5.29	2.88 5.37	3.04 5.46	3.21 5.22	3.39 5.66					
25	2,67 5.26	2.83 5.34	2.99 5.43	3.12 2.92	3.33 5.62	3.52 5.74					
26	2.77 5.31	2.93 5.39	3.10 2.49	3.27 5.54	3.46 5.70	3.66 5.82					
27	2.87 5.36	3.04 2.45	3.51 2.22	3.40 5.66	3.59 5.78	3.80 2.91					
28	2.98 5.42	3.15 5.52	3.34 5.63	3.53 5.74	3.74 5.87	3.96 6.02					
29	3.10 5.49	3.58 2.29	3.47 5.71	3.68 5.83	3.89 5.97	4.13 6.13					
30	3.22 5.56	3.41 5.67	3.61 5.79	3.83 5.93	4.06 6.09	4.31 6.26					
31	3.35 5.63	3.55 5.76	3.82 5.89	4.00 6.04	4125 6.21	4.52 6.40					
32	3.49 5.72	3.70 5.85	3.93 6.00	4.18 6.16	4.45 6.35	4.74 6.56					
33	3.64 5.81	3.87 5.96	4.11 6.13	4.38 6.30	4.67 6.51	4.99 6.74					
34	3.80 5.92	4.05 6.08	4.31 6.25	4.60 6.46	4.92 6.69	5.27 6.95					
35	3.98 6.03	4.54 6.51	4.23 6.41	4.85 6.63	5.20 6.89	5.59 7.20					
36	4.18 6.16	4.46 6.36	4.77 6.58	5.12 6.84	5.51 7.14	5.95 7.49					
37	4.39 6.30	4.70 6.53	5.04 6.78	5.43 7.07	5.87 7.42	6.38 7.83					
٠,		,	1 3 -1	1 0 40 . 47	1	1					

LATITUDE 28°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° 0 2 4 6 7	H. M. S. 5 20 12:4 5 10 29:8 5 0 42:5 4 50 50:0 4 45 51:5	2.63		s. -2·42 2·50 2·59 2·68 2·73	H. M. S. 5 15 21·9 5 5 29·6 4 55 31·9 4 45 28·0 4 40 23·6	s. -2·46 2·54 2·63 2·74 2·79	H. M. S. 5 12 53.5 5 2 55.9 4 52 52.3 4 42 42.2 4 37 34.4	s. -2.49 2.58 2.68 2.79 2.85	5 0 19.4 4 50 9.7 4 39 52.8	s. -2.53 2.63 2.74 2.85 2.91	4 47 23.7 4 36 59.8	s. -2·58 2·68 2·79 2·92 2·98
8 9 10 11 12	4 40 51.5 4 35 49.9 4 30 46.6 4 25 41.4 4 20 34.3	2.83	4 38 6·1 4 33 1·4 4 27 54·7 4 22 46·1 4 17 35·4	2·78 2·84 2·90 2·96 3·02		3.03	4 32 24.7 4 27 12.9 4 21 58.9 4 16 42.6 4 11 23.9	2:91 2:97 3:04 3:11 3:18	4 18 54·4 4 13 33·8	3.13 3.15	4 26 27.2 4 21 7.4 4 15 45.0 4 10 19.9 4 4 51.9	3.05 3.12 3.20 3.28 3.36
13 14 15 16 17	4 15 25.2 4 10 13.8 4 5 0.3 3 59 44.1 3 54 25.2	3.00 3.07 3.14 3.21 3.29	4 I 49.3 3 56 28.7	3.09 3.15 3.23 3.30 3.38	3 58 33.0	3·17 3·24 3·32 3·40 3·49	4 6 2.4 4 0 38.2 3 55 11.0 3 49 40.5 3 44 6.5	3.42 3.21	4 2 44.5 3 57 15.3 3 51 42.9 3 46 6.8 3 40 27.1	3.43 3.52 3.62	3 59 20·7 3 53 46·2 3 48 8·1 3 42 26·2 3 36 40·1	3'45 3'54 3'64 3'74 3'85
18 19 20 21 22	3 49 3.6 3 43 38.8 3 38 10.7 3 32 39.3 3 27 4.0	3.45	3 45 38·6 3 40 8·7 3 34 35·2 3 28 57·8 3 23 16·1	3.47 3.56 3.65 3.76 3.87	3 36 31·7 3 30 52·1	3.58 3.68 3.78 3.89 4.01	3 38 28·9 3 32 47·2 3 21 10·4 3 15 14·4	3.81	3 34 43 ² 3 28 54 ⁹ 3 23 1 ⁷ 3 17 3 ³ 3 10 59 ¹	3°94 4°07	3 30 49'4 3 24 53'9 3 18 53'0 3 12 46'3 3 6 33'1	3'97 4'09 4'23 4'37 4'53
23 24 25 26 27	3 21 24·5 3 15 40·5 3 9 51·6 3 3 57·3 2 57 57·1	3.84 3.96 4.08 4.21 4.36	3 11 38·7 3 5 42·0 2 59 39·2		3 1 21.7	4.43		4·31 4·63 4·81 5·01	2 58 31·2 2 52 5·9 2 45 32·0	4·85 5·06	3 0 12·8 2 53 44·8 2 47 7·8 2 40 21·0 2 33 23·1	4.70 4.89 5.09 5.33 5.58
28 29 30 31 32	2 51 50·3 2 45 36·2 2 39 14·0 2 32 42·6 2 26 0·9	5.10		4.93 5.15 5.39	2 42 22·I 2 35 44·7 2 28 56·5 2 2I 56·I 2 I4 4I·5	4·97 5·19 5·44 5·71 6·03	2 30 24.9 2 23 21.1 2 16 2.9	5.49 5.77 6.09	2 17 24·6 2 9 45·7	5·82 6·14 6·52	2 3 0.4	5.86 6.19 6.58 7.03 7.56

Alt.	L. 18° A	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
°	s. s. -1.69 -4.8	-1.80 - 4.87	s. s. -1.90 -4.91	s. s. -2.01 -4.96	s. s. -2·12 -5·00	s. s. -2*24 -5*05
2	1.80 4.8	7 1.90 4.91	2.01 4.96	2.13 2.00	2.24 2.02	2.36 2.11
4	1.91 4.9	1 2.02 4.96	2.13 2.00	2.25 5.06	2.36 2.11	2.48 5.17
6	2.02 4.0	6 2.14 2.01	2.25 5.06	2.37 2.11	2.20 2.17	2.62 5.23
7	2.08 4.0	9 2.50 2.04	2.32 5.09	2.44 2.12	2.22 2.31	2.70 5.27
8	2.15 5.0	2.26 5.06	2.39 2.13	2.21 2.18	2.64 5.24	2.77 5.31
9	2.51 2.0	4 2.33 5.09	2.46 5.15	2.58 5.21	2.71 5.28	2.85 5.35
10	2.28 5.0	7 2.40 5.13	2.23 2.10	2.66 5.25	2.79 5.32	2.93 5.40
II	2.32 2.1	0 2.47 5.16	2.60 5.22	2.74 5.29	2.87 5.36	3.02 2.44
12	2.42 2.1	3 2.55 5.20	2.68 5.26	2.82 5.33	2.96 2.41	3.11 2.49
13	2.49 2.1	7 2.62 5.24	2.76 5.30	2.90 5.38	3.05 5.46	3.50 2.22
14	2.57 5.2	2.71 5.28	2.84 5.35	2.99 5.43	3.14 2.21	3.30 5.60
15	2.65 5.2	5 2.79 5.32	2.93 5.40	3.08 5.48	3.24 5.57	3.40 5.67
16	2.73 5.2	9 2.88 5.37	3.03 5.45	3.18 2.24	3.34 2.63	3.21 2.43
17	2.82 5.3	2.97 5.42	3.15 2.20	3.50 2.60	3.45 5.40	3.63 5.81
18	2.91 5.3	3.07 5.47	3.23 5.26	3.39 5.66	3.57 5.77	3.76 5.88
19	3.01 2.4		3.34 2.63	3.21 2.23	3.69 5.85	3.89 5.97
20	3.11 2.2		3.45 5.69	3.63 5.81	3.83 5.93	4.03 6.06
21	3.55 2.5		3.57 5.77	3.76 5.89	3.97 6.02	4.18 6.17
22	3.33 2.6	3.21 2.43	3.40 2.82	3.90 5.98	4.15 6.15	4.35 6.28
23	3.45 5.2	0 3.64 5.81	3.84 5.94	4.05 6.08	4.28 6.23	4.23 6.40
24	3.58 5.7	7 3.78 5.90	3.99 6.04	4.22 6.10	4.46 6.36	4.72 6.54
25	3.72 5.8		4.12 6.14	4.39 6.31	4.65 6.49	4.93 6.70
26	3·86 5·9	5 4.09 6.10	4.33 6.26	4.58 6.44	4.86 6.65	5.17 6.87
27	4.02 6.0	6 4.36 6.33	4.2 6.40	4.79 6.59	5.10 6.83	5.43 7.07
28	4.19 6.1	7 4.45 6.35	4.72 6.54	5.03 6.77	5.36 7.02	5.73 7.30
29	4.38 6.3		4.95 6.71	5.28 6.96	5.65 7.24	6.06 7.57
30	4.20 6.4		5.21 6.90	5.28 2.18	5.99 7.51	6.45 7.88
31	4.81 6.6		5.20 2.13	5.91 7.44	6.37 7.82	6.91 8.26
32	5.06 6.7	9 5.42 7.06	5.82 7.38	6.29 7.75	6.83 8.19	7.45 8.72

LATITUDE 29°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4 °	Decl. Var.	5°	Decl. Var.
0 6 8 10 12	H. M. S. 6 0 0.0 5 32 32.7 5 23 22.5 5 14 11.5 5 4 59.6	s. 2·22 2·24 2·25 2·26 2·28	H. M. S. 5 57 46.9 5 30 18.3 5 21 7.3 5 11 55.3 5 2 41.9	s. -2·22 2·25 2·26 2·28 2·31	H. M. S. 5 55 33.8 5 28 3.2 5 18 51.1 5 9 37.8 5 0 22.8	2.30	H. M. S. 5 53 20.5 5 25 47.2 5 16 33.8 5 7 18.9 4 58 2.1	s. -2·22 2·27 2·30 2·36	H. M. S. 5 51 6·9 5 23 30·3 5 14 15·4 5 4 58·6 4 55 39·7	2.35	H. M. S. 5 48 52.9 5 21 12.3 5 11 55.6 5 2 36.7 4 53 15.5	s. -2·24 2·31 2·34 2·38 2·42
14 16 18 19 20	4 55 46·2 4 46 31·2 4 37 14·3 4 32 35·1 4 27 55·2	2·37 2·39	4 53 26·9 4 44 10·1 4 34 51·0 4 30 10·6 4 25 29·4	2·37 2·41 2·43	4 51 5.9 4 41 47.0 4 32 25.5 4 27 43.7 4 23 1.1	2·45 2·47	4 48 43·1 4 39 21·7 4 29 57·5 4 25 14·2 4 20 30·1	2.49 2.21	4 46 18·3 4 36 54·3 4 27 27·0 4 22 42·0 4 17 56·1	2.48 2.53 2.56	4 43 51.5 4 34 24.4 4 24 53.8 4 20 7.0 4 15 19.1	2·47 2·52 2·58 2·61 2·64
21 22 23 24 25	4 23 14·8 4 18 33·5 4 13 51·6 4 9 8·9 4 4 25·3	2.45		2·50 2·53 2·56	4 18 17·7 4 13 33·4 4 8 48·1 4 4 2·0 3 59 14·7	2·55 2·58 2·61	4 15 44.9 4 10 58.9 4 6 11.7 4 1 23.5 3 56 34.0	2·75 2·60 2·63 2·67 2·71		2·66 2·69 2·73	4 10 30·2 4 5 40·0 4 0 48·5 3 55 55·5 3 51 1·2	2.68 2.72 2.76 2.80 2.84
26 27 28 29 30	3 59 40.7 3 54 55.2 3 50 8.6 3 45 20.8 3 40 31.9	2·59 2·63 2·66	3 57 5·2 3 52 17·7 3 47 29·0 3 42 39·0 3 37 47·5	2·66 2·69 2·73	3 54 26·2 3 49 36·4 3 44 45·3 3 39 52·8 3 34 58·7	2·72 2·76 2·81	3 51 43·3 3 46 51·1 3 41 57·4 3 37 2·2 3 32 5·2		3 48 56·4 3 44 1·5 3 39 5·1 3 34 6·8 3 29 6·7	2·86 2·91 2·96	3 46 5·2 3 41 7·5 3 36 8·0 3 31 6·4 3 26 2·8	2·89 2·94 2·99 3·05 3·11
31 32 33 34 35	3 35 41.5 3 30 49.8 3 25 56.5 3 21 1.5 3 16 4.7	2·83 2·88	3 32 54.7 3 28 0.1 3 23 3.9 3 18 5.8 3 13 5.6	2·87 2·92 2·97	3 30 3.0 3 25 5.5 3 20 6.0 3 15 4.5 3 10 0.6	3.01 5.95	3 27 6.4 3 22 5.5 3 17 2.5 3 11 57.2 3 6 49.3			3.14	3 20 56·8 3 15 48·4 3 10 37·3 3 5 23·2 3 0 5·9	3·18 3·25 3·32 3·40 3·49
36 37 38 39 40	3 11 6·0 3 6 5·1 3 1 1·8 2 55 56·1 2 50 47·6	3·06 3·12 3·19	3 8 3·3 3 2 58·5 2 57 51·1 2 52 40·9 2 47 27·5	3·32 3·32	3 4 54·3 2 59 45·3 2 54 33·3 2 49 18·1 2 43 59·4	3·36 3·45	3 I 38.6 2 56 24.9 2 5I 7.9 2 45 47.2 2 40 22.5	3.40 3.49 3.59	2 58 15.7 2 52 56.9 2 47 34.2 2 42 7.4 2 36 36.1	3·54 3·63 3·74	2 54 45.2 2 49 20.6 2 43 51.8 2 38 18.2 2 32 39.6	3.58 3.68 3.79 3.91 4.04
41 42 43 44 45	2 45 36·1 2 40 21·2 2 35 2·7 2 29 40·0 2 24 12·7	3.44 3.54 3.65	2 42 10·8 2 36 50·1 2 31 25·4 2 25 55·8 2 20 21·1	3·59 3·71 3·83	2 38 36·7 2 33 9·8 2 27 38·0 2 22 0·8 2 16 17·5	3.76 3.88 4.02	2 34 53.3 2 29 19.3 2 23 39.6 2 17 53.8 2 12 0.9	3.93 4.02	2 30 59·8 2 25 17·7 2 19 29·3 2 13 33·7 2 7 29·9	4.13		4·18 4·34 4·52 4·72 4·94

Alt.	L. 0° A.	L. 1° A.	L. 2° A.	L. 3° A.	L. 4° A.	L. 5° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
	- '00 -4.57	- '09 -4'57	18 -4.58	- '27 -4'58	- '37 -4'59	- '46 -4'59
	'09 4.57	'18 4'58	-27 4.58	'36 4'59	'46 4'60	'55 4'61
	'18 4.58	'27 4'58	-36 4.59	'45 4'60	'55 4'61	'64 4'62
	'27 4.58	'36 4'59	-45 4.60	'55 4'61	'64 4'62	'73 4'63
	'36 4.59	'45 4'60	-54 4.61	'64 4'62	'73 4'63	'83 4'64
10	*45 4*59	*54 4.61	·64 4·62	*73 4*63	·83 4·65	*93 4*67
12	*54 4*60	*64 4.62	·73 4·63	*83 4*65	·93 4·67	1*03 4*69
14	*64 4*62	*74 4.63	·83 4·65	*93 4*67	I·03 4·69	1*14 4*71
16	*74 4*63	*84 4.65	·94 4·67	I*04 4*69	I·14 4·7I	1*25 4*74
18	*84 4*65	*94 4.67	I·04 4·69	I*15 4*71	I·25 4·74	1*36 4*77
20	*94 4.67	1.05 4.69	1·15 4·72	1·26 4·74	1·37 4·77	1.48 4.81
22	1.05 4.69	1.16 4.72	1·27 4·75	1·38 4·78	1·49 4·81	1.61 4.85
24	1.16 4.72	1.28 4.75	1·39 4·78	1·50 4·81	1·62 4·85	1.74 4.89
26	1.28 4.75	1.40 4.78	1·52 4·82	1·64 4·86	1·76 4·90	1.89 4.95
28	1.41 4.78	1.53 4.82	1·66 4·86	1·78 4·91	1·91 4·96	2.04 5.01
30	1.54 4.82	1.67 4.87	1.80 4.91	1.93 4.96	2·07 5·02	2·21 5·08
32	1.69 4.87	1.82 4.92	1.96 4.97	2.10 5.03	2·24 5·09	2·40 5·16
34	1.84 4.93	1.98 4.99	2.13 5.04	2.28 5.11	2·44 5·18	2·60 5·26
36	2.01 5.00	2.16 5.06	2.32 5.13	2.48 5.20	2·65 5·29	2·83 5·38
38	2.20 5.07	2.36 5.15	2.53 5.23	2.71 5.31	2·89 5·41	3·09 5·52
40	2.40 5.17	2·58 5·25	2·77 5·34	2·96 5·45	3·17 5·56	3·39 5·69
42	2.64 5.28	2·83 5·38	3·04 5·49	3·26 5·61	3·49 5·75	3·75 5·91
43	2.76 5.34	2·97 5·45	3·19 5·57	3·42 5·71	3·67 5·87	3·95 6·04
44	2.90 5.42	3·11 5·54	3·35 5·67	3·60 5·82	3·88 5·99	4·18 6·19
45	3.05 5.50	3·28 5·63	3·53 5·78	3·80 5·95	4·10 6·14	4·43 6·36

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 239 LATITUDE 29°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

		Di	ECLINA'	LION-	-CONTR	ARY	NAME	<i>TO</i> —	LATITU	DE.		
True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 46 38.4 5 37 24.9 5 28 10.0 5 18 53.2 5 9 34.3	s. -2·25 2·27 2·30 2·33 2·37	5 16 32.7	s. -2·26 2·28 2·32 2·35 2·39	5 23 32·0 5 14 10·9	s. -2·27 2·30 2·34 2·38 2·42	5 11 47.6	2.36		2.43	H. M. S. 5 35 15.5 5 25 51.8 5 16 25.4 5 6 55.8 4 57 22.7	s. -2·31 2·36 2·41 2·46 2·52
10 12 13 14 15	5 0 13·1 4 50 49·3 4 46 6·0 4 41 22·4 4 36 37·6	2·48 2·51	4 57 47.8 4 48 21.0 4 43 36.4 4 38 50.8 4 34 4.4	2:51		2.59		2.63		2.00	4 47 45.7 4 38 4.3 4 33 11.8 4 28 18.0 4 23 22.8	2.59 2.66 2.70 2.74 2.78
16 17 18 19 20	4 31 52.0 4 27 5.3 4 22 17.7 4 17 28.9 4 12 39.0	2·59 2·63	4 29 16·9 4 24 28·3 4 19 38·6 4 14 47·6 4 9 55·4	2.68	4 16 56·3 4 12 2·9	2.66 2.69 2.73 2.77 2.82	4 14 10·5 4 9 14·6			.2.90	4 13 27·9 4 8 27·9	2·82 2·87 2·92 2·97 3·03
21 22 23 24 25	4 7 47.7 4 2 55.2 3 58 1.2 3 53 5.6 3 48 8.4	2.87	4 0 6·6 3 55 9·8	2.89	4 2 II·9 3 57 I4·0 3 52 I4·3 3 47 I2·7 3 42 9·2	2.86 2.91 2.96 3.02 3.08	3 54 17·1 3 49 14·2 3 44 9·3	2.93 2.99 3.10 3.10	3 46 9·3	3.19		3.09 3.15 3.21 3.28 3.36
26 27 28 29 30	3 43 9·5 3 38 8·6 3 33 5·7 3 28 0·7 3 22 53·2	3.08	3 40 9.0 3 35 4.7 3 29 58.2 3 24 49.3 3 19 37.7	3·11 3·17 3·24	3 37 3.5 3 31 55.5 3 26 45.0 3 21 31.8 3 16 15.7	3:34		3·30 3·38 3·46 3·54		3.40	3 27 13·2 3 21 51·9 3 16 27·2 3 10 58·8 3 5 26·4	3°43 3°52 3°61 3°70 3°81
31 32 33 34 35	3 17 43.2 3 12 30.4 3 7 14.7 3 1 55.6 2 56 32.9	3·36 3·44 3·52	3 14 23·2 3 9 5·7 3 3 44·8 2 58 20·2 2 52 51·7	3.47 3.56 3.66	3 10 56.4 3 5 33.7 3 0 7.2 2 54 36.6 2 49 1.4	3.80	3 7 22·2 3 I 53·7 2 56 21·1 2 50 43·8 2 45 I·5	3.84	2 58 5·5 2 52 26·0	3.88	2 59 49.6 2 54 8.0 2 48 21.1 2 42 28.3 2 36 28.9	3.92 4.04 4.17 4.32 4.47
36 37 38 39 40	2 51 6·3 2 45 35·4 2 39 59·7 2 34 18·7 2 28 31·8	3.83 3.95 4.08	2 47 18·6 2 41 40·7 2 35 57·4 2 30 8·0 2 24 11·8	4.00 4.13 4.28	2 43 21.3 2 37 35.6 2 31 43.7 2 25 44.9 2 19 38.2	4·18 4·33 4·50	2 39 13.4 2 33 19.1 2 27 17.6 2 21 8.2 2 14 49.6	4·38 4·55 4·74	2 28 50·0 2 22 37·8 2 16 16·3	4.60 4.79 5.01	2 30 22·1 2 24 7·1 2 17 42·6 2 11 7·3 2 4 19·5	4.65 4.84 5.07 5.31 5.59
	,	V	ARIATIO	ON TO	O I' OF	LAT	ITUDE	AND	ALTITU	DE.		
Alt.	L. 6°	Α.	L. 7°	Α.	L. 8°	Α.	L. 9°	Α.	L. 10°	' A.	L. 11°	A.
°	s. 55	s. -4.60	- ·64	s. 4.62	s. - '74	s. -4.63	s. - ·83	s. 4.65	s. - '93	s. -4.66	S. - I·02	s. -4.68

1	Alt.	L. 6 °	A.	L. 7°	Α.	L. 8	° A.	L. 9°	A.	L. 10	° A.	L. 11	° A.
	° 0 2 4 6 8	s. - ·55 - ·64 ·73 ·83 ·93	s. -4.60 4.62 4.63 4.65 4.67	s. - ·64 ·74 ·83 ·93 I·02	s. -4.62 4.63 4.65 4.67 4.69	S. - ·74 ·83 ·92 I·02 I·12	s. -4.63 4.65 4.67 4.69 4.71	S. - ·83 ·92 I·02 I·12 I·22	s. 4.65 4.67 4.69 4.71 4.73	S. - '93 1'02 1'12 1'22 1'33	s. -4.66 4.69 4.71 4.73 4.76	S. -1.02 1.12 1.22 1.32 1.43	s. -4.68 4.71 4.73 4.76 4.79
	10 12 14 16 18	1.03 1.13 1.24 1.35 1.47	4·69 4·70 4·74 4·77 4·80	1·13 1·23 1·34 1·46 1·58	4.71 4.74 4.77 4.80 4.84	1·23 1·34 1·45 1·57 1·69	4.74 4.77 4.80 4.83 4.88	1·33 1·44 1·56 1·68	4.76 4.80 4.83 4.87 4.92	1.43 1.55 1.67 1.80 1.93	4.79 4.83 4.87 4.91 4.96	1·54 1·66 1·78 1·91 2·05	4.83 4.87 4.91 4.96 5.01
	20	1·59	4.84	1.71	4.88	1.83	4.92	1.95	4.97	2·07	5.02	2·20	5.08
	22	1·72	4.89	1.85	4.93	1.97	4.98	2.10	5.03	2·23	5.09	2·37	5.15
	24	1·87	4.94	1.99	4.99	2.12	5.04	2.26	5.10	2·40	5.16	2·54	5.23
	26	2·02	5.00	2.15	5.05	2.29	5.11	2.43	5.18	2·58	5.25	2·74	5.33
	28	2·18	5.07	2.32	5.13	2.47	5.20	2.62	5.27	2·78	5.35	2·95	5.44
	30	2·36	5·15	2·51	5·22	2.67	5·29	2·83	5·38	3.01	5.47	3·19	5.58
	32	2·55	5·24	2·72	5·32	2.89	5·41	3·07	5·51	3.26	5.62	3·46	5.74
	33	2·66	5·29	2·83	5·38	3.01	5·48	3·20	5·58	3.40	5.70	3·62	5.83
	34	2·77	5·35	2·95	5·44	3.14	5·55	3·34	5·66	3.55	5.79	3·78	5.93
	35	2·89	5·41	3·08	5·51	3.28	5·63	3·49	5·75	3.72	5.89	3·96	6.05
	36	3.02	5.48	3·22	5.59	3.43	5.71	3.65	5.85	3·90	6.01	4·16	6·18
	37	3.15	5.55	3·36	5.68	3.59	5.81	3.83	5.96	4·09	6.14	4·37	6·33
	38	-3.30	5.64	3·52	5.77	3.76	5.92	4.02	6.09	4·30	6.28	4·62	6·50
	39	3.46	5.73	3·70	5.88	3.95	6.05	4.23	6.23	4·54	6.45	4·49	6·69
	40	3.63	5.84	3·89	6.00	4.17	6.19	4.47	6.40	4·81	6.64	5·19	6·91

LATITUDE 29°.

		Di	ECLINAT	LION-	-CONTR	ARY	NAME	TO-	LATITUI	DE.		
True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 32 56.0 5 23 29.6 5 14 0.1 5 4 27.1 4 54 50.4	2·38 2·44 2·49	H. M. S. 5 30 35.4 5 21 5.9 5 11 33.1 5 1 56.5 4 52 15.7	2·41 2·47 2·53		2·50 2·57	H. M. S. 5 25 50.0 5 16 13.6 5 6 33.2 4 56 48.4 4 46 58.6		5 13 44.7	s. -2·43 2·50 2·57 2·65 2·74	H. M. S. 5 20 58·3 5 11 13·8 5 1 24·6 4 51 30·2 4 41 30·0	s. -2·46 2·53 2·61 2·70 2·79
10 12 14 15 16	4 45 9.3 4 35 23.4 4 25 32.2 4 20 34.3 4 15 34.9	2·71 2·79 2·84	4 42 30·2 4 32 39·5 4 22 42·9 4 17 42·2 4 12 39·8	2·85 2·90	4 39 48·2 4 29 52·3 4 19 50·0 4 14 46·3 4 9 40·5	2.91	4 37 3.2 4 27 1.7 4 16 53.3 4 11 46.2 4 6 36.9	2·78 2·87 2·98 3·04 3·10	4 24 7.4 4 13 52.4 4 8 41.7	2·83 2·94 3·05 3·11 3·18	4 31 23·3 4 21 9·3 4 10 47·1 4 5 32·5 4 0 15·6	2·89 3·00 3·13 3·19 3·26
17 18 19 20 21	4 10 33.7 4 5 30.7 4 0 25.7 3 55 18.7 3 50 9.5	3.11	4 7 35.4 4 2 29.1 3 57 20.6 3 52 9.9 3 46 56.7	3.13	4 4 32.8 3 59 22.9 3 54 10.6 3 48 55.9 3 43 38.5	3.51 3.58	4 I 25.5 3 56 II.7 3 50 55.4 3 45 36.3 3 40 I4.3	3·33 3·37	3 58 13·3 3 52 55·4 3 47 34·6 3 42 10·9 3 36 43·9	3·25 3·32 3·40 3·48 3·56	3 54 55.9 3 49 33.4 3 44 7.9 3 38 39.1 3 33 6.7	3·34 3·42 3·50 3·59 3·68
22 23 24 25 26	3 44 57.8 3 39 43.7 3 34 26.8 3 29 6.9 3 23 43.8	3·31 3·38 3·46	3 41 40·9 3 36 22·4 3 31 0·8 3 25 35·9 3 20 7·6	3.41 3.49 3.58	3 38 18·2 3 32 54·8 3 27 28·1 3 21 57·8 3 16 23·6	3.20 3.40	3 34 49.2 3 29 20.6 3 23 48.4 3 18 12.2 3 12 31.6	3.73	3 31 13·5 3 25 39·3 3 20 1·0 3 14 18·3 3 8 30·8	3·65 3·75 3·86 3·97 4·09	3 10 15.7	3.78 3.89 4.00 4.12 4.26
27 28 29 30 31	3 18 17·3 3 12 47·0 3 7 12·6 3 1 33·7 2 55 49·9	3·84 3·95	3 14 35.3 3 8 58.8 3 3 17.8 2 57 31.8 2 51 40.2	3.88 3.99 4.12	3 10 45·1 3 5 1·9 2 59 13·7 2 53 19·8 2 47 19·7	4·15 4·29	3 6 46·3 3 0 55·7 2 54 59·5 2 48 56·9 2 42 47·2	4·33 4·48	3 2 38·0 2 56 39·3 2 50 34·2 2 44 21·9 2 38 1·7	4·22 4·37 4·52 4·69 4·88	2 58 19·4 2 52 11·8 2 45 56·9 2 39 33·8 2 33 1·6	4·40 4·56 4·73 4·92 5·14
32 33 34 35 36	2 50 0.7 2 44 5.4 2 38 3.5 2 31 54.1 2 25 36.3	4·36 4·52 4·70	2 45 42.6 2 39 38.1 2 33 26.0 2 27 5.3 2 20 34.9	4·56 4·74 4·94	2 41 12.7 2 34 57.8 2 28 34.3 2 22 0.8 2 15 15.9	4·79 4·99 5·22	2 36 29.7 2 30 3.3 2 23 26.7 2 16 38.6 2 9 37.2	5.04 5.27	2 18 1·4 2 10 56·5	5.09 5.32 5.59 5.89 6.25	2 19 24·3 2 12 15·9 2 4 51·4	5·38 5·65 5·96 6·32 6·74
		VA	RIATIO	N TC	ı' OF	LATI	TUDE A	AND	ALTITU	DE.		
Alt.	L. 12°	Α.	L. 13°	Α.	L. 14°	Α.	L. 15°	A.	L. 16°	Α.	L. 17°	A.
0 2 4 6 8	s. -1·12 - 1·22 1·32 1·42 1·53	s. -4·71 4·73 4·76 4·79 4·82	s. 1·22 1·32 1·42 1·53 1·64	s. -4.73 4.76 4.79 4.82 4.86	s. -1·32 - 1·42 1·52 1·63 1·75	s. -4.76 4.79 4.82 4.86 4.90	s. -1.42 - 1.52 1.63 1.74 1.86	s. -4.78 4.82 4.85 4.89 4.94	s. 1·52 1·62 1·73 1·85 1·97	s. -4.82 4.85 4.89 4.93 4.98	s. 1·62 1·73 1·84 1·96 2·09	s. -4.85 4.89 4.93 4.98 5.03
10 12 14 15 16	1.65 1.77 1.90 1.96 2.03	4.86 4.90 4.95 4.98 5.00	1.76 1.88 2.02 2.09 2.16	4.90 4.95 5.00 5.03 5.06	1·87 2·00 2·14 2·21 2·28	4.94 4.99 5.05 5.08 5.11	1·99 2·12 2·26 2·34 2·41	4.99 5.04 5.10 5.14 5.17	2·10 2·24 2·39 2·46 2·55	5.03 5.09 5.16 5.20 5.24	2·22 2·37 2·52 2·60 2·69	5.09 5.15 5.22 5.26 5.30
17 18 19	2·11 2·18 2·26 2·33	5.03 5.10 5.13	2·23 2·31 2·39	5.09 5.12 5.16	2·36 2·44 2·53 2·61	5·15 5·18 5·22	2·50 2·58 2·67 2·76	5·21 5·25 5·29	2·63 2·72 2·81	5·28 5·32 5·37	2·78 2·87 2·97	5·35 5·40 5·45

5.20

5.24

5.29

5·33 5·39 5·44

5.20

5.57 5.65 5.72 5.81

5.91

6.02

6.14

6.27

6.43 6.60

2.47

2.56

2.65

2·75 2·85

2·95 3·06

3.18

3.31

3.44

3.59

3.74

3.01

4.09

4.29

4.21

4.76

2.33

2.42

2.21

2.60

2.69

2.79

2.90

3.01

3.12

3·25 3·38

3.23

3.68

3.85

4.03

4.23

4.44

21

22

23

24

25 26

27 28

29

30

31

32

33

34

35 36

5.13

5.17

5.21

5.26

2.31

5·36 5·41

5.47

5.24 5.61

5.69

5.77

5.87

5.98 6.09

6·23 6·38

2·44 2·53 2·61

2.71

2.80

2.90

3.01

3.12

3.24

3.37

3.50

3.81

3.98

4.16

4·36 4·58 4·83

5.11

5.27

5.31

5.36

5.42 5.47 5.54 5.61

5.68

5.76

5.85

5.95

6.06

6.18

6·32 6·47 6·65

6.86

5.34

5.45

5.21 5.21

5.64

5.72

5·80

5.89

2.00

6.23

6·37 6·52 6·71

6.91

7.15

2.76

2.86

2.96

3.07

3.18

3.30

3'43

3.56

3.71

3.87

4.04

4.22

4.43 4.65

4.90

5.18

5.20

2.91

3.03

3.13

3·24 3·36

3.49 3.63

3.93

4.10

4.29

4.20

4.72

4.97 5.26

5.58

5.95

5.42

5.60

5.67

5·75 5·84

5.03 6.03

6.14

6.27

6.41

6.57

6.97

7.21

7.50

5.21

5.57

5.64 5.71 5.79 5.87

5.97

6.07

6.19

6·32 6·46

6.62

6.81

7.02

7.27

7.57

7.92

3.02

3:30

3.42 3.55 3.69

3.83

3.99

4.17

4.36

4.79

5.05

5.33 5.66

6.03

6.47

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 241 LATITUDE 29°.

DECLINATION—CONTRARY NAME TO-LATITUDE.

True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
0 2 4 5 6	H. M. S. 5 18 29.8 5 8 40.8 4 58 46.6 4 53 47.5 4 48 46.9	s. -2·49 2·57 2·65 2·70 2·75	5 6 5.4	s. -2.53 2.61 2.70 2.75 2.80	H. M. S. 5 13 26·5 5 3 27·5 4 53 22·5 4 48 17·6 4 43 11·0	2.65 2.75 2.80	H. M. S. 5 10 51.5 5 0 46.9 4 50 36.0 4 45 27.9 4 40 17.9	2.86	H. M. S. 5 8 14·0 4 58 3·5 4 47 46·2 4 42 34·6 4 37 21·1	2.92	H. M. S. 5 5 33.9 4 55 17.0 4 44 52.8 4 39 37.7 4 34 20.3	s. -2.69 2.80 2.92 2.98 3.05
7 8 9 10 11	4 43 44.7 4 38 40.9 4 33 35.3 4 28 27.9 4 23 18.5	2·85 2·90 2·96	4 40 55.4 4 35 48.4 4 30 39.5 4 25 28.6 4 20 15.5	3.02		3.10	4 35 6·0 4 29 51·9 4 24 35·7 4 19 17·1 4 13 55·9	3·10 3·10	4 32 5.5 4 26 47.5 4 21 27.2 4 16 4.3 4 10 38.7	3.18	4 23 38.6 4 18 13.9 4 12 46.5	3·12 3·19 3·26 3·34 3·42
12 13 14 15 16	4 18 6·9 4 12 53·2 4 7 37·1 4 2 18·4 3 56 57·1	3·14 3·21	4 15 0.2 4 9 42.4 4 4 22.1 3 58 59.0 3 53 32.9	3·15 3·22 3·29 3·37 3·45	4 I I·8	3.47	4 8 32·I 4 3 5·4 3 57 35·7 3 52 2·7 3 46 26·I	3.57	4 5 10·2 3 59 38·5 3 54 3·5 3 48 24·9 3 42 42·5	3·59 3·69	4 I 42.4 3 56 5.4 3 50 24.8 3 44 40.2 3 38 51.4	3.51 3.60 3.70 3.81 3.92
18	3 51 32·8 3 46 5·5 3 40 34·8 3 35 0·5 3 29 22·3	3·52 3·61 3·70	3 48 3.8 3 42 31.0 3 36 54.9 3 31 14.6 3 25 30.1	3·63	3 44 28·2 3 38 49·9 3 33 7·6 3 27 20·9 3 21 29·5	3·75 3·85 3·97	3 40 45.8 3 35 1.3 3 29 12.4 3 23 18.7 3 17 19.8		3 36 55.9 3 31 4.8 3 25 8.7 3 19 7.3 3 13 0.1	4·01 4·14	3 32 57·9 3 26 59·6 3 20 55·7 3 14 46·0 3 8 29·7	4.04 4.16 4.30 4.44 4.60
22 23 24 25 26	3 23 39.9 3 17 52.9 3 12 0.9 3 6 3.4 2 59 59.9	4·03 4·16 4·29	3 19 40·9 3 13 46·6 3 7 46·7 3 1 40·7 2 55 27·9	4·19 4·32 4·47	3 15 32·9 3 9 30·6 3 3 22·0 2 57 6·6 2 50 43·6	4·36 4·51 4·67	3 II 15.0 3 5 3.9 2 58 45.8 2 52 20.0 2 45 45.5	4.89		4.57 4.74 4.93 5.13 5.36		4·77 4·96 5·17 5·40 5·66
28 29 30	2 53 49.7 2 47 32.1 2 41 6.2 2 34 31.0 2 27 45.2	5.18		5.01 5.23 5.47	2 44 12·0 2 37 30·8 2 30 38·8 2 23 34·2 2 16 15·3	5·27 5·52	2 39 1·3 2 32 6·0 2 24 58·1 2 17 35·6 2 9 56·1	5·57 5·85	2 33 33.8 2 26 22.5 2 18 56.4 2 11 13.0 2 3 8.9	5·90 6·23 6·61	2 27 47·3 2 20 17·6 2 12 30·3 2 4 22·1 1 55 48·7	5.95 6.28 6.67 7.12 7.66

VARIATION	$T \cap$	-/	OE	T	ATITITE	ANTI	AT TITTIDE

Alt.	L. 18° A.	L. 19° A.	L. 20° A.	L. 21° A.	L. 22° A.	L. 23° A.
° 0 2 4 5 6	s. s.					
	-1.73 -4.89	-1.83 -4.93	-1.94 -4.97	-2.05 -5.01	-2·17 -5·06	-2·28 -5·11
	1.84 4.93	1.95 4.97	2.06 5.02	2.17 5.06	2·29 5·11	2·41 5·17
	1.95 4.97	2.07 5.03	2.18 5.07	2.30 5.12	2·42 5·18	2·55 5·24
	2.02 5.00	2.13 5.05	2.25 5.10	2.37 5.15	2·49 5·21	2·62 5·27
	2.08 5.02	2.19 5.07	2.31 5.13	2.44 5.18	2·56 5·24	2·69 5·31
7	2·14 5·05	2·26 5·10	2·38 5·16	2·51 5·22	2·64 5·28	2·77 5·35
8	2·21 5·08	2·33 5·13	2·45 5·19	2·58 5·25	2·72 5·32	2·85 5·39
9	2·28 5·11	2·40 5·16	2·53 5·23	2·66 5·29	2·80 5·36	2·94 5·43
10	2·35 5·14	2·47 5·20	2·60 5·26	2·74 5·33	2·88 5·40	3·02 5·48
11	2·42 5·17	2·55 5·24	2·68 5·30	2·82 5·37	2·97 5·45	3·12 5·53
12	2·50 5·21	2·63 5·28	2·77 5·35	2·91 5·42	3.06 5.50	3.21 5.59
13	2·58 5·25	2·71 5·32	2·85 5·39	3·00 5·47	3.15 5.56	3.31 5.65
14	2·66 5·29	2·80 5·36	2·94 5·44	3·10 5·52	3.25 5.61	3.42 5.71
15	2·74 5·33	2·89 5·41	3·04 5·49	3·20 5·58	3.36 5.67	3.53 5.78
16	2·83 5·38	2·98 5·46	3·14 5·55	3·30 5·64	3.47 5.74	3.65 5.85
17	2·93 5·43	3.08 5.52	3·24 5·61	3:41 5:71	3:59 5:81	3·78 5·93
18	3·03 5·48	3.19 5.57	3·35 5·67	3:53 5:78	3:72 5:89	3·91 6·02
19	3·13 5·54	3.30 5.64	3·47 5·74	3:66 5:85	3:85 5:98	4·06 6·11
20	3·24 5·60	3.41 5.71	3·60 5·82	3:79 5:94	3:99 6:07	4·21 6·22
21	3·35 5·67	3.54 5.78	3·73 5·90	3:93 6:03	4:15 6:17	4·38 6·33
22	3·48 5·74	3.67 5.86	3·87 5·99	4·08 6·13	4·31 6·29	4·56 6·46
23	3·61 5·82	3.81 5.95	4·02 6·09	4·25 6·24	4·49 6·41	4·76 6·60
24	3·75 5·91	3.96 6.05	4·19 6·20	4·43 6·37	4·69 6·55	4·97 6·76
25	3·90 6·01	4.12 6.16	4·36 6·32	4·62 6·50	4·90 6·71	5·21 6·93
26	4·06 6·11	4.30 6.28	4·56 6·45	4·84 6·66	5·14 6·88	5·48 7·14
27	4·23 6·23	4.49 6.41	4·77 6·61	5.07 6.83	5.41 7.08	5·78 7·37
28	4·42 6·36	4.70 6.56	5·00 6·78	5.33 7.03	5.70 7.31	6·12 7·64
29	4·63 6·51	4.93 6.73	5·26 6·97	5.63 7.25	6.04 7.58	6·52 7·96
30	4·86 6·67	5.19 6.92	5·55 7·20	5.97 7.52	6.44 7.90	6·98 8·35
31	5·12 6·87	5.48 7.14	5·89 7·45	6.35 7.83	6.90 8.27	7·54 8·83

LATITUDE 30°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

-		1-		-		T	1		1		1	-
True Alt.	0°	Decl. Var.	1°	Decl. Var.	2°	Decl. Var.	3°	Decl. Var.	4°	Decl. Var.	5°	Decl. Var.
0 4 6 8 10	H. M. S. 6 0 0.0 5 41 31.1 5 32 16.2 5 23 0.5 5 13 44.0	s. -2.31 2 32 2.33 2.34 2.36	5 20 39.7	s. -2·31 2·32 2·34 2·36 2·38	5 18 17.8	s. -2·31 2·33 2·35 2·37 2·40	5 15 54.8	s. -2·32 2·35 2·37 2·39 2·42	5 32 10·5 5 22 51·3 5 13 30·5	s. -2·32 2·36 2·39 2·42 2·45	5 29 48·3 5 20 27·6 5 II 4·9	s. -2·33 2·38 2·40 2·44 2·48
12 14 16 18 19	5 4 26·1 4 55 6·9 4 45 45·9 4 36 22·8 4 31 40·3		5 2 2.7 4 52 41.7 4 43 18.7 4 33 53.3 4 29 9.6	2·43 2·47 2·51	4 59 37.7 4 50 14.8 4 40 49.5 4 31 21.5 4 26 36.3	2:43 2:46 2:50 2:55 2:58		2·50 2·54 2·59	4 54 42.8 4 45 15.1 4 35 44.4 4 26 10.2 4 21 21.7	2·53 2·58 2·64 2·67	4 52 12·5 4 42 42·0 4 33 8·1 4 23 30·5 4 18 40·0	2·52 2·57 2·63 2·69 2·72
20 21 22 23 24	4 26 57.2 4 22 13.4 4 17 28.8 4 12 43.4 4 7 57.1	2.56	4 24 25·1 4 19 39·8 4 14 53·6 4 10 6·6 4 5 18·5	2.58	4 21 50·3 4 17 3·4 4 12 15·5 4 7 26·6 4 2 36·6	2.60 2.63 2.66 2.69 2.73	4 14 24.0 4 9 34.2 4 4 43.3		4 1 56.4	2·70 2·74 2·77 2·81 2·85	4 4 1.4 3 59 5.8	2·76 2·79 2·83 2·88 2·92
25 26 27 28 29	4 3 9.8 3 58 21.5 3 53 32.2 3 48 41.6 3 43 49.8	2.79	4 0 29.4 3 55 39.1 3 50 47.6 3 45 54.7 3 41 0.4	2·70 2·74 2·78 2·82 2·86	3 57 45.3 3 52 52.8 3 47 58.9 3 43 3.6 3 38 6.6		3 50 2·6 3 45 6·1 3 40 8·0	2.92	3 47 8·2 3 42 8·9 3 37 7·7	2.90 2.94 2.99 3.05 3.10	3 44 9·3 3 39 6·9 3 34 2·4	2.97 3.02 3.13 3.13
30 31 32 33 34	3 38 56·5 3 34 1·8 3 29 5·5 3 24 7·5 3 19 7·6	2.97	3 26 7.8	3.09	3 33 7.9 3 28 7.4 3 23 4.8 3 18 0.2 3 12 53.1	3.16	3 19 56·3 3 14 47·7	3.13 3.13	3 21 51·8 3 16 41·8 3 11 29·0		3 18 35·2 3 13 20·9 3 8 3·6	3·40 3·48
35 36 37 38 39	3 14 5.7 3 9 1.6 3 3 55.1 2 58 46.0 2 53 34.0	3·15 3·21 3·28	3 5 49.7 3 0 39.0 2 55-25.3	3·18 3·25 3·33 3·41 3·49	3 2 31·2 2 57 15·8 2 51 57·1	3.24	2 59 5·5 2 53 44·9	3.49 3.58 3.68	2 55 32·1 2 50 5·9 44 35·5	3.62 3.83	2 57 18·6 2 51 50·6 2 46 18·1 2 40 40·8 2 34 58·2	3.77 3.88 4.00
40 41 42 43 44	2 48 18·8 2 43 0·3 2 37 37·9 2 32 11·3 2 26 40·0	3.75	2 44 47.9 2 39 23.5 2 33 54.9 2 28 21.3 2 22 42.4	3.80	2 4I 8·3 2 35 37·5 2 30 I·7 2 24 20·4 2 I8 32·8	3.85 3.98 4.11	2 37 19·3 2 31 41·3 2 25 57·5 2 20 7·5 2 14 10·1	4·03 4·17 4·33	2 15 41.3	4·22 4·38 4·56	2 29 9.7 2 23 14.5 2 17 11.7 2 11 0.4 2 4 39.1	4·44 4·63 4·84

Alt.	L. 0°	Α.	L. 1°	Α.	L. 2°	A.	L. 3°	A.	L. 4°	A.	L. 5°	Α.
	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
0	00	-4.62	09	-4.62	- 19	-4.62	- ⋅28	-4.62	- '37	-4.63	- '47	-4.64
2	•09	4.62	•19	4.62	•28	4.63	•37	4.63	•47	4.64	•56	4.65
4	•19	4.62	•28	4.63	•3 8	4.63	.47	4.64	•56	4.65	∙66	4.66
6	•28	4.63	•38	4.63	•46	4.64	•57	4.65	∙66	4.67	•76	4.68
8	*37	4.63	.47	4.64	•57	4.65	•66	4.67	•76	4.68	∙86	4.70
IO	•47	4.64	•57	4.65	•67	4.67	•77	4.68	∙86	4.70	·96	4.72
12	•57	4.65	.67	4.67	•77	4.68	.87	4.70	.97	4.72	1.07	4.74
14	•67	4.67	•77	4.68	.87	4.70	.97	4.72	1.07	4.74	1.18	4.77
16	-78	4.68	-88	4.70	1.00	4.72	1.08	4.74	1.10	4.77	1.30	4.80
18	•88	4.70	•99	4.72	1.00	4.75	1.30	4.77	1.31	4.81	1.42	4.83
20	•99	4.72	1.10	4.75	1.21	4.77	1.32	4.80	1.43	4.83	1.54	4.87
22	1.11	4.75	1.22	4.78	1.33	4.81	1.45	4.84	1.56	4.88	1.68	4.91
24	1.23	4.78	1.34	4.81	1.46	4.84	1.58	4.88	1.70	4.92	1.82	4.97
26	1.36	4.81	1.47	4.85	1.60	4.89	1.72	4.93	1.85	4.97	1.08	5.02
28	1.49	4.85	1.61	4.89	1.74	4.94	1.87	4.98	2.01	5.04	2.14	5.09
30	1.63	4.90	1.76	4.94	1.90	4.99	2.03	5.05	2.18	5.11	2:33	5:17
32	1.79	4.95	1.03	5.00	2.07	5.06	2.21	5.12	2.37	5.19	2.52	5.26
34	1.95	5.01	2.10	5.07	2.25	5.14	2.41	5.21	2.57	5.29	2.74	5.37
36	2.13	5.09	2.29	5.16	2.46	5.23	2.63	5.31	2.81	5.40	2.99	5.20
38	2.33	5.17	2.20	5.25	2.68	5.34	2.87	5.44	3.07	5.55	3.28	5.67
40	2.56	5.28	2.75	5°37	2.94	5.48	3.16	5.59	3.37	5.72	3.61	5.86
41	2.77	5.34	2.88	5.44	3.09	5.55	3.31	5.68	3.24	5.82	3.80	5.98
42	2.81	5.41	3.03	5.52	3.24	5.64	3.48	5.78	3.73	5.94	4.01	6.02
43	2.96	5.48	3.18	5.60	3.41	5.74	3.67	5.89	3.94	6.07	4.24	6.27
44	3.11	5.56	3:34	5.69	3:59	5.85	3.87	6.02	4.17	6.22	4.50	6.44

HOUR-ANGLES AND VARIATIONS TO 1' OF LAT., DECL., AND ALT. 243 LATITUDE 30°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	6°	Decl. Var.	7°	Decl. Var.	8°	Decl. Var.	9°	Decl. Var.	10°	Decl. Var.	11°	Decl. Var.
° 0 2 4 6 8	H. M. S. 5 46 5·1 5 36 46·0 5 27 25·3 5 18 2·7 5 8 37·8	2.39	H. M. S. 5 43 44.4 5 34 23.7 5 25 1.1 5 15 36.3 5 6 9.1	s. -2·35 2·38 2·41 2·45 2·49	H. M. S. 5 41 23.0 5 32 0.5 5 22 35.8 5 13 8.6 5 3 38.7	2.43	H. M. S. 5 39 0.8 5 29 36.2 5 20 9.1 5 10 39.3 5 1 6.4	2.46	H. M. S. 5 36 37.7 5 27 10.7 5 17 41.0 5 8 8.3 4 58 32.1	s. -2·39 2·44 2·48 2·53 2·59	H. M. s. 5 34 13.5 5 24 43.9 5 15 11.3 5 5 35.4 4 55 55.7	s. -2.41 2.46 2.51 2.56 2.63
10 12 13 14 15	4 59 10.5 4 49 40.2 4 44 53.8 4 40 6.6 4 35 18.5	2.61	4 56 39.0 4 47 5.7 4 42 17.7 4 37 28.7 4 32 38.7	2·54 2·59 2·62 2·65 2·69	4 54 5.6 4 44 29.0 4 39 39.1 4 34 48.3 4 29 56.2	2·63 2·66 2·70	4 51 30·1 4 41 49·7 4 36 57·9 4 32 5·0 4 27 10·7	2.61 2.68 2.71 2.75 2.78	4 48 52·2 4 39 7·9 4 34 13·9 4 29 18·7 4 24 22·1	2·72 2·76 2·80	4 46 11.8 4 36 23.2 4 31 26.9 4 26 29.2 4 21 30.0	2·69 2·77 2·81 2·85 2·90
18	4 30 29°3 4 25 39°1 4 20 47°7 4 15 55°2 4 11 1°3	2·70 2·74 2·77	4 27 47.6 4 22 55.3 4 18 1.8 4 13 7.0 4 8 10.6	2.75	4 25 3.0 4 20 8.5 4 15 12.6 4 10 15.2 4 5 16.2	2.81 2.85 2.89	4 12 19·7 4 7 19·6		4 19 24.0 4 14 24.3 4 9 23.1 4 4 20.0 3 59 15.1	2·93 2·98 3·03	4 16 29·2 4 11 26·7 4 6 22·4 4 1 16·2 3 56 7·8	2.94 2.99 3.05 3.10 3.16
22 23 24	4 6 6·1 4 1 9·4 3 56 11·1 3 51 11·2 3 46 9·4	2·90 2·95 2·99	4 3 12.8 3 58 13.4 3 53 12.3 3 48 9.2 3 43 4.2	2.92 2.97 3.02 3.07 3.13	4 0 15.6 3 55 13.2 3 50 8.9 3 45 2.5 3 39 54.0	3.10 3.10		3.06 3.12 3.18 3.24 3.31	3 54 8·1 3 48 59·0 3 43 47·6 3 38 33·7 3 33 17·1	3·26	3 50 57·3 3 45 44·4 3 40 29·0 3 35 10·8 3 29 49·7	3·22 3·29 3·36 3·43 3·51
27 28 29	3 41 5.7 3 35 59.8 3 30 51.8 3 25 41.3 3 20 28.3	3·16 3·22 3·29	3 37 57.0 3 32 47.5 3 27 35.6 3 22 20.9 3 17 3.3		3 34 43°1 3 29 29°6 3 24 13°3 3 18 54°1 3 13 31°6	3.32		3.24 3.62	3 27 57·6 3 22 35·0 3 17 9·0 3 11 39·3 3 6 5·6	3.75	3 18 57·5 3 13 25·9 3 7 50·3	3.60 3.69 3.78 3.89 4.00
32 33 34	3 15 12·3 3 9 53·3 3 4 30·9 2 59 4·8 2 53 34·7	3·52 3·61 3·70	3 11 42.6 3 6 18.4 3 0 50.4 2 55 18.4 2 49 41.7	3.65 3.74 3.85	3 8 5.6 3 2 35.7 2 57 1.7 2 51 22.9 2 45 39.2	3.78 3.89 4.00	3 4 20·8 2 58 44·7 2 53 3·9 2 47 17·8 2 41 26·0	4.04 4.12	3 0 27.5 2 54 44.6 2 48 56.3 2 43 2.1 2 37 1.4	4.08		4·12 4·26 4·40 4·56 4·74
37 38 39	2 48 0·2 2 42 20·8 2 36 35·8 2 30 44·9 2 24 47·1	4.04 4.18 4.32	2 44 0·1 2 38 13·1 2 32 19·6 2 26 19·2 2 20 11·0	4·22 4·37 4·54	2 39 49.6 2 33 53.9 2 27 50.9 2 21 40.0 2 15 20.0	4.42 4.59 4.78	2 35 27.7 2 29 22.3 2 23 8.6 2 16 45.6 2 10 12.0	4·64 4·83	2 18 11.0	4.88 5.10 5.35	2 26 4·9 2 19 36·1 2 12 56·2 2 6 3·6 1 58 55·9	4.93 5.15 5.40 5.68 6.03

Alt.	L. 6° A.	L. 7° A.	L. 8° A.	L. 9° A.	L. 10° A.	L. 11° A.
° 0 2 4 6 8	s. s.	s. s.	s. s.	s. s.	s. s.	s. s.
	- '56 -4'65	66 -4.66	75 -4.68	- ·85 - 4·69	- '95 - 4.71	-1.04 -4.73
	'66 4'66	.76 4.68	.85 4.70	·95 4·72	1:04 4.74	1.15 4.76
	'75 4'68	.85 4.70	.95 4.72	I·05 4·74	1:15 4.76	1.25 4.78
	'85 4'70	.96 4.72	1.05 4.74	I·16 4·76	1:26 4.79	1.36 4.81
	'96 4'72	I.06 4.74	1.16 4.76	I·26 4·79	1:37 4.82	1.47 4.85
10	1.06 4.74	1·17 4·76	1·27 4·79	1·37 4·82	1.48 4.85	1·59 4·89
12	1.17 4.77	1·28 4·79	1·38 4·82	1·49 4·85	1.60 4.88	1·71 4·93
14	1.29 4.79	1·39 4·82	1·50 4·86	1·61 4·89	1.73 4.93	1·84 4·97
16	1.41 4.83	1·52 4·86	1·63 4·90	1·75 4·94	1.86 4.98	1·98 5·03
18	1.53 4.87	1·65 4·90	1·76 4·94	1·88 4·99	2.01 5.04	2·13 5·09
20	1.66 4.91	1.78 4.95	1.90 5.00	2·03 5·05	2·16 5·10	2·29 5·16
22	1.80 4.96	1.93 5.00	2.06 5.06	2·19 5·11	2·33 5·17	2·47 5·24
24	1.95 5.01	2.08 5.07	2.22 5.12	2·36 5·19	2·50 5·25	2·65 5·33
26	2.11 5.08	2.25 5.14	2.39 5.20	2·54 5·27	2·70 5·35	2·86 5·43
28	2.29 5.15	2.44 5.22	2.59 5.29	2·75 5·38	2·92 5·46	3·09 5·56
30	2·48 5·24	2.64 5.32	2.80 5.40	2·98 5·50	3·16 5·60	3·36 5·71
32	2·69 5·34	2.86 5.43	3.05 5.53	3·24 5·64	3·44 · 5·76	3·66 5·89
33	2·80 5·40	2.99 5.50	3.18 5.61	3·38 5·72	3·59 5·85	3·82 6·00
34	2·93 5·47	3.12 5.57	3.32 5.69	3·53 5·82	3·76 5·96	4·01 6·12
35	3·06 5·54	3.26 5.65	3.47 5.78	3·70 5·92	3·94 6·07	4·21 6·25
36	3·19 5·62	3:40 5:74	3·63 5·88	3.88 6.03	4·14 6·20	4:43 6:40
37	3·34 5·70	3:57 5:84	3·81 5·99	4.07 6.16	4·36 6·35	4:67 6:57
38	3·50 5·80	3:75 5:95	4·00 6·12	4.29 6.31	4·60 6·52	4:95 6:77
39	3·68 5·91	3:94 6:07	4·22 6·26	4.53 6.47	4·87 6·72	5:26 7:00
40	3·87 6·03	4:15 6:21	4·45 6·42	4.80 6.66	5·18 6·93	5:61 7:27

LATITUDE 30°.

DECLINATION—CONTRARY NAME TO—LATITUDE.

True Alt.	12°	Decl. Var.	13°	Decl. Var.	14°	Decl. Var.	15°	Decl. Var.	16°	Decl. Var.	17°	Decl. Var.
0 2 4 6 8	H. M. S. 5 31 48·2 5 22 15·7 5 12 40·0 5 3 0·5 4 53 17·0		5 10 6·8 5 0 23·5	2.57	5 17 14.6 5 7 31.6 4 57 44.2	s. -2.48 2.54 2.60 2.67 2.75	H. M. S. 5 24 24.2 5 14 41.3 5 4 54.3 4 55 2.5 4 45 5.3	s. -2.51 2.57 2.64 2.72 2.80	5 12 6·1 5 2 14·7 4 52 18·1	2.76	H. M. S. 5 19 20·0 5 9 28·8 4 59 32·6 4 49 30·8 4 39 22·8	s. -2.57 2.64 2.72 2.81 2.91
10 12 13 14 15	4 43 28·8 4 33 35·5 4 28 36·7 4 23 36·4 4 18 34·4	2·82 2·86 2·91	4 40 43.0 4 30 44.6 4 25 43.1 4 20 39.9 4 15 34.9	2.88	4 17 39.6	2·98	4 19 44.9 4 14 35.3	3.00				3.02 3.13 3.20 3.33
16 17 18 19 20	4 13 30·7 4 8 25·0 4 3 17·5 3 58 7·7 3 52 55·9	3·06	4 0 7.9 3 54 54.5	3.08 3.14 3.20 3.26 3.33	4 2 8·5 3 56 53·5 3 51 36·1	3·15 3·22 3·28 3·35 3·43			3 55 32.4 3 50 8.9 3 44 42.5	3.22	3 57 31·3 3 52 6·1 3 46 37·8 3 41 6·2 3 35 31·0	3.41 3.49 3.57 3.66 3.75
21 22 23 24 25	3 47 41.4 3 42 24.4 3 37 4.6 3 31 41.8 3 26 15.7	3·38 3·46 3·54	3 44 20.0 3 38 58.6 3 33 34.1 3 28 6.2 3 22 34.7	3·48 3·56 3·65	3 40 52·8 3 35 26·5 3 29 56·9 3 24 23·6 3 18 46·2	3.50 3.59 3.68 3.77 3.88	3 31 47.9 3 26 12.7 3 20 33.4	3.61 3.70 3.80 3.91 4.02	3 28 2·1 3 22 20·8 3 16 34·9	3.73 3.83 3.93 4.05 4.17	3 18 20·6 3 12 27·7	3.85 3.96 4.08 4.20 4.34
26 27 28 29 30	3 20 46·1 3 15 12·7 3 9 35·0 3 3 52·8 2 58 5·5	3·81 3·92 4·04	3 16 59.4 3 11 19.7 3 5 35.4 2 59 46.0 2 53 50.9	3.95 4.07 4.20	3 I 26·5	3.99 4.10 4.23 4.37 4.52	3 3 7·2 2 57 7·5 2 51 1·3		2 58 46·0 2 52 37·4 2 46 21·4	4.60 4.77	3 0 24.8 2 54 13.7 2 47 55.1 2 41 28.3 2 34 52.1	
31 32 33 34 35	2 52 12·6 2 46 13·9 2 40 8·1 2 33 54·8 2 27 32·8	4·44 4·61 4·78	2 47 49.6 2 41 41.4 2 35 25.3 2 29 0.6 2 22 25.9	4.65 4.83 5.03	2 43 14·6 2 36 55·9 2 30 28·3 2 23 50·6 2 17 1·3	4·69 4·88 5·03 5·31 5·57	2 31 56·1 2 25 15·4 2 18 22·9	5·36 5·63	2 33 24.0 2 26 40.3 2 19 44.7 2 12 35.2 2 5 9.5	5.41 5.68 5.99	2 13 53.6 2 6 24.2	5.73 6.05 6.41

O	17° A.
2 1:24 4:78 1:35 4:81 1:45 4:84 1:56 4:87 1:66 4:91 4 1:35 4:81 1:46 4:84 1:56 4:88 1:67 4:91 1:78 4:95 6 1:46 4:81 1:46 4:84 1:56 4:88 1:67 4:91 1:78 4:95 8 1:58 4:88 1:69 4:92 1:80 4:96 1:79 4:95 1:90 5:00 10 1:70 4:92 1:81 4:96 1:93 5:01 2:05 5:05 2:17 5:10 12 1:83 4:97 1:95 5:01 2:07 5:06 2:19 5:11 2:32 5:16 13 1:90 4:99 2:02 5:04 2:14 5:09 2:26 5:14 2:39 5:20 14 1:96 5:02 2:09 5:07 2:21 5:12 2:34 5:18 2:47 5:24 15 2:04 5:05 2:16 5:13 2:37 5:12<	. S.
4 1:35 4:81 1:46 4:84 1:56 4:88 1:67 4:91 1:78 4:95 1:79 5:00 2:03 5:05 5:05 2:17 5:10 5:00 12:07 5:06 2:19 5:11 2:32 5:16 5:13 1:90 4:99 2:02 5:04 2:14 5:09 2:26 5:14 2:39 5:20 5:04 2:14 5:09 2:26 5:14 2:39 5:20 5:14 2:39 5:20 5:14 2:39 5:20 5:41 1:39 5:10 2:21 5:12 2:34 5:18 2:47 5:24 1:52 2:34 5:18 2:47 5:24 1:52 2:25 5:25 2:64 5:32 1:7 5:24 1:5 2:50 5:25 2:64 5:32 1:7	
6	77 4.95
8	89 4.99
10 1.70 4.92 1.81 4.96 1.93 5.01 2.05 5.05 2.17 5.10 12 1.83 4.97 1.95 5.01 2.07 5.06 2.19 5.11 2.32 5.16 13 1.90 4.99 2.02 5.04 2.14 5.09 2.26 5.14 2.39 5.20 14 1.96 5.02 2.09 5.07 2.21 5.12 2.34 5.18 2.47 5.24 15 2.04 5.05 2.16 5.10 2.29 5.15 2.42 5.21 2.56 5.28 16 2.11 5.08 2.24 5.13 2.37 5.19 2.50 5.25 2.64 5.32 17 2.19 5.11 2.32 5.17 2.45 5.23 2.59 5.30 2.73 5.37 18 2.27 5.14 2.40 5.20 2.54 5.27 2.68 5.34 2.83 5.42 19 2.35 5.18 2.48 5.24 2.63 5	02 5.04
12	15 5.10
13 1.90 4.99 2.02 5.04 2.14 5.09 2.26 5.14 2.39 5.20 14 1.96 5.02 2.09 5.07 2.21 5.12 2.34 5.18 2.47 5.24 15 2.04 5.05 2.16 5.10 2.29 5.15 2.42 5.21 2.56 5.24 16 2.11 5.08 2.24 5.13 2.37 5.19 2.50 5.25 2.64 5.32 17 2.19 5.11 2.32 5.17 2.45 5.23 2.59 5.30 2.73 5.37 18 2.27 5.14 2.40 5.24 2.63 5.31 2.77 5.39 2.93 5.42 19 2.35 5.18 2.48 5.24 2.63 5.31 2.77 5.39 2.93 5.47 20 2.43 5.22 2.57 5.29 2.72 5.36 2.87 5.44 3.03	29 5.16
14 1.96 5.02 2.09 5.07 2.21 5.12 2.34 5.18 2.47 5.24 15 2.04 5.05 2.16 5.10 2.29 5.15 2.42 5.21 2.56 5.28 16 2.11 5.08 2.24 5.13 2.37 5.19 2.50 5.25 2.64 5.32 17 2.19 5.11 2.32 5.17 2.45 5.23 2.59 5.30 2.73 5.37 18 2.27 5.14 2.40 5.20 2.54 5.27 2.68 5.34 2.83 5.42 19 2.35 5.18 2.48 5.24 2.63 5.31 2.77 5.39 2.93 5.47 20 2.43 5.22 2.57 5.29 2.72 5.36 2.87 5.44 3.03 5.53 21 2.52 5.26 2.67 5.33 2.82 5.41 2.98 5.50 3.14	45 5.23
15 2.04 5.05 2.16 5.10 2.29 5.15 2.42 5.21 2.56 5.28 16 2.11 5.08 2.24 5.13 2.37 5.19 2.50 5.25 2.64 5.32 17 2.19 5.11 2.32 5.17 2.45 5.23 2.59 5.30 2.73 5.37 18 2.27 5.14 2.40 5.20 2.54 5.27 2.68 5.34 2.83 5.42 19 2.35 5.18 2.48 5.24 2.63 5.31 2.77 5.39 2.93 5.47 20 2.43 5.22 2.57 5.29 2.72 5.36 2.87 5.44 3.03 5.53 21 2.52 5.26 2.67 5.33 2.92 5.47 3.09 5.56 3.26 5.65 22 2.61 5.31 2.76 5.38 2.92 5.47 3.09 5.56 3.26	53 5.26
16	61 5·31
17 2·19 5·11 2·32 5·17 2·45 5·23 2·59 5·30 2·73 5·37 18 2·27 5·14 2·40 5·20 2·54 5·27 2·68 5·34 2·83 5·42 19 2·35 5·18 2·48 5·24 2·63 5·31 2·77 5·39 2·93 5·47 20 2·43 5·22 2·57 5·29 2·72 5·36 2·87 5·44 3·03 5·53 21 2·52 5·26 2·67 5·33 2·82 5·41 2·98 5·50 3·14 5·59 22 2·61 5·31 2·76 5·33 2·92 5·47 3·09 5·56 3·26 5·65 23 2·71 5·35 2·87 5·44 3·03 5·52 3·20 5·62 3·38 5·73 24 2·81 5·41 2·97 5·50 3·15 5·59 3·33 5·69 3·51	70 5:35
17 2:19 5:11 2:32 5:17 2:45 5:23 2:59 5:30 2:73 5:37 18 2:27 5:14 2:40 5:20 2:54 5:27 2:68 5:34 2:83 5:42 19 2:35 5:18 2:48 5:24 2:63 5:31 2:77 5:39 2:93 5:47 20 2:43 5:22 2:57 5:39 2:93 5:47 3:03 5:53 2:87 5:44 3:03 5:53 2:87 5:44 3:03 5:55 3:14 5:59 3:26 5:65 3:26 5:65 3:26 5:65 3:26 5:65 3:26 5:65 3:26 5:65 3:26 5:65 3:26 5:65 3:28 5:73 24 2:81 5:41 2:97 5:50 3:15 5:59 3:33 5:62 3:38 5:73 24 2:81 5:41 2:97 5:50 3:15 5:59 3:33 5:69 3:51 5:80 25	79 5.40
18 2·27 5·14 2·40 5·20 2·54 5·27 2·68 5·34 2·83 5·42 19 2·35 5·18 2·48 5·24 2·63 5·31 2·77 5·39 2·93 5·47 2·93 5·47 2·0 2·87 5·44 3·03 5·53 2·87 5·44 3·03 5·53 2·87 5·44 3·03 5·53 3·14 5·59 2·2 2·61 5·31 2·76 5·38 2·92 5·47 3·09 5·56 3·26 5·65 3·38 5·73 3·26<	88 5.45
19 2·35 5·18 2·48 5·24 2·63 5·31 2·77 5·39 2·93 5·47 20 2·43 5·22 2·57 5·29 2·72 5·36 2·87 5·44 3·03 5·53 21 2·52 5·26 2·67 5·33 2·82 5·41 2·98 5·50 3·14 5·59 22 2·61 5·31 2·76 5·38 2·92 5·47 3·09 5·56 3·26 5·65 23 2·71 5·35 2·87 5·44 3·03 5·52 3·20 5·62 3·38 5·73 24 2·81 5·41 2·97 5·50 3·15 5·59 3·33 5·69 3·51 5·80 25 2·92 5·46 3·09 5·56 3·27 5·66 3·46 5·77 3·65 5·89 26 3·03 5·52 3·21 5·62 3·40 5·73 3·59 5·85 3·80	98 5.50
20	09 5.56
22 2·61 5·31 2·76 5·38 2·92 5·47 3·09 5·56 3·26 5·65 23 2·71 5·35 2·87 5·44 3·03 5·52 3·20 5·62 3·38 5·73 24 2·81 5·41 2·97 5·50 3·15 5·59 3·33 5·69 3·51 5·80 25 2·92 5·46 3·09 5·56 3·27 5·66 3·46 5·77 3·65 5·89 26 3·03 5·52 3·21 5·62 3·40 5·73 3·59 5·85 3·80 5·98 27 3·15 5·59 3·34 5·70 3·53 5·82 3·74 5·95 3·97 6·09 28 3·28 5·67 3·48 5·78 3·68 5·91 3·90 6·05 4·14 6·20 29 3·41 5·75 3·84 6·01 4·08 6·16 4·33 6·33	20 5.62
22 2:61 5:31 2:76 5:38 2:92 5:47 3:09 5:56 3:26 5:65 3:26 5:65 3:28 5:73 3:28 5:73 3:29 5:52 3:20 5:62 3:38 5:73 3:21 5:50 3:15 5:59 3:33 5:69 3:51 5:80 3:25 2:92 5:46 3:09 5:56 3:27 5:66 3:46 5:77 3:65 5:89 3:65 5:89 3:27 3:15 5:59 3:34 5:70 3:53 5:82 3:74 5:95 3:97 6:09 4:14 6:20 4:14 6:20 4:33 6:33 4:43 6:33 6:33 4:43 6:33 <	32 5.69
23 2·71 5·35 2·87 5·44 3·03 5·52 3·20 5·62 3·38 5·73 24 2·81 5·41 2·97 5·50 3·15 5·59 3·33 5·69 3·51 5·80 25 2·92 5·46 3·09 5·56 3·27 5·66 3·46 5·77 3·65 5·89 26 3·03 5·52 3·21 5·62 3·40 5·73 3·59 5·85 3·80 5·98 27 3·15 5·59 3·34 5·70 3·53 5·82 3·74 5·95 3·97 6·09 28 3·28 5·67 3·48 5·78 3·68 5·91 3·90 6·05 4·14 6·20 29 3·41 5·75 3·64 6·01 4·08 6·16 4·33 6·33	44 5.76
24 2.81 5.41 2.97 5.50 3.15 5.59 3.33 5.69 3.51 5.80 25 2.92 5.46 3.09 5.56 3.27 5.66 3.46 5.77 3.65 5.89 26 3.03 5.52 3.21 5.62 3.40 5.73 3.59 5.85 3.80 5.98 27 3.15 5.59 3.34 5.70 3.53 5.82 3.74 5.95 3.97 6.09 28 3.28 5.67 3.48 5.78 3.68 5.91 3.90 6.05 4.14 6.20 29 3.41 5.75 3.62 5.87 3.88 6.16 4.33 6.33	57 5.84
25	71 5.93
27 3·15 5·59 3·34 5·70 3·53 5·82 3·74 5·95 3·97 6·09 4 28 3·28 5·67 3·48 5·78 3·68 5·91 3·90 6·05 4·14 6·20 4 29 3·41 5·75 3·62 5·87 3·84 6·01 4·08 6·16 4·33 6·33	86 6.02
27 3·15 5·59 3·34 5·70 3·53 5·82 3·74 5·95 3·97 6·09 4 28 3·28 5·67 3·48 5·78 3·68 5·91 3·90 6·05 4·14 6·20 4 29 3·41 5·75 3·62 5·87 3·84 6·01 4·08 6·16 4·33 6·33	03 6.13
28 3·28 5·67 3·48 5·78 3·68 5·91 3·90 6·05 4·14 6·20 4 29 3·41 5·75 3·62 5·87 3·84 6·01 4·08 6·16 4·33 6·33	20 6.25
29 3.41 5.75 3.62 5.87 3.84 6.01 4.08 6.16 4.33 6.33	40 6.38
	61 6.52
30 330 303 370 397 402 012 427 029 434 040	84 6.69
	10 6. 88
32 3.89 6.04 4.13 6.20 4.41 6.39 4.70 6.59 5.02 6.83	39 7.10
33 4.07 6.16 4.33 6.34 4.63 6.54 4.96 6.78 5.31 7.04 5	71 7:35
34 4.27 6.29 4.56 6.50 4.88 6.72 5.24 6.99 5.64 7.29 6	10 7.65
	53 8·o1

LATITUDE 30°.

		D	ECLINA?	TION-	-CONTR	ARY	NAME	<i>TO</i> —I	LATITUE	E.		
True Alt.	18°	Decl. Var.	19°	Decl. Var.	20°	Decl. Var.	21°	Decl. Var.	22°	Decl. Var.	23°	Decl. Var.
° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	H. M. S. 5 16 45.0 5 6 49.2 4 56 47.9 4 51 45.0 4 46 40.6	s. -2.60 2.68 2.77 2.81 2.86	H. M. S. 5 14 8.0 5 4 7.2 4 54 0.4 4 48 54.6 4 43 47.2	2·72 2·82	H. M. S. 5 II 28.7 5 I 22.5 4 5I 9.9 4 46 I.0 4 40 50.3	s. -2.68 2.77 2.87 2.92 2.98	H. M. S. 5 8 46·9 4 58 34·9 4 48 16·1 4 43 3·9 4 37 49·7		4 55 44.4 4 45 18.9 4 40 3.1	s. -2·76 2·87 2·98 3·05 3·11	4 36 58.4	s. -2.81 2.92 3.05 3.12 3.18
7 8 9 10	4 41 34.5 4 36 26.5 4 31 16.7 4 26 4.9 4 20 50.9	2·91 2·97 3·02 3·08 3·14	4 38 37.8 4 33 26.6 4 28 13.3 4 22 57.8 4 17 40.0	2·97 3·03 3·09 3·15 3·22	4 35 37.6 4 30 22.7 4 25 5.7 4 19 46.3 4 14 24.5	3.04 3.10 3.16 3.23 3.30	4 32 33.3 4 27 14.7 4 21 53.7 4 16 30.1 4 11 3.9	3·11 3·24 3·31 3·39	4 29 24·9 4 24 2·2 4 18 36·9 4 13 8·9 4 7 37·8	3*25	4 26 12·0 4 20 44·9 4 15 15·1 4 9 42·1 4 4 6·0	3·26 3·33 3·41 3·49 3·58
12 13 14 15 16	4 15 34.7 4 10 16.1 4 4 54.9 3 59 30.9 3 54 4.0	3·21 3·28 3·35 3·42 3·51	4 12 19·8 4 6 56·9 4 1 31·3 3 56 2·6 3 50 30·6	3·29 3·36 3·44 3·52 3·61	4 8 59·9 4 3 32·5 3 58 2·0 3 52 28·2 3 46 50·9	3·38 3·45 3·54 3·63 3·72	4 5 34·6 4 0 2·3 3 54 26·6 3 48 47·4 3 43 4·3	3:47 3:55 3:64 3:74 3:84	4 2 3.6 3 56 26.0 3 50 44.8 3 44 59.6 3 39 10.2	3.57 3.66 3.76 3.86 3.97	3 58 26·4 3 52 43·2 3 46 55·9 3 41 4·3 3 35 8·1	3.67 3.88 3.99 4.11
17 18 19 20 21	3 48 33.9 3 43 0.5 3 37 23.3 3 31 42.2 3 25 56.8	3.59 3.68 3.78 3.88 3.99	3 44 55.3 3 39 16.2 3 33 33.1 3 27 45.6 3 21 53.4	3.70 3.80 3.90 4.01 4.13	3 41 9.9 3 35 24.7 3 29 35.1 3 23 40.6 3 17 40.9	4.04 4.16	3 37 17·0 3 31 25·2 3 25 28·5 3 19 26·5 3 13 18·6	3.95 4.06 4.19 4.32 4.46	3 33 16·2 3 27 17·2 3 21 12·8 3 15 2·5 3 8 45·6	4.08 4.21 4.34 4.49 4.65	3 29 6·8 3 22 59·9 3 16 47·1 3 10 27·6 3 4 0·9	4·23 4·37 4·52 4·68 4·85
22 23 24 25 26	3 20 6·7 3 14 11·6 3 8 10·9 3 2 3·9 2 55 50·3	4·10 4·23 4·37 4·52 4·68	3 15 56·0 3 9 52·9 3 3 43·6 2 57 27·3 2 51 3·4	4·26 4·40 4·55 4·71 4·89	3 II 35.4 3 5 23.6 2 59 4.8 2 52 38.3 2 46 3.0	4.43 4.58 4.75 4.93 5.13	3 7 4°3 3 0 42°8 2 54 13°5 2 47 35°4 2 40 47°4	4·62 4·78 4·97 5·17 5·40	3 2 21·5 2 55 49·4 2 49 8·4 2 42 17·3 2 35 14·9	4·82 5·01 5·21 5·44 5·70	2 57 25.9 2 50 41.9 2 43 47.8 2 36 42.2 2 29 23.4	5.05 5.25 - 5.49 5.74 6.04
27 28 29 30 31	2 49 29·1 2 42 59·5 2 36 20·4 2 29 30·6 2 22 28·5	5·27 5·51	2 44 31.0 2 37 49.0 2 30 56.1 2 23 50.7 2 16 30.8	5.09 5.31 5.56 5.84 6.16	2 39 18·0 2 32 21·9 2 25 13·2 2 17 49·9 2 10 9·5	6.21	2 33 48·2 2 26 36·1 2 19 9·3 2 11 25·1 2 3 20·3	5·65 5·94 6·27 6·65 7·09	2 27 59·5 2 20 29·1 2 12 41·1 2 4 32·2 1 55 58·1	5·99 6·32 6·71 7·16 7·70	2 21 49·3 2 13 57·5 2 5 44·5 1 57 6·0 1 47 55·8	6·38 6·77 7·23 7·78 8·46
		VA	RIATIO	N TO	ı' OF	LATI	TUDE A	ND .	ALTITUI	DE.		
Alt.	L. 18°	Α.	L. 19°	Α.	L. 20°	Α.	L. 21°	Α	L. 22°	Α.	L. 23°	Α.
o 2 4 5 6		s. -4.94 4.99 5.04 5.06 5.09	s. -1.87 - 1.99 2.12 2.19 2.26	s. -4.98 5.03 5.08 5.11 5.14	s. -1.98 - 2.11 2.31 2.38	s. -5.02 5.08 5.13 5.16 5.19	s. -2·10 - 2·23 2·36 2·43 2·50	s. -5.07 5.13 5.19 5.22 5:25	s. -2·22 - 2·35 2·49 2·56 2·63	s. -5·12 5·18 5·25 5·28 5·32	s. -2·33 - 2·47 2·61 2·69 2·77	s. -5·17 5·24 5·30 5·34 5·39
7 8 9 10	2·20 2·27 2·35 2·42 2·50	5·12 5·15 5·18 5·21 5·25	2·33 2·40 2·47 2·55 2·63	5·17 5·20 5·24 5·28 5·32	2.45 2.53 2.61 2.69 2.77	5·23 5·27 5·30 5·34 5·39	2·58 2·66 2·74 2·83 2·92	5·29 5·33 5·37 5·41 5·46	2.71 2.80 2.88 2.97 3.07	5·36 5·40 5·44 5·49 5·54	2·85 2·94 3·03 3·12 3·22	5.43 5.47 5.52 5.58 5.63
12 13 14 15 16	2·58 2·66 2·75 2·84 2·94	5·29 5·33 5·38 5·42 5·47	2·72 2·80 2·90 2·99 3·10	5·36 5·40 5·45 5·50 5·56	2·86 2·95 3·05 3·15 3·26	5.43 5.48 5.53 5.59 5.65	3.01 3.11 3.21 3.32 3.43	5.51 5.57 5.62 5.69 5.75	3·16 3·27 3·37 3·49 3·61	5.60 5.66 5.72 5.79 5.86	3·32 3·43 3·55 3·67 3·80	5.69 5.75 5.82 5.90 5.98
17 18 19 20 21	3.04 3.14 3.25 3.37 3.50	5.53 5.59 5.65 5.72 5.79	3·20 3·31 3·43 3·56 3·69	5.62 5.68 5.75 5.83 5.91	3·37 3·49 3·62 3·75 3·90	5·72 5·79 5·87 5·95 6·04	3.55 3.68 3.81 3.96 4.11	5.83 5.90 5.99 6.08 6.18	3.74 3.87 4.02 4.17 4.34	5.94 6.03 6.12 6.23 6.34	3·93 4·08 4·24 4·41 4·59	6·07 6·16 6·27 6·38 6·51

6.00

6.10

6·21 6·33 6·47

6.62

6.79

6.99

7·21 7·48

3.83

3.99 4.15 4.33

4.23

4.74 4.98 5.24

5·53 5·87

4.05 4.22

4.40 4.59 4.81

5.04

5.91 5.61

5°94 6°34

6.14

6·25 6·38 6·51 6·67

6.84

7.04

7·27 7·53 7·84

4.28

4·46 4·66 4·87

5.11

5.38 5.68 6.02

6·42 6·88

6.30

6·42 6·56 6·72 6·89

7.09

7·32 7·59 7·91

8.28

4.52

4.73 4.94 5.18

5.45

5.75 6.10

6·49 6·96

7.52

6·47 6·61

6.77

6.95

7.15

7°39 7°65

7.97 8.36 8.82

4·79 5·01

5·25 5·52 5·83

6.18

6.58

7·05 7·62 8·32

6.66

6.82

7.00

7.20

7.44

7·72 8·04

8.43

8.91

9.49

23

24

25 26

27 28

29

30

31

5.88

5·96 6·06

6.17

6.29

6.42

6·57 6·74

6·93

3.63

3·77 3·93

4.09

4.27

4.46

4·91 5·17 5·46

TABLE II.
SEXAGESIMAL PROPORTIONAL TABLE.

,	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
I 	0.10	0.20	0.30	0.40	0.20	0.60	0.70	0.80	0.90	1.00	1.10	1.30	1.30	1.40	1.20
2 3 4 5	0·2 0·3 0·4 0·5	0.4 0.6 0.8 1.0	0.6 0.9 1.2 1.5	0·8 1·2 1·6 2·0	1.0 1.5 2.0 2.5	1.8 2.4 3.0	1.4 2.1 2.8 3.5	1·6 2·4 3·2 4·0	1·8 2·7 3·6 4·5	2·0 3·0 4·0 5·0	2·2 3·3 4·4 5·5	2·4 3·6 4·8 6·0	2·6 3·9 5·2 6·5	2·8 4·2 5·6 7·0	3.0 4.5 6.0 7.5
6 7 8 9	0·6 0·7 0·8 0·9	1·2 1·4 1·6 1·8 2·0	1.8 2.1 2.4 2.7 3.0	2.4 2.8 3.2 3.6 4.0	3.0 3.5 4.0 4.5 5.0	3·6 4·2 4·8 5·4 6·0	4·2 4·9 5·6 6·3 7·0	4·8 5·6 6·4 7·2 8·0	5·4 6·3 7·2 8·1 9·0	6·0 7·0 8·0 9·0 10·0	6·6 7·7 8·8 9·9	7·2 8·4 9·6 10·8 12·0	7·8 9·1 10·4 11·7 13·0	8·4 9·8 11·2 12·6 14·0	9·0 10·5 12·0 13·5 15·0
11 12 13 14 15	1·1 1·2 1·3 1·4 1·5	2·2 2·4 2·6 2·8 3·0	3·3 3·6 3·9 4·2 4·5	4.4 4.8 5.2 5.6 6.0	5.5 6.0 6.5 7.0 7.5	6·6 7·2 7·8 8·4 9·0	7·7 8·4 9·1 9·8 10·5	8·8 9·6 10·4 11·2 12·0	9.9 10.8 11.7 12.6 13.5	11.0 12.0 13.0 14.0 15.0	12·1 13·2 14·3 15·4 16·5	13·2 14·4 15·6 16·8 18·0	14·3 15·6 16·9 18·2 19·5	15.4 16.8 18.2 19.6 21.0	16·5 18·0 19·5 21·0 22·5
16 17 18 19 20	1.6 1.7 1.8 1.9 2.0	3·2 3·4 3·6 3·8 4·0	4·8 5·1 5·4 5·7 6·0	6·4 6·8 7·2 7·6 8·0	8·0 8·5 9·0 9·5	9.6 10.2 10.8 11.4 12.0	11·2 11·9 12·6 13·3 14·0	12·8 13·6 14·4 15·2 16·0	14·4 15·3 16·2 17·1 18·0	16·0 17·0 18·0 19·0 20·0	17.6 18.7 19.8 20.9 22.0	19·2 20·4 21·6 22·8 24·0	20·8 22·I 23·4 24·7 26·0	22:4 23:8 25:2 26:6 28:0	24.0 25.5 27.0 28.5 30.0
21 22 23 24 25	2·1 2·2 2·3 2·4 2·5	4·2 4·4 4·6 4·8 5·0	6·3 6·6 6·9 7·2 7·5	8·4 8·8 9·2 9·6	10·5 11·0 11·5 12·0	12·6 13·2 13·8 14·4 15·0	14·7 15·4 16·1 16·8 17·5	16·8 17·6 18·4 19·2 20·0	18·9 19·8 20·7 21·6 22·5	21·0 22·0 23·0 24·0 25·0	23·1 24·2 25·3 26·4 27·5	25·2 26·4 27·6 28·8 30·0	27·3 28·6 29·9 31·2 32·5	29.4 30.8 32.2 33.6 35.0	31·5 33·0 34·5 36·0 37·5
26 27 28 29 30	2·6 2·7 2·8 2·9 3·0	5·2 5·4 5·6 5·8 6·0	7·8 8·1 8·4 8·7 9·0	10.4 10.8 11.2 11.6 12.0	13.0 13.5. 14.0 14.5 15.0	15·6 16·2 16·8 17·4 18·0	18·2 18·9 19·6 20·3 21·0	20·8 21·6 22·4 23·2 24·0	23.4 24.3 25.2 26.1 27.0	26·0 27·0 28·0 29·0 30·0	28.6 29.7 30.8 31.9 33.0	31·2 32·4 33·6 34·8 36·0	33·8 35·1 36·4 37·7 39·0	36·4 37·8 39·2 40·6 42·0	39.0 40.5 42.0 43.5 45.0
31 32 33 34 35	3·1 3·3 3·4 3·5	6·2 6·4 6·6 6·8 7·0	9·3 9·6 9·9 10·2 10·5	12·4 12·8 13·2 13·6 14·0	15·5 16·0 16·5 17·0	18·6 19·2 19·8 20·4 21·0	21·7 22·4 23·1 23·8 24·5	24·8 25·6 26·4 27·2 28·0	27·9 28·8 29·7 30·6 31·5	31·0 32·0 33·0 34·0 35·0	34·1 35·2 36·3 37·4 38·5	37·2 38·4 39·6 40·8 42·0	40·3 41·6 42·9 44·2 45·5	43.4 44.8 46.2 47.6 49.0	46·5 48·0 49·5 51·0 52·5
36 37 38 39 40	3.6 3.7 3.8 3.9 4.0	7·2 7·4 7·6 7·8 8·0	10·8 11·1 11·4 11·7 12·0	14·4 14·8 15·2 15·6 16·0	18·0 18·5 19·0 19·5 20·0	21.6 22.2 22.8 23.4 24.0	25·2 25·9 26·6 27·3 28·0	28·8 29·6 30·4 31·2 32·0	32.4 33.3 34.2 35.1 36.0	36·0 37·0 38·0 39·0 40·0	39.6 40.7 41.8 42.9 44.0	43·2 44·4 45·6 46·8 48·0	46·8 48·1 49·4 50·7 52·0	50·4 51·8 53·2 54·6 56·0	54.0 55.5 57.0 58.5 60.0
41 42 43 44 45	4·1 4·2 4·3 4·4 4·5	8·2 8·4 8·6 8·8 9·0	12·3 12·6 12·9 13·2 13·5	16·4 16·8 17·2 17·6 18·0	20·5 21·0 21·5 22·0 22·5	24.6 25.2 25.8 26.4 27.0	28·7 29·4 30·1 30·8 31·5	32·8 33·6 34·4 35·2 36·0	36·9 37·8 38·7 39·6 40·5	41.0 42.0 43.0 44.0 45.0	45.1 46.2 47.3 48.4 49.5	49·2 50·4 51·6 52·8 54·0	53·3 54·6 55·9 57·2 58·5	57.4 58.8 60.2 61.6 63.0	61·5 63·0 64·5 66·0 67·5
46 47 48 49 50	4·6 4·7 4·8 4·9 5·0	9·2 9·4 9·6 9·8 10·0	13·8 14·1 14·4 14·7 15·0	18·4 18·8 19·2 19·6 20·0	23.0 23.5 24.0 24.5 25.0	27·6 28·2 28·8 29·4 30·0	32·2 32·9 33·6 34·3 35·0	36·8 37·6 38·4 39·2 40·0	41.4 42.3 43.2 44.1 45.0	46·0 47·0 48·0 49·0 50·0	50·6 51·7 52·8 53·9 55·0	55°2 56°4 57°6 58°8 60°0	59.8 61.1 62.4 63.7 65.0	64·4 65·8 67·2 68·6 70·0	69·0 70·5 72·0 73·5 75·0
51 52 53 54 55	5·1 5·2 5·3 5·4 5·5	10·2 10·4 10·6 10·8 11·0	15·3 15·6 15·9 16·2 16·5	20.4 20.8 21.2 21.6 22.0	25.5 26.0 26.5 27.0 27.5	30·6 31·2 31·8 32·4 33·0	35.7 36.4 37.1 37.8 38.5	40·8 41·6 42·4 43·2 44·0	45.9 46.8 47.7 48.6 49.5	51.0 52.0 53.0 54.0 55.0	56·1 57·2 58·3 59·4 60·5	61·2 62·4 63·6 64·8 66·0	66·3 67·6 68·9 70·2 71·5	71:4 72:8 74:2 75:6 77:0	76·5 78·0 79·5 81·0 82·5
56 57 58 59 60	5·6 5·7 5·8 5·9 6·0	11.4 11.6 11.8 12.0	16·8 17·1 17·4 17·7 18·0	22·4 22·8 23·2 23·6 24·0	28.0 28.5 29.0 29.5 30.0	33.6 34.2 34.8 35.4 36.0	39·2 39·9 40·6 41·3 42·0	44.8 45.6 46.4 47.2 48.0	50·4 51·3 52·2 53·1 54·0	56·0 57·0 58·0 59·0 60·0	61.6 62.7 63.8 64.9 66.0	67·2 68·4 69·6 70·8 72·0	72·8 74·1 75·4 76·7 78·0	78·4 79·8 81·2 82·6 84·0	84.0 85.5 87.0 88.5 90.0

í	s. 1.60	s. 1.70	s. 1·80	s. 1.90	s. 2.00	s. 2·10	s. 2·20	s. 2·30	s. 2·40	s. 2·50	s. 2·60	s. 2·70	s. 2.80	s. 2·90	s. 3.00
2	3.5	3'4	3.6	3.8	4.0	4.5	4.4	4.6	4.8	5.0	5.3	ļ	5.6	5.8	6.0
3 4 5	4·8 6·4 8·0	5·1 6·8 8·5	5.4 7.2 9.0	5·7 7·6 9·5	8.0 8.0	6·3 8·4 10·5	6.6 8.8 11.0	6·9 9·2 11·5	7·2 9·6 12·0	7·5 10·0 12·5	7·8 10·4 13·0	5.4 8.1 10.8 13.5	8·4 11·2 14·0	8·7 11·6 14·5	9.0 12.0 15.0
6 7 8	9·6 11·2 12·8	10·2 11·9	10·8 12·6 14·4	11·4 13·3 15·2	12.0 14.0 16.0	12·6 14·7 16·8	13·2 15·4 17·6	13·8 16·1 18·4	14·4 16·8 19·2	15.0 17.5 20.0	15·6 18·2 20·8	16·2 18·9 21·6	16·8 19·6 22·4	17·4 20·3 23·2	18·0 21·0 24·0
9	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23·4 26·0	24.3	25·2 28·0	26·I 29·0	27·0 30·0
11 12 13 14	17.6 19.2 20.8 22.4	18·7 20·4 22·1 23·8	19·8 21·6 23·4 25·2	20·9 22·8 24·7 26·6 28·5	22.0 24.0 26.0 28.0	23·1 25·2 27·3 29·4	24·2 26·4 28·6 30·8	25·3 27·6 29·9 32·2	26·4 28·8 31·2 33·6	27·5 30·0 32·5 35·0	28.6 31.2 33.8 36.4	29·7 32·4 35·1 37·8	30·8 33·6 36·4 39·2	31.9 34.8 37.7 40.6	33.0 36.0 39.0 42.0
15	24.0	25.5	28.8	30.4	32.0	31.5	33.0	34·5 36·8	36·0 38·4	37·5 40·0	39·0 41·6	43.2	44.8	43.5	48.0
17 18 19 20	27·2 28·8 30·4 32·0	28·9 30·6 32·3 34·0	30·6 32·4 34·2 36·0	32·3 34·2 36·1 38·0	34.0 36.0 38.0 40.0	35·7 37·8 39·9 42·0	37.4 39.6 41.8 44.0	39·1 41·4 43·7 46·0	40·8 43·2 45·6 48·0	42.5 45.0 47.5 50.0	44.2 46.8 49.4 52.0	45.9 48.6 51.3 54.0	47.6 50.4 53.2 56.0	49°3 52°2 55°1 58°0	51.0 54.0 57.0 60.0
21 22 23	33.6 35.2 36.8	35·7 37·4 39·1	37·8 39·6 41·4	39.9 41.8 43.7	42.0 44.0 46.0	44·1 46·2 48·3	46·2 48·4 50·6	48·3 50·6 52·9	50.4 52.8 55.2	52·5 55·0 57·5	54·6 57·2 59·8	56·7 59·4 62·1	58·8 61·6 64·4	60·9 63·8 66·7	63·0 66·0 69·0
24 25	38·4 40·0	40·8 42·5	43°2 45°0	45·6 47·5	48.0 50.0	52·5	52·8 55·0	55·2 57·5	57·6 60·0	60·0 62·5	62·4 65·0	64·8 67·5	67·2 70·0	72·5	75.0
26 27 28 29 30	41.6 43.2 44.8 46.4 48.0	44.2 45.9 47.6 49.3 51.0	46.8 48.6 50.4 52.2 54.0	49.4 51.3 53.2 55.1 57.0	52.0 54.0 56.0 58.0 60.0	54.6 56.7 58.8 60.9 63.0	57·2 59·4 61·6 63·8 66·0	59·8 62·1 64·4 66·7 69·0	62·4 64·8 67·2 69·6 72·0	65.0 67.5 70.0 72.5 75.0	67.6 70.2 72.8 75.4 78.0	70·2 72·9 75·6 78·3 81·0	72.8 75.6 78.4 81.2 84.0	75.4 78.3 81.2 84.1 87.0	78.0 81.0 84.0 87.0 90.0
31 32	49.6	52·7 54·4	55·8 57·6	58·9 60·8	62·0 64·0	65·1 67·2	68·2 70·4	71·3 73·6	74°4 76·8	77·5 80·0	80·6 83·2	83·7 86·4	86·8 89·6	89·9 92·8	93·0 96·0
33 34 35	52·8 54·4 56·0	56·1 57·8 59·5	59°4 61°2 63°0	62·7 64·6 66·5	66·0 68·0 70·0	69·3 71·4 73·5	72·6 74·8 77·0	75°9 78°2 80°5	79·2 81·6 84·0	82·5 85·0 87·5	85·8 88·4 91·0	91·8 94·5	92·4 95·2 98·0	95.7 98.6 101.5	99.0 102.0 105.0
36 37 38 39	57·6 59·2 60·8 62·4	61·2 62·9 64·6 66·3	64·8 66·6 68·4 70·2	68·4 70·3 72·2 74·1	72·0 74·0 76·0 78·0	75·6 77·7 79·8 81·9	79°2 81°4 83°6 85°8	82·8 85·1 87·4 89·7	86·4 88·8 91·2 93·6	90·0 92·5 95·0 97·5	93·6 96·2 98·8 101·4	97·2 99·9 102·6 105·3	100·8 103·6 106·4 109·2	104·4 107·3 110·2 113·1	108·0 111·0 114·0 117·0
40 41	64.0	69.7	72.0	76·0	80·0	84.0	90.2	92.0	96.0	100.0	104.0	108.0	112.0	118.0	120.0
42 43 44 45	67·2 68·8 70·4 72·0	71·4 73·1 74·8 76·5	75·6 77·4 79·2 81·0	79·8 81·7 83·6 85·5	84·0 86·0 88·0 90·0	88·2 90·3 92·4 94·5	92·4 94·6 96·8 99·0	96.6 98.9 101.2	100·8 103·2 105·6 108·0	105.0 107.5 110.0 112.5	109·2 111·8 114·4 117·0	113·4 116·1 118·8 121·5	117·6 120·4 123·2 126·0	121·8 124·7 127·6 130·5	126.0 129.0 132.0 135.0
46 47 48	73·6 75·2 76·8	78·2 79·9 81·6	82·8 84·6 86·4	87·4 89·3 91·2	92.0 94.0 96.0	96·6 98·7 100·8	103.4			117.5	119·6 122·2 124·8	126.9	128·8 131·6 134·4		138·0 141·0 144·0
49 50	78·4 80·0	83·3 85·0	88·2 90·0	93.1 93.1	98.0	102.9	107.8	112.7	117.6	122.5	127.4	132.3	137·2 140·0	142.1	147·0 150·0
51 52 53	81.6 83.2 84.8	86·7 88·4 90·1	91·8 93·6 95·4	96·9 98·8 100·7	104.0 106.0	107·1 109·2 111·3	114·4 116·6	121.9	122·4 124·8 127·2		137.8			153.7	153.0 156.2
54 55	86·4 88·0	93.2	97·2 99·0	104.2	110.0 108.0		118.8	126.5	132·0	137·5		145.8	154.0		165.0
56 57 58	89.6 91.2 92.8	95°2 96°9 98°6	104.4	108.3	116.0	119.7	125.4	128·8 131·1 133·4	139.2	142.5	150.8	153·9 156·6	159.6		168.0 171.0 174.0
59 60	94·4 96·0	100.3		114.0							156.0		165·2 168·0		180.0

TABLE II.

í	s. 3·10	s. 3·20	s. 3·30	s. 3·40	s. 3·50	s. 3·60	s. 3·70	s. 3·80	s. 3·90	s. 4.00	s. 4·10	s. 4·20	s. 4·30	s. 4·40	s. 4·50
2 3 4 5	6·2 9·3 12·4 15·5	6·4 9·6 12·8 16·0	6·6 9·9 13·2 16·5	6·8 10·2 13·6 17·0	7.0 10.5 14.0 17.5	7·2 10·8 14·4 18·0	7.4 11.1 14.8 18.5	7·6 11·4 15·2 19·0	7·8 11·7 15·6 19·5	8·0 12·0 16·0 20·0	8·2 12·3 16·4 20·5	8·4 12·6 16·8 21·0	8·6 12·9 17·2 21·5	8·8 13·2 17·6 22·0	9.0 13.5 18.0 22.5
6 7 8 9	18.6 21.7 24.8 27.9 31.0	19·2 22·4 25·6 28·8 32·0	19·8 23·1 26·4 29·7 33·0	20·4 23·8 27·2 30·6 34·0	21.0 24.5 28.0 31.5 35.0	21.6 25.2 28.8 32.4 36.0	22·2 25·9 29·6 33·3 37·0	22.8 26.6 30.4 34.2 38.0	23.4 27.3 31.2 35.1 39.0	24.0 28.0 32.0 36.0 40.0	24.6 28.7 32.8 36.9 41.0	25·2 29·4 33·6 37·8 42·0	25.8 30.1 34.4 38.7 43.0	26·4 30·8 35·2 39·6 44·0	27·0 31·5 36·0 40·5 45·0
11 12 13 14 15	34·I 37·2 40·3 43·4 46·5	35°2 38°4 41°6 44°8 48°0	36·3 39·6 42·9 46·2 49·5	37.4 40.8 44.2 47.6 51.0	38·5 42·0 45·5 49·0 52·5	39·6 43·2 46·8 50·4 54·0	40.7 44.4 48.1 51.8 55.5	41·8 45·6 49·4 53·2 57·0	42.9 46.8 50.7 54.6 58.5	44.0 48.0 52.0 56.0 60.0	45·1 49·2 53·3 57·4 61·5	46·2 50·4 54·6 58·8 63·0	47:3 51:6 55:9 60:2 64:5	48·4 52·8 57·2 61·6 66·0	49.5 54.0 58.5 63.0 67.5
16 17 18 19 20	49.6 52.7 55.8 58.9 62.0	51·2 54·4 57·6 60·8 64·0	52·8 56·1 59·4 62·7 66·0	54.4 57.8 61.2 64.6 68.0	56·0 59·5 63·0 66·5 70·0	57.6 61.2 64.8 68.4 72.0	59·2 62·9 66·6 70·3 74·0	60·8 64·6 68·4 72·2 76·0	62·4 66·3 70·2 74·1 78·0	64.0 68.0 72.0 76.0 80.0	65·6 69·7 73·8 77·9 82·0	67·2 71·4 75·6 79·8 84·0	68·8 73·1 77·4 81·7 86·0	70·4 74·8 79·2 83·6 88·0	72.0 76.5 81.0 85.5 90.0
2I 22 23 24 25	65·1 68·2 71·3 74·4 77·5	67·2 70·4 73·6 76·8 80·0	69·3 72·6 75·9 79·2 82·5	71·4 74·8 78·2 81·6 85·0	73°5 77°0 80°5 84°0 87°5	75.6 79.2 82.8 86.4 90.0	77·7 81·4 85·1 88·8 92·5	79.8 83.6 87.4 91.2 95.0	81.9 85.8 89.7 93.6 97.5	84.0 88.0 92.0 96.0	86·1 90·2 94·3 98·4 102·5	88·2 92·4 96·6 100·8 105·0	90·3 94·6 98·9 103·2 107·5	105.6	94.5 99.0 103.5 108.0
26 27 28 29 30	80.6 83.7 86.8 89.9 93.0	83·2 86·4 89·6 92·8 96·0	85.8 89.1 92.4 95.7 99.0	88·4 91·8 95·2 98·6	91.0 94.5 98.0 101.5 105.0	93·6 97·2 100·8 104·4 108·0	107.3	98·8 102·6 106·4 110·2 114·0	101·4 105·3 109·2 113·1 117·0	108.0 115.0	106·6 110·7 114·8 118·9 123·0	109·2 113·4 117·6 121·8 126·0	111.8 116.1 120.4 124.7 129.0		117·0 121·5 126·0 130·5 135·0
34	96·1 99·2 102·3 105·4 108·5	99·2 102·4 105·6 108·8	102·3 105·6 108·9 112·2 115·5	105.4 108.8 112.2 115.6		115·2 118·8	118.4	129.2	120·9 124·8 128·7 132·6 136·5	132·0 136·0	127·1 131·2 135·3 139·4 143·5	130·2 134·4 138·6 142·8 147·0	133·3 137·6 141·9 146·2 150·5	136·4 140·8 145·2 149·6 154·0	139·5 144·0 148·5 153·0 157·5
37 38 39	111·6 114·7 117·8 120·9 124·0	115·2 118·4 121·6 124·8 128·0	118·8 122·1 125·4 128·7 132·0	122·4 125·8 129·2 132·6 136·0		136·8 140·4	144.3	136·8 140·6 144·4 148·2 152·0	140.4 144.3 148.2 152.1 156.0	152.0 156.0	147·6 151·7 155·8 159·9 164·0		154.8 159.1 163.4 167.7 172.0	158·4 162·8 167·2 171·6 176·0	162.0 166.5 171.0 175.5 180.0
42 43 44	127·1 130·2 133·3 136·4	131·2 134·4 137·6 140·8	135·3 138·6 141·9 145·2 148·5	149.6	143.5 147.0 150.5 154.0 157.5	154·8 158·4	159.1	155.8 159.6 163.4 167.2 171.0	159·9 163·8 167·7 171·6	168·0 172·0 176·0	168·1 172·2 176·3 180·4 184·5	172:2 176:4 180:6 184:8 189:0	176·3 180·6 184·9 189·2	189.2	184·5 189·0 193·5 198·0 202·5
47 48 49	142·6 145·7 148·8 151·9 155·0	147·2 150·4 153·6 156·8 160·0	151.8 155.1 158.4 161.7 165.0	159·8 163·2 166·6	161.0 164.5 168.0 171.5	169·2 172·8	173·9 177·6 181·3	182·4 186·2	183.3	188·0 192·0 196·0	188·6 192·7 196·8 200·9 205·0	197.4 201.6 205.8	202·1 206·4 210·7	211.2	216.0
52 53 54	158·1 161·2 164·3 167·4 170·5	163·2 166·4 169·6 172·8 176·0	168·3 171·6 174·9 178·2 181·5	173.4 176.8 180.2 183.6 187.0	185.5		188·7 192·4 196·1 199·8 203·5	197·6 201·4 205·2	206·7 210·6	208·0 212·0 216·0	209·1 213·2 217·3 221·4 225·5	218.4	223·6 227·9 232·2	224·4 228·8 233·2 237·6 242·0	238.5
57	173·6 176·7 179·8 182·9 186·0	179·2 182·4 185·6 188·8 192·0	191.4	193·8 197·2 200·6	203.0 206.2	208.8	210·9 214·6 218·3	224.5 224.5	226.2	232·0 236·0	229·6 233·7 237·8 241·9 246·0	247.8	245°1 249°4 253°7	250·8 255·2 259·6	252.0 256.5 261.0 265.5 270.0

						1	1								
í	s. 4·60	s. 4·70	s. 4·80	s. 4·90	s. 5.00	s. 5·10	s. 5·20	s. 5·30	s. 5·40	s. 5·50	s. 5·60	s. 5'70	s. 5·80	s. 5·90	s. 6·00
2 3 4 5	9·2 13·8 18·4 23·0	9°4 14°1 18°8 23°5	9.6 14.4 19.2 24.0	9·8 14·7 19·6 24·5	10·0 15·0 20·0 25·0	10·2 15·3 20·4 25·5	10·4 15·6 20·8 26·0	10·6 15·9 21·2 26·5	10·8 16·2 21·6 27·0	11·0 16·5 22·0 27·5	11·2 16·8 22·4 28·0	11·4 17·1 22·8 28·5	11·6 17·4 23·2 29·0	11.8 17.7 23.6 29.5	12.0 18.0 24.0 30.0
6 7 8 9 10	27·6 32·2 36·8 41·4 46·0	28·2 32·9 37·6 42·3 47·0	28·8 -33·6 38·4 43·2 48·0	29.4 34.3 39.2 44.1 49.0	30·0 35·0 40·0 45·0 50·0	30·6 35·7 40·8 45·9 51·0	31·2 36·4 41·6 46·8 52·0	31.8 37.1 42.4 47.7 53.0	32·4 37·8 43·2 48·6 54·0	33.0 38.5 44.0 49.5 55.0	33·6 39·2 44·8 50·4 56·0	34·2 39·9 45·6 51·3 57·0	34·8 40·6 46·4 52·2 58·0	35.4 41.3 47.2 53.1 59.0	36·0 42·0 48·0 54·0 60·0
11 12 13 14 15	50·6 55·2 59·8 64·4 69·0	51.7 56.4 61.1 65.8 70.5	52·8 57·6 62·4 67·2 72·0	53.9 58.8 63.7 68.6 73.5	55.0 60.0 65.0 70.0 75.0	56·1 61·2 66·3 71·4 76·5	57·2 62·4 67·6 72·8 78·0	58·3 63·6 68·9 74·2 79·5	59.4 64.8 70.2 75.6 81.0	60·5 66·0 71·5 77·0 82·5	61.6 67.2 72.8 78.4 84.0	62.7 68.4 74.1 79.8 85.5	63·8 69·6 75·4 81·2 87·0	64·9 70·8 76·7 82·6 88·5	66·0 72·0 78·0 84·0 90·0
16 17 18 19 20	73·6 78·2 82·8 87·4 92·0	75·2 79·9 84·6 89·3 94·0	76·8 81·6 86·4 91·2 96·0	78·4 83·3 88·2 93·1 98·0	80·0 85·0 90·0 95·0	81.6 86.7 91.8 96.9	83·2 88·4 93·6 98·8 104·0		86·4 91·8 97·2 102·6 108·0	88·0 93·5 99·0 104·5	106.4	91·2 96·9 102·6 108·3 114·0	92·8 98·6 104·4 110·2 116·0	94.4 100.3 106.2 112.1 118.0	96.0 102.0 108.0 114.0
2I 22 23 24 25	96·6 101·2 105·8 110·4	98·7 103·4 108·1 112·8	100·8 105·6 110·4 115·2 120·0	102·9 107·8 112·7 117·6 122·5	115.0	107·1 112·2 117·3 122·4 127·5	109·2 114·4 119·6 124·8	121.9	113·4 118·8 124·2 129·6 135·0	115·5 121·0 126·5 132·0 137·5	123·2 128·8 134·4	119·7 125·4 131·1 136·8 142·5	139.2	123·9 129·8 135·7 141·6 147·5	126·0 132·0 138·0 144·0 150·0
26 27 28 29 30	119·6 124·2 128·8 133·4 138·0	122·2 126·9 131·6 136·3 141·0	124·8 129·6 134·4 139·2 144·0	127·4 132·3 137·2 142·1 147·0	140·0 145·0	132·6 137·7 142·8 147·9 153·0	135·2 140·4 145·6 150·8 156·0	153.7	140·4 145·8 151·2 156·6 162·0	143.0 148.5 154.0 159.5 165.0	151·2 156·8 162·4	148·2 153·9 159·6 165·3 171·0	150·8 156·6 162·4 168·2 174·0	153.4 159.3 165.2 171.1 177.0	156·0 162·0 168·0 174·0 180·0
31 32 33 34 35	142.6 147.2 151.8 156.4 161.0		148·8 153·6 158·4 163·2 168·0	151.9 156.8 161.7 166.6 171.5	155.0 160.0	158·1 163·2 168·3 173·4 178·5	161·2 166·4 171·6 176·8 182·0	164·3 169·6 174·9 180·2 185·5	167·4 172·8 178·2 183·6 189·0	181.2	179·2 184·8	176·7 182·4 188·1 193·8 199·5	179.8 185.6 191.4 197.2 203.0	182.9 188.8 194.7 200.6 206.5	186.0 192.0 198.0 204.0
36 37 38 39 40	165.6 170.2 174.8 179.4 184.0	169·2 173·9 178·6 183·3 188·0	172.8 177.6 182.4 187.2 192.0	176.4 181.3 186.2 191.1 196.0		183.6 188.7 193.8 198.9	187·2 192·4 197·6 202·8 208·0	190·8 196·1 201·4 206·7 212·0	194.4 199.8 205.2 210.6 216.0	209.0	201.6 207.2 212.8 218.4 224.0	205·2 210·9 216·6 222·3 228·0		212·4 218·3 224·2 230·1 236·0	216·0 222·0 228·0 234·0 240·0
41 42 43 44 45	188.6 193.2 197.8 202.4 207.0	192·7 197·4 202·1 206·8 211·5	196·8 201·6 206·4 211·2 216·0	200·9 205·8 210·7 215·6	205·0 210·0 215·0 220·0 225·0	209·1 214·2 219·3 224·4	213·2 218·4 223·6 228·8	217·3 222·6 227·9 233·2	221·4 226·8 232·2 237·6 243·0	225·5 231·0 236·5	229·6 235·2 240·8	233·7 239·4 245·1 250·8 256·5	237·8 243·6 249·4	241.9 247.8 253.7 259.6 265.5	246·0 252·0 258·0 264·0 270·0
46 47 48 49 50	211·6 216·2 220·8 225·4 230·0	216·2 220·9 225·6 230·3 235·0	220.8	225.4 230.3 235.2 240.1	230·0 235·0 240·0 245·0	234·6 239·7 244·8 249·9 255·0	239·2 244·4 249·6	243·8 249·I	248·4 253·8 259·2 264·6 270·0	253.0 258.5 264.0	257·6 263·2 268·8 274·4	262.2	266·8 272·6 278·4 284·2 290·0	271·4 277·3 283·2 289·1 295·0	276·0 282·0 288·0
51 52 53 54 55	234·6 239·2 243·8 248·4 253·0	239·7 244·4 249·1 253·8 258·5	244·8 249·6 254·4 259·2 264·0	249.9 254.8 259.7 264.6 269.5	255·0 260·0	260·1 265·2 270·3	265·2 270·4 275·6 280·8 286·0	270·3 275·6 280·9 286·2 291·5	275.4 280.8 286.2 291.6 297.0	280.5	285·6 291·2 296·8	290·7 296·4 302·1 307·8 313·5	295·8 301·6 307·4 313·2 319·0	300·9 306·8 312·7	306·0 312·0 318·0 324·0 330·0
56 57 58 59 60	257·6 262·2 266·8 271·4 276·0	263·2 267·9 272·6 277·3 282·0	268·8 273·6 278·4 283·2 288·0	274·4 279·3 284·2 289·I 294·0	280·0 285·0 290·0 295·0	285.6 290.7 295.8 300.9 306.0	291·2 296·4 301·6 306·8	296·8 302·1 307·4 312·7	302·4 307·8 313·2 318·6 324·0	308·0 313·5 308·0	313·6 319·2 324·8 330·4	319·2 324·9 330·6 336·3 342·0	324·8 330·6 336·4 342·2	330·4 336·3	336·0 342·0 348·0

TABLE II.

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í	s. 6·10	s. 6·20	s. 6·30	s. 6·40	s. 6·50	s. 6·6o	s. 6·70	s. 6·8o	s. 6·90	s. 7·00	s. 7·10	s. 7·20	s. 7·30	s. 7·40	s. 7·50
2 3 4 5	12·2 18·3 24·4 30·5	12·4 18·6 24·8 31·0	12·6 18·9 25·2 31·5	12·8 19·2 25·6 32·0	13·0 19·5 26·0 32·5	13·2 19·8 26·4 33·0	13·4 20·1 26·8 33·5	13·6 20·4 27·2 34·0	13·8 20·7 27·6 34·5	14.0 21.0 28.0 35.0	14·2 21·3 28·4 35·5	14.4 21.6 28.8 36.0	14·6 21·9 29·2 36·5	14·8 22·2 29·6 37·0	15·0 22·5 30·0 37·5
6 7 8 9 10	36·6 42·7 48·8 54·9 61·0	37·2 43·4 49·6 55·8 62·0	37·8 44·1 50·4 56·7 63·0	38·4 44·8 51·2 57·6 64·0	39.0 45.5 52.0 58.5 65.0	39·6 46·2 52·8 59·4 66·0	40·2 46·9 53·6 60·3 67·0	40·8 47·6 54·4 61·2 68·0	41.4 48.3 55.2 62.1 69.0	42·0 49·0 56·0 63·0 70·0	42.6 49.7 56.8 63.9 71.0	43·2 50·4 57·6 64·8 72·0	43.8 51.1 58.4 65.7 73.0	44.4 51.8 59.2 66.6 74.0	45.0 52.5 60.0 67.5 75.0
11 12 13 14 15	67·1 73·2 79·3 85·4 91·5	68·2 74·4 80·6 86·8 93·0	69·3 75·6 81·9 88·2 94·5	70·4 76·8 83·2 89·6 96·0	71.5 78.0 84.5 91.0 97.5	72·6 79·2 85·8 92·4 99·0	73.7 80.4 87.1 93.8 100.5	74.8 81.6 88.4 95.2 102.0	75.9 82.8 89.7 96.6 103.5	77.0 84.0 91.0 98.0 105.0	78·1 85·2 92·3 99·4 106·5	79°2 86°4 93°6 100°8 108°0	80·3 87·6 94·9 102·2 109·5	81·4 88·8 96·2 103·6 111·0	82·5 90·0 97·5 105·0 112·5
16 17 18 19 20	97·6 103·7 109·8 115·9	99°2 105°4 111°6 117°8 124°0	100·8 107·1 113·4 119·7 126·0	108·8 115·2 121·6		112·2 118·8 125·4	113·9 120·6 127·3	108·8 115·6 122·4 129·2 136·0	110°4 117°3 124°2 131°1 138°0	119.0 126.0 133.0	113·6 120·7 127·8 134·9 142·0	115·2 122·4 129·6 136·8 144·0	116·8 124·1 131·4 138·7 146·0	118·4 125·8 133·2 140·6 148·0	127·5 135·0 142·5
21 22 23 24 25	128·1 134·2 140·3 146·4 152·5	130·2 136·4 142·6 148·8 155·0	132·3 138·6 144·9 151·2 157·5		136·5 143·0 149·5 156·0 162·5	151.8	147.4	149·6 156·4	144.9 151.8 158.7 165.6 172.5	154.0 161.0 168.0	149·1 156·2 163·3 170·4 177·5	151·2 158·4 165·6 172·8 180·0	153·3 160·6 167·9 175·2 182·5	155·4 162·8 170·2 177·6 185·0	172.5
26 27 28 29 30	158·6 164·7 170·8 176·9 183·0	179.8	163·8 170·1 176·4 182·7 189·0	172·8 179·2 185·6	169·0 175·5 182·0 188·5 195·0	171.6 178.2 184.8 191.4 198.0	180·9 187·6 194·3		179.4 186.3 193.2 200.1	189·0 196·0	184·6 191·7 198·8 205·9 213·0	187·2 194·4 201·6 208·8 216·0	197·1 204·4 211·7	192·4 199·8 207·2 214·6 222·0	195.0 202.5 210.0 217.5 225.0
31 32 33 34 35		192·2 198·4 204·6 210·8 217·0	195·3 201·6 207·9 214·2 220·5	198·4 204·8 211·2 217·6 224·0		204.6 211.2 217.8 224.4 231.0	214·4 221·1 227·8	210·8 217·6 224·4 231·2 238·0	213.9 220.8 227.7 234.6 241.5	238.0		223·2 230·4 237·6 244·8 252·0	233.6	229·4 236·8 244·2 251·6 259·0	232·5 240·0 247·5 255·0 262·5
36 37 38 39 40	219·6 225·7 231·8 237·9 244·0	223·2 229·4 235·6 241·8 248·0	226·8 233·1 239·4 245·7 252·0	230·4 236·8 243·2 249·6 256·0	234.0 240.5 247.0 253.5 260.0	237·6 244·2 250·8 257·4 264·0	241·2 247·9 254·6 261·3 268·0		248·4 255·3 262·2 269·1 276·0	252.0 259.0 266.0 273.0 280.0	269.8	259·2 266·4 273·6 280·8 288·0		266·4 273·8 281·2 288·6 296·0	270·0 277·5 285·0 292·5 300·0
41 42 43 44 45	250·1 256·2 262·3 268·4 274·5	254·2 260·4 266·6 272·8 279·0	258·3 264·6 270·9 277·2 283·5	262·4 268·8 275·2 281·6 288·0	286∙0	270·6 277·2 283·8 290·4 297·0	294.8		282·9 289·8 296·7 303·6 310·5	301.0	298·2 305·3 312·4	295·2 302·4 309·6 316·8 324·0	313.9	303.4 310.8 318.2 325.6 333.0	307.5 315.0 322.5 330.0 337.5
46 47 48 49 50	280·6 286·7 292·8 298·9 305·0	291·4 297·6 303·8	296·1 302·4 308·7	294.4 300.8 307.2 313.6 320.0	305.5 312.0 318.5	303·6 310·2 316·8 323·4 330·0	314·9 321·6 328·3	319·6 326·4 333·2	324·3 331·2 38·1	322.0 329.0 336.0 343.0 350.0	333.7 340.8 347.9	331·2 338·4 345·6 352·8 360·0	343°1 350°4 357°7		345.0 352.5 360.0 367.5 375.0
51 52 53 54 55	311·1 317·2 323·3 329·4 335·5	316·2 322·4 328·6 334·8 341·0	321·3 327·6 333·9 340·2 346·5	332·8 339·2 345·6	331·5 338·0 344·5 351·0 357·5	336·6 343·2 349·8 356·4 363·0	348·4 355·1 361·8	353.6	351.9 358.8 365.7 372.6 379.5	364.0	376.3	367·2 374·4 381·6 388·8 396·0	379·6 386·9 394·2	377.4 384.8 392.2 399.6 407.0	382·5 390·0 397·5 405·0 412·5
56 57 58 59 60	341.6 347.7 353.8 359.9 366.0		352.8 359.1 365.4 371.7 378.0	364·8 371·2	364.0 370.5 377.0 383.5 390.0	389.4	381·9 388·6 395·3	387·6 394·4 401·2	393·3 400·2 407·1	413.0	404·7 411·8	410.4 417.6 424.8	430.7	429·2 436·6	420·0 427·5 435·0 442·5 450·0

í	s. 7·60	s. 7·70	s. 7·80	s. 7.90	s. 8·00	s. 8·10	s. 8·20	s. 8·30	s. 8·40	s. 8·50	s. 8·60	s. 8·70	s. 8·80	s. 8·90	s. 9*00
2 3 4 5	15·2 22·8 30·4 38·0	15·4 23·1 30·8 38·5	15·6 23·4 31·2 39·0	15·8 23·7 31·6 39·5	16·0 24·0 32·0 40·0	16·2 24·3 32·4 40·5	16·4 24·6 32·8 41·0	16·6 24·9 33·2 41·5	16·8 25·2 33·6 42·0	17.0 25.5 34.0 42.5	17·2 25·8 34·4 43·0	17·4 26·1 34·8 43·5	17·6 26·4 35·2 44·0	17·8 26·7 35·6 44·5	18·0 27·0 36·0 45·0
6 7 8 9	45.6 53.2 60.8 68.4 76.0	46·2 53·9 61·6 69·3 77·0	46·8 54·6 62·4 70·2 78·0	47.4 55.3 63.2 71.1 79.0	48·0 56·0 64·0 72·0 80·0	48·6 56·7 64·8 72·9 81·0	49°2 57°4 65°6 73°8 82°0	49·8 58·1 66·4 74·7 83·0	50.4 58.8 67.2 75.6 84.0	51.0 59.5 68.0 76.5 85.0	51.6 60.2 68.8 77.4 86.0	52·2 60·9 69·6 78·3 87·0	52·8 61·6 70·4 79·2 88·0	53°4 62°3 71°2 80°1 89°0	54.0 63.0 72.0 81.0 90.0
11 12 13 14 15	83.6 91.2 98.8 106.4 114.0	84.7 92.4 100.1 107.8 115.5	85.8 93.6 101.4 109.2 117.0	86·9 94·8 102·7 110·6 118·5	88.0 96.0 104.0 112.0 120.0	89·1 97·2 105·3 113·4 121·5	90·2 98·4 106·6 114·8	91·3 99·6 107·9 116·2 124·5	92·4 100·8 109·2 117·6 126·0	110.2	94.6 103.2 111.8 120.4 129.0	95.7 104.4 113.1 121.8 130.5	96·8 105·6 114·4 123·2 132·0	97.9 106.8 115.7 124.6 133.5	99.0 108.0 117.0 126.0 135.0
16 17 18 19 20	121·6 129·2 136·8 144·4 152·0	130.0	124·8 132·6 140·4 148·2 156·0		152.0	145·8 153·9	139·4 147·6 155·8	132·8 141·1 149·4 157·7 166·0	134.4 142.8 151.2 159.6 168.0	144·5 153·0 161·5	137·6 146·2 154·8 163·4 172·0	139·2 147·9 156·6 165·3	140·8 149·6 158·4 167·2 176·0	151.3	144.0 153.0 162.0 171.0 180.0
2I 22 23 24 25	159·6 167·2 174·8 182·4 190·0	161·7 169·4 177·1 184·8 192·5	163·8 171·6 179·4 187·2 195·0	181·7 189·6	168·0 176·0 184·0 192·0 200·0		172·2 180·4 188·6 196·8 205·0	174·3 182·6 190·9 199·2 207·5	176·4 184·8 193·2 201·6 210·0	204.0	197·8 206·4	182.7 191.4 200.1 208.8 217.5	184.8 193.6 202.4 211.2 220.0	186·9 195·8 204·7 213·6 222·5	189.0 198.0 207.0 216.0 225.0
26 27 28 29 30	197·6 205·2 212·8 220·4 228·0	200·2 207·9 215·6 223·3 231·0	202·8 210·6 218·4 226·2 234·0	205·4 213·3 221·2 229·1 237·0	208·0 216·0 224·0 232·0 240·0	210.6 218.7 226.8 234.9 243.0	213·2 221·4 229·6 237·8 246·0	215·8 224·1 232·4 240·7 249·0	218·4 226·8 235·2 243·6 252·0	221.0 229.5 238.0 246.5 255.0	249.4	226-2 234-9 243-6 252-3 261-0	228·8 237·6 246·4 255·2 264·0	231.4 240.3 249.2 258.1 267.0	234.0 243.0 252.0 261.0 270.0
31 32 33 34 35	235.6 243.2 250.8 258.4 266.0	238·7 246·4 254·1 261·8 269·5	241.8 249.6 257.4 265.2 273.0	244.9 252.8 260.7 268.6 276.5	248.0 256.0 264.0 272.0 280.0	251·1 259·2 267·3 275·4 283·5	262·4 270·6 278·8	257·3 265·6 273·9 282·2 290·5	260·4 268·8 277·2 285·6 294·0			269·7 278·4 287·1 295·8 304·5	272·8 281·6 290·4 299·2 308·0	275·9 284·8 293·7 302·6 311·5	279.0 288.0 297.0 306.0 315.0
36 37 38 39 40	273.6 281.2 288.8 296.4 304.0	277·2 284·9 292·6 300·3 308·0	280·8 288·6 296·4 304·2 312·0	308.1	288.0 296.0 304.0 312.0 320.0	291.6 299.7 307.8 315.9 324.0	295·2 303·4 311·6 319·8 328·0	298·8 307·1 315·4 323·7 332·0	302·4 310·8 319·2 327·6 336·0	314·5 323·0 331·5	309·6 318·2 326·8 335·4 344·0	313·2 321·9 330·6 339·3 348·0	316·8 325·6 334·4 343·2 352·0	320·4 329·3 338·2 347·1 356·0	324 0 333.0 342.0 351.0 360.0
41 42 43 44 45	311·6 319·2 326·8 334·4 342·0	315·7 323·4 331·1 338·8 346·5	319·8 327·6 335·4 343·2 351·0	323.9 331.8 339.7 347.6 355.5	328·0 336·0 344·0 352·0 360·0	340·2 348·3	336·2 344·4 352·6 360·8 369·0	340·3 348·6 356·9 365·2 373·5	344.4 352.8 361.2 369.6 378.0		352·6 361·2 369·8 378·4 387·0	356·7 365·4 374·1 382·8 391·5	360·8 369·6 378·4 387·2 396·0	382·7	369·0 378·0 387·0 396·0 405·0
46 47 48 49 50	357·2 364·8 372·4	354·2 361·9 369·6 377·3 385·0		387.1	376·0 384·0 392·0	380.7	385.4 393.6 401.8	390.1	394·8 403·2 411·6	399·5 408·0	404·2 412·8 421·4	408.9		418·3 427·2 436·1	414.0 423.0 432.0 441.0 450.0
52 53 54	387.6 395.2 402.8 410.4 418.0	400.4 408.1 415.8	397·8 405·6 413·4 421·2 429·0	410·8 418·7 426·6	416.0	421·2 429·3 437·4	434·6 442·8	431.6	428·4 436·8 445·2 453·6 462·0	442.0 450.5 459.0	438.6 447.2 455.8 464.4 473.0	443.7 452.4 461.1 469.8 478.5	457·6 466·4	462 8 471 7 480 6	459.0 468.0 477.0 486.0 495.0
56 57 58 59 60	433°2 440°8	431·2 438·9 446·6 454·3 462·0	436·8 444·6 452·4 460·2 468·0	450·3 458·2 466·1	456·0	453·6 461·7 469·8 477·9 486·0	459°2 467°4 475°6 483°8 492°0	464·8 473·1 481·4 489·7 498·0	487·2 495·6	476·0 484·5 493·0 501·5 510·0	498·8 507·4	495.9 504.6 513.3	492.8 501.6 510.4 519.2 528.0	507·3 516·2 525·1	522.0

							AZI	MUT	HS.						
	90°	89°	88°	87°	86°	85°	84°	83°	82°	81°	80°	79°	78°	77°	76°
	s.	s.	s.	s.	s.										
	4.00	4.00	4.00	4.01	4.01	4.02	4.02	4.03	4.04	4.02	4.06	4'07	4.09	4.10	4.15
	4.00	4.00	4.00	4.01	4.01	4.02	4.03	4.03	4.04	4.02	4.06	4.08	4.09	4.11	4.15
	4.00	4.00	4.00	4.01	4.01	4.02	4.02	4.03	4.04	4.02	4.06	4.08	4.09	4.11	4.13
	4.01	4.01	4.01	4.01	4.02	4.03	4.03	4.04	4.04	4.06	4.07	4.08	4.09	4.11	4.13
	4.01	4.01	4.01 4.03	4.02	4.03	4.03	4.04	4.04	4.05	4.06	4.08	4.08	4.10	4.13	4.13
l									4.06	440#	4408	4470			4.7
ı	4.03	4.03	4.03	4.04	4.04	4.04 4.02	4.04	4.06	4.06	4.07 4.08	4.08	4.11	4·11 4·12	4.14	4.15
ı	4.04	4.04	4.04	4.04	4.05	4.02	4.06	4.07	4.08	4 09	4 10	4 11	4 13	4 15	4.16
ı	4.05	4.05	4.05	4.06	4.06	4.07	4.07	4.08	4.09	4.10	4.11	4.13	4.14	4.16	4.1
l	4.06	4.06	4.06	4.07	4.02	4.08	4.08	4.09	4.10	4.11	4.13	4.14	4.12	4.12	4.10
l	4.07	4.08	4.08	4.08	4.08	4.09	4.10	4.11	4.11	4'13	4.14	4.12	4.17	4.18	4.20
ŀ	4.09	4.09	4.09	4.09	4.10	4·10	4.11	4.12	4.13	4.14	4.12	4.17	4.18	4.30	4.2
L	4.10	4.11	4.11	4.11	4.13	4.13	4.13	4.14	4.12	4.16	4.17	4.18	4.20	4.31	4.2
ı	4.13	4.13	4'12	4.13	4.13	4.14	4.12	4.12	4.16	4.12	4.19	4.30	4.31	4.53	4.2
١	4.14	4.14	4.14	4.12	4.12	4.16	4.19	4.12	4.18	4.19	4.30	4.55	4.53	4.22	4.5
ı	4.16	4.16	4.16	4.17	4.17	4.18	4.18	4.19	4.20	4.51	4.53	4.24	4.25	4.27	4.2
L	4.18	4.18	4.19	4.19	4.19	4.50	4.31	4.31	4.55	4.53	4.25	4.26	4•28	4.59	4'3
L	4.51	4.31	4.31	4.31	4.55	4.55	4.53	4.54	4.22	4.56	4.22	4.58	4.30	4'32	4.3
l	4.23	4.59	4.29	4.24	4.24	4.22	4.28	4.20	4·30	4.31 4.31	4·30 4·32	4·31	4·32 4·35	4.34	4'3
ı			4 -0												
ı	4.58	4.59	4.59	4.59	4.30	4.30	4.31	4.35	4'33	4.34	4.32	4.36	4.38	4.40	4.4
L	4.31	4.31	4.35	4.35	4.35	4.33	4.34	4.32	4.36	4.37	4*38	4.39	4.41	4'43	4.4
L	4.34	4'35	4.32	4.32	4.36	4.36	4.37	4.38	4.39	4.40	4.41	4.43	4.44	4.46	4.4
l	4.38 4.41	4.38 4.41	4·38	4.42 4.42	4·42	4·40 4·43	4.40 4.44	4.41 4.41	4.46	4°43 4°47	4·45 4·48	4.46	4.48	4.49 4.23	4.5
ı	7 77	7 7-					1								
L	4.42	4'45	4'45	4.46	4.46	4.47	4.47	4.48	4.49	4.21	4.52	4.23	4.55	4.57	4.5
L	4.49	4.49	4.49	4.49	4.20	4.21	4.21	4.22	4.53	4.55	4.56	4.57	4.59	4.61	4.6
L	4.23	4.23	4.23 4.28	4.24 4.28	4.54 4.58	4.55	4.22 4.60	4.26 4.61	4.57	4·59 4·63	4.60	4.66	4.68	4.69	4.7
ı	4.57	4.57 4.62	4.62	4.63	4.63	4.24 4.64	4.64	4.65	4.66	4.68	4.69	4.71	4.72	4.74	4.7
L	1			65	4.68	4.68	4,60		4.57	1000			4.77	4.79	4.8
L	4.67	4.67 4.22	4·67	4.67	4.73	4.73	4.69	4.70	4·71 4·76	4·72 4·78	4·74 4·79	4.75	4.82	4.84	4.8
L	4.77	4.77	4.77	4.78	4.78	4.79	4.80	4.75 4.81	4.82	4 83	4.84	4.86	4.88	4.89	4.9
L	4.82	4.82	4.83	4.83	4.84	4.84	4.85	4.86	4.87	4.89	4.90	4.92	4.93	4.95	4.9
L	4.88	4.88	4.89	4.89	4.90	4.90	4.91	4.92	4.93	4.94	4.96	4.97	4.99	2.01	5.0
ı	4.94	4.95	4.95	4.95	4.96	4.96	4.97	4.98	4.99	5.01	5.02	5.04	5.05	5.07	5.1
L	5.0I	5.01	5.01	5.02	5.02	5.03	5.04	5.02	5.06	5.07	5.09	5.10	5.13	5.14	5.1
ı	5.08	5.08	5.08	5.08	5.09	5.10	5.10	5.11	5.13	5.14	5.12	5.17	5.19	5.21	5.2
L	5.12	5.12	5.12	5.12	5.16	5.17	5.18	5.18	5.20	5.21	5.23	5.24	5.26	5.28	5.3
ı	5.55	5.22	5.22	5.53	5.23	5.24	5.25	5.26	5.27	5.29	5.30	5.35	5.34	5.36	5.3
ı	5.30	5.30	5.30	5.31	5.31	5.32	5.33	5.34	5:35	5.37	5.38	5.40	5.42	5.44	5.4
1	5.38	5.38	5.39	5.39	5.40	5.40	5.41	5.42	5.44	5.45	5.47	5.48	5.50	5.2	5.5
ı	5.47	5.47	5.47	5.48	5.48	5.49	5.20	5.21	5.2	5.24	5.22	5.57	5.20	5.61	5.6
l	5.26	5.26	5.56	5.57	5.57	5.58	5.59	5.60	5.62	5.63	5.65	5.66	5.68	5.71	5.7
ı	5.66	5.66	5.66	5.66	5.67	5.68	5.69	5.40	5.41	5.73	5.74	5.76	5.78	5.81	5.8
1	5.76	5.76	5.76	5.77	5.77	5.78	5.79	5·8o	5.81	5.83	5.85	5.87	5.89	5.91	5.9
ı	5.87	5.87	5.87	5.87	5.88	5.89	5.90	2.01	5.92	5.94	5.96	5.97	6.00	6.02	6.0
i	5.98	5.98	5.98	5.99	5.99	6.00	6.01	6.02	6.04	6.05	6.07	6.09	6.11	6.14	6.1
١	6.10	6.10	6.10	6.11	6.11	6.12	6.13	6.14	6.16	6.30	6.32	6.34	6.36	6.39	6.4
١				i		i									
1	6.36	6.36	6.36	6.36	6.37	6.38	6.39	6.40	6.42	6.44	6.45	6.48	6.50	6.67	6.5
ĺ	6.50	6.50	6.50	6.66	6.51	6·52 6·67	6·53 6·68	6.55	6.21	6.58	6.60	6.62	6.80	6.82	6.8
1	6·65	6.65	6.65	6.81	6.82	6.83	6.84	6.86	6.87	6.89	6.91	6.93	6.96	6.98	7.0
Í	6.97	6.97	6.98	6.98	6.99	7.00	7.01	7.03	7.04	7.06	7.08	7.10	7.13	7.16	7.1
	-	4.7.	7.16	7.16	7.7.	7.18	7.70	7.21	7.22	7.24	7.26	7.29	7.31	7:34	7:3
ł	7.15	7.15		7.35	7.17	7.37	7.19	7.40	7.42	7.44	7.46	7.48	7.21		7:5
١	7·34 7·55	7.35	7.35	7.56	7:57	7.58	7.59	7.61	7.62	7.64	7.66	7.69	7.72	7·54 7·75	7.7
п	7.77	7.77	7.77	7.78	7.79	7.80	7.81	7.82	7.84	7.86	7.89	7.91	7.94	7.97	8.0
ı		1 / / /	1 / //										8.18	8.21	8.2

To convert time into longitude divide by 4. Thus 8 oo s. $\div 4 = 2'$ long.

							AZ	IMUT	HS.						
Lat.	75°	74°	73°	72°	71°	70°	6 9°	68°	-67°	66°	65°	64°	63°	62°	61°
0 1 2 3 4 5	s. 4·14 4·14 4·15 4·15 4·16	s. 4·16 4·16 4·17 4·17 4·18	s. 4·18 4·18 4·19 4·19 4·19	S. 4·21 4·21 4·21 4·21 4·22 4·22	s. 4·23 4·23 4·23 4·24 4·24 4·25	s. 4·26 4·26 4·26 4·26 4·27 4·27	s. 4·28 4·29 4·29 4·30 4·30	s. 4.31 4.31 4.32 4.32 4.32 4.33	s. 4°35 4°35 4°35 4°35 4°36 4°36	s. 4.38 4.38 4.38 4.38 4.39 4.40	s. 4.41 4.41 4.42 4.42 4.42 4.43	s. 4.45 4.45 4.45 4.46 4.46 4.47	s. 4.49 4.49 4.49 4.50 4.50 4.51	s. 4.53 4.53 4.53 4.54 4.54 4.55	s. 4·57 4·57 4·58 4·58 4·58 4·59
6 7 8 9	4·16 4·17 4·18 4·19 4·20	4·18 4·19 4·20 4·21 4·23	4·2I 4·2I 4·22 4·23 4·25	4·23 4·24 4·25 4·26 4·27	4·25 4·26 4·27 4·28 4·30	4·28 4·29 4·30 4·31 4·32	4·31 4·32 4·33 4·34 4·35	4·34 4·35 4·36 4·37 4·38	4·37 4·38 4·39 4·40 4·41	4.40 4.41 4.42 4.43 4.45	4.44 4.45 4.46 4.47 4.48	4:47 4:48 4:49 4:51 4:52	4·51 4·52 4·53 4·55 4·56	4·56 4·56 4·57 4·59 4·60	4.60 4.61 4.62 4.63 4.64
11 12 13 14 15	4·22 4·23 4·25 4·27 4·29	4·24 4·25 4·27 4·31	4·26 4·28 4·29 4·31 4·33	4·28 4·30 4·32 4·33 4·35	4·31 4·32 4·34 4·36 4·38	4·34 4·35 4·37 4·39 4·41	4·36 4·38 4·40 4·42 4·44	4.39 4.41 4.43 4.45 4.47	4.43 4.44 4.46 4.48 4.50	4.46 4.48 4.49 4.51 4.53	4.50 4.51 4.53 4.55 4.57	4.53 4.55 4.57 4.59 4.61	4.57 4.59 4.61 4.63 4.65	4·62 4·63 4·65 4·67 4·69	4.66 4.68 4.69 4.71 4.73
16 17 18 19 20	4·31 4·35 4·35 4·41	4.33 4.35 4.38 4.40 4.43	4·35 4·37 4·40 4·42 4·45	4·38 4·40 4·42 4·45 4·48	4.40 4.42 4.45 4.47 4.50	4.43 4.45 4.48 4.50 4.53	4.46 4.48 4.51 4.53 4.56	4.49 4.51 4.54 4.59	4·52 4·54 4·57 4·60 4·62	4.56 4.58 4.60 4.63 4.66	4.59 4.62 4.64 4.67 4.70	4.63 4.65 4.68 4.71 4.74	4.67 4.69 4.72 4.75 4.78	4.71 4.74 4.76 4.79 4.82	4.76 4.78 4.81 4.84 4.87
21	4.44	4.46	4.48	4.51	4.53	4·56	4.59	4.62	4.65	4.69	4.73	4.77	4.81	4·85	4·90
22	4.47	4.49	4.51	4.54	4.56	4·59	4.62	4.65	4.69	4.72	4.76	4.80	4.84	4·89	4·93
23	4.50	4.52	4.54	4.57	4.60	4·62	4.65	4.69	4.72	4.76	4.79	4.83	4.88	4·92	4·97
24	4.53	4.56	4.58	4.60	4.63	4·66	4.69	4.72	4.76	4.79	4.83	4.87	4.91	4·96	5·01
25	4.57	4.59	4.62	4.64	4.67	4·70	4.73	4.76	4.79	4.83	4.87	4.91	4.95	5·00	5·05
26	4.61	4.63	4.65	4.68	4·71	4.74	4.77	4·80	4.83	4·87	4.91	4.95	4·99	5.04	5.09
27	4.65	4.67	4.69	4.72	4·75	4.78	4.81	4·84	4.88	4·91	4.95	5.00	5·04	5.08	5.13
28	4.69	4.71	4.74	4.76	4·79	4.82	4.85	4·89	4.92	4·96	5.00	5.04	5·08	5.13	5.18
29	4.73	4.76	4.78	4.81	4·84	4.87	4.90	4·93	4.97	5·01	5.05	5.09	5·13	5.18	5.23
30	4.78	4.80	4.83	4.86	4·88	4.92	4.95	4·98	5.02	5·06	5.05	5.14	5·18	5.23	5.28
31	4·83	4·85	4·88	4·91	4.94	4.97	5.00	5.03	5.07	5·11	5·15	5·19	5.24	5°29	5°34
32	4·88	4·91	4·93	4·96	4.99	5.02	5.05	5.09	5.12	5·16	5·20	5·25	5.29	5°34	5°39
33	4·94	4·96	4·99	5·01	5.04	5.08	5.11	5.14	5.18	5·22	5·26	5·31	5.35	5°40	5°45
34	5·00	5·02	5·05	5·07	5.10	5.13	5.17	5.20	5.24	5·28	5·32	5·37	5.42	5°46	5°52
35	5·06	5•08	5·11	5·13	5.16	5.20	5.23	5.27	5.30	5·35	5·39	5·43	5.48	5°53	5°58
36	5·12	5·14	5·17	5·20	5.23	5·26	5·30	5.33	5·37	5.41	5.46	5.50	5.55	5.60	5.65
37	5·19	5·21	5·24	5·27	5.30	5·33	5·36	5.40	5·44	5.48	5.53	5.57	5.62	5.67	5.73
38	5·26	5·28	5·31	5·34	5.37	5·40	5·44	5.47	5·51	5.56	5.60	5.65	5.70	5.75	5.80
39	5·33	5·35	5·38	5·41	5.44	5·48	5·51	5.55	5·59	5.63	5.68	5.73	5.78	5.83	5.88
40	5·41	5·43	5·46	5·49	5.52	5·56	5·59	5.63	5·67	5.72	5.76	5.81	5.86	5.91	5.97
41 42 43 44 45	5·49 5·57 5·66 5·76 5·86	5.51 5.60 5.69 5.78 5.88	5.54 5.63 5.72 5.81 5.92	5.57 5.66 5.75 5.85 5.95	5.61 5.69 5.78 5.88 5.98	5.64 5.73 5.82 5.92 6.02	5.68 5.77 5.86 5.96 6.06	5·72 5·81 5·90 6·00 6·10	5·76 5·85 5·94 6·04 6·15	5·80 5·89 5·99 6·09 6·19	5·85 5*94 6·03 6·14 6·24	5·90 5·99 6·09 6·19 6·29	5.95 6.04 6.14 6.24 6.35	6.00 6.10 6.19 6.41	6.06 6.15 6.25 6.36 6.47
46	5.97	5.99	6·02	6·05	6·09	6·13	6·17	6·21	6·26	6·30	6·35	6·41	6·46	6·52	6·58
47	6.07	6.10	6·13	6·17	6·20	6·24	6·28	6·33	6·37	6·42	6·47	6·53	6·58	6·64	6·71
48	6.19	6.22	6·25	6·29	6·32	6·36	6·40	6·45	6·49	6·54	6·60	6·65	6·71	6·77	6·83
49	6.31	6.34	6·38	6·41	6·45	6·49	6·53	6·58	6·62	6·67	6·73	6·78	6·84	6·91	6·97
50	6.44	6.47	6·51	6·54	6·58	6·62	6·67	6·71	6·76	6·81	6·87	6·92	6·98	7·05	7·11
51	6·58	6·61	6.65	6.68	6.72	6·76	6·81	6.86	6·90	6·96	7·01	7.07	7·13	7·20	7·27
52	6·73	6·76	6.79	6.83	6.87	6·91	6·96	7.01	7·06	7·11	7·17	7.23	7·29	7·36	7·43
53	6·88	6·91	6.95	6.99	7.03	7·07	7·12	7.17	7·22	7·28	7·33	7.39	7·46	7·53	7·60
54	7·05	7·08	7.12	7.16	7.20	7·24	7·29	7.34	7·39	7·45	7·51	7.57	7·64	7·71	7·78
55	7·22	7·25	7.29	7.33	7.38	7·42	7·47	7.52	7·58	7·63	7·69	7.76	7·83	7·90	7·97
56	7·41	7.44	7·48	7·52	7.57	7.61	7.66	7·71	7·77	7·83	7·89	7·96	8·03	8·10	8·18
57	7·60	7.64	7·68	7·72	7.77	7.82	7.87	7·92	7·98	8·04	8·10	8·17	8·24	8·32	8·40
58	7·81	7.85	7·89	7·94	7.98	8.03	8.09	8·14	8·20	8·26	8·33	8·40	8·47	8·55	8·63
59	8·04	8.08	8·12	8·17	8.21	8.26	8.32	8·38	8·44	8·50	8·57	8·64	8·72	8·80	8·88
60	8·28	8.32	8·37	8·41	8.46	8.51	8.57	8·63	8·69	8·76	8·83	8·90	8·98	9·06	9·15

To convert time into longitude divide by 4. Thus $8.28 \text{ s.} \div 4 = 2'.07 \text{ long.}$

TABLE III.

SHOWING THE ERROR PRODUCED IN THE TIME OR LONGITUDE BY AN ERROR OF 1' IN THE ALTITUDE.

						OF 1		IE AL							
Lat.	60°	59°	58°	57°	56°	55°	54°	53°	52°	51°	50°	49°	48°	47°	46°
0 1 2 3 4 5	s. 4.62 4.62 4.62 4.63 4.63 4.64	s. 4.67 4.67 4.67 4.67 4.68 4.68	s. 4·72 4·72 4·72 4·73 4·73	s. 4.77 4.77 4.77 4.78 4.78 4.79	s. 4·82 4·83 4·83 4·84 4·84	s. 4.88 4.88 4.89 4.89 4.90 4.90	s. 4.94 4.95 4.95 4.95 4.96 4.96	s. 5.01 5.01 5.01 5.02 5.02 5.03	s. 5.08 5.08 5.08 5.08 5.09 5.10	s. 5·15 5·15 5·15 5·15 5·16 5·17	s. 5·22 5·22 5·22 5·23 5·23 5·24	s. 5·30 5·30 5·31 5·31 5·32	s. 5·38 5·39 5·39 5·40 5·40	s. 5·47 5·47 5·47 5·48 5·48 5·49	s. 5·56 5·56 5·56 5·57 5·57
6 7 8 9	4.64 4.65 4.66 4.68 4.69	4.69 4.70 4.71 4.72 4.74	4.74 4.75 4.76 4.78 4.79	4.80 4.81 4.82 4.83 4.84	4.85 4.86 4.87 4.89 4.90	4·91 4·92 4·93 4·94 4·96	4.97 4.98 4.99 5.01 5.02	5.04 5.05 5.06 5.07 5.09	5·10 5·11 5·13 5·14 5·15	5·17 5·19 5·20 5·21 5·23	5·25 5·26 5·27 5·29 5·30	5:33 5:34 5:35 5:37 5:38	5·41 5·42 5·45 5·45	5.50 5.51 5.52 5.54 5.55	5.59 5.60 5.62 5.63 5.65
11 12 13 14 15	4.71 4.72 4.74 4.76 4.78	4.75 4.77 4.79 4.81 4.83	4.81 4.82 4.84 4.86 4.88	4.86 4.88 4.89 4.92 4.94	4.92 4.93 4.95 4.97 5.00	4.97 4.99 5.01 5.03 5.06	5.04 5.05 5.07 5.10 5.12	5·10 5·12 5·14 5·16 5·19	5·17 5·19 5·21 5·23 5·26	5°24 5°26 5°28 5°30 5°33	5·32 5·34 5·36 5·38 5·41	5·40 5·42 5·46 5·49	5·48 5·50 5·52 5·55 5·57	5.57 5.59 5.61 5.64 5.66	5.66 5.68 5.71 5.73 5.76
16 17 18 19 20	4·80 4·83 4·86 4·88 4·92	4.85 4.88 4.91 4.94 4.97	4.91 4.93 4.96 4.99 5.02	4·96 4·99 5·01 5·04 5·08	5.02 5.05 5.07 5.10 5.13	5.08 5.11 5.13 5.16 5.20	5·14 5·17 5·20 5·23 5·26	5·21 5·24 5·27 5·30 5·33	5·28 5·31 5·34 5·37 5·40	5·35 5·38 5·41 5·44 5·48	5°43 5°46 5°49 5°52 5°56	5.51 5.54 5.57 5.60 5.64	5.60 5.63 5.66 5.69 5.73	5.69 5.72 5.75 5.78 5.82	5.78 5.81 5.85 5.88 5.92
21 22 23 24 25	4.95 4.98 5.02 5.06 5.10	5.00 5.03 5.07 5.11 5.15	5.05 5.09 5.12 5.16 5.20	5·11 5·14 5·18 5·22 5·26	5·17 5·20 5·24 5·32	5·23 5·27 5·30 5·34 5·39	5·30 5·33 5·37 5·41 5·46	5·36 5·40 5·44 5·48 5·53	5.44 5.47 5.51 5.56 5.60	5.51 5.55 5.59 5.63 5.68	5.59 5.63 5.67 5.72 5.76	5.68 5.72 5.76 5.80 5.85	5.77 5.81 5.85 5.89 5.94	5.86 5.90 5.94 5.99 6.03	5.96 6.00 6.04 6.09 6.13
26 27 28 29 30	5·14 5·18 5·23 5·28 5·33	5·19 5·24 5·28 5·34 5·39	5·25 5·29 5·34 5·39 5·45	5·31 5·35 5·40 5·45 5·51	5·37 5·42 5·46 5·52 5·57	5:43 5:48 5:53 5:58 5:64	5.50 5.55 5.60 5.65 5.71	5.57 5.62 5.67 5.73 5.78	5.65 5.70 5.75 5.80 5.86	5.73 5.78 5.83 5.88 5.94	5.81 5.86 5.91 5.97 6.03	5.90 5.95 6.00 6.06 6.12	5.99 6.04 6.10 6.15 6.22	6·09 6·14 6·19 6·25 6·32	6·19 6·24 6·30 6·36 6·42
31 32 33 34 35	5·39 5·45 5·51 5·57 5·64	5.44 5.50 5.56 5.63 5.70	5·50 5·56 5·62 5·69 5·76	5.56 5.62 5.69 5.75 5.82	5.63 5.69 5.75 5.82 5.89	5·70 5·76 5·82 5·89 5·96	5.77 5.83 5.90 5.96 6.04	5·84 5·91 5·97 6·04 6·11	5·92 5·99 6·05 6·12 6·20	6·00 6·07 6·14 6·21 6·28	6·09 6·16 6·23 6·30 6·37	6·18 6·25 6·32 6·39 6·47	6·28 6·35 6·42 6·49 6·57	6·38 6·45 6·52 6·60 6·68	6·49 6·56 6·63 6·71
36 37 38 39 40	5.71 5.78 5.86 5.94 6.03	5.77 5.84 5.92 6.00 6.09	5.83 5.91 5.99 6.07 6.16	5·90 5·97 6·05 6·14 6·23	5·96 6·04 6·12 6·21 6·30	6.04 6.11 6.20 6.28 6.37	6·11 6·19 6·27 6·36 6·45	6·19 6·27 6·36 6·44 6·54	6·27 6·36 6·44 6·53 6·63	6·36 6·44 6·53 6·62 6·72	6·45 6·54 6·63 6·72 6·82	6·55 6·64 6·73 6·82 6·92	6.65 6.74 6.83 6.93 7.03	6·76 6·85 6·94 7·04 7·14	6·87 6·96 7·06 7·16 7·26
41 42 43 44 45	6·12 6·22 6·32 6·42 6·53	6·18 6·28 6·38 6·49 6·60	6·25 6·35 6·45 6·56 6·67	6·32 6·42 6·52 6·63 6·75	6·39 6·49 6·60 6·71 6·82	6·47 6·57 6·68 6·79 6·91	6·55 6·65 6·76 6·87 6·99	6.64 6.74 6.85 6.96 7.08	6·73 6·83 6·94 7·06 7·18	6·82 6·93 7·04 7·16 7·28	6·92 7·03 7·14 7·26 7·38	7·02 7·13 7·25 7·37 7·50	7·13 7·24 7·36 7·48 7·61	7·25 7·36 7·48 7·60 7·73	7·37 7·48 7·60 7·73 7·86
46 47 48 49 50	6.65 6.77 6.90 7.04 7.19	6·72 6·84 6·97 7·11 7·26	6·79 6·92 7·05 7·19 7·34	6.87 6.99 7.13 7.27 7.42	6·95 7·07 7·21 7·35 7·51	7·03 7·16 7·30 7·44 7·60	7·12 7·25 7·39 7·54 7·69	7·21 7·34 7·49 7·63 7· 79	7·31 7·44 7·59 7·74 7·90	7·41 7·55 7·69 7·85 8·01	7·52 7·66 7·80 7·96 8·12	7.63 7.77 7.92 8.08 8.25	7·75 7·89 8·04 8·20 8·37	7·87 8·02 8·17 8·34 8·51	8·00 8·15 8·31 8·48 8·65
51 52 53 54 55	7·34 7·50 7·67 7·86 8·05	7·42 7·58 7·75 7·94 8·14	7·49 7·66 7·84 8·02 8·22	7·58 7·75 7·93 8·11 8·32	7.67 7.84 8.02 8.21 8.41	7·76 7·93 8·11 8·31 8·51	7•86 8·03 8·22 8·41 8·62	7.96 8.14 8.32 8.52 8.73	8.07 8.24 8.43 8.64 8.85	8·18 8·36 8·55 8·76 8·97	8·30 8·48 8·68 8·88 9·10	8·42 8·61 8·81 9·02 9·24	8·55 8·74 8·94 9·16 9·38	8.69 8.88 9.09 9.30 9.54	8·84 9·03 9·24 9·46 9·69
56 57 58 59 60	8·26 8·48 8·72 8·97 9·24	8·35 8·57 8·81 9·06 9·33	8·43 8·66 8·90 9·16 9·43	8·53 8·76 9·00 9·26 9·54	8.63 8.86 9.10 9.37 9.65	8·73 8·97 9·21 9·48 9·77	8.84 9.08 9.33 9.60 9.89	8·96 9·20 9·45 9·72 10·02	9.08 9.32 9.58 9.86 10.15	9·20 9·45 9·71 9·99 10·29	9:34 9:59 9:85 10:14 10:44	9.48 9.73 10.00 10.29 10.60	9.63 9.88 10.16 10.45	9.78 10.04 10.32 10.62 10.94	9.94 10.21 10.49 10.80

To convert time into longitude divide by 4. Thus $9.24 \text{ s.} \div 4 = 2'.31$ long.

							AZI	MUT	HS.						
Lat	45°	44°	43°	42°	41°	40°	39°	38°	37°	36°	35°	34°	33°	32°	31°
° 0 1 2 3 4 5	s. 5.66 5.66 5.66 5.66 5.67 5.68	s. 5.76 5.76 5.76 5.77 5.77	s. 5.87 5.87 5.87 5.87 5.88 5.89	s. 5.98 5.98 5.98 5.99 5.99	s. 6·10 6·10 6·11 6·11 6·11	s. 6·22 6·22 6·23 6·23 6·24 6·25	s. 6·36 6·36 6·36 6·37 6·38	s. 6·50 6·50 6·51 6·51 6·52	s. 6·65 6·65 6·65 6·66 6·66	s. 6·81 6·81 6·81 6·82 6·83	s. 6·97 6·97 6·98 6·98 6·99	s. 7·15 7·15 7·16 7·16 7·17 7·18	s. 7·34 7·35 7·35 7·36 7·37	s. 7·55 7·55 7·55 7·56 7·57 7·58	s. 7.77 7.77 7.77 7.78 7.79 7.80
6 7 8 9 10	5.69 5.70 5.71 5.73 5.74	5.79 5.80 5.81 5.83 5.85	5.90 5.91 5.92 5.94 5.96	6·01 6·02 6·04 6·05 6·07	6·13 6·14 6·16 6·17 6·19	6·26 6·27 6·28 6·30 6·32	6·39 6·40 6·42 6·44 6·45	6·53 6·55 6·56 6·58 6·60	6.68 6.70 6.71 6.73 6.75	6.84 6.86 6.87 6.89 6.91	7·01 7·03 7·04 7·06 7·08	7·19 7·21 7·22 7·24 7·26	7·38 7·40 7·42 7·44 7·46	7·59 7·61 7·62 7·64 7·66	7·81 7·82 7·84 7·86 7·89
11 12 13 14 15	5.76 5.78 5.81 5.83 5.86	5.87 5.89 5.91 5.93 5.96	5.97 6.00 6.02 6.04 6.07	6.09 6.11 6.14 6.16 6.19	6·21 6·23 6·26 6·28 6·31	6·34 6·36 6·39 6·41 6·44	6.48 6.50 6.52 6.55 6.58	6.62 6.64 6.67 6.70 6.73	6.77 6.80 6.82 6.85 6.88	6·93 6·96 6·98 7·01 7·05	7·10 7·13 7·16 7·19 7·22	7·29 7·31 7·34 7·37 7·41	7·48 7·51 7·54 7·57 7·60	7·69 7·72 7·75 7·78 7·81	7·91 7·94 7·97 8·00 8·04
16 17 18 19 20	5.88 5.92 5.95 5.98 6.02	5.99 6.02 6.05 6.09 6.13	6·10 6·13 6·17 6·20 6·24	6·22 6·25 6·28 6·32 6·36	6·34 6·38 6·41 6·45 6·49	6·47 6·51 6·54 6·58 6·62	6.61 6.65 6.68 6.72 6.76	6·76 6·79 6·83 6·87 6·91	6·91 6·95 6·99 7·03 7·07	7·08 7·12 7·16 7·20 7·24	7·25 7·29 7·33 7·38 7·42	7·44 7·48 7·52 7·57 7·61	7·64 7·68 7·72 7·77 7·82	7.85 7.89 7.94 7.98 8.03	8·08 8·12 8·17 8·21 8·26
21 22 23 24 25	6.06 6.10 6.15 6.19 6.24	6·17 6·21 6·26 6·30 6·35	6·28 6·33 6·37 6·42 6·47	6·40 6·45 6·49 6·54 6·60	6·53 6·58 6·62 6·67 6·73	6.67 6.71 6.76 6.81 6.87	6.81 6.86 6.90 6.96 7.01	6·96 7·01 7·06 7·11 7·17	7·12 7·17 7·22 7·28 7·33	7·29 7·34 7·39 7·45 7·51	7.47 7.52 7.58 7.63 7.69	7·66 7·71 7·77 7·83 7·89	7·87 7·92 7·98 8·04 8·10	8·09 8·14 8·20 8·26 8·33	8·32 8·38 8·44 8·50 8·57
26 27 28 29 30	6·29 6·35 6·41 6·47 6·53	6·41 6·46 6·52 6·58 6·65	6·53 6·58 6·64 6·71 6·77	6.65 6.71 6.77 6.83 6.90	6·78 6·84 6·91 6·97 7·04	6·92 6·98 7·05 7·11 7·19	7.07 7.13 7.20 7.27 7.34	7·23 7·29 7·36 7·43 7·50	7·39 7·46 7·53 7·60 7·67	7·57 7·64 7·71 7·78 7·86	7·76 7·83 7·90 7·97 8·05	7.96 8.03 8.10 8.18 8.26	8·17 8·24 8·32 8·40 8·48	8·40 8·47 8·55 8·63 8·72	8.64 8.72 8.80 8.88 8.97
31 32 33 34 35	6·60 6·67 6·74 6·82 6·91	6·72 6·79 6·87 6·95 7·03	6.84 6.92 6.99 7.07 7.16	6·97 7·05 7·13 7·21 7·30	7·11 7·19 7·27 7·35 7·44	7·26 7·34 7·42 7·51 7·60	7·42 7·49 7·58 7·67 7·76	7·58 7·66 7·75 7·84 7·93	7.75 7.84 7.93 8.02 8.11	7.94 8.02 8.11 8.21 8.31	8·14 8·22 8·32 8·41 8·51	8·35 8·43 8·53 8·63 8·73	8·57 8·66 8·76 8·86 8·97	8·81 8·90 9·10 9·21	9.06 9.16 9.26 9.37 9.48
36 37 38 39 40	6·99 7·08 7·18 7·28 7·38	7·12 7·21 7·31 7·41 7·52	7·25 7·34 7·44 7·55 7·66	7·39 7·49 7·59 7·69 7·80	7·54 7·63 7·74 7·85 7·96	7·69 7·79 7·90 8·01 8·12	7·86 7·96 8·07 8·18 8·30	8·03 8·14 8·24 8·36 8·48	8·22 8·32 8·43 8·55 8·68	8·41 8·52 8·64 8·76 8·88	8.62 8.73 8.85 8.97 9.10	8·84 8·96 9·08 9·20 9·34	9.08 9.20 9.32 9.45 9.59	9·33 9·45 9·58 9·71 9·85	9.60 9.72 9.86 9.99
41 42 43 44 45	7·50 7·61 7·73 7·86 8·00	7.63 7.75 7.87 8.00 8.14	7.77 7.89 8.02 8.15 8.29	7.92 8.04 8.17 8.31 8.45	8·08 8·20 8·34 8·48 8·62	8·25 8·37 8·51 8·65 8·80	8:42 8:55 8:69 8:84 8:99	8.61 8.74 8.88 9.03 9.19	8·81 8·94 9·09 9·24 9·40	9.02 9.16 9.30 9.46 9.62	9 ·24 9·38 9·54 9·69 9·86	9.48 9.63 9.78 9.94 10.12	9.73 9.88 10.04 10.39	10.00 10.16 10.32 10.49 10.67	10·29 10·45 10·62 10·80 10·98
46 47 48 49 50	8·14 8·29 8·45 8·62 8·80	8·29 8·44 8·61 8·78 8·96	8:44 8:60 8:77 8:94 9:12	8.61 8.77 8.93 9.11 9.30	8·78 8·94 9·11 9·29 9·49	8·96 9·12 9·30 9·49 9·68	9·15 9·32 9·50 9·69 9·89	9.90	9.57 9.75 9.93 10.13 10.34	9.98 10.12		10.49	10.77 10.97 11.19	11.07 11.25 11.51	11.61
51 52 53 54 55	8·99 9·19 9·40 9·62 9·86	9·15 9·35 9·57 9·80 10·04		9.50 9.71 9.93 10.17 10.42	10.32	10·11 10·34		10.55 10.80 11.02		11.28	11.33 11.86	11.62	12.20	12.26 12.54 12.84	13.31
56 57 58 59 60	10·39 10·67 10·98	10.87	10.77 11.07	10.69 10.97 11.28 11.61 11.96	11·19 11·51 11·84	11·13 11·43 11·74 12·08 12·45	11.99	11.92 12.26 12.61	12.24	12·17 12·49 12·84 13·21 13·61	12·80 13·16 13·54	13.89	13.86	13·86 14·24 14·66	14.26

To convert time into longitude divide by 4. Thus 12.0 s. $\div_4 = 3'$ long.

TABLE III.

						OF I	AZIM								
Lat.	30°	29°	28°	27°	26°	25°	24°	23°	22°	21°	20°	19°	18°	17°	16°
° 0 1 2 3 4 5	s. 8.00 8.00 8.00 8.01 8.02 8.03	s. 8·25 8·25 8·26 8·26 8·27 8·28	s. 8·52 8·52 8·53 8·53 8·54 8·55	s. 8·81 8·82 8·82 8·83 8·84	s. 9°12 9°13 9°13 9°14 9°15	s. 9.46 9.47 9.47 9.48 9.49 9.50	s. 9.83 9.84 9.84 9.85 9.86 9.87	s. 10·2 10·2 10·3 10·3	s. 10·7 10·7 10·7 10·7 10·7	S. 11·2 11·2 11·2 11·2 11·2	S. 11.7 11.7 11.7 11.7 11.7	S. 12·3 12·3 12·3 12·3 12·3	s. 13.0 13.0 13.0 13.0	s. 13.7 13.7 13.7 13.7 13.7	s. 14·5 14·5 14·5 14·5 14·5
6 7 8 9	8.04 8.06 8.08 8.10 8.12	8·30 8·31 8·33 8·35 8·38	8·57 8·58 8·60 8·63 8·65	8.86 8.88 8.90 8.92 8.95	9·17 9·21 9·21 9·27	9·52 9·54 9·56 9·58 9·61	9.89 9.91 9.91 9.89	10·3 10·3 10·4 10·4	10·7 10·8 10·8 10·8	11.3 11.3 11.3 11.5	11.8 11.8 11.8	12·4 12·4 12·4 12·4	13.1 13.1 13.0 13.0	13·8 13·8 13·9 13·9	14·6 14·7 14·7 14·7
11 12 13 14 15	8·15 8·18 8·21 8·24 8·28	8·41 8·43 8·47 8·50 8·54	8.68 8.71 8.74 8.78 8.82	8.98 9.01 9.04 9.08 9.12	9·30 9·36 9·40 9·45	9.64 9.68 9.71 9.75 9.80	10.0 10.1 10.1 10.1	10·4 10·5 10·6 10·6	11.0 11.0 11.0 10.0	11.4 11.5 11.5 11.6	11.9 12.0 12.1 12.1	12·5 12·6 12·6 12·7 12·7	13·2 13·3 13·3 13·4	13·9 14·0 14·1 14·2	14·8 14·8 14·9 15·0 15·0
16 17 18 19 20	8·32 8·37 8·41 8·46 8·51	8·58 8·63 8·68 8·73 8·78	8.86 8.91 8.96 9.01 9.07	9·17 9·21 9·32 9·38	9.49 9.54 9.59 9.65 9.71	9.85 9.90 9.95 10.0	10·2 10·3 10·4 10·5	10.6 10.7 10.8 10.8 10.9	11·1 11·2 11·3 11·4	11.6 11.7 11.8 11.8	12·2 12·3 12·4 12·4	12·8 12·8 12·9 13·0 13·1	13·5 13·5 13·6 13·7 13·8	14·2 14·3 14·4 14·5 14·6	15·1 15·2 15·3 15·4
21 22 23 24 25	8·57 8·63 8·69 8·76 8·83	8.84 8.90 8.96 9.03 9.10	9·13 9·19 9·26 9·33 9·40	9.44 9.50 9.57 9.64 9.72	9.77 9.84 9.91 9.99	10·1 10·2 10·3 10·4 10·4	10·5 10·6 10·7 10·8 10·9	11.0 11.1 11.2 11.3	11.4 11.5 11.6 11.7 11.8	12·0 12·1 12·2 12·3	12·5 12·6 12·7 12·8 12·9	13·2 13·3 13·4 13·6	13·9 14·0 14·1 14·3	14·7 14·8 14·9 15·0 15·1	15.5 15.7 15.8 15.9 16.0
26 27 28 29 30	8·90 8·98 9·06 9·15 9·24	9·18 9·26 9·34 9·43 9·53	9.48 9.56 9.65 9.74 9.84	9.80 9.89 9.98 10.1	10·2 10·3 10·4 10·5	10·5 10·6 10·7 10·8 10·9	10·9 11·0 11·1 11·2 11·4	11.4 11.5 11.6 11.7 11.8	11.9 12.0 12.1 12.2 12.3	12·4 12·5 12·6 12·8 12·9	13·0 13·1 13·2 13·4 13·5	13·7 13·8 13·9 14·0 14·2	14·4 14·5 14·7 14·8 14·9	15·2 15·3 15·6 15·8	16·1 16·3 16·4 16·6 16·8
31 32 33 34 35	9°33 9°43 9°54 9°65 9°77	9.63 9.73 9.84 9.95	9.94 10.0 10.3 10.4	10·3 10·4 10·5 10·6 10·8	11.1 10.8 10.8 10.9	11.0 11.2 11.3 11.4 11.6	11.5 11.6 11.7 11.9 12.0	11.9 12.1 12.2 12.3 12.5	12·5 12·6 12·7 12·9 13·0	13.0 13.2 13.3 13.5 13.6	13.6 13.8 14.0 14.1 14.3	14·3 14·5 14·6 14·8 15·0	15·1 15·3 15·4 15·6 15·8	16·0 16·1 16·3 16·5 16·7	16·9 17·1 17·3 17·5 17·7
36 37 38 39 40	9·89 10·0 10·2 10·3 10·4	10.3 10.9 10.6 10.8	10·5 10·7 10·8 11·0 11·1	10.0 11.3 11.2	11.3 11.4 11.6 11.7	11·7 11·9 12·0 12·2 12·4	12·2 12·3 12·5 12·7 12·8	12·7 12·8 13·0 13·2 13·4	13·2 13·4 13·6 13·7 13·9	13·8 14·0 14·2 14·4 14·6	14·5 14·6 14·8 15·0 15·3	15·2 15·4 15·6 15·8 16·0	16·0 16·2 16·4 16·7 16·9	16·9 17·1 17·4 17·6 17·9	17·9 18·2 18·4 18·7 18·9
41 42 43 44 45	10.6 10.8 10.8	10·9 11·1 11·3 11·5 11·7	11.3 11.5 11.8 11.8	11.7 11.9 12.0 12.2 12.5	12·1 12·3 12·5 12·7 12·9	12·5 12·7 12·9 13·2 13·4	13.0 13.2 13.4 13.7	13.6 13.8 14.0 14.2 14.5	14·1 14·4 14·6 14·8 15·1	14·8 15·0 15·3 15·5 15·8	15·5 15·7 16·0 16·3 16·5	16·3 16·5 16·8 17·1 17·4	17·2 17·4 17·7 18·0 18·3	18·1 18·4 18·7 19·0 19·3	19·2 19·5 19·8 20·2 20·5
46 47 48 49 50	11.5 11.7 12.0 12.2 12.4	11.9 12.1 12.6 12.8	12·3 12·5 12·7 13·0	12·7 12·9 13·4 13·7	13·1 13·4 13·6 13·9 14·2	13·6 13·9 14·1 14·4 14·7	14·2 14·4 14·7 15·0 15·3	14·7 15·0 15·3 15·6 15·9	15·4 15·7 16·0 16·3 16·6	16·1 16·4 16·7 17·0 17·4	16·8 17·1 17·5 17·8 18·2	17·7 18·0 18·4 18·7 19·1	18·6 19·0 19·3 19·7 20·1	19.7 20.1 20.4 20.9 21.3	20·9 21·3 21·7 22·1 22·6
51 52 53 54 55	12·7 13·0 13·3 13·6 13·9	13·1 13·4 13·7 14·0 14·4	13·5 13·8 14·2 14·5 14·9	14.0 14.3 14.6 15.0	14·5 14·8 15·2 15·5 15·9	15.0 15.4 15.7 16.1 16.5	15·5 16·0 16·3 16·7 17·1	16·3 16·6 17·0 17·4 17·8	17·0 17·3 17·7 18·2 18·6	17·7 18·1 18·5 19·0	18·6 19·0 19·4 19·9 20·4	19·5 20·0 20·4 20·9 21·4	20·6 21·0 21·5 22·0 22·6	21.7 22.2 22.3 23.3 23.9	23·I 23·6 24·I 24·7 25·3
56 57 58 59 60	14·3 14·9 15·5 16·0	14·8 15·1 15·6 16·0 16·5	15·2 15·6 16·1 16·5 17·0	15·8 16·2 16·6 17·1 17·6	16·3 16·8 17·2 17·7 18·2	16·9 17·4 17·9 18·4 18·9	17·6 18·1 18·6 19·1 19·7	18·3 18·8 19·3 19·9 20·5	19·1 19·6 20·1 20·7 21·4	20·0 20·5 21·1 21·7 22·3	20·9 21·5 22·1 22·7 23·4	22.0 22.6 23.2 23.9 24.6	23·1 23·8 24·4 25·1 25·9	24·5 25·1 25·8 26·6 27·4	26·0 26·4 27·4 28·2 29·0

To convert time into longitude divide by 4. Thus $16 s. \div 4=4'$ long.

							AZIN	IUTH	S.						
Lat.	15°	14°	13°	12°	11°	10°	9°	8°	7°	6°	5°	4°	3°	2°	1°
° 0 1 2 3 4 5	s. • 15·4 15·5 15·5 15·5 15·5	s. 16·5 16·5 16·5 16·6 16·6	s. 17·8 17·8 17·8 17·8 17·8	s. 19·2 19·3 19·3 19·3 19·3	S. 21.0 21.0 21.0 21.0 21.0 21.0	s. 23.0 23.0 23.0 23.1 23.1 23.1	s. 25.6 25.6 25.6 25.6 25.6 25.6 25.7	s. 28·7 28·7 28·8 28·8 28·8 28·9	s. 32·8 32·8 32·8 32·9 32·9 32·9	s. 38·3 38·3 38·3 38·3 38·4 38·4	s. 45°9 45°9 45°9 46°0 46°0 46°1	s. 57·4 57·4 57·4 57·5 57·6	s. 76·4 76·4 76·5 76·5 76·6 76·7	s. 115 115 115 115 115	s. 229 229 229 230 230 230
6 7 8 9	15·5 15·6 15·6 15·6	16·6 16·7 16·7 16·8	17·9 17·9 18·0 18·0	19·3 19·4 19·5 19·5	21·1 21·1 21·2 21·2 21·3	23·2 23·3 23·3 23·4	25.7 25.8 25.8 25.9 26.0	28·9 29·0 29·1 29·2	33·3 33·1 33·1 33·1	38·5 38·6 38·6 38·7 38·9	46·1 46·2 46·3 46·5 46·6	57·7 57·8 57·9 58·1 58·2	76·9 77·0 77·2 77·4 77·6	115 115 116 116 116	230 231 231 232 233
11 12 13 14 15	15.7 15.8 15.9 15.9 16.0	16·8 16·9 17·0 17·0 17·1	18·1 18·2 18·2 18·3 18·4	19·6 19·7 19·7 19·8 19·9	21.4 21.4 21.5 21.6 21.7	23·5 23·5 23·6 23·7 23·8	26·0 26·1 26·2 26·4 26·5	29·3 29·4 29·5 29·6 29·8	33.4 33.6 33.7 33.8 34.0	39·6 39·1 39·3 39·1	46·8 46·9 47·1 47·3 47·5	58·4 58·6 58·9 59·1 59·4	77.9 78.1 78.4 78.8 79.1	117 118 118 118	233 234 235 236 237
16 17 18 19 20	16·1 16·2 16·3 16·4	17·2 17·3 17·4 17·5 17·6	18·5 18·6 18·7 18·8 18·9	20·0 20·1 20·2 20·3 20·5	21·8 21·9 22·0 22·2 22·3	24.0 24.1 24.2 24.4 24.5	26·6 26·7 26·9 27·0 27·2	29·9 30·1 30·2 30·4 30·6	34·1 34·3 34·7 34·9	39·8 40·0 40·2 40·5 40·7	47.7 48.0 48.3 48.5 48.8	59°7 60°0 60°3 60°6 61°0	79.5 79.9 80.4 80.8 81.3	119 120 121 121 122	238 240 241 242 244
21 22 23 24 25	16·6 16·7 16·8 16·9	17.7 17.8 18.0 18.1 18.2	19·0 19·2 19·3 19·5	20·6 20·7 20·9 21·1 21·2	22·5 22·6 22·8 22·9 23·1	24.7 24.8 25.0 25.2 25.4	27·4 27·6 27·8 28·0 28·2	30·8 31·0 31·2 31·5 31·7	35·2 35·4 35·7 35·9 36·2	41.0 41.3 41.6 41.9 42.2	49°2 49°5 49°9 50°2 50°6	61.4 61.8 62.3 62.8 63.3	81·9 82·4 83·0 83·7 84·3	123 124 125 125 126	246 247 249 251 253
26 27 28 29 30	17·2 17·3 17·5 17·7 17·8	18·4 18·6 18·7 18·9 19·1	19·8 20·0 20·1 20·3 20·5	21.4 21.6 21.8 22.0 22.2	23.3 23.5 23.7 24.0 24.2	25.6 25.8 26.1 26.3 26.6	28·4 28·7 29·0 29·2 29·5	32·0 32·3 32·6 32·9	36·5 36·8 37·2 37·5 37·9	42.6 42.9 43.3 43.8 44.2	51·1 51·5 52·0 52·5 53·0	63·8 64·4 64·9 65·6 66·2	85.0 85.8 86.6 87.4 88.3	128 129 130 131 132	255 257 260 262 265
31 32 33 34 35	18·0 18·2 18·4 18·6 18·9	19·3 19·5 19·7 19·9 20·2	20·7 21·0 21·2 21·4 21·7	22·4 22·7 22·9 23·2 23·5	24.5 24.7 25.0 25.3 25.6	26·9 27·2 27·5 27·8 28·1	29·8 30·2 30·5 30·8 31·2	33.5 33.9 34.3 34.7 35.1	38·3 38·7 39·1 39·6 40·1	44.6 45.1 45.6 46.2 46.7	53·5 54·1 54·7 55·4 56·0	66·9 67·6 68·4 69·2 70·0	89·2 90·1 91·1 92·2 93·3	134 135 137 138 140	267 270 273 276 280
36 37 38 39 40	19·1 19·4 19·6 19·9 20·2	20·4 20·7 21·0 21·3 21·6	22.0 22.3 22.6 22.9 23.2	23·8 24·1 24·4 24·8 25·1	25.9 26.2 26.6 27.0 27.4	28·5 28·8 29·2 29·6 30·1	31.6 32.0 32.4 32.9 33.4	35.5 36.0 36.5 37.0 37.5	40·6 41·1 41·7 42·2 42·8	47·3 47·9 48·6 49·2 50·0	56·7 57·5 58·2 59·1 59·9	70·9 71·8 72·8 73·8 74·9	94.5 95.7 97.0 98.3 99.8	142 144 145 147 150	283 287 291 295 299
41 42 43 44 45	20·5 20·8 21·1 21·5 21·9	21·9 22·2 22·6 23·0 23·4	23.6 23.9 24.3 24.7 25.1	25.5 25.9 26.3 26.7 27.2	27·8 28·2 28·7 29·1 29·6	30·5 31·0 31·5 32·0 32·6	33.9 34.4 35.0 35.5 36.2	38·1 38·7 39·3 40·0 40·6	43.5 44.2 44.9 45.6 46.4	50·7 51·5 52·3 53·2 54·1	60·8 61·8 62·8 63·8 64·9	76·0 77·2 78·4 79·7 81·1	101 103 105 106 108	152 154 157 159 162	304 308 313 319 324
46 47 48 49 50	22·2 22·7 23·1 23·6 24·0	23·8 24·2 24·7 25·2 25·7	25·6 26·1 26·6 27·1 27·7	27·7 28·2 28·8 29·3 29·9	30·2 30·7 31·3 32·0 32·6	33·2 33·8 34·4 35·1 35·8	36·8 37·5 38·2 39·0 39·8	41·4 42·1 43·0 43·8 44·7	47·2 48·1 49·1 50·0 51·1	55·I 56·I 57·2 58·3 59·5	66·1 67·3 68·6 70·0 71·4	82·5 84·1 85·7 87·4 89·2	110 112 114 116 119	165 168 171 175 178	330 336 343 349 357
51 52 53 54 55	24.6 25.1 25.7 26.3 26.9	26·3 26·9 27·5 28·1 28·8	28·3 28·9 29·5 30·3 31·0	30·6 31·2 32·0 32·7 33·5	33·3 34·1 34·8 35·7 36·5	36·6 37·4 38·3 39·2 40·2	40·6 41·5 42·5 43·5 44·6	45.7 46.7 47.8 48.9 50.1	52·2 53·3 54·5 55·8 57·2	60·8 62·2 63·6 65·1 66·7	72·9 74·5 76·3 78·1 80·0	91·1 93·1 95·3 97·6 91·1	121 124 127 130 133	182 186 190 195 200	364 372 381 390 400
56 57 58 59 60	27·6 28·4 29·2 30·0 30·9	29·6 30·4 31·2 32·1 33 1	31·8 32·6 33·6 34·5 35·6	34.4 35.3 36.3 37.4 38.5	37·5 38·5 39·6 40·7 41·9	41·2 42·3 43·5 44·7 46·1	45.7 46.9 48.3 49.6 51.1	51.4 52.8 54.2 55.8 57.5	58·7 60·3 61·9 63·7 65·6	68·4 70·3 72·2 74·3 76·5	82·1 84·3 86·6 89·1 91·8	102·5 105·3 108·2 111·3 114·7	137 140 144 148 153	205 210 216 223 229	410 421 432 445 458

When the Latitude Variation is + name the Azimuth the same name as Latitude.

", ", opposite name to the Latitude.

On the Equator the Azimuth will have the same name as the Declination.

Lat.							LAT	ITUI	DES.						
Var. to 1	0°	5°	10°	13°	16°	18°	20°	22°	24°	25°	26°	27°	28°	29°	30°
			,			•	AZI	MUT	HS.			<u>' </u>	'	•	,
0.00	90.0	90.0	90.0	90°0	90.0	90.0	90.0	90°0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
0.10	88.6	88.6	88.6	88°6	88.6	88.6	88.7	88°7	88.7	88.7	88.7	88.7	88.7	88.7	88.8
0.20	87.1	87.1	87.2	87°2	87.2	87.3	87.3	87°3	87.4	87.4	87.4	87.4	87.5	87.5	87.5
0.30	85.7	85.7	85.8	85°8	85.9	85.9	86.0	86°0	86.1	86.1	86.1	86.2	86.2	86.2	86.3
0.40	84.3	84.3	84.4	84°4	84.5	84.5	84.6	84°7	84.8	84.8	84.9	84.9	85.0	85.0	85.1
0·50	82·9	82·9	83.0	83·1	83·2	83·2	83·3	83.4	83.5	83.5	83.6	83.6	83.7	83·8	83.8
0·60	81·5	81·5	81.6	81·7	81·8	81·9	82·0	82.1	82.2	82.3	82.3	82.4	82.5	82·5	82.6
0·70	80·1	80·1	80.2	80·3	80·5	80·6	80·7	80.8	80.9	81.0	81.1	81.2	81.2	81·3	81.4
0·80	78·7	78·7	78.9	79·0	79·1	79·2	79·4	79.5	79.6	79.7	79.8	79.9	80.0	80·1	80.2
0·90	77·3	77·4	77.5	77·6	77·8	77·9	78·1	78.1	78.4	78.5	78.6	78.7	78.8	78·9	79.0
1.00 1.10 1.30 1.40	76·0 74·6 73·3 72·0 70·7	76·0 74·7 73·4 72·1 70·8	76·2 74·9 73·5 72·3 71·0	76·3 75·0 73·7 72·4 71·2	76·5 75·2 73·9 72·7 71·4	76·6 75·4 74·1 72·8 71·6	76·8 75·5 74·3 73·0 71·8	76·9 75·7 74·5 73·2 72·0	77·1 75·9 74·7 73·5 72·3	77·2 76·0 74·8 73·6 72·4	77·3 76·1 74·9 73·7 72·5	77·4 76·2 75·0 73·9 72·7	77.6 76.4 75.2 74.0 72.8	77.7 76.5 75.3 74.1 73.0	77·8 76·6 75·4 74·3 73·1
1·50 1·60 1·70 1·80 1·90	69·4 68·2 67·0 65·8 64·6	69·5 68·3 67·1 65·9 64·7	69.7 68.5 67.3 66.1 64.9	69·9 68·7 67·5 66·3 65·2	70°2 69°0 67°8 66°6 65°5	70·4 69·2 68·0 66·8 65·7	70.6 69.4 68.2 67.1 65.9	70·8 69·7 68·5 67·4 66·2	71·1 69·9 68·8 67·7 66·5	71·2 70·1 68·9 67·8 66·7	71·4 70·2 69·0 66·9	71·5 70·4 69·3 68·2 67·1	71.7 70.5 69.4 68.3 67.2	71·8 70·7 69·6 68·5 67·5	72.0 70.9 69.8 68.7 67.6
2.00	63.4	63·5	63·8	64.0	64·3	64·6	64·8	65·1	65·5	65.6	65·8	66·0	66·2	66·4	66.6
2.10	62.3	62·4	62·7	62.9	63·2	63·5	63·7	64·0	64·4	64.6	64·7	64·9	65·1	65·3	65.6
2.20	61.2	61·3	61·6	61.8	62·1	62·4	62·7	63·0	63·3	63.5	63·7	63·9	64·1	64·3	64.5
2.30	60.1	60·2	60·5	60.7	61·1	61·3	61·6	61·9	62·3	62.5	62·7	62·9	63·1	63·3	63.5
2.40	59.0	59·1	59·4	59.7	60·0	60·3	60·6	60·9	61·3	61.5	61·7	61·9	62·1	62·3	62.5
2·50	58·0	58·1	58·4	58·7	59.0	59°3	59·6	59·9	60·3	60·5	60·7	60·9	61·1	61·3	61.6
2·60	57·0	57·1	57·4	57·7	58.0	58°3	58·6	58·9	59·3	59·5	59·7	59·9	60·1	60·4	60.6
2·70	56·0	56·1	56·4	56·7	57.0	57°3	57·6	58·0	58·3	58·5	58·8	59·0	59·2	59·4	59.7
2·80	55·0	55·1	55·4	55·7	56.1	56°3	56·7	57·0	57·4	57·6	57·8	58·0	58·3	58·5	58.8
2·90	54·1	54·2	54·5	54·8	55.1	55°4	55·7	56·1	56·5	56·7	56·9	57·1	57·4	57·6	57.9
3.00	53·1	53·2	53.6	53·8	54.2	54·5	54·8	55·2	55.6	55·8	56·0	56·2	56·5	56·7	57.0
3.10	52·2	52·3	52.6	52·9	53.3	53·6	53·9	54·3	54.7	54·9	55·1	55·4	55·6	55·9	56.1
3.20	51·3	51·4	51.8	52·1	52.4	52·7	53·1	53·4	53.8	54·1	54·3	54·5	54·8	55·0	55.3
3.30	50·5	50·6	50.9	51·2	51.6	51·9	52·2	52·6	53.0	53·2	53·4	53·7	53·9	54·2	54.5
3.40	49·6	49·7	50.1	50·4	50.7	51·0	51·4	51·8	52.2	52·4	52·6	52·9	53·1	53·4	53.6
3.50	48.8	48·9	49·2	49.5	49·9	50·2	50·6	50·9	51.4	51.6	51.8	52·1	52·3	52.6	52·8
3.60	48.0	48·1	48·4	48.8	49·1	49·4	49·8	50·2	50.6	50.8	51.0	51·3	51·5	51.8	52·1
3.70	47.2	47·3	47·7	48.0	48·4	48·7	49·0	49·4	49.8	50.0	50.3	50·5	50·8	51.0	51·3
3.80	46.5	46·6	46·9	47.2	47·6	47·9	48·2	48·6	49.0	49.3	49.5	49·8	50·0	50.3	50·6
3.90	45.7	45·8	46·2	46.5	46·9	47·2	47·5	47·9	48.3	48.5	48.8	49·0	49·3	49.5	49·8
4.00 4.10 4.20 4.30 4.40	45.0 44.3 43.6 42.9 42.3	45·1 44·4 43·7 43·0 42·4	45.4 44.7 44.0 43.4 42.7	45.7 45.0 44.3 43.7 43.0	46·I 45·4 44·7 44·I 43·6	46·4 45·7 45·0 44·4 43·7	46·8 46·1 45·4 44·7 44·1	47·2 46·5 45·8 45·1 44·6	47.6 46.9 46.2 45.5 44.9	47·8 47·1 46·4 45·7 45·1	48·1 47·3 46·0 45·3	48·3 47·6 46·9 46·2 45·6	48.6 47.9 47.2 46.5 45.8	48.8 48.1 47.4 46.8 46.1	49·I 48·4 47·7 47·0 46·4
4.50	41.6	41.7	42·I	42·4	42·8	43.1	43'4	43·8	44·2	44.4	44.7	44.9	45.2	45.5	45.7
4.60	41.0	41.1	41·4	41·7	42·1	42.4	42'8	43·2	43·6	43.8	44.1	44.3	44.6	44.8	45.1
4.70	40.4	40.5	40·8	41·1	41·5	41.8	42'2	42·5	43·0	43.2	43.4	43.7	43.9	44.2	44.5
4.80	39.8	39.9	40·2	40·5	40·9	41.2	41'5	41·9	42·4	42.6	42.8	43.1	43.3	43.6	43.9
4.90	39.2	39.3	39·7	40·0	40·3	40.6	41'0	41·4	41·8	42.0	42.2	42.5	42.8	43.0	43.3
5.00 5.10 5.20 5.30 5.40	38·7 38·1 37·6 37·0 36·5	38·8 38·2 37·7 37·1 36·6	39·1 38·5 38·0 37·5 36·9	39.4 38.8 38.3 37.8 37.2	39·8 39·2 38·7 38·1 37·6	40·1 39·5 39·0 38·4 37·9	40.4 39.8 39.3 38.8 38.2	40·8 40·2 39·1 39·1 38·6	41.5 40.6 40.1 39.6 39.6	41.4 40.9 40.3 39.8 39.3	41.7 41.1 40.6 40.0 39.5	41.4 40.8 40.3 39.7	42·2 41·6 41·1 40·5 40·0	42.4 41.9 41.3 40.8 40.8	42·7 42·2 41·6 41·0 40·5
5.50	36·0	36·1	36·4	36·7	37·1	37.4	37·7	38·1	38·5	38·7	39.0	39·2	39.5	39.7	40·I
5.60	35·5	35·6	36·0	36·2	36·6	36.9	37·2	37·6	38·0	38·2	38.5	38·7	39.0	39.2	39·5
5.70	35·1	35·2	35·5	35·8	36·1	36.4	36·8	37·1	37·5	37·8	38.0	38·2	38.5	38.7	39·0
5.80	34·6	34·7	35·0	35·3	35·7	35.9	36·3	36·6	37·0	37·3	37.5	37·7	38.0	38.3	38·5
5.90	34·1	34·2	34·5	34·8	35·2	35.5	35·8	36·2	36·6	36·8	37.0	37·3	37.5	37.8	38·1

When the Latitude Variation is + name the Azimuth the same name as Latitude. ,, , opposite name to the Latitude. On the Equator the Azimuth will have the same name as the Declination.

Lat.							LAT	ITUI	ES.						
Var. to t	0°	5°	10°	13°	16°	18°	20°	22°	24°	25°	26°	27°	28°	29°	30°
							AZ	MUT	HS.					1	
s. 6.00 6.10 6.20 6.30 6.40	33.7 33.3 32.8 32.4 32.0	33.8 33.3 32.9 32.5 32.1	34·I 33·6 33·2 32·8 32·4	34·4 33·9 33·5 33·7	34·7 34·3 33·9 33·4 33·0	35.0 34.6 34.2 33.7 33.3	35.4 34.9 34.5 34.0 33.6	35·7 35·3 34·8 34·4 34·4	36·1 35·6 35·2 34·8 34·4	36·3 35·9 35·4 35·0 34·6	36·6 36·1 35·7 35·2 34·8	36·8 36·3 35·9 35·4 35·0	37·1 36·6 36·2 35·7 35·3	37·3 36·9 36·4 35·9 35·5	37.6 37.1 36.7 36.2 35.8
6·50 6·60 6·70 6·80 6·90	31.6 30.5 30.5 30.5	31.3 30.6 31.3 30.6	32.0 31.6 31.2 30.9	32·3 31·5 31·3 30·8	32.6 32.2 31.8 31.5	32.2 32.1 31.4 31.4	33.2 32.8 32.4 32.0 31.7	33.6 33.2 32.8 32.4 32.0	34.0 33.6 33.2 32.8 32.4	34.2 33.8 33.4 33.0 32.6	34.4 34.0 33.6 33.2 32.8	34.6 34.2 33.8 33.4 33.0	34·9 34·5 34·1 33·7 33·3	35·I 34·7 34·3 33·9 33·5	35.4 35.0 34.6 34.2 33.8
7·00 7·10 7·20 7·30 7·40	29.7 29.4 29.1 28.7 28.4	29.8 29.5 29.1 28.8 28.5	30·1 29·8 29·4 29·1 28·8	30.4 30.0 29.7 29.4 29.0	30·7 30·4 30·0 29·7 29·4	31.0 30.6 30.3 29.9 29.6	31·3 30·9 30·6 30·2 29·9	31·6 31·3 30·6 30·6	31.3 31.0 31.0	32·2 31·5 31·5 31·6	32·4 32·1 31·7 31·4	32·7 32·3 31·6 31·6	32·5 32·5 32·2 31·8	33·2 32·8 32·1 32·1 31·7	33.4 33.0 32.3 32.3
7.50 7.60 7.70 7.80 7.90	28·1 27·8 27·4 27·1 26·9	28·2 27·8 27·5 27·2 26·9	28·4 28·1 27·8 27·5 27·2	28·7 28·4 28·1 27·8 27·5	29.0 28.7 28.4 28.1 27.8	29·3 29·0 28·6 28·3 28·0	29.6 29.3 28.9 28.6 28.3	29.9 29.6 29.3 28.9 28.6	30·3 29·9 29·3 29·3	30·5 30·1 29·8 29·5 29·5	30·7 30·4 30·0 29·7 29·4	30·6 30·2 29·9	31·1 30·8 30·5 30·1	31.4 31.0 30.4 30.4	30.3 31.0 31.3 31.3
8.00 8.10 8.20 8.30 8.40	26·6 26·3 26·0 25·7 25·5	26·7 26·4 26·1 25·8 25·5	26·9 26·6 26·4 26·1 25·8	27·2 26·9 26·6 26·3 26·0	27·5 27·2 26·9 26·6 26·4	27·7 27·4 27·2 26·9 26·6	28·0 27·7 27·4 27·1 26·9	28·3 28·0 27·7 27·5 27·2	28·7 28·4 28·1 27·8 27·5	28·9 28·6 28·3 28·0 27·7	29°1 28°8 28°5 28°2 27°9	29·3 29·0 28·7 28·4 28·1	29.5 29.2 28.6 28.6 28.3	29.8 29.4 29.1 28.9 28.6	30·0 29·7 29·4 29·1 28·8
8·50 8·60 8·70 8·80 8·90	25·2 24·9 24·4 24·2	25·3 25·0 24·8 24·5 24·3	25.5 25.3 25.0 24.8 24.5	25.8 25.5 25.3 25.0 24.8	26·1 25·8 25·6 25·3 25·1	26·3 26·1 25·8 25·5 25·3	26·6 26·3 26·1 25·8 25·6	26·9 26·6 26·4 26·1 25·9	27·3 27·0 26·7 26·5 26·2	27.4 27.2 26.6 26.4	27.6 27.4 27.1 26.8 26.6	27.8 27.6 27.3 27.0 26.8	28·1 27·8 27·5 27·2 27·0	28·3 28·0 27·7 27·5 27·2	28·5 28·2 28·0 27·7 27·4
9·00 9·10 9·20 9·30 9·40	24.0 23.7 23.5 23.3 23.1	24.0 23.8 23.6 23.4 23.1	24·3 24·0 23·8 23·6 23·4	24.2 24.3 24.0 23.8 23.6	24.8 24.6 24.3 24.1 23.9	25.0 24.8 24.6 24.3 24.1	25·3 25·1 24·8 24·6 24·4	25.6 25.4 25.1 24.9 24.7	25.9 25.7 25.5 25.2 25.0	26·1 25·9 25·6 25·4 25·2	26·3 26·1 25·8 25·6 25·6	26·5 26·3 26·0 25·8 25·5	26·7 26·5 26·2 26·0 25·7	26·9 26·7 26·4 26·2 25·9	27·2 26·9 26·7 26·4 26·2
9·50 9·60 9·70 9·80 9·90	22.8 22.6 22.4 22.2 22.0	22·9 22·3 22·3 22·1	23·1 22·9 22·5 22·5	23.4 23.2 22.7 22.5	23.7 23.4 23.2 23.0 22.8	23.0 23.7 23.4 23.2 23.0	24·I 23·9 23·7 23·5 23·3	24.4 24.2 24.0 23.8 23.5	24.7 24.5 24.3 24.1 23.9	24.9 24.2 24.2 24.0	25·1 24·9 24·6 24·4 24·2	25·3 25·1 24·8 24·6 24·4	25.5 25.3 25.0 24.8 24.6	25·7 25·5 25·2 25·0 24·8	25·9 25·7 25·5 25·2 2 5 ·0
10.00 10.10 10.30 10.40	21.8 21.4 21.2 21.2	21·9 21·3 21·3 21·3	22·1 21·5 21·5 21·5	22·3 22·1 21·9 21·7 21·5	22.6 22.4 22.2 22.0 21.8	22.8 22.6 22.4 22.2 22.0	23·I 22·9 22·7 22·5 22·3	23·3 23·1 22·9 22·7 22·5	23.6 23.4 23.2 23.0 22.8	23.8 23.6 23.4 23.2 23.0	24.0 23.8 23.6 23.4 23.2	24·2 24·0 23·8 23·5 23·3	24.4 24.2 23.9 23.7 23.5	24.6 24.4 24.2 23.9 23.7	24.8 24.6 24.4 24.2 23.9
10.20 10.20 10.20 10.30 10.30	20·9 20·7 20·3 20·3	20·9 20·7 20·6 20·4 20·4	21·1 21·0 20·8 20·6 20·4	21.4 21.2 20.8 20.6	21.4 21.3 21.1 20.9	21.8 21.6 21.3 21.3	22·1 21·9 21·7 21·5 21·3	22:3 22:1 22:0 21:8 21:6	22.6 22.4 22.3 22.1 21.9	22.8 22.6 22.4 22.2 22.0	23.0 22.8 22.6 22.4 22.2	23·1 23·0 22·8 22·6 22·4	23·3 23·1 22·9 22·6	23·5 23·3 23·1 23·0 22·8	23.7 23.5 23.3 23.2 23.0
11.00 11.10 11.30 11.40	20.0 19.8 19.7 19.5 19.3	20·1 19·9 19·7 19·6 19·4	20·3 20·1 19·9 19·8	20·5 20·1 20·0 19·8	20·7 20·5 20·4 20·2 20·1	20·9 20·8 20·6 20·4 20·3	21.0 20.8 20.6 20.5	21·4 21·2 21·1 20·9 20·7	21.7 21.5 21.4 21.2 21.0	21.9 21.7 21.3 21.3	22.0 21.8 21.7 21.5 21.5	22·2 22·0 21·8 21·7 21·5	22·4 22·2 22·0 21·8 21·7	22.6 22.4 22.2 21.9	22.8 22.6 22.4 22.2 22.1
11.50 11.60 11.70 11.80 11.90	19·2 19·0 18·9 18·7 18·6	19·2 19·1 18·9 18·8 18·6	19·5 19·1 19·1 19·8	19·6 19·5 19·2 19·0	19·9 19·7 19·6 19·4 19·3	20·1 19·9 19·8 19·6	20·3 20·2 20·0 19·8 19·7	20.6 20.4 20.2 20.1 19.9	20·8 20·7 20·5 20·4 20·2	21.0 20.8 20.7 20.5 20.3	21·2 21·0 20·8 20·7 20·5	21.3 21.0 20.8 20.7	21.2 21.3 21.2 21.0 20.8	21.7 21.3 21.2 21.0	21.9 21.7 21.5 21.4 21.2

TABLE IV.—AZIMUTH TABLE.

When the Latitude Variation is + name the Azimuth the same name as Latitude.

", ", opposite name to the Latitude.
On the Equator the Azimuth will have the same name as the Declination.

Lat.							LAT	ITUI	ES.						
Var. to 1'	0°	5°	10°	13°	16°	18°	20°	22°	24°	25°	26°	27°	28°	29°	80°
							AZI	MUT	HS.			•		,	
\$. 12.00 12.10 12.20 12.30 12.40	18·4 18·3 18·2 18·0 17·9	18·5 18·4 18·2 18·1 17·9	18·7 18·6 18·4 18·3 18·1	18·9 18·7 18·6 18·5 18·3	19·1 19·0 18·7 18·6	19·3 19·2 19·0 18·9 18·7	19·5 19·4 19·1 18·9	19.8 19.6 19.3 19.3	20.0 19.9 19.6 19.4	20·2 20·0 19·9 19·7 19·6	20·3 20·2 20·0 19·9 19·7	20·5 20·4 20·2 20·1 19·9	20·7 20·5 20·4 20·2 20·1	20·9 20·7 20·5 20·4 20·2	21·1 20·9 20·7 20·6 20·4
12·50 12·60 12·70 12·80 12·90	17·7 17·6 17·5 17·4 17·2	17·8 17·7 17·5 17·4 17·3	18·0 17·9 17·6 17·5	18·2 18·0 17·9 17·8 17·7	18·4 18·3 18·1 18·0 17·9	18·6 18·5 18·3 18·2 18·1	18·8 18·7 18·5 18·4 18·3	19.0 18.9 18.8 18.6 18.5	19·3 19·2 19·0 18·9 18·7	19.4 19.3 19.2 19.0 18.9	19·6 19·5 19·3 19·2	19·8 19·6 19·5 19·3	19.3 19.5 19.5 19.5	20·1 19·9 19·8 19·7 19·5	20·3 20·1 20·0 19·8 19·7
13.00 13.20 13.40 13.60 13.80	17·1 16·9 16·6 16·4 16·2	17·2 16·9 16·7 16·4 16·2	17·4 17·1 16·9 16·6	17·5 17·3 17·0 16·8 16·6	17·7 17·5 17·3 17·0 16·8	17·9 17·7 17·4 17·2 16·9	18·1 17·9 17·6 17·4	18·4 18·1 17·8 17·6 17·4	18·6 18·4 18·0 17·8 17·6	18·8 18·5 18·2 18·0 17·7	18·9 18·6 18·4 18·1	19.0 18.8 18.5 18.3	19·2 18·9 18·7 18·4 18·2	19.4 19.1 18.8 18.6	19·6 19·3 19·0 18·8 18·5
14.00 15.00 16.00 17.00 18.00	15·9 14·9 14·0 13·2 12·5	16·0 15·0 14·1 13·3 12·6	16·2 15·2 14·2 13·4 12·7	16·3 15·3 14·4 13·6 12·8	16·6 15·5 14·6 13·8 13·0	16·7 15·7 14·7 13·9 13·2	16·9 15·8 14·9 14·0	17·1 16·0 15·1 14·2 13·5	17·4 16·3 15·3 14·4 13·7	17·5 16·4 15·4 14·6 13·8	17.6 16.5 15.5 14.7 13.9	17·8 16·7 15·7 14·8 14·0	17·9 16·8 15·8 14·9 14·1	18·0 16·0 15·0 14·3	18·3 17·1 16·1 15·2 14·4
19.00 20.00 21.00 22.00 23.00	10.3 10.8 11.3	11.9 11.4 10.8 10.3 9.9	12.0 11.2 10.2 10.2	12·2 11·6 11·1 10·6 10·1	12·3 11·8 11·2 10·7 10·3	12·5 11·9 11·3 10·4	12.6 12.0 11.5 11.0 10.5	12·8 12·2 11·6 11·1 10·6	13.0 12.3 11.8 11.3 10.8	13.0 12.4 11.3 10.9	13·2 12·5 12·0 11·4 11·0	13·3 12·7 12·1 11·5 11·0	13·4 12·8 12·2 11·6 11·1	13·5 12·9 12·3 11·7	13·7 13·0 12·4 11·9 11·4
24.00 25.00 26.00 27.00 28.00	9·5 9·1 8·7 8·4 8·1	9·5 9·1 8·8 8·5 8·2	9·6 9·2 8·9 8·6 8·3	9·7 9·3 9·0 8·6 8·3	9·8 9·4 9·1 8·8 8·5	9°9 9°5 9°2 8°9 8°5	9°7 9°3 9°0 8°6	9·8 9·4 9·1 8·8	9.9 9.6 9.2 8.9	10.4 10.0 9.6 9.3 9.0	10·5 10·1 9·7 9·4 9·0	10·6 10·2 9·4 9·1	10·7 10·3 9·5 9·5	10·8 10·4 10·0 9·6 9·3	10·9 10·5 10·1 9·7 9·4
29.00 30.00 31.00 32.00 33.00	7·9 7·6 7·1 6·9	7·9 7·6 7·4 7·2 6·9	8·0 7·7 7·5 7·2 7·0	8·1 7·8 7·5 7·3 7·1	8·2 7·9 7·6 7·4 7·2	8·3 8·0 7·7 7·5 7·3	8·3 8·0 7·8 7·6 7·3	8·5 8·2 7·9 7·7 7·4	8·6 8·3 8·0 7·8 7·6	8·7 8·4 8·1 7·9 7·6	8·7 8·4 8·2 7·9 7·7	8·8 8·5 8·2 8·0 7·7	8·9 8·6 8·3 8·1 7·8	9·0 8·7 8·4 8·1 7·9	9'0 8.8 8.5 8.2 8.0
34.00 35.00 36.00 37.00 38.00	6·7 6·5 6·3 6·2 6·0	6·7 6·5 6·4 6·2 6·0	6.8 6.6 6.4 6.3 6.1	6·9 6·7 6·5 6·3 6·2	7.0 6.8 6.6 6.4 6.2	7·1 6·9 6·7 6·5 6·3	7·1 6·9 6·7 6·6 6·4	7·2 7·1 6·8 6·6 6·5	7·4 7·1 6·9 6·7 6·6	7:4 7:2 7:0 6:8 6:6	7·5 7·2 7·0 6·9 6·7	7·5 7·3 7·1 6·9 6·7	7·6 7·4 7·2 7·0 6·8	7·7 7·4 7·2 7·0 6·9	7·7 7·5 7·3 7·1 6·9
39.00 40.00 42.00 44.00 46.00	5.9 5.7 5.4 5.2 5.0	5.9 5.7 5.5 5.2 5.0	5·9 5·8 5·6 5·3 5·0	6·0 5·9 5·6 5·3 5·1	6·1 5·9 5·7 5·4 5·2	6·2 6·0 5·7 5·5 5·2	6·2 6·1 5·8 5·5 5·3	6·3 6·2 5·9 5·6 5·4	6·4 6·2 6·0 5·7 5·4	6·5 6·3 6·0 5·7 5·5	6·5 6·3 6·0 5·8 5·5	6·6 6·4 6·1 5·8 5·6	6·6 6·4 6·2 5·9 5·6	6·7 6·5 6·2 5·9 5·7	6·8 6·6 6·3 6·0 5·7
48.00 50.00 52.00 54.00 56.00	4·8 4·6 4·4 4·2 4·1	4·8 4·6 4·4 4·3 4·1	4·8 4·6 4·5 4·3 4·1	4.9 4.7 4.5 4.3 4.2	5.0 4.8 4.6 4.4 4.3	5.0 4.8 4.6 4.5 4.3	5·1 4·9 4·7 4·5 4·3	5·1 4·9 4·7 4·6 4·4	5·2 5·0 4·8 4·6 4·4	5°3 5°0 4°8 4°7 4°5	5°3 5°0 4°9 4°7 4°5	5·3 5·1 4·9 4·8 4·6	5·4 5·2 5·0 4·8 4·6	5·5 5·2 5·0 4·8 4·7	5·5 5·3 5·1 4·9 4·7
58.00 60.00 70.00 80.00 90.00	4.0 3.8 3.3 2.9 2.5	4.0 3.8 3.3 2.9 2.6	4.0 3.9 3.3 2.9 2.6	4.0 3.9 3.4 2.9 2.6	4·1 4·0 3·4 3·0 2·6	4·I 4·0 3·4 3·0 2·7	4·2 4·1 3·5 3·0 2·7	4°3 4°1 3°5 3°1 2°7	4·3 4·2 3·6 3·1 2·8	4.4 4.2 3.6 3.2 2.8	4·4 4·2 3·6 3·2 2·8	4·4 4·3 3·7 3·2 2·9	4·5 4·3 3·7 3·2 2·9	4.5 4.4 3.7 3.3 2.9	4·6 4·4 3·8 3·3 2·9
100.0 120.0 150.0 200.0 300.0	2·3 1·9 1·5 1·1 0·8	2·3 1·9 1·5 1·2 0·8	2:3 1:9 1:6 1:2 0:8	2·4 2·0 1·6 1·2 0·8	2 4 2·0 1·6 1·2 0·8	2·4 2·0 1·6 1·2 0·8	2:4 2:0 1:6 1:2 0:8	2:5 2:1 1:6 1:2 0:8	2·5 2·1 1·7 1·3 0·8	2·5 2·1 1·7 1·3 0·8	2.2 2.1 1.7 1.3 0.8	2.6 2.1 1.7 1.3 0.9	2·6 2·2 1·7 1·3 0·9	2·6 2·2 1·7 1·3 0·9	2.6 2.2 1.8 1.3 0.9

When the Latitude Variation is + name the Azimuth the same name as Latitude.

" opposite name to the Latitude.

Lat.							LAT	ITUI	DES.						
Var. to 1'	31°	3 2°	33°	34°	35°	36°	37°	38°	39°	40°	41°	42°	43°	44°	45°
							AZI	MUT	HS.						
5. 0.00 0.10 0.20 0.30 0.40	90.0 88.8 87.5 86.3 85.1	90.0 88.8 87.6 86.4 85.2	90.0 88.8 87.6 86.4 85.2	90.0 88.8 87.6 86.4 85.3	90.0 88.8 87.7 86.5 85.3	90.0 88.9 87.7 86.5 85.4	90.0 88.9 87.7 86.6 85.4	90.0 88.9 87.7 86.6 85.5	90·0 88·9 87·8 86·7 85·6	90.0 88.9 87.8 86.7 85.6	90.0 88.9 87.8 86.8 85.7	90.0 88.9 87.9 86.8 85.7	90·0 89·0 87·9 86·9 85·8	90.0 89.0 87.9 86.9 85.9	90.0 89.0 88.0 87.0 86.0
0·50 0·60 0·70 0·80 0·90	83.9 82.7 81.5 80.3 79.1	83.9 82.8 81.6 80.4 79.2	84.0 82.8 81.7 80.5 79.3	84·1 82·9 81·7 80·6 79·4	84·2 83·0 81·8 80·7 79·6	84·2 83·1 81·9 80·8 79·7	84·3 83·2 82·0 80·9 79·8	84·4 83·3 82·1 81·0 79·9	84·4 83·4 82·3 81·2 80·1	84.5 83.4 82.4 81.3 80.2	84.6 83.5 82.5 81.4 80.4	84.7 83.6 82.6 81.5 80.5	84·8 83·7 82·7 81·7 80·6	84·9 83·8 82·8 81·8 80·8	84·9 83·9 82·9 82·0 81·0
1.00 1.10 1.20 1.30 1.40	77.9 76.7 75.6 74.4 73.3	78·0 76·9 75·7 74·6 73·5	78·2 77·0 75·9 74·8 73·6	78·3 77·2 76·0 74·9 73·8	78·4 77·3 76·2 75·1 74·0	78·6 77·4 76·4 75·3 74·2	78·7 77·6 76·5 75·4 74·4	78·9 77·8 76·7 75·6 74·6	79.0 77.9 76.9 75.8 74.8	79°2 78°1 77°1 76°0 75°0	79·3 78·3 77·2 76·2 75·2	79.5 78.4 77.4 76.4 75.4	79.6 78.6 77.6 76.6 75.6	79·8 78·8 77·8 76·8 75·9	80·0 79·0 78·0 77·1 76·1
1.50 1.60 1.70 1.80 1.90	72·2 71·1 70·0 68·9 67·8	72·4 71·3 70·2 69·1 68·1	72·5 71·5 70·4 69·3 68·3	72·7 71·7 70·6 69·5 68·5	72·9 71·9 70·8 69·8 68·7	73·1 72·1 70·0 69·0	73·3 72·3 71·4 70·2 69·2	73.5 72.5 71.5 70.5 69.5	73·8 72·7 71·7 70·7 69·8	74.0 73.0 72.0 71.0 70.0	74·2 73·2 72·2 71·2 70·3	74·4 73·4 72·5 71·5 70·6	74.7 73.7 72.7 71.8 70.8	74.9 73.9 73.0 72.1 71.1	75·1 74·2 73·3 72·3 71·4
2.00 2.10 2.20 2.30 2.40	66.8 65.8 64.8 63.8 62.8	67.0 66.0 65.0 64.0 63.0	67·2 66·2 65·2 64·3 63·3	67·5 66·4 65·5 64·5 63·6	67·7 66·7 65·7 64·8 63·8	68·0 67·0 66·0 65·1 64·1	68·2 67·3 66·3 65·3 64·4	68·5 67·5 66·6 65·6 64·7	68·8 67·8 66·9 65·9 65·0	69.0 68.1 67.2 66.2 65.3	69·3 68·4 67·5 66·5 65·6	69·6 68·7 67·8 66·8 66·0	69·9 69·0 68·1 67·2 66·3	70·2 69·3 68·4 67·5 66·7	70·5 69·6 68·7 67·9 67·0
2·50 2·60 2·70 2·80 2·90	61·8 60·9 59·0 59·1	62·1 61·1 60·2 59·3 58·4	62·3 61·4 60·5 59·6 58·7	62·6 61·7 60·8 59·9 59·0	62·9 62·0 61·1 60·2 59·3	63·2 62·3 61·4 60·5 59·6	63·5 62·6 61·7 60·8 59·9	63·8 62·9 62·0 61·1 60·3	64·1 63·2 62·3 61·5 60·6	64.4 63.5 62.6 61.8 61.0	64·8 63·9 63·0 62·2 61·3	65·1 64·2 63·3 62·5 61·7	65.4 64.6 63.7 62.9 62.1	65.8 64.9 64.1 63.3 62.5	66·1 65·3 64·5 63·7 62·9
3.00 3.10 3.20 3.30 3.40	57·3 56·4 55·6 54·7 53·9	57·5 56·7 55·8 55·0 54·2	57·8 57·0 56·1 55·3 54·5	58·1 57·3 56·4 55·6 54·8	58·4 57·6 56·8 55·9 55·2	58·8 57·9 57·1 56·3 55·5	59·1 58·3 57·4 56·6 55·8	59.4 58.6 57.8 57.0 56.2	59·8 58·9 58·1 57·3 56·6	60·1 59·3 58·5 57·7 56·9	60·5 59·7 58·9 58·1 57·3	50·9 59·3 58·5 57·7	61·3 60·5 59·7 58·9 58·1	61.7 60.8 60.1 59.3 58.6	62·1 61·3 60·5 59·7 59·0
3.50 3.60 3.70 3.80 3.90	53·1 52·4 51·6 50·8 50·1	53.4 52.6 51.9 51.1 50.4	53.7 53.0 52.2 51.5 50.7	54.0 53.3 52.5 51.8 51.1	54·4 53·6 52·8 52·1 51·4	54.7 53.9 53.2 52.5 51.7	55·1 54·3 53·5 52·8 52·1	55.4 54.7 53.9 53.2 52.5	55·8 55·0 54·3 53·6 52·8	56·2 55·4 54·7 54·0 53·2	56·6 55·8 55·1 54·4 53·7	57.0 56.2 55.5 54.8 54.5	57.4 56.6 55.9 55.2 55.0	57·8 57·1 56·4 55·7 55·5	58·3 57·5 56·8 56·1 55·9
4.00 4.10 4.20 4.30 4.40	49.4 48.7 48.0 47.3 46.7	49.7 49.0 48.3 47.6 47.0	50·0 49·3 48·6 48·0 47·3	50·3 49·6 49·0 48·3 47·6	50.7 50.0 49.3 48.6 48.0	51.0 50.3 49.7 49.0 48.3	51.4 50.7 50.1 49.4 48.7	51·8 51·1 50·4 49·7 49·1	52·1 50·1 50·1 49·5	52·5 51·9 51·2 49·9	53.0 50.9 50.9 50.9	53'4 52'7 52'0 51'3 50'7	53·8 53·1 52·5 51·8 51·2	54·3 53·6 52·9 52·3 51·6	54.7 54.1 53.4 52.8 52.1
4.50 4.60 4.70 4.80 4.90	46·1 45·4 44·8 44·2 43·6	46·3 45·7 45·1 44·5 43·9	46·7 46·0 45·4 44·8 44·2	47.0 46.4 45.8 45.1 44.6	47.3 46.7 46.1 45.5 44.9	47.7 47.1 46.5 45.8 45.3	48·1 47·4 46·8 46·2 45·6	48·4 47·8 47·2 46·6 46·0	48·8 48·2 47·6 47·0 46·4	49.2 48.6 48.0 47.4 46.8	49.7 49.0 48.4 47.8 47.2	50·1 49·5 48·9 48·3 47·7	50·6 49·9 49·3 48·7 48·1	51.0 50.4 49.8 49.2 48.6	51·5 50·9 50·3 49·7 49·1
5.00 5.10 5.20 5.30 5.40	43.0 42.5 41.9 41.4 40.8	43.3 42.8 42.2 41.7 41.1	43.6 43.1 42.5 42.0 41.5	44.0 43.4 42.9 42.3 41.8	44.3 43.8 43.2 42.7 42.1	44.7 44.1 43.6 43.0 42.5	45.0 44.5 43.9 43.4 42.8	45'4 44'9 44'3 43'8 43'2	45·8 45·3 44·7 44·1 43·6	46·2 45·7 45·1 44·6 44·0	46·7 46·1 45·5 45·0 44·5	47·1 46·5 46·0 45·4 44·9	47.6 47.0 46.4 45.9 45.4	48·0 47·5 46·9 46·4 45·8	48·5 48·0 47·4 46·9 46·3
5.50 5.60 5.70 5.80 5.90	40·3 39·8 39·3 38·8 38·3	40·6 40·1 39·6 39·1 38·6	40.4 39.9 39.4 39.4	41·3 40·7 40·2 39·8 39·3	47.6 40.6 40.1 39.6	42.0 41.4 40.9 40.4 40.4	42·3 41·8 41·3 40·8 40·3	42.7 42.2 41.7 41.2 40.7	43·I 42·6 42·I 41·6 41·I	43.5 43.0 42.5 42.0 41.5	43.9 43.4 42.4 42.4	44'4 43'9 43'4 42'9 42'4	44.8 44.3 43.8 43.3 42.8	45°3 44°8 44°3 43°8 43°3	45.8 45.3 44.8 44.3 43.8

When the Latitude Variation is + name the Azimuth the same name as Latitude.

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Lat.							LAT	ITUD	ES.						
Var. to 1'	31°	32°	33°	34°	35°	36°	37°	38°	39°	40°	41°	42°	43°	44°	45°
							AZI	MUT	HS.						
\$. 6.00 6.10 6.20 6.30 6.40	37·9 37·4 37·0 36·5 36·1	38·2 37·7 37·3 36·8 36·4	38·5 38·0 37·6 37·1 36·7	38·8 38·3 37·9 37·4 37·0	39·1 38·7 38·2 37·8 37·3	39·5 39·0 38·6 38·1 37·7	39·9 39·4 38·9 38·5 38·0	40.2 39.8 39.3 38.8 38.4	39.7 39.2 38.8	41.0 40.5 40.1 39.6 39.2	41.5 41.0 40.5 40.1 39.6	41.0 41.4 41.0	42·4 41·9 41·4 40·9 40·5	42·8 42·3 41·9 41·4 41·0	43·3 42·8 42·4 41·9 41·5
6·50 6·60 6·70 6·80 6·90	35.7 35.3 34.9 34.5 34.1	36·0 35·6 35·1 34·7 34·4	36·3 35·9 35·4 35·0 34·7	36·6 36·2 35·8 35·4 35·0	36·9 36·5 36·1 35·7 35·3	37·2 36·8 36·4 36·0 35·6	37·6 37·2 36·8 36·4 36·0	38·0 37·6 37·1 36·7 36·3	38·4 38·0 37·5 37·1 36·7	38·8 38·3 37·9 37·5 37·1	39·2 38·8 38·3 37·9 37·5	39·6 39·2 38·8 38·4 38·0	40·1 39·6 39·2 38·8 38·4	40·5 40·1 39·7 39·3 38·9	41.0 40.6 40.2 39.8 39.3
7.00 7.10 7.20 7.30 7.40	33·7 33·3 32·6 32·6 32·3	34.0 33.6 33.2 32.9 32.5	34·3 33·9 33·5 33·2 32·8	34.6 34.2 33.8 33.5 33.5	34°9 34°5 34°1 33°8 33°4	35·2 34·8 34·5 34·1 33·7	35.6 35.2 34.8 34.4 34.1	35.9 35.6 35.2 34.8 34.4	36·3 35·9 35·6 35·2 34·8	36·7 36·3 36·0 35·6 35·2	37·1 36·7 36·4 36·0 35·6	37.6 37.2 36.8 36.4 36.0	38·0 37·6 37·2 36·8 36·5	38·5 38·1 37·7 37·3 36·9	38·9 38·5 38·2 37·8 37·4
7·50 7·60 7·70 7·80 7·90	31.6 31.2 30.9 30.6	32·2 31·8 31·5 31·2 30·8	32.4 32.1 31.8 31.4 31.4	32·7 32·4 32·1 31·7 31·4	33.1 32.7 32.4 32.0 31.7	33.4 33.0 32.7 32.4 32.0	33.7 33.4 33.0 32.7 32.4	34·1 33·7 33·4 33·1 32·7	34.2 34.1 33.8 33.4 33.4	34·8 34·5 34·1 33·8 33·5	35.2 34.3 34.2 34.2 33.8	35.7 35.3 35.0 34.6 34.3	36·1 35·7 35·4 35·0 34·7	36·5 36·2 35·8 35·5 35·1	37·0 36·7 36·3 36·0 35·6
8·00 8·10 8·20 8·30 8·40	30·3 29·9 29·3 29·1	30·5 30·2 29·6 29·6 29·3	30·8 30·5 30·2 29·9 29·6	31·1 30·8 30·2 30·2	31·4 31·1 30·8 30·5	31·7 31·4 31·1 30·8 30·5	32·0 31·7 31·4 31·1 30·8	32·4 32·1 31·8 31·4 31·1	32·8 32·4 32·1 31·8 31·5	33·1 32·8 32·5 32·2 31·9	33·5 33·2 32·6 32·6 32·3	33.9 33.6 33.0 32.7	34.4 34.0 33.7 33.4 33.1	34·8 34·5 34·1 33·8 33·5	35·3 34·9 34·3 34·9
8·50 8·60 8·70 8·80 8·90	28·8 28·5 28·2 27·9 27·7	29.0 28.7 28.4 28.2 27.9	29.3 29.0 28.7 28.5 28.2	29.6 29.3 29.0 28.7 28.5	29.9 29.6 29.3 29.0 28.7	30·2 29·9 29·6 29·3 29·0	30·5 30·2 29·6 29·3	30·8 30·6 30·3 30·0 29·7	30.0 30.3 30.0 30.3	31.6 31.3 31.0 30.7 30.4	30.8 31.0 31.0 31.0	32·3 32·0 31·7 31·5	32·8 32·5 32·2 31·9 31·6	33·2 32·9 32·6 32·3 32·0	33.6 33.3 33.0 32.7 32.4
9.00 9.10 9.30 9.40	27.4 27.1 26.9 26.6 26.4	27·7 27·4 27·1 26·9 26·6	27.9 27.6 27.4 27.1 26.9	28·2 27·9 27·7 27·4 27·2	28·5 28·2 28·0 27·7 27·5	28·8 28·5 28·3 28·0 27·7	29·1 28·8 28·6 28·3 28·0	29.4 29.1 28.9 28.6 28.4	29.8 29.5 29.2 29.0 28.7	30·1 29·8 29·6 29·3 29·1	30·5 30·2 29·7 29·4	30·9 30·6 30·3 30·0 29·8	31.3 31.0 30.4 30.4 30.4	31.4 31.1 30.9 30.6	31.0 31.3 31.6 31.0
9·50 9·60 9·70 9·80 9·90	26·1 25·9 25·5 25·2	26·4 26·2 25·9 25·7 25·5	26·6 26·4 26·2 26·0 25·7	26·9 26·7 26·4 26·2 26·0	27·2 27·0 26·7 26·5 26·2	27·5 27·2 27·0 26·8 26·5	27.8 27.6 27.3 27.1 26.8	28·1 27·9 27·6 27·4 27·1	28·4 28·2 27·9 27·7 27·4	28·8 28·5 28·3 28·0 27·8	29·2 28·9 28·6 28·4 28·1	29.5 29.3 29.0 28.8 28.5	29.9 29.7 29.4 29.2 28.9	30·3 30·1 29·6 29·6 29·3	30.8 30.5 30.0 29.7
10.00 10.10 10.20 10.40	25.0 24.8 24.6 24.4 24.2	25·3 25·0 24·8 24·6 24·4	25.5 25.3 25.1 24.8 24.6	25.8 25.5 25.3 25.1 24.9	26.0 25.8 25.6 25.4 25.2	26·3 26·1 25·6 25·6 25·4	26·6 26·4 26·2 25·9 25·7	26·9 26·7 26·5 26·2 26·0	27·2 27·0 26·8 26·5 26·3	27.6 27.3 27.1 26.9 26.7	27·9 27·7 27·5 27·2 27·0	28·3 28·0 27·8 27·6 27·4	28·7 28·4 28·2 28·0 27·7	29·1 28·8 28·6 28·3 28·1	29.5 29.2 29.0 28.8 28.5
10·50 10·60 10·70 10·80 10·90	24.0 23.8 23.6 23.4 23.2	24·2 24·0 23·8 23·6 23·4	24 4 24 2 24 0 23 8 23 6	24.7 24.5 24.3 24.1 23.9	24·9 24·7 24·5 24·3 24·1	25·2 25·0 24·8 24·6 24·4	25.5 25.3 25.1 24.9 24.7	25.8 25.6 25.4 25.2 25.0	26·1 25·9 25·7 25·5 25·3	26·4 26·2 26·0 25·8 25·6	26·8 26·6 26·3 26·1 25·9	27·1 26·9 26·7 26·5 26·3	27·5 27·3 27·1 26·9 26·6	27·9 27·6 27·4 27·2 27·0	28·3 28·1 27·9 27·6 27·4
11.00 11.10 11.20 11.40	23.0 22.8 22.6 22.4 22.4	23·2 23·0 22·8 22·6 22·5	23.4 23.2 23.1 22.9 22.7	23·7 23·5 23·1 22·9	23.9 23.7 23.6 23.4 23.4	24·2 24·0 23·8 23·6 23·4	24·5 24·3 24·1 23·9 23·7	24·8 24·6 24·4 24·2 24·0	25·I 24·9 24·7 24·5 24·3	25.4 25.2 25.0 24.8 24.6	25·7 25·5 25·3 25·1 24·9	26·1 25·9 25·7 25·5 25·3	26·4 26·2 26·0 25·8 25·6	26·8 26·6 26·4 26·2 26·0	27·2 27·0 26·8 26·6 26·4
11.50 11.60 11.70 11.80 11.90	22·1 21·9 21·7 21·6 21·4	22·3 22·1 21·9 21·8 21·6	22·5 22·4 22·2 22·0 21·8	22·8 22·6 22·4 22·2 22·1	23.0 22.8 22.6 22.5 22.3	23·2 23·1 22·9 22·7 22·5	23.5 23.4 23.2 23.0 22.8	23·8 23·6 23·4 23·3 23·1	24·I 23·9 23·7 23·6 23·4	24.4 24.2 24.0 23.9 23.7	24.7 24.6 24.4 24.2 24.0	25·1 24·9 24·7 24·5 24·3	25.4 25.2 25.0 24.9 24.7	25·8 25·6 25·4 25·2 25·0	26·2 26·0 25·8 25·6 25·4

When the Latitude Variation is + name the Azimuth the same name as Latitude. , , opposite name to the Latitude.

Lat.							LAT	ITUI	DES.						
Var. to 1'	31°	32°	33°	34°	35°	36°	37°	38°	39°	40°	41°	42°	43°	44°	45°
							AZI	MUT	HS.						
s. 12.00 12.10 12.20 12.30 12.40	21·2 21·1 20·9 20·8 20·6	21.2 21.3 21.1 21.0 20.8	21.7 21.4 21.4 21.0	21.9 21.7 21.6 21.4 21.3	22·I 22·0 2I·8 2I·6 2I·5	21.7 22.4 22.2 21.7	22·7 22·3 22·1 22·0	22·9 22·6 22·4 22·3	23·2 23·0 22·9 22·7 22·5	23·5 23·3 23·2 23·0 22·8	23.8 23.6 23.5 23.3 23.1	24·2 24·0 23·8 23·6 23·5	24·5 24·3 24·1 23·9 23·8	24.2 24.2 24.3 24.3 24.3	25·2 25·0 24·9 24·7 24·5
12·50 12·60 12·70 12·80 12·90	20.4 20.3 20.2 19.9	20·7 20·5 20·4 20·2 20·1	20·9 20·7 20·6 20·4 20·3	21·1 21·0 20·8 20·7 20·5	21·3 21·2 20·9 20·7	21.6 21.4 21.3 21.1 20.9	21.8 21.7 21.5 21.4 21.2	22·1 21·9 21·8 21·6 21·5	22.4 22.2 22.0 21.9 21.7	22·7 22·5 22·3 22·2 22·0	23.0 22.8 22.6 22.5 22.3	23·3 23·1 22·9 22·8 22·6	23.6 23.5 23.1 23.1 22.9	24.0 23.8 23.6 23.5 23.3	24·3 24·2 24·0 23·8 23·7
13.00 13.20 13.40 13.60 13.80	19.7 19.5 19.2 18.9 18.7	19·9 19·7 19·1 19·1	20·1 19·9 19·6 19·3	20.4 20.1 19.8 19.5 19.5	20.6 20.3 20.0 19.8 19.5	20·8 20·5 20·3 20·0 19·7	21·1 20·8 20·5 20·2 19·9	21.3 21.0 20.7 20.5 20.5	21.6 21.3 21.0 20.7 20.4	21.6 21.3 21.0 20.7	22·2 21·9 21·6 21·3	22·5 22·2 21·6 21·6	22.8 22.5 22.2 21.6	23·2 22·8 22·2 22·2 21·9	23.2 23.2 22.6 22.6
14.00 15.00 16.00 17.00 18.00	18·4 17·3 16·3 15·3 14·5	18·6 17·5 16·4 15·5 14·7	18·8 17·6 16·6 15·7 14·8	19.0 17.8 16.8 15.8	19°2 18°0 17°0 16°0 15°2	19.4 18.2 17.2 16.2 15.4	19·7 18·5 17·4 16·4 15·5	19·9 18·7 17·6 16·6 15·7	20·2 18·9 17·8 16·8 16·0	20·5 19·2 18·1 17·1 16·2	20·7 19·5 18·3 17·3 16·4	21·0 19·7 18·6 17·5 16·6	21·3 20·0 18·0 17·8 16·9	21·7 20·3 19·2 18·1 17·2	22.0 20.7 19.5 18.4 17.4
19.00 20.00 21.00 23.00	13·8 13·1 12·5 12·0 11·5	13·9 12·6 12·1 11·6	14·1 13·4 12·8 12·2 11·7	14·2 13·6 12·9 12·4 11·8	14·4 13·7 13·1 12·5 12·0	14·6 13·9 13·2 12·7 12·1	14·8 14·1 13·4 12·8 12·3	15.0 14.2 13.6 13.0 12.4	15·2 14·4 13·8 13·2 12·6	15.4 14.6 13.9 13.4 12.8	15.6 14.8 14.1 13.5 13.0	15·8 15·1 14·4 13·7 13·2	16·1 15·3 14·6 14·0 13·4	16·3 15·5 14·8 14·2 13·6	16·6 15·8 15·1 14·4 13·8
24.00 25.00 26.00 27.00 28.00	11.0 10.6 10.2 9.8 9.5	11·1 10·7 10·3 9·9 9·6	11·2 10·8 10·4 10·0 9·7	11.4 10.9 10.5 10.1 9.8	11.5 11.0 10.6 10.2 9.9	11.6 11.2 10.4 10.4	11.8 10.9 10.5 10.1	11.0 10.6 11.0	12·1 11·6 11·2 10·8	12·3 11·8 11·4 10·9 10·6	12·5 12·0 11·5 11·1 10·7	12·6 12·1 11·7 11·3 10·9	12·8 12·3 11·9 11·4 11·1	13.0 12.5 12.1 11.6 11.6	13·3 12·7 12·3 11·8 11·4
29.00 30.00 31.00 32.00 33.00	9·1 8·8 8·5 8·3 8·0	9·2 8·9 8·6 8·4 8·1	9°3 9°0 8°7 8°5 8°2	9·4 9·1 8·8 8·6 8·3	9°5 9°2 8°9 8°7 8°4	9·7 9·4 9·1 8·8 8·5	9·8 9·5 9·2 8·9 8·6	9.9 9.6 9.3 9.0 8.7	9.7 9.4 9.1 8.8	9.9 9.6 9.3 9.9	10·3 10·0 9·7 9·4 9·1	10·5 10·2 9·8 9·5 9·5	10·7 10·3 10·0 9·7 9·4	10·8 10·5 10·2 9·9 9·6	11.0 10.7 10.3 10.0 9.7
34.00 35.00 36.00 37.00 38.00	7·8 7·6 7·4 7·2 7·0	7·9 7·7 7·5 7·2 7·1	8·o 7·7 7·5 7·3 7·1	8·1 7·8 7·6 7·4 7·2	8·2 7·9 7·7 7·5 7·3	8·3 8·0 7·8 7·6 7·4	8·4 8·1 7·9 7·7 7·5	8·5 8·2 8·0 7·8 7·6	8.6 8.3 8.1 7.9 7.7	8·7 8·5 8·3 8·0 7·8	8·8 8·6 8·4 8·1 7·9	9.0 8.7 8.5 8.3 8.0	9·1 8·9 8·6 8·4 8·2	9·3 9·0 8·8 8·5 8·3	9°4 9°2 8°9 8°7 8°5
39.00 40.00 42.00 44.00 46.00	6·8 6·7 6·3 6·0 5·8	6·9 6·7 6·4 6·1 5·8	7.0 6.8 6.5 6.2 5.9	7.0 6.9 6.5 6.2 6.0	7·1 7·0 6·6 6·3 6·0	7·2 7·0 6·7 6·4 6·1	7·3 7·1 6·8 6·5 6·2	7·4 7·2 6·9 6·6 6·3	7·5 7·3 7·0 6·7 6·4	7·6 7·4 7·1 6·8 6·5	7·7 7·5 7·2 6·9 6·6	7·8 7·7 7·3 7·0 6·7	8·0 7·8 7·4 7·1 6·8	8·1 7·9 7·5 7·2 6·9	8·2 8·0 7·6 7·3 7·0
48.00 50.00 52.00 54.00 56.00	5.5 5.3 5.1 4.9 4.7	5.6 5.4 5.2 5.0 4.8	5.7 5.4 5.2 5.0 4.8	5.7 5.6 5.3 5.1 4.9	5·8 5·6 5·3 5·2 5·0	5.9 5.6 5.4 5.2 5.0	5.9 5.7 5.3 5.3	6·0 5·8 5·6 5·4 5·2	6·1 5·9 5·6 5·4 5·2	6·2 6·0 5·7 5·5 5·3	6·3 6·1 5·8 5·6 5·4	6.4 6.1 5.9 5.7 5.5	6·5 6·2 6·0 5·8 5·6	6·6 6·3 6·1 5·9 5·7	6·7 6·4 6·2 6·0 5·8
58.00 60.00 70.00 80.00 90.00	4.6 4.4 3.8 3.3 3.0	4.6 4.5 3.8 3.4 3.0	4.7 4.5 3.9 3.4 3.0	4.7 4.6 3.9 3.5 3.1	4·8 4·7 4·0 3·5 3·1	4.9 4.7 4.0 3.5 3.1	4.9 4.8 4.1 3.6 3.2	5.0 4.8 4.1 3.6 3.6	5·1 4·9 4·2 3·7 3·3	5·1 5·0 4·3 3·7 3·3	5·2 5·0 4·3 3·8 3·4	5.3 5.1 4.4 3.8 3.4	5.4 5.2 4.5 3.9 3.5	5.5 5.3 4.5 4.0 3.5	5.6 5.4 4.6 4.0 3.6
100·0 120·0 150·0 200·0 300·0	2·7 2·2 1·8 1·3 0·9	2·7 2·2 1·8 1·4 0·9	2·7 2·3 1·8 1·4 0·9	2·8 2·3 1·8 1·4 0·9	2·8 2·3 1·9 1·4 0·9	2·8 2·3 1·9 1·4 0·9	2·9 2·4 1·9 1·4	2·9 2·4 1·9 1·5 1·0	2·9 2·4 2·0 1·5 1·0	3.0 2.5 2.0 1.5 1.0	3.0 2.5 2.0 1.5 1.0	3·1 2·6 2·1 1·5 1·0	3·1 2·6 2·1 1·6 1·0	3°2 2°6 2°1 1°6 1°0	3·2 2·7 2·2 1·6 1·1

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" opposite name to the Latitude.

Lat.							LAT	ITUI	DES.						
Var. to 1'	46°	47°	48°	49°	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°	60°
							AZ	MUT	HS.						
s. 0.00 0.10 0.20 0.30 0.40	90.0 89.0 88.0 87.0 86.0	90.0 89.0 88.0 87.0 86.1	90.0 89.0 88.1 87.1 86.2	90.0 89.0 88.1 87.2 86.2	90.0 89.0 88.2 87.2 86.3	90·0 89·0 88·2 87·3 86·4	90·0 89·1 88·2 87·4 86·5	90.0 89.1 88.3 87.4 86.6	90.0 89.2 88.3 87.5 86.6	90.0 89.2 88.4 87.5 86.7	90.0 89.2 88.4 87.6 86.8	90.0 89.2 88.4 87.7 86.9	90.0 89.2 88.5 87.7 87.0	90.0 89.3 88.5 87.8 87.1	90.0 89.3 88.6 87.9 87.1
0·50 0·60 0·70 0·80 0·90	85.0 84.1 83.0 82.1 81.1	85.1 84.2 83.2 82.2 81.3	85·2 84·3 83·3 82·4 81·4	85·3 84·4 83·5 82·5 81·6	85°4 84°5 83°6 82°7 81°8	85.5 84.6 83.7 82.8 81.9	85.6 84.7 83.9 83.0 82.1	85.7 84.8 84.0 83.1 82.3	85.8 85.0 84.1 83.3 82.5	85.9 85.1 84.3 83.5 82.6	86.0 85.2 84.4 83.6 82.8	86·1 85·3 84·6 83·8 83·0	86·2 85·5 84·7 84·0 83·2	86·3 85·6 84·9 84·1 83·4	86·4 85·7 85·0 84·3 83·4
1.00 1.10 1.30 1.40	80·1 79·2 78·2 77·3 76·3	80·3 79·4 78·4 77·5 76·6	80·5 79·6 78·6 77·7 76·8	80.7 79.8 78.9 78.0 77.1	80·9 80·0 79·1 78·2 77·3	81·1 80·2 79·3 78·4 77·6	81·2 80·4 79·5 78·7 77·8	81·4 80·6 79·8 78·9 78·1	81.6 80.8 80.0 79.2 78.4	81.8 81.0 80.2 79.4 78.6	82.0 81.3 80.5 79.7 78.9	82·2 81·5 80·7 80·0 79·2	82·5 81·7 81·0 80·2 79·5	82·7 81·9 81·2 80·5 79·8	82·9 82·2 81·5 80·8 80·1
1·50 1·60 1·70 1·80 1·90	75.4 74.5 73.6 72.6 71.7	75.7 74.7 73.8 72.9 72.1	75.9 75.0 74.1 73.2 72.4	76·2 75·3 74·4 73·6 72·7	76·4 75·6 74·7 73·9 73·0	76·7 75·9 75·0 74·2 73·4	77.0 76.2 75.3 74.5 73.7	77·3 76·5 75·7 74·8 74·0	77.6 76.8 76.0 75.2 74.4	77·9 77·1 76·3 75·5 74·8	78·2 77·4 76·6 75·9 75·1	78·5 77·7 77·0 76·2 75·5	78·8 78·0 77·3 76·6 75·9	79·1 78·4 77·7 77·0 76·3	79·4 78·7 78·0 77·3 76·6
2.00 2.10 2.20 2.30 2.40	70·8 70·0 69·1 68·2 67·4	71·2 70·3 69·4 68·6 67·7	71·5 70·6 69·8 69·0 68·1	71.8 71.0 70.2 69.3 68.5	72·2 71·4 70·5 69·7 68·9	72·5 71·7 70·9 70·1 69·3	72·9 72·1 71·3 70·5 69·7	73·3 72·5 71·7 70·9 70·1	73.6 72.9 72.1 71.3 70.6	74.0 73.2 72.5 71.7 71.0	74.4 73.6 72.9 72.2 71.5	74·8 74·0 73·3 72·6 71·9	75·2 74·5 73·8 73·1 72·4	75·6 74·9 74·2 73·5 72·8	76·0 75·3 74·6 74·0 73·3
2·50 2·60 2·70 2·80 2·90	66·5 65·7 64·9 64·1 63·3	66·9 66·1 65·3 64·5 63·7	67·3 66·5 65·7 64·9 64·1	67.7 66.9 66.1 65.3 64.6	68·1 67·3 66·5 65·8 65·0	68·5 67·8 67·0 66·2 65·5	69·0 68·2 67·4 66·7 65·9	69.4 68.6 67.9 67.2 66.4	69·8 69·1 68·4 67·6 66·9	70·3 69·6 68·9 68·1 67·4	70·7 70·0 69·3 68·6 67·9	71·2 70·5 69·8 69·1 68·5	71.7 71.0 70.3 69.6 69.6	72·2 71·5 70·8 70·2 69·5	72.6 72.0 71.4 70.7 70.1
3.00 3.10 3.30 3.40	62·5 61·7 60·9 60·2 59·4	62·9 62·1 60·6 59·9	63.4 62.6 61.8 61.1 60.4	63.8 63.0 62.3 61.6 60.9	64·3 63·5 62·8 62·1 61·3	64.7 64.0 63.3 62.6 61.9	65·2 64·5 63·8 63 I 62·4	65.7 65.0 64.3 63.6 62.9	66·2 65·5 64·8 64·1 63·5	66·7 66·0 65·4 64·7 64·0	67·2 66·6 65·9 65·2 64·6	67·8 67·1 66·5 65·8 65·2	68·3 67·7 67·0 66·4 65·8	68·9 68·2 67·6 67·0 66·4	69·4 68·8 68·2 67·6 67·0
3.50 3.60 3.70 3.80 3.90	58·7 58·0 57·3 56·6 55·9	59·2 58·5 57·8 57·1 56·4	59.7 58.9 58.2 57.6 56.9	59.4 58.7 58.1 57.4	60·6 60·0 59·3 58·6 57·9	61·2 60·5 59·8 59·1 58·5	61.7 60.3 59.7 59.0	62·2 61·6 60·9 60·2 59·6	62·8 62·1 61·5 60·8 60·2	63·3 62·7 62·1 61·4 60·8	63·9 63·3 62·7 62·0 61·4	64·5 63·9 63·3 62·6 62·0	65·1 64·5 63·9 63·3 62·7	65.7 65.1 64.5 63.9 63.3	66·4 65·8 65·2 64·6 64·0
4.00 4.10 4.20 4.30 4.40	55·2 54·6 53·9 53·3 52·6	55.7 55.0 54.4 53.8 53.1	56·2 55·6 54·9 54·3 53·6	56·7 56·1 55·4 54·8 54·2	57·3 56·6 56·0 55·4 54·7	57·8 57·2 56·5 55·9 55·3	58·4 57·7 57·1 56·5 55·9	59.0 58.3 57.7 57.1 56.5	59·6 58·9 58·3 57·7 57·1	59.5 58.9 58.3 57.8	60·8 60·2 59·6 59·0 58·4	61·4 60·8 60·2 59·7 59·1	62·1 61·5 60·9 60·3 59·8	62·7 62·2 61·6 61·0 60·5	63·4 62·9 62·3 61·7 61·2
4.50 4.60 4.70 4.80 4.90	52.0 51.4 50.8 50.2 49.6	52·5 51·9 51·3 50·7 50•1	53.0 52.4 51.8 51.2 50.7	53.6 53.0 52.4 51.8 51.2	54·I 53·5 52·9 52·4 51·8	54.7 54.1 53.5 52.9 52.4	55.3 54.7 54.1 53.5 53.0	55.9 55.3 54.7 54.2 53.6	56·5 55·9 55·4 54·8 54·2	57·2 56·6 56·0 55·5 54·6	57·8 57·3 56·7 56·1 55·6	58·5 57·9 57·4 56·8 56·3	59·2 58·6 58·0 57·5 57·0	59.9 59.4 58.8 58.3 57.8	60·6 60·1 59·6 59·0
5.00 5.10 5.20 5.30 5.40	49.0 48.5 47.9 47.4 46.8	49.6 49.0 48.4 47.9 47.4	50·I 49·5 49·0 48·4 47·9	50·6 50·1 49·5 49·0 48·5	51·2 50·7 50·1 49·6 49·1	51·8 51·3 50·7 50·2 49·7	52.4 51.9 51.3 50.8 50.8	53.0 52.5 52.0 51.4 50.9	53.7 53.2 52.6 52.1 51.6	54.4 53.8 53.3 52.8 52.3	55.0 54.5 54.0 53.5 53.0	55·8 55·2 54·7 54·2 53·7	56·5 56·0 55·4 54·9 54·4	57·2 56·7 56·2 55·7 55·2	58·0 57·5 57·0 56·5 56·0
5.50 5.60 5.70 5.80 5.90	46·3 45·8 45·3 44·8 44·3	46·8 46·3 45·8 45·3 44·8	47.4 46.9 46.4 45.9 45.4	47.9 47.4 46.9 46.4 45.9	48·5 48·0 47·5 47·0 46·5	49·I 48·6 48·I 47·6 47·I	49.8 49.2 48.7 48.2 47.8	50·4 49·9 49·4 48·9 48·4	51·1 50·5 50·1 49·6 49·1	51·7 51·2 50·7 50·3 49·8	52·4 51·9 51·4 51·0 50·5	53·2 52·7 52·2 51·7 51·2	53°9 53°4 52°9 52°5 52°0	54.7 54.2 53.7 53.2 52.8	55.5 55.0 54.5 54.1 53.6

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Lat.							LAT	TTUI	DES.						
Var. to 1'	46°	47°	48°	49°	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°	80°
		1	1	ı	1		AZ	IMUT	HS.						,
s. 6·00 6·10 6·20 6·30 6·40	43·8 43·3 42·9 42·4 42·0	44·3 43·9 43·4 42·9 42·5	44.9 44.4 44.0 43.2 43.2	45.5 45.0 44.5 44.0 43.6	46.0 45.6 45.1 44.6 44.2	46·7 46·2 45·7 45·2 44·8	47·3 46·8 46·3 45·9 45·4	47.9 47.4 47.0 46.5 46.1	48.6 48.1 47.7 47.2 46.8	49.3 48.8 48.4 47.9 47.5	50.0 49.5 49.1 48.6 48.2	50.8 50.3 49.8 49.4 48.9	51·5 51·0 50·6 50·1 49•7	52·3 51·8 51·4 50·9 50·5	53·1 52·7 52·2 51·8 51·3
6·50 6·60 6·70 6·80 6·90	41.5 41.1 40.7 40.3 39.8	42.0 41.6 41.2 40.8 40.3	42.6 42.2 41.7 41.3 40.9	43·2 42·7 42·3 41·9 41·5	43.7 43.3 42.9 42.5 42.0	44°3 43°9 43°5 43°1 42°6	45.0 44.5 44.1 43.7 43.3	45.6 45.2 44.8 44.3 43.9	46·3 45·9 45·4 45·0 44·6	47.0 46.6 46.1 45.7 45.3	47·7 47·3 46·9 46·4 46·0	48·5 48·1 47·6 47·2 46·8	49°3 48°8 48°4 48°0 47°6	50·1 49·6 49·2 48·8 48·4	50·9 50·5 50·0 49·6 49·2
7·00 7·10 7·20 7·30 7·40	39°4 39°0 38°7 38°3 37°9	39·9 39·5 39·2 38·8 38·4	40·5 40·1 39·7 39·3 38·9	41·1 40·6 40·3 39·9 39·5	41.6 41.2 40.8 40.4 40.1	42·2 41·8 41·4 41·0 40·7	42·9 42·4 42·1 41·7 41·3	43.2 43.1 42.7 42.3 41.9	44·2 43·8 43·4 43·0 42·6	44.9 44.5 44.1 43.7 43.3	45.6 45.2 44.8 44.4 44.0	46·4 46·0 45·6 45·2 44·8	47·2 46·7 46·4 46·0 45·6	48·0 47·6 47·2 46·8 46·4	48·8 48·4 48·0 47·6 47·2
7·50 7·60 7·70 7·80 7·90	37·5 37·1 36·8 36·4 36·1	38·0 37·7 37·3 36·9 36·6	38·5 38·2 37·8 37·5 37·1	39·1 38·7 38·4 38·0 37·6	39·7 39·3 38·9 38·6 38·2	40·3 39·9 39·5 39·2 38·8	40·9 40·5 40·1 39·8 39·4	41.2 40.8 40.4 40.0	42.2 41.8 41.5 41.1 40.7	42.9 42.5 42.2 41.8 41.4	43.6 43.3 42.9 42.5 42.1	44'4 44'0 43'6 43'3 42'9	45·2 44·8 44·4 44·1 43·7	46·0 45·6 45·2 44·9 44·5	46·8 46·5 46·1 45·7 45·3
8·00 8·10 8·20 8·30 8·40	35.7 35.4 35.1 34.7 34.4	36·2 35·9 35·6 35·2 34·9	36·8 36·4 36·1 35·7 35·4	37·3 37·0 36·6 36·3 36·0	37.9 37.5 37.2 36.8 36.5	38·5 38·1 37·8 37·4 37·1	39·1 38·7 38·4 38·0 37·7	39.7 39.4 39.0 38.7 38.4	40.4 40.0 39.2 39.3 39.0	41·1 40·7 40·4 40·0 39·7	41·8 41·4 41·1 40·7 40·4	42.6 42.2 41.8 41.5 41.5	43·3 43·0 42·6 42·3 41·9	44.5 43.8 43.4 43.1 42.8	45.0 44.6 44.3 43.9 43.6
8·50 8·60 8·70 8·80 8·90	34·1 33·8 33·5 33·2 32·9	34·6 34·3 34·0 33·7 33·4	35·I 34·8 34·5 34·2 33·9	35.6 35.3 35.0 34.7 34.4	36·2 35·9 35·6 35·3 34·9	36·8 36·5 36·1 35·8 35·5	37.4 37.1 36.7 36.4 36.1	38·0 37·7 37·4 37·1 36·7	38·7 38·4 38·0 37·7 37·4	39.4 39.0 38.7 38.4 38.1	40.1 39.8 39.4 39.1 38.8	40·8 40·5 40·2 39·8 39·5	41.6 41.3 40.9 40.6 40.3	42·4 42·1 41·7 41·4 41·1	43·2 42·9 42·6 42·3 41·9
9.00 9.10 9.30 9.40	32.6 32.3 32.0 31.7 31.5	33.1 32.8 32.2 32.3	33.6 33.3 33.0 32.7 32.5	34·I 33·8 33·5 33·2 33·0	34.7 34.4 34.1 33.8 33.5	35·2 34·9 34·6 34·3 34·1	35·8 35·5 35·2 34·9 34·6	36·4 36·1 35·8 35·5 35·3	37·1 36·8 36·5 36·2 35·9	37·8 37·5 37·2 36·9 36·6	38·5 38·2 37·9 37·6 37·3	39·2 38·9 38·6 38·3 38·0	40·0 39·7 39·4 39·1 38·8	40·8 40·5 40·2 39·9 39·6	41.6 41.3 41.0 40.7 40.4
9·50 9·60 9·70 9·80 9·90	31·2 31·0 30·7 30·4 30·2	31·7 31·4 31·1 30·9	32·2 31·6 31·4 31·4	32·7 32·4 32·1 31·9 31·6	33·2 33·0 32·7 32·4 32·1	33·8 33·5 33·2 33·0 32·7	34·4 34·1 33·8 33·5 33·3	35.0 34.7 34.4 34.1 33.9	35.6 35.3 35.0 34.8 34.5	36·3 36·0 35·7 35·4 35·1	37.0 36.7 36.4 36.1 35.8	37·7 37·4 37·1 36·8 36·6	38·5 38·2 37·9 37·6 37·3	39·3 39·0 38·7 38·4 38·1	40·1 39·8 39·5 39·2 38·9
10.00 10.10 10.30 10.40	29·9 29·7 29·4 29·2 29·0	30.4 30.1 29.9 29.4	30·9 30·6 30·4 30·1 29·9	31·4 31·1 30·9 30·6 30·4	31·9 31·6 31·4 31·1 30·9	32·4 32·2 31·9 31·7	33.0 32.7 32.5 32.2 32.0	33.6 33.3 33.1 32.8 32.6	34·2 34·0 33·7 33·4 33·2	34·9 34·6 34·4 34·1 33·8	35.6 35.3 35.0 34.8 34.5	36·3 36·0 35·8 35·5 35·2	37.0 36.8 36.5 36.2 36.0	37·8 37·5 37·3 37·0 36 8	38·7 38·4 38·1 37·8 37·6
10·50 10·60 10·70 10·80 10·90	28·7 28·5 28·3 28·1 27·8	29·2 29·0 28·7 28·5 28·3	29.6 29.4 29.2 29.0 28.7	30·1 29·9 29·7 29·4 29·2	30·6 30·4 30·2 30·0 29·7	31·2 30·9 30·7 30·5 30·2	31.2 31.3 31.0 30.8	32·3 32·1 31·8 31·6 31·4	32·9 32·7 32·4 32·2 32·0	33.6 33.3 33.1 32.9 32.6	34·2 34·0 33·7 33·5 33·3	35.0 34.7 34.4 34.2 34.0	35.7 35.5 35.2 35.0 34.7	36·5 36·2 36·0 35·7 35·5	37·3 37·0 36·8 36·5 36·3
11.00 11.10 11.30 11.40	27.6 27.4 27.2 27.0 26.8	28·1 27·8 27·6 27·4 27·2	28·5 28·3 28·1 27·9 27·7	29.0 28.8 28.6 28.3 28.1	29.5 29.3 29.1 28.8 28.6	30·0 29·8 29·6 29·3 29·1	30·6 30·3 30·1 29·9 29·7	31·1 30·9 30·7 30·4 30·2	31.5 31.3 31.0 30.8	32.4 32.1 31.9 31.7 31.5	33.0 32.8 32.6 32.3 32.1	33.7 33.5 33.3 33.0 32.8	34.5 34.2 34.0 33.7 33.5	35.2 35.0 34.7 34.5 34.3	36·0 35·8 35·3 35·3 35·3
11.50 11.60 11.70 11.80 11.90	26·6 26·4 26·2 26·0 25·8	27.0 26.8 26.6 26.4 26.2	27·5 27·3 27·1 26·9 26·7	27·9 27·7 27·5 27·3 27·1	28·4 28·2 28·0 27·8 27·6	28·9 28·7 28·5 28·3 28·1	29.5 29.3 29.0 28.8 28.6	30·0 29·8 29·6 29·4 29·2	30·6 30·4 30·2 30·0 29·7	31.0 30.8 30.6 30.4	31.9 31.7 31.4 31.2 31.0	32·5 32·3 32·1 31·9 31·7	33·3 33·1 32·8 32·6 32·4	34.0 33.8 33.6 33.4 33.4	34·8 34·6 34·1 34·1

TABLE IV.—AZIMUTH TABLE.

When the Latitude Variation is + name the Azimuth the same name as Latitude.

" opposite name to the Latitude.

Lat.							LAT	TITU	DES.						
Var. to 1	46°	47°	48°	49°	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°	60°
				·	·		AZI	MUT	HS.	<u>'</u>	<u>*</u>	,		·	
\$. 12.00 12.10 12.20 12.30 12.40	25.6 25.4 25.3 25.1 24.9	26·0 25·8 25·7 25·5 25·3	26·5 26·3 26·1 25·9 25·7	26·9 26·7 26·6 26·4 26·2	27·4 27·2 27·0 26·8 26·6	27·9 27·7 27·5 27·3 27·1	28·4 28·2 28·0 27·8 27·7	29.0 28.8 28.6 28.4 28.2	29.6 29.3 29.2 29.0 28.8	30·2 30·0 29·8 29·6 29·4	30·8 30·6 30·4 30·2 30·0	31.5 31.2 31.0 30.8 30.6	32·2 31·5 31·5 31·3	32·9 32·5 32·3 32·1	33·7 33·5 33·3 33·0 32·8
12·50 12·60 12·70 12·80 12·90	24·7 24·6 24·4 24·2 24·0	25·1 25·0 24·8 24·6 24·4	25.5 25.4 25.2 25.0 24.8	26·0 25·8 25·6 25·5 25·3	26·4 26·3 26·1 25·9 25·7	26·9 26·8 26·6 26·4 26·2	27·5 27·3 27·1 26·9 26·7	28·0 27·8 27·6 27·4 27·2	28.6 28.4 28.2 28.0 27.8	29·2 29·0 28·8 28·6 28·4	29·8 29·6 29·4 29·2 29·0	30·4 30·2 30·0 29·8 29·6	31·1 30·9 30·5 30·5	31.6 31.4 31.2	32·6 32·4 32·2 32·0 31·8
13.00 13.10 13.30 13.40	23·9 23·7 23·6 23·4 23·3	24·3 24·1 24·0 23·8 23·6	24.7 24.5 24.4 24.2 24.0	25·1 25·0 24·8 24·6 24·5	25.6 25.4 25.2 25.1 24.9	26·1 25·9 25·7 25·5 25·4	26·6 26·4 26·2 26·0 25·9	27·1 26·9 26·7 26·5 26·4	27·6 27·4 27·3 27·1 26·9	28·2 28·0 27·8 27·7 27·5	28·8 28·6 28·5 28·3 28·1	29·5 29·3 29·1 28·9 28·7	30·1 29·9 29·8 29·6 29·4	30·3 30·3 30·3	31·6 31·4 31·2 31·0 30·8
13.50 13.60 13.70 13.80 13.90	23·1 22·9 22·8 22·6 22·5	23·5 23·3 23·2 23·0 22·9	23·9 23·7 23·6 23·4 23·3	24·3 24·1 24·0 23·8 23·7	24·7 24·6 24·4 24·3 24·1	25·2 25·0 24·9 24·7 24·6	25.7 25.5 25.4 25.2 25.0	26·2 26·0 25·9 25·7 25·6	26·7 26·6 26·4 26·2 26·1	27·3 27·1 27·0 26·8 26·6	27·9 27·7 27·6 27·4 27·2	28·5 28·4 28·2 28·0 27·8	29·2 29·0 28·8 28·7 28·5	29·9 29·7 29·4 29·4	30·5 30·3 30·1 29·9
14.00 14.10 14.30 14.40	22·4 22·2 22·1 21·9 21·8	22·7 22·6 22·4 22·3 22·2	23·1 23·0 22·8 22·7 22·5	23·5 23·4 23·2 23·1 22·9	24.0 23.8 23.7 23.5 23.4	24·4 24·3 24·1 24·0 23·8	24·9 24·7 24·6 24·4 24·3	25.4 25.2 25.1 24.9 24.8	25·9 25·8 25·6 25·4 25·3	26·5 26·3 26·2 26·0 25·8	27·1 26·9 26·7 26·6 26·4	27·7 27·5 27·3 27·2 27·0	28·3 28·2 28·0 27·8 27·7	29.0 28.8 28.7 28.5 28.3	29.7 29.6 29.4 29.2 29.0
14.50 14.60 14.70 14.80 14.90	21·7 21·5 21·4 21·3 21·1	22.0 21.9 21.8 21.6 21.5	22·4 22·3 22·1 22·0 21·9	22·8 22·7 22·5 22·4 22·3	23·2 23·1 22·9 22·8 22·7	23·7 23·5 23·4 23·2 23·1	24·1 24·0 23·8 23·7 23·6	24.0 24.3 24.3 24.2	25·1 25·0 24·8 24·7 24·5	25·7 25·5 25·4 25·2 25·1	26·3 26·1 25·9 25·8 25·6	26·9 26·7 26·5 26·4 26·2	27·5 27·3 27·2 27·0 26·9	28·2 28·0 27·8 27·7 27·5	28·9 28·7 28·6 28·4 28·2
15.00 15.10 15.30 15.40	21.0 20.9 20.5 20.6 20.5	21·4 21·2 21·1 21·0 20·8	21·5 21·3 21·3 21·2	22·1 22·0 21·9 21·6	22·5 22·4 22·3 22·1 22·0	23.0 22.8 22.7 22.6 22.4	23·4 23·3 23·1 23·0 22·9	23·9 23·8 23·6 23·5 23·3	24·4 24·3 24·1 24·0 23·8	24·9 24·8 24·6 24·5 24·4	25.5 25.3 25.2 25.1 24.9	26·1 25·9 25·8 25·6 25·5	26·7 26·6 26·4 26·3 26·1	27.4 27.2 27.1 26.9 26.8	28·1 27·9 27·8 27·6 27·4
15.50 15.60 15.70 15.80 15.90	20·4 20·3 20·1 20·0 19·9	20·7 20·6 20·5 20·4 20·2	21·1 21·0 20·8 20·7 20·6	21·5 21·3 21·2 21·1 21·0	21·9 21·7 21·6 21·5 21·4	22·3 22·2 22·0 21·9 21·8	22·7 22·6 22·5 22·3 22·2	23·2 23·1 22·9 22·8 22·7	23·7 23·6 23·4 23·3 23·2	24·2 24·1 23·9 23·8 23·7	24.8 24.6 24.5 24.4 24.2	25·3 25·2 25·1 24·9 24·8	26·0 25·8 25·7 25·5 25·4	26·6 26·5 26·3 26·2 26·0	27·3 27·1 27·0 26·9 26·7
16·00 16·20 16·40 16·60 16·80	19·8 19·6 19·3 19·1	20·1 19·9 19·5 19·2	20·5 20·3 20·0 19·8 19·6	20·9 20·6 20·4 20·2 19·9	21.3 21.0 20.8 20.5 20.3	21·7 21·4 21·2 21·0 20·7	22·I 21·8 21·6 21·4 21·1	22·6 22·3 22·1 21·8 21·6	23.0 22.8 22.5 22.3 22.0	23.6 23.3 23.0 22.8 22.5	24·1 23·8 23·6 23·3 23·1	24·7 24·4 24·1 23·9 23·6	25·3 25·0 24·7 24·4 24·2	25.9 25.6 25.3 25.1 24.8	26·6 26·3 26·0 25·7 25·5
17·00 17·20 17·40 17·60 17·80	18·7 18·3 18·1 17·9	19.0 18.8 18.6 18.4 18.2	19.4 19.2 19.0 18.8 18.6	19·7 19·3 19·1 18·9	20·I 19·9 19·5 19·3	20·5 20·3 20·1 19·6	20·9 20·7 20·5 20·3 20·0	21·4 21·1 20·9 20·7 20·5	21.8 21.6 21.4 21.1 20.9	22·3 22·1 21·8 21·6 21·4	22·8 22·6 22·3 22·1 21·9	23.4 23.1 22.9 22.6 22.4	23·9 23·7 23·4 23·2 23·0	24·6 24·3 24·1 23·8 23·6	25·2 24·9 24·7 24·4 24·2
18.00 18.20 18.40 18.60 18.80	17·7 17·6 17·4 17·2 17·0	18·0 17·9 17·7 17·5 17·3	18·4 18·2 18·0 17·8 17·6	18·7 18·5 18·3 18·1 18·0	19·1 18·9 18·7 18·5 18·3	19·4 19·2 19·1 18·9 18·7	19·8 19·6 19·4 19·2 19·0	20·3 20·1 19·9 19·7 19·5	20·7 20·3 20·1 19·9	21·2 21·0 20·8 20·5 20·3	21·7 21·5 21·2 21·0 20·8	22·2 22·0 21·8 21·5 21·3	22·8 22·5 22·3 22·1 21·9	23·3 23·1 22·9 22·7 22·4	24.0 23.7 23.5 23.3 23.0
19.00 19.20 19.40 19.60 19.80	16·9 16·7 16·5 16·4 16·2	17·2 17·0 16·8 16·7 16·5	17·5 17·3 17·1 17·0 16·8	17·8 17·6 17·4 17·3 17·1	18·1 18·0 17·8 17·6 17·4	18·5 18·3 18·1 18·0 17·8	18·9 18·7 18·5 18·3 18·2	19·3 19·1 18·9 18·6	19·7 19·3 19·1 19·2	20·2 20·0 19·8 19·6 19·4	20·6 20·4 20·2 20·0 19·9	21·1 20·9 20·5 20·5	21·7 21·5 21·3 21·1 20·9	22·2 22·0 21·8 21·6 21 4	22·8 22·6 22·4 22·2 22·0

When the Latitude Variation is + name the Azimuth the same name as Latitude.

"" opposite name to the Latitude.

Lat.							LAT	ITUI	DES.				p.		
Var. to 1'	46°	47°	48°	49°	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°	60°
		,	,		,		AZI	MUT	HS.						
s. 20·00 20·20 20·40 20·60 20·80	16·1 15·9 15·6 15·5	16·3 16·2 16·0 15·9	16.6 16.5 16.3 16.2 16.0	17.0 16.8 16.6 16.5 16.3	17·3 17·1 17·0 16·8 16·7	17.6 17.5 17.3 17.1 17.0	18.0 17.8 17.7 17.5 17.3	18·4 18·2 18·0 17·9 17·7	18.8 18.6 18.4 18.3 18.1	19·2 19·0 18·9 18·7 18·5	19·7 19·3 19·1 19·0	20·2 20·0 19·8 19·6 19·4	20·7 20·3 20·1 19·9	21·2 21·0 20·8 20·7 20·5	21.8 21.6 21.4 21.2 21.0
21.00 21.20 21.40 21.60 21.80	15·3 15·2 15·0 14·9 14·8	15.6 15.3 15.2 15.1	15·9 15·7 15·6 15·5 15·3	16·2 16·0 15·9 15·8 15·6	16·5 16·4 16·2 16·1 15·9	16·8 16·7 16·5 16·4 16·3	17·2 17·0 16·9 16·7 16·6	17.6 17.4 17.2 17.1 16.9	17·9 17·8 17·6 17·5 17·3	18·4 18·2 18·0 17·9 17·7	18.8 18.6 18.5 18.3 18.2	19·3 19·1 18·8 18·6	19·8 19·6 19·4 19·3 19·1	20·3 20·1 19·9 19·8 19·6	20·8 20·7 20·5 20·3 20·2
22.00 22.20 22.40 22.60 22.80	14·7 14·5 14·4 14·3 14·2	14·9 14·8 14·7 14·5 14·4	15·2 15·1 14·9 14·8 14·7	15·5 15·4 15·2 15·1 15·0	15·8 15·7 15·5 15·4 15·3	16·1 16·0 15·8 15·7 15·6	16·5 16·3 16·2 16·0 15·9	16·8 16·7 16·5 16·4 16·2	17·2 17·0 16·9 16·8 16·6	17·6 17·4 17·3 17·1 17·0	18·0 17·9 17·7 17·6 17·4	18·5 18·3 18·2 18·0 17·8	18·9 18·8 18·6 18·5 18·5	19·4 19·3 19·1 19·0 18·8	20·0 19·8 19·7 19·5 19·3
23.00 23.20 23.40 23.60 23.80	14.0 13.9 13.8 13.7 13.6	14·3 14·2 14·1 14·0 13·8	14.6 14.4 14.3 14.2 14.1	14·8 14·7 14·6 14·5 14·4	15·1 15·0 14·8 14·8	15·4 15·3 15·2 15·1 14·9	15·8 15·6 15·5 15·4 15·3	16·1 16·0 15·7 15·6	16·5 16·3 16·2 16·1 15·9	16·9 16·5 16·5	17·3 17·1 17·0 16·9 16·7	17·7 17·6 17·4 17·3 17·1	18·2 18·0 17·9 17·7 17·6	18·7 18·5 18·4 18·2 18·1	19·2 19·0 18·9 18·7 18·6
24.00 24.40 24.80 25.20 25.60	13·5 13·3 13·1 12·9 12·7	13.7 13.5 13.1 13.1	14.0 13.8 13.5 13.3	14·3 14·0 13·8 13·6 13·4	14·5 14·3 14·1 13·9 13·7	14·8 14·6 14·4 14·2 13·9	15·1 14·9 14·7 14·5 14·2	15.5 15.2 15.0 14.8 14.6	15.8 15.1 15.1 14.9	16·2 15·9 15·5 15·5	16·6 16·3 16·1 15·8 15·6	17.0 16.7 16.5 16.2 16.0	17·5 17·2 16·9 16·7 16·4	17·9 17·7 17·1 16·9	18·4 18·1 17·6 17·6
26.00 27.00 28.00 29.00 30.00	12·5 12·0 11·6 11·2 10·9	12·7 12·2 11·8 11·4	12·9 12·1 11·6 11·3	13·2 12·7 12·3 11·9 11·5	13·5 13·0 12·5 12·1 11·7	13·7 13·2 12·8 12·4 12·0	14.0 13.5 13.1 12.6 12.2	14·3 13·8 13·4 12·9 12·5	14·7 14·1 13·7 13·2 12·8	15.0 14.5 14.0 13.5 13.1	15.4 14.8 14.3 13.8 13.4	15·8 15·2 14·7 14·2 13·8	16·2 15·6 15·1 14·6 14·1	16·6 16·0 15·5 15·0 14·5	17·1 16·5 15·4 14·9
31.0 32.0 34.0 35.0	10·5 10·2 9·6 9·6	10·7 10·4 10·1 9·8 9·5	10·9 10·6 10·3 10·0 9·7	11·1 10·8 10·5 10·2 9·9	11.3 11.0 10.4 10.1	11.6 11.2 10.6 10.6	11.8 11.5 11.1 10.8 10.5	12·1 11·7 11·4 11·1 10·7	12·4 12·0 11·6 11·3 11·0	12·7 12·3 11·6 11·6	13.0 12.6 12.2 11.9 11.5	13·3 12·9 12·5 12·2 11·8	13·7 13·3 12·9 12·5 12·2	14.0 13.6 13.2 12.9	14·5 14·0 13·6 13·2 12·9
36·0 37·0 38·0 39·0 40·0	9°1 8°8 8°6 8°4 8°2	9·3 9·0 8·8 8·5 8·3	9°4 9°2 8°9 8°7 8°5	9·6 9·4 9·1 8·9 8·7	9·8 9·5 9·3 9·1 8·8	9.7 9.5 9.3 9.0	10·2 10·0 9·7 9·5 9·2	10·5 10·2 9·9 9·7 9·4	10·7 10·4 10·1 9·9 9·7	11.0 10.7 10.4 10.1 9.9	11·2 10·9 10·4 10·1	11·5 11·2 10·9 10·7	11.8 11.5 11.2 11.0 10.7	12·2 11·8 11·5 11·0	12·5 12·2 11·6 11·6
42.0 44.0 46.0 48.0 50.0	7·8 7·5 7·1 6·8 6·6	7·9 7·6 7·3 7·0 6·7	8·1 7·7 7·4 7·1 6·8	8·3 7·9 7·5 7·2 7·0	8·4 8·0 7·7 7·4 7·1	8·6 8·2 7·9 7·5 7·2	8·8 8·4 8·0 7·6 7·4	9·0 8·6 8·2 7·9 7·6	9·2 8·8 8·4 8·1 7·8	9·4 9·0 8·6 8·3 7·9	9·7 9·2 8·8 8·5 8·1	9·9 9·5 9·1 8·7 8·4	9.7 9.3 8.9 8.6	10·5 10·0 9·6 9·2 8·8	10·8 10·3 9·5 9·5
52.0 54.0 56.0 58.0 60.0	6·3 6·1 5·9 5·7 5·5	6·4 6·2 6·0 5·8 5·6	6·6 6·3 6·1 5·9 5·7	6·7 6·4 6·2 6·0 5·8	6·8 6·6 6·1 5·9	7·0 6·7 6·3 6·0	7·1 6·9 6·6 6·4 6·2	7·3 7·0 6·8 6·5 6·3	7·5 7·2 6·9 6·7 6·5	7·6 7·4 7·1 6·9 6·6	7·8 7·5 7·3 7·0 6·8	8·0 7·7 7·5 7·2 7·0	8·3 8·0 7·7 7·4 7·2	8·5 8·2 7·9 7·6 7·4	8·7 8·4 8·1 7·8 7·6
64.0 70.0 80.0 90.0 100.0	5·1 4·7 4·1 3·7 3·3	5·2 4·8 4·2 3·7 3·4	5·3 4·9 4·3 3·8 3·4	5.4 5.0 4.4 3.9 3.5	5·6 5·1 4·4 4·0 3·6	5·7 5·2 4·5 4·0 3·6	5·8 5·3 4·6 4·1 3·7	5·9 5·4 4·7 4·2 3·8	6·1 5·6 4·3 3·9	6·2 5·7 5·0 4·4 4·0	6·4 5·8 5·1 4·5 4·1	6·5 6·0 5·2 4·7 4·2	6·7 6·2 5·4 4·8 4·3	6·9 6·3 5·5 4·9 4·4	7·1 6·5 5·7 5·1 4·6
120·0 140·0 160·0 200·0 300·0	2·7 2·4 2·1 1·6 1·1	2·8 2·4 2·1 1·7 1·1	2·8 2·4 2·1 1·7 1·1	2·9 2·5 2·2 I·7 I·2	3.0 2.5 2.2 1.8 1.8	3.0 2.6 2.3 1.8	3·1 2·7 2·3 1·9 1·2	3·2 2·7 2·4 1·9 1·3	3·2 2·8 2·4 1·9 1·3	3·3 2·8 2·5 2·0 1·3	3.4 2.9 2.6 2.0 1.4	3.5 3.0 2.6 2.1 1.4	3·6 3·1 2·7 2·2 1·4	3 7 3 2 2.8 2.2 1.5	3·8 3·3 2·9 2·3 1·5

TABLE V.

AZIMUTH CORRESPONDING TO LATITUDE VARIATION IN DEPARTURE.

Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.
s. •000 •007 •014 •021 •028	90 89·9 89·8 89·7 89·6	s. '449 '456 '463 '470 '477	83.6 83.5 83.4 83.3 83.2	s. ·909 ·916 ·924 ·931 ·938	77·2 77·1 77·0 76·9 76·8	s. 1·393 1·401 1·409 1·416 1·424	70·8 70·7 70·6 70·5 70·4	s. 1.916 1.925 1.934 1.942 1.951	64·4 64·3 64·2 64·1 64·0	s. 2·500 2 509 2·519 2·529 2·538	58.0 57.9 57.8 57.7 57.6	s. 3·170 3 182 3·193 3·204 3·216	51.6 51.5 51.4 51.3 51.2
.035 .042 .049 .056 .063	89·5 89·4 89·3 89·1	·484 ·491 ·498 ·505 512	83·1 83·0 82·9 82·8 82·7	·946 ·953 ·960 ·968 ·975	76·7 76·6 76·5 76·4 76·3	1.432 1.440 1.448 1.456 1.464	70·3 70·2 70·0 69·9	1.960 1.968 1.977 1.986 1.994	63·9 63·8 63·7 63·6 63·5	2 548 2·558 2·568 2·578 2·588	57·5 57·4 57·3 57·2 57·1	3·228 3·239 3·251 3·262 3·274	51.0 50.9 50.8 50.8
.070 .077 .084 .091 .098	89·0 88·9 88·8 88·7 88·6	·520 ·527 ·534 ·541 ·548	82·6 82·5 82·4 82·3 82·2	·982 ·990 ·997 I·005 I·012	76·2 76·1 76·0 75·9 75·8	1.472 1.480 1.488 1.496 1.504	69·8 69·7 69·6 69·5 69·4	2.003 2.012 2.021 2.029 2.038	63·4 63·3 63·2 63·1 63·0	2·598 2·608 2·618 2·628 2·638	57.0 56.9 56.8 56.7 56.6	3.286 3.297 3.309 3.321 3.333	50·6 50·5 50·4 50·2
•105 •112 •119 •126 •133	88·5 88·4 88·3 88·2 88·1	*552 *562 *569 *576 *584	82·1 82·0 81·9 81·8 81·7	1.020 1.027 1.034 1.042 1.049	75·7 75·6 75·5 75·4 75·3	1.512 1.520 1.528 1.536 1.544	69·3 69·2 69·0 68·9	2.047 2.056 2.065 2.073 2.082	62·9 62·8 62·7 62·6 62·5	2.648 2.658 2.668 2.678 2.688	56·5 56·4 56·3 56·2 56·1	3·344 3·356 3·368 3·380 3·392	50·1 50·0 49·9 49·8 49·7
•140	88·0	·591	81·6	1.057	75·2	1.552	68·8	2·091	62·4	2.698	56·0	3.404	49·6
•147	87·9	·598	81·5	1.064	75·1	1.560	68·7	2·100	62·3	2.708	55·9	3.416	49·5
•154	87·8	·605	81·4	1.072	75·0	1.568	68·6	2·109	62·2	2.718	55·8	3.428	49·4
•161	87·7	·612	81·3	1.079	74·9	1.576	68·5	2·118	62·1	2.729	55·7	3.441	49·3
•168	87·6	·619	81·2	1.087	74·8	1.584	68·4	2·127	62·0	2.739	55·6	3.453	49·2
·175	87·5	·626	81·1	1.094	74·7	1·592	68·3	2·136	61·9	2.749	55.5	3.465	49·1
·182	87·4	·634	81·0	1.102	74·6	1·600	68·2	2·145	61·8	2.759	55.4	3.477	49·0
·189	87·3	·641	80·9	1.109	74·5	1·608	68·1	2·154	61·7	2.769	55.3	3.490	48·9
·196	87·2	·648	80·8	1.117	74·4	1·616	68·0	2·163	61·6	2.780	55.2	3.502	48·8
·203	87·1	·655	80·7	1.124	74·3	1·624	67·9	2·172	61·5	2.790	55.1	3.514	48·7
·210	87.0	·662	80·6	1·132	74·2	1.632	67·8	2·181	61·4	2.801	55.0	3·526	48.6
·217	86.9	·669	80·5	1·140	74·1	1.640	67·7	2·190	61·3	2.811	54.9	3·539	48.5
·224	86.8	·677	80·4	1·147	74·0	1.649	67·6	2·199	61·2	2.822	54.8	3·552	48.4
·231	86.7	·684	80·3	1·154	73·9	1.657	67·5	2·208	61·1	2.832	54.7	3·564	48.3
·238	86.6	·691	80·2	1·162	73·8	1.665	67·4	2·217	61·0	2.843	54.6	3·576	48.2
·245	86·5	·698	80·1	1·170	73·7	1.673	67·3	2·226	60·9	2.853	54·5	3.589	48·1
·252	86·4	·705	80·0	1·177	73·6	1.681	67·2	2·236	60·8	2.864	54·4	3.602	48·0
·259	86·3	·712	79·9	1·185	73·5	1.690	67·1	2·245	60·7	2.874	54·3	3.614	47·9
·266	86·2	·720	79·8	1·192	73·4	1.698	67·0	2·254	60·6	2.885	54·2	3.627	47·8
·273	86·1	·727	79·7	1·200	73·3	1.706	66·9	2·263	60·5	2.896	54·1	3.640	47·7
·280	86·0	734	79·6	1·208	73·2	1·714	66·8	2·272	60·4	2.906	54.0	3.652	47.6
·287	85·9	741	79·5	1·215	73·1	1·723	66·7	2·282	60·3	2.917	53.9	3.665	47.5
·294	85·8	748	79·4	1·223	73·0	1·731	66·6	2·291	60·2	2.928	53.8	3.678	47.4
·301	85·7	756	79·3	1·230	72·9	1·739	66·5	2·300	60·1	2.938	53.7	3.691	47.3
·308	85·6	763	79·2	1·238	72·8	1·748	66·4	2·309	60·0	2.949	53.6	3.704	47.2
·315	85·5	.770	79·1	1·246	72·7	1·756	66·3	2·319	59·9	2.960	53.5	3.717	47·1
·322	85·4	.778	79·0	1·254	72·6	1·764	66·2	2·328	59·8	2.971	53.4	3.730	47·0
·329	85·3	.785	78·9	1·261	72·5	1·772	66·1	2·337	59·7	2.982	53.3	3.743	46·9
·336	85·2	.792	78·8	1·269	72·4	1·781	66·0	2·347	59·6	2.992	53.2	3.756	46·8
·343	85·1	.799	78·7	1·276	72·3	1·789	65·9	2·356	59·5	3.003	53.1	3.769	46·7
*350 *357 *364 *371 *378	85.0 84.9 84.8 84.7 84.6	·806 ·814 ·821 ·828 ·836	78·6 78·5 78·4 78·3 78·2	1.284 1.292 1.300 1.308 1.315	72·2 72·1 72·0 71·8	1.798 1.806 1.814 1.823 1.831	65.8 65.7 65.6 65.5 65.4	2·366 2·375 2·384 2·394 2·403	59.4 59.3 59.2 59.1 59.0	3.014 3.025 3.036 3.047 3.058	53.0 52.9 52.8 52.7 52.6	3.783 3.796 3.809 3.822 3.836	46·6 46·5 46·4 46·3 46·2
*385 *392 *399 *406 *413	84·5 84·4 84·3 84·2 84·1	·842 ·850 ·858 ·865 ·872	78·1 78·0 77·9 77·8 77·7	1·323 1·331 1·338 1·346 1·354	71·7 71·6 71·4 71·3	1.840 1.848 1.857 1.865 1.874	65·3 65·2 65·1 65·0 64·9	2·413 2·422 2·432 2·442 2·451	58·9 58·8 58·7 58·6 58·5	3.069 3.081 3.092 3.103 3.114	52·5 52·4 52·3 52·2 52·1	3.849 3.863 3.876 3.890 3.904	46·1 46·0 45·9 45·8 45·7
.420	84.0	·880	77·6	1·362	71·2	1.882	64·8	2.461	58·4	3·125	52.0	3.917	45.6
.428	83.9	·887	77·5	1·370	71·1	1.891	64·7	2.470	58·3	3·136	51.9	3.931	45.5
.434	83.8	·894	77·4	1·378	71·0	1.899	64·6	2.480	58·2	3·148	51.8	3.945	45.4
.441	83.7	·902	77·3	1·385	70·9	1.908	64·5	2.490	58·1	3·159	51.7	3.958	45.3
.449	83.6	·909	77·2	1·393	70·8	1.916	64·4	2.500	58·0	3·170	51.6	3.972	45.2

AZIMUTH CORRESPONDING TO LATITUDE VARIATION IN DEPARTURE.

Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.	Lat. Var. in Dep.	Azim.
s. 3.972 3.986 4.000 4.014 4.028	45.2 45.1 45.0 44.9 44.8	s. 4.975 4.993 5.011 5.029 5.047	38.8 38.7 38.6 38.5 38.4	s. 6·303 6·327 6·352 6·376 6·401	32.4 32.3 32.3 32.0	s. 8·20 8·24 8·27 8·31 8·35	26.0 25.9 25.8 25.7 25.6	s. 11·30 11·36 11·42 11·49 11·55	19.5 19.4 19.3 19.2	s. 17·33 17·46 17·61 17·75 17·89	13.0 12.9 12.8 12.7 12.6	s. 35°1 35°7 36°2 36°8 37°4	6.5 6.4 6.3 6.2 6.1
4.042 4.056 4.070 4.084 4.099	44.7 44.6 44.5 44.4 44.3	5.065 5.083 5.101 5.120 5.138	38·3 38·2 38·1 38·0 37·9	6.426 6.451 6.476 6.502 6.527	31·9 31·8 31·7 31·6 31·5	8·39 8·42 8·46 8·50 8·54	25.5 25.4 25.3 25.2 25.1	11.62 11.68 11.75 11.82 11.89	19.0 18.9 18.8 18.7 18.6	18·04 18·19 18·35 18·50 18·66	12·5 12·4 12·3 12·2 12·1	38·1 38·7 39·4 40·1 40·8	6·0 5·9 5·8 5·7 5·6
4·113 4·128 4·142 4·157 4·172	44.2 44.1 44.0 43.9 43.8	5·157 5·175 5·194 5·213 5·232	37·8 37·7 37·6 37·5 37·4	6·553 6·579 6·605 6·631 6·657	31·4 31·3 31·2 31·1	8·58 8·62 8·66 8·70 8·74	25.0 24.9 24.8 24.7 24.6	11.95 12.02 12.09 12.17 12.24	18·5 18·4 18·3 18·2 18·1	18.82 18.98 19.15 19.31 19.49	12.0 11.9 11.8 11.7 11.6	41·5 42·3 43·1 43·9 44·8	5.5 5.4 5.3 5.2 5.1
4·186 4·200 4·216 4·230 4·244	43.7 43.6 43.5 43.4 43.3	5.251 5.270 5.289 5.308 5.328	37·3 37·2 37·1 37·0 36·9	6.684 6.710 6.737 6.764 6.791	30·9 30·8 30·7 30·6 30·5	8·78 8·82 8·86 8·90 8·94	24·5 24·4 24·3 24·2 24·1	12·31 12·38 12·46 12·53 12·61	18·0 17·9 17·8 17·7	19.66 19.84 20.02 20.20 20.39	11·5 11·4 11·3 11·2	45.7 46.7 47.6 48.6 49.7	5.0 4.9 4.8 4.7 4.6
4·260 4·275 4·289 4·304 4·320	43.2 43.1 43.0 42.9 42.8	5·347 5·366 5·386 5·406 5·426	36·8 36·7 36·6 36·5 36·4	6.818 6.845 6.873 6.901 6.929	30·4 30·3 30·1 30·0	8·98 9·03 9·07 9·11	24.0 23.9 23.8 23.7 23.6	12.69 12.76 12.84 12.92 13.00	17·5 17·4 17·3 17·2	20·58 20·77 20·97 21·17 21·37	10.0 10.8 10.6	50·8 52·0 53·2 54·5 55·8	4.5 4.4 4.3 4.2 4.1
4·336 4·350 4·364 4·380 4·396	42.7 42.6 42.5 42.4 42.3	5.445 5.465 5.485 5.506 5.526	36·3 36·2 36·1 36·0 35·9	6.956 6.984 7.013 7.041 7.070	29.9 29.8 29.7 29.6 29.5	9·20 9·24 9·29 9·33 9·38	23·5 23·4 23·3 23·2 23·1	13.08 13.17 13.25 13.33 13.42	17·0 16·9 16·8 16·7 16·6	21·58 21·79 22·01 22·23 22·46	10·5 10·4 10·3 10·1	57·2 58·7 60·2 61·9 63·6	4.0 3.9 3.8 3.7 3.6
4·412 4·427 4·442 4·458 4·474	42·2 42·1 42·0 41·9 41·8	5.546 5.567 5.587 5.608 5.628	35.8 35.7 35.6 35.5 35.4	7.099 7.128 7.157 7.186 7.216	29.4 29.3 29.1 29.0	9.42 9.47 9.52 9.56 9.61	23.0 22.9 22.8 22.7 22.6	13·50 13·59 13·68 13·77 13·86	16·5 16·4 16·3 16·1	22.68 22.92 23.16 23.40 23.65	10·0 9·9 9·8 9·7 9·6	65.4 67.3 69.4 71.5 73.9	3·5 3·4 3·3 3·2 3·1
4.489 4.505 4.521 4.537 4.553	41.7 41.6 41.4 41.3	5.649 5.670 5.691 5.713 5.734	35·3 35·2 35·1 35·0 34·9	7·246 7·276 7·306 7·336 7·367	28·9 28·8 28·7 28·6 28·5	9.66 9.70 9.75 9.80 9.85	22·5 22·4 22·3 22·2 22·1	13·95 14·04 14·14 14·23 14·33	16·0 15·9 15·8 15·7 15·6	23·90 24·16 24·43 24·70 24·97	9·5 9·4 9·3 9·2 9 I	76·3 79·0 81·8 84·8 88·1	3.0 2.9 2.8 2.7 2.6
4.569 4.585 4.602 4.618 4.634	41·2 41·1 41·0 40·9 40·8	5.755 5.777 5.798 5.820 5.842	34.8 34.7 34.6 34.5 34.4	7·398 7·429 7·460 7·491 7·523	28·4 28·3 28·2 28·1 28·0	9.90 9.95 10.00 10.05	22.0 21.9 21.8 21.7 21.6	14·42 14·52 14·62 14·72 14·82	15·5 15·4 15·3 15·2 15·1	25.25 25.54 25.84 26.14 26.45	9.0 8.9 8.8 8.7 8.6	91·6 95·4 99·6 104 109	2·5 2·4 2·3 2·2 2·1
4.650 4.667 4.683 4.700 4.717	40.7 40.6 40.5 40.4 40.3	5.864 5.886 5.908 5.930 5.953	34·3 34·2 34·1 34·0 33·9	7.555 7.587 7.619 7.651 7.684	27·9 27·8 27·7 27·6 27·5	10·15 10·21 10·26 10·31 10·37	21·5 21·4 21·3 21·2 21·1	14·93 15·03 15·14 15·25 15·36	15.0 14.9 14.8 14.7 14.6	26·76 27·09 27·42 27·76 28·10	8·5 8·4 8·3 8·2 8·1	114 121 127 135 143	2·0 1·9 1·8 1·7 1·6
4·733 4·750 4·767 4·784 4·801	40·2 40·1 40·0 39·9 39·8	5.975 5.998 6.020 6.043 6.066	33·8 33·7 33·6 33·5 33·4	7·717 7·750 7·783 7·817 7·850	27·4 27·3 27·2 27·1 27·0	10.42 10.47 10.53 10.59 10.64	21.0 20.9 20.8 20.7 20.6	15.47 15.58 15.69 15.81 15.92	14·5 14·4 14·3 14·2 14·1	28·46 28·83 29·20 29·58 29·98	8·0 7·9 7·8 7·7 7·6	153 164 176 191 208	1·5 1·4 1·3 1·2
4·818 4·835 4·852 4·870 4·887	39.7 39.6 39.5 39.4 39.3	6.090 6.113 6.136 6.160 6.183	33·3 33·2 33·1 33·0 32·9	7·884 7·919 7·953 7·988 8·023	26·9 26·8 26·7 26·6 26·5	10.70 10.76 10.81 10.87 10.93	20·5 20·4 20·3 20·2 20·1	16.04 16.16 16.28 16.41 16.53	14.0 13.9 13.8 13.7 13.6	30·38 30·80 31·22 31·66 32·11	7·5 7·4 7·3 7·2 7·1	229 255 286 327 382	1.0 0.9 0.8 0.7 0.6
4·904 4·922 4·940 4·958 4·975	39·2 39·1 39·0 38·9 38·8	6·207 6·231 6·255 6·279 6·303	32·8 32·7 32·6 32·5 32·4	8.058 8.093 8.129 8.165 8.201	26·4 26·3 26·2 26·1 26·0	10·99 11·05 11·11 11·17 11·23	20·0 19·9 19·8 19·7 19·6	16·66 16·79 16·92 17·05 17·19	13·5 13·4 13·3 13·2 13·1	32·58 33·05 33·54 34·05 34·57	7.0 6.9 6.8 6.7 6.6	458 573 764 1146 2292	0.5 0.4 0.3 0.2 0.1

TABLE VI.

POSITION LINES CORRESPONDING TO LATITUDE VARIATION FOR USE WITH THE PLANE SCALE CHART.

When the Latitude Variation is + name the Position Line contrary Name to Latitude. When - same Name as Latitude.

Lat. Var. in Dep.	Posn. Line.	Lat. Var. in Dep.	Posn. Line.	Lat. Var. in Dep.	Posn. Line.	Lat. Var. in Dep.	Posn. Line.	Lat. Var. in Dep.	Posn. Line.	Lat. Var. in Dep.	Posn. Line.	Lat. Var. in Dep.	Posn. Line.
s. •00 •01 •03 •04 •06	0.0 0.2 0.4 0.6 0.8	s. •91 •92 •94 •95	12.8 13.0 13.2 13.4 13.6	s. 1·92 1·93 1·95 1·97	25.6 25.8 26.0 26.2 26.4	s. 3·17 3·19 3·22 3·24 3·26	38.4 38.6 38.8 39.0 39.2	s. 4.97 5.01 5.05 5.08 5.12	51·2 51·4 51·6 51·8 52·0	s. 8·20 8·27 8·35 8·42 8·50	64·0 64·2 64·4 64·6 64·8	s. 17·3 17·6 17·9 18·2 18·5	77.0 77.2 77.4 77.6 77.8
·07	1.0	·98	13·8	2·00	26.6	3·39	39·4	5·16	52·2	8·58	65·0	18·8	78·0
·08	1.2	1·00	14·0	2·02	26.8	3·31	39·6	5·19	52·4	8·66	65·2	19·1	78·2
·10	1.4	1·01	14·2	2·04	27.0	3·36	39·8	5·23	52·6	8·74	65·4	19·5	78·4
·11	1.6	1·03	14·4	2·06	27.2	3·36	40·0	5·27	52·8	8·82	65·6	19·8	78·6
·13	1.8	1·04	14·6	2·07	27.4	3·38	40·2	5·31	53·0	8·90	65·8	20·2	78·8
·14	2·0	1.06	14·8	2·09	27.6	3·40	40.4	5.35	53·2	8·98	66·0	20·6	79.0
·15	2·2	1.08	15·0	2·11	27.8	3·43	40.6	5.39	53·4	9·07	66·2	21·0	79.2
·17	2·4	1.09	15·2	2·13	28.0	3·45	40.8	5.43	53·6	9·16	66·4	21·4	79.4
·18	2·6	1.11	15·4	2·14	28.2	3·48	41.0	5.46	53·8	9·24	66·6	21·8	79.6
·20	2·8	1.12	15·6	2·16	28.4	3·50	41.2	5.51	54·0	9·33	66·8	22·2	79.8
·21	3.0	1·14	15·8	2·18	28·6	3·53	41.4	5.21	54·2	9.42	67·0	22·7	80·0
·22	3.2	1·15	16·0	2·20	28·8	3·55	41.6	5.21	54·4	9.52	67·2	23·2	80·2
·24	3.4	1·17	16·2	2·22	29·0	3·58	41.8	5.63	54·6	9.61	67·4	23·6	80·4
·25	3.6	1·18	16·4	2·24	29·2	3·60	42.0	5.67	54·8	9.70	67·6	24·2	80·6
·27	3.8	1·20	16·6	2·25	29·4	3·63	42.2	5.71	55·0	9.80	67·8	24·7	80·8
·28 ·29 ·31 ·32 ·34	4.0 4.2 4.4 4.6 4.8	1·21 1·23 1·25 1·26 1·28	16·8 17·0 17·2 17·4 17·6	2·27 2·29 2·31 2·33 2·35	29.6 29.8 30.0 30.2 30.4	3.65 3.68 3.70 3.73 3.76	42.4 42.6 42.8 43.0 43.2	5.75 5.80 5.84 5.89 5.93	55·2 55·4 55·6 55·8 56·0	9.90 10.00 10.10 10.31	68·0 68·2 68·4 68·6 68·8	25·2 25·8 26·4 27·1 27·8	81.0 81.2 81.4 81.6 81.8
*35	5.0	1·29	17·8	2·37	30.6	3.78	43.4	5.97	56·2	10·42	69.0	28·5	82·0
*36	5.2	1·31	18·0	2·38	30.8	3.81	43.6	6.02	56·4	10·53	69.2	29·2	82·2
*38	5.4	1·32	18·2	2·40	31.0	3.84	43.8	6.07	56·6	10·64	69.4	30·0	82·4
*39	5.6	1·34	18·4	2·42	31.2	3.86	44.0	6.11	56·8	10·76	69.6	30·8	82·6
*41	5.8	1·35	18·6	2·44	31.4	3.89	44.2	6.16	57·0	10·87	69.8	31·7	82·8
*42 *43 *45 *46 *48	6·0 6·2 6·4 6·6 6·8	1·37 1·38 1·40 1·41 1·42	18·8 19·0 19·2 19·4	2·46 2·48 2·50 2·52 2·54	31.6 31.8 32.0 32.2 32.4	3.92 3.94 3.97 4.00 4.03	44.4 44.6 44.8 45.0 45.2	6·21 6·25 6·30 6·35 6·40	57·2 57·4 57·6 57·8 58·0	10·99 11·11 11·23 11·36 11·49	70·0 70·2 70·4 70·6 70·8	32.6 33.5 34.6 35.7 36.8	83.0 83.2 83.4 83.6 83.8
*49	7·0	1.44	19·8	2.56	32.6	4.06	45.4	6.45	58·2	11.62	71·0	38·1	84.0
*50	7·2	1.46	20·0	2.58	32.8	4.08	45.6	6.50	58·4	11.75	71·2	39·4	84.2
*52	7·4	1.47	20·2	2.60	33.0	4.11	45.8	6.55	58·6	11.89	71·4	40·8	84.4
*53	7·6	1.49	20·4	2.62	33.2	4.14	46.0	6.60	58·8	12.02	71·6	42·3	84.6
*55	7·8	1.50	20·6	2.64	33.4	4.17	46.2	6.66	59·0	12.17	71·8	43·9	84.8
•56 •58 •59 •60 •62	8·0 8·2 8·4 8·6 8·8	1·52 1·54 1·55 1·57 1·58	20·8 21·0 21·2 21·4 21·6	2.66 2.68 2.70 2.72 2.74	33.6 33.8 34.0 34.2 34.4	4·20 4·23 4·26 4·29 4·32	46·4 46·6 46·8 47·0 47·2	6.71 6.76 6.82 6.87 6.93	59.4 59.6 59.8 60.0	12·31 12·46 12·61 12·76 12·92	72·0 72·2 72·4 72·6 72·8	45.7 47.6 49.7 52.0 54.5	85.0 85.2 85.4 85.6 85.8
•63	9.0	1.60	21·8	2.76	34.6	4·35	47.4	6·98	60·2	13.08	73°0	57·2	86·0
•65	9.2	1.62	22·0	2.78	34.8	4·38	47.6	7·04	60·4	13.25	73°2	60·2	86·2
•66	9.4	1.63	22·2	2.80	35.0	4·41	47.8	7·10	60·6	13.42	73°4	63·6	86·4
•68	9.6	1.65	22·4	2.82	35.2	4·44	48.0	7·16	60·8	13.59	73°6	67·3	86·6
•69	9.8	1.66	22·6	2.84	35.4	4·47	48.2	7·22	61·0	13.77	73°8	71·5	86·8
•70 •72 •73 •75 •76	10.0 10.2 10.4 10.6	1.68 1.70 1.71 1.73 1.75	22·8 23·0 23·2 23·4 23·6	2.86 2.88 2.91 2.93 2.95	35.6 35.8 36.0 36.2 36.4	4·50 4·54 4·57 4·60 4·63	48.4 48.6 48.8 49.0 49.2	7·28 7·34 7·40 7·46 7·52	61·2 61·4 61·6 61·8 62·0	13.95 14.14 14.33 14.52 14.72	74.0 74.2 74.4 74.6 74.8	76·3 81·8 88·1 95·4 104	87.0 87.2 87.4 87.6 87.8
•78 •79 •81 •82 •84	11.0 11.2 11.4 11.6 11.8	1.76 1.78 1.80 1.81 1.83	23·8 24·0 24·2 24·4 24·6	2·97 2·99 3·01 3·04 3·06	36.6 36.8 37.0 37.2 37.4	4.67 4.70 4.73 4.77 4.80	49.4 49.6 49.8 50.0 50.2	7·59 7·65 7·72 7·78 7·85	62·2 62·4 62·6 62·8 63·0	14·93 15·14 15·36 15·58	75.0 75.2 75.4 75.6 75.8	114 127 143 163 190	88·0 88·2 88·4 88·6 88·8
·85	12·0	1.85	24·8	3.08	37.6	4·83	50·4	7·92	63·2	16·04	76·0	229	89.0
·86	12·2	1.86	25·0	3.10	37.8	4·87	50·6	7·99	63·4	16·28	76·2	286	89.2
·88	12·4	1.88	25·2	3.12	38.0	4·90	50·8	8·06	63·6	16·53	76·4	382	89.4
·89	12·6	1.90	25·4	3.15	38.2	4·94	51·0	8·13	63·8	16·79	76·6	573	89.6
·91	12·8	1.92	25·6	3.17	38.4	4·97	51·2	8·20	64·0	17·05	76·8	1146	89.8

It must be borne in mind that Table VI. does not give the true geographical lines of position, but lines of position which will give the same result as to latitude and longitude on a plane chart as the true lines of position would give on a Mercator chart.

This table has been published on account of the difficulty often experienced in getting a suitable scale Mercator chart for plotting Sumner positions, as the ocean charts are usually on too small a scale, and, moreover, it saves the trouble of getting out an ordinary chart.

Plane Sumner charts can naturally be published at a much cheaper price, as one chart does for all the states of these cases at the control of the cont

latitudes; or the position may be plotted on paper with squared lines ruled on it. If neither of these are at hand, the Sumner position may be plotted in the work book by drawing a horizontal line representing the D.R. latitude at time of second observation, and a line at right angles to this as a meridian of longitude, which may be used for laying off the position-lines by a protractor.

On the horizontal line set off the points of two longitudes at a distance from one another of say I min. to 10' of longitude. From these two points lay off the Sumner lines, and from the point where they intersect draw a perpendicular to the parallel of D.R. latitude; the longitude at the point struck by the perpendicular is the longitude required, and can be measured from either of the points of longitude.

With our movidion latitudes the position lines movel of course the cot off from the movidion latitudes the position lines movel of course the cot off from the movidion latitudes the position latitudes the position lines movel of course the cot off from the movidion latitudes the position lines movel of course the cot off from the movidion latitudes the position lines are the cot of the points of the position lines are the cot of the points of the points

With ex-meridian latitudes the position-lines would of course be set off from the meridian, from the

starting-points of the latitudes by the observations.

Special Caution.—When double altitudes are taken with a run interval between the sights the traverse table should be employed to bring both observations up to the same instant of time, as the true course plotted on the plane chart would not give a correct result. If the course is plotted it must be altered in the same way as shown below for the position-lines. A small 6-inch boxwood protractor rule with a diagonal scale of inches for measuring to $\frac{1}{100}$ part of an inch may be bought for about 1s., and is the only instrument which will be required. which will be required.

The examples on accompanying chartlet below will show how a plane chart may be used, and illustrates clearly how both the Mercator and plane charts may be made to give the same final position from position.

line plottings.

The upper longitude scale with the meridian scale represents a Mercator chart in latitude 60° N., where I' of latitude would equal 2' of longitude, and the lower longitude scale represents with the same meridian scale of latitude a plane Sumner chart, where the scales of latitude and longitude are equal, as on the Equator.

Two positions are plotted, one from a parallel of latitude starting from latitude 59° 55′ N. and longitudes 10° 0′ W. and 10° 20′ W. with true position-lines N. 26° W. and N. 26° E., and the other from a meridian starting from longitude 10° 0′ W. and latitudes 59° 55′ N. and 60° 5′ N. with true position-lines N. 45° E.

and S. 45° E.

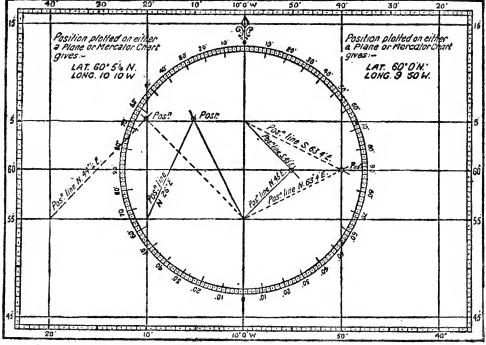
and S. 45° E.

First observation star's bearing N. 64° E., position-line N. 26° W., in latitude 60° gives (p. 264, Table IV.) lat. var. 3³·90, which gives (p. 270, Table VI.), position-line for plane chart N. 44½° W., and for the second position-line in same way N. 44½° E.

For second position star's bearing N. 45° W. and S. 45° W. gives (p. 265) lat. var. 8³·00, which gives (p. 270) position-lines for plane chart N. 63°·4 E. and S. 63°·4 E.

Upper longitudes represent scale on a Mercator Chart. Position-lines on Mercator Chart represented by continuous lines.

10 10°0 W 30



Lower longitudes represent scale on a Plane Chart. Position-lines on Plane Chart represented by dotted lines.

Note.—Without the aid of this table the Sumner position from simultaneous observations of two stars. or from two sun observations (if the course and true interval is applied from the traverse table), will always give the same latitude when taken from a plane as from a Mercator chart, and the correct longitude will be found by converting the departure into d. long.

In the example above in latitude 60°, 10′ dep. gives 20′ d. long.

272 TABLE VII.—HOUR-ANGLE LIMITS FOR EX-MERIDIAN TABLE VIII.

THE TABLE SHOWS THE LIMITS WITHIN WHICH THE REDUCTION AT 1 MIN., AS GIVEN IN TABLE VIII., WHEN MULTIPLIED BY THE NUMBER OF MINUTES IN TABLE BELOW, WILL NOT GIVE A GREATER ERROR IN REDUCTION THAN $0\frac{1}{2}$.

		\mathbf{L}^{p}	TIT	UDE	AN	D DI	ECLI:	NAT	ION	OF	SAM	E NA	AME.			
Lat.						D	ECLI	NAT	ION.							
Lat.	0°	2°	4°	6°	8°	10°	15°	20°	25°	30°	35°	40°	45°	50°	60°	70°
٥	M.	М.	М.	м.	М.	М.	M.	M.	М.	м.	М.	M.	M.	M.	M.	M.
0		14 n	28 n	36 g	36 g	40 g	42 g	44 g	46 g	48 g	50 g	52 g	55 g	58 g	63 g	71
1 2	7 n 14 n	7 n	20 n	33 g 25 g	35 g 28 g	35 g 33 g	39 g 36 g	42 g 40 g	45 g 44 g	47 g 46 g	50 g 49 g	51 g 50 g	54 g 53 g	57 g 56 g	63 g 62 g	7I 70
	20 n	7 n	7 n	20 n	23 g	28 g	34 g	38 g	42 g	45 g	48 g	49 g	52 g	56 g	62 g	69
3	271	14 n	••	14 n	23 g	26 g	32 g	35 g	40 g	44 g	47 g	48 g	52 g	56 g	62 g	68
6	301	251	14 n		14 n	21 g	28 g	33 g	37 g	40 g	44 g	46 g	50 g	54 g	60 g	67
8	311	261	201	131		14 g	23 g	30 g	34 g	39 g	4I g	44 g	48 g	52 g	58 g	66
10 12	33 l	271	22 l 26 l	20 l	13 l	-::	19 g	26 g	31 g	36 g	37 g	44 g	46 g	50 g	56 g	65
15	33 l 34 l	29 l 32 l	281	23 l 26 l	241	14 l 20 l	15 g	24 g 18 g	28 g 25 g	34 g 30 g	37 g 35 g	41 g	44 g 42 g	46 g 45 g	56 g 55 g	63 62
20	351	341	321	291	281	261	181		16 g	25 g	30 g	34 g	38 g	42 g	52 g	60
25	371	36 l	351	33 l	321	30 Î	241	181	108	16 g	24 g	30 g	35 g	4 2 5 40 g	32 g	57
30	401	381	371	361	341	32 l	28 l	231	171		17 g	24 g	30 g	36 g	45 g	56
35	421	41 l	40 l	381	37 l	35 l	311	28 l	24 l	16 l	٠.,	17g	25 g	30 g	42 g	54
40	441	431	41 l	401	40 l	39 l	371	321	281	24 l	16 l	•••	16 g	26 g	39 g	53
45	461	451	441	421	421	41 l	401	381	321	281	241	181		17 g	32 g	51
50	481	481	461	441	441	43 l	421	41 l	371	321	281	251	20 l		28 g	46
55 60	50 l 52 l	49 l 51 l	481 511	461 481	461 481	45 l 47 l	45 l 47 l	44 l 47 l	42 l 44 l	381 411	33 l 38 l	301	251	191 281	20 g	42
70		581	581	581	581	571	561	551	541	521		351 481	32 l 46 l		22]	35
70	571	581	581	581	581	571	561	551	541	521	491	481	461	42 l	33 l	

IN	FEF	RIOF	T]	RAN	SIT.						
	DE	CLI	NAT	NOI							
	Lat.	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
Note. g Signifies that true reduction is greater than tabular reduction l Signifies that true reduction is less than tabular reduction r Signifies that there will be no error in the reduction within the limits given greater than of.	25 30 35 40 45 50 55 60 70	M	M	M	M 70 l 70 l 69 l	M 74 l 70 l 74 l 72 l	M. 861 801 801 801 741	M. 120 l 100 l 90 l 82 l 80 l	M. 110 g 140 g 140 l 104 l 90 l 86 l 83 l	M. 94 g 100 g 118 g 138 g 156 l 112 l 100 l 89 l	M. 87 g 93 g 92 g 100 g 104 g 140 g 210 g 126 l

	1	LATI	TUD	E Al	ND]	DECI	JINA	TION	OF	CO	NTR	ARY	NA	ME.		
Lat.						D	ECL	INAT	YON.	•						
Lat.	0°	2°	4°	6°	8°	10°	15°	20°	25°	30°	35°	40°	45°	50°	60°	70°
î 2 3 4	M. 7 n 14 n 20 n 27 l 30 l	M. 20 n 26 n 34 l 36 l 37 l	M. 34 g 40 g 45 l 47 l 39 l	M. 45 g 51 g 62 n 561 451	M. 43 g 50 g 62 g 82 n 58 l	M. 42 g 44 g 55 g 66 g 70 l	M. 43 g 45 g 50 g 56 g 74 g	M. 45 g 46 g 50 g 55 g 60 g	M. 47 g 48 g 51 g 56 g 60 g	M. 49 g 50 g 54 g 57 g 57 g	M. 52 g 54 g 54 g 58 g 57 g	M. 53 g 55 g 56 g 58 g 58 g	M. 56 g 56 g 58 g 58 g 60 g	M. 58 g 58 g 60 g 61 g 62 g	M. 63 g 63 g 63 g 64 g 67 g	M. 71 g 71 g 70 g 70 g
8 10 12 15 20	311 331 331 341 351	361 361 361 361 381	401 401 401 401 401	451 421 431 401 421	521 481 461 451 451	591 521 501 481 461	1101 721 631 551 501	70 g 110 g 90 l 68 l 56 l	66 g 74 g 90 g 92 l 68 l	66 g 71 g 79 g 102 g 69 l	66 g 68 g 74 g 80 g 130 n	62 g 66 g 72 g 77 g 106 g	63 g 67 g 70 g 76 g 82 g	64 g 67 g 70 g 72 g 80 g	68 g 70 g 70 g 70 g 70 g 79 g	72 g 73 g 74 g
25 30 35 40 45	371 401 421 441 461	401 421 441 451 481	421 441 451 471 481	451 451 461 481 501	461 461 481 491 501	481 491 501 511 521	501 511 521 531 541	551 561 571 581 581	641 621 601 601 601	701 661 661 641 631	811 781 701 701 681	861 861 751 701	120 n 109 l 90 l 80 l	96g 146g 1151	89 g 	••
50 55 60 70	481 501 521 571	49 l 50 l 54 l 61 l	501 511 551 611	51 l 53 l 55 l 60 l	521 541 561 581	531 541 561 621	551 561 571 631	581 581 581	601 601 601	63 l 63 l 	671 		•••		••	•••

							AZII	MUT	HS.							
Lat.	1°	1°·5	2°.0	2°-4	2°.8	3°·0	3°-2	3°·4	3°·6	3°.8	4°-0	4°·2	4°-4	4°·6	4°·8	5°.0
	R	EDU	CTIO	N T	TT C	IE N	1ERI	DIA	N A.	ГНО	OUR-	ANG	LE (OF 1	MI	N.
0	·131	·196	·262	·314	·367	·393	·419	·445	·471	·498	·524	·550	·576	·602	·629	·655
4	·131	·196	·261	·313	·366	·392	·418	·444	·470	·496	·522	·549	·575	·601	·627	·653
8	·130	·194	·259	·311	·363	·388	·415	·441	·467	·493	·519	·545	·571	·597	·622	·649
10	·129	·193	·258	·309	·361	·387	·413	·438	·464	·490	·516	·542	·567	·593	·619	·645
12	·128	·192	·256	·307	·359	·384	·410	·435	·461	·487	·512	·538	·464	·589	·615	·641
14	·127	·190	·254	·305	·356	·381	·406	·432	·457	·483	•508	·534	·559	·585	·610	·636
16	·126	·189	·252	·302	·352	·378	·403	·428	·453	·478	•504	·529	·554	·579	·604	·630
18	·125	·187	·249	·299	·349	·374	·398	·423	·448	·473	•498	·523	·548	·573	·598	·623
19	·124	·186	·247	·297	·347	·371	·396	·421	·446	·470	•495	·520	·545	·570	·594	·620
20	·123	·184	·246	·295	·344	·369	·394	·418	·443	·468	•492	·517	·541	·566	·591	·616
21	·122	·183	·244	·293	·342	·367	·391	·416	.440	·465	·489	·513	·538	· 562	·587	·612
22	·121	·182	·243	·291	·340	·364	·388	·413	.437	·461	·486	·510	·534	· 559	·583	·607
23	·120	·181	·241	·289	·337	·362	·386	·410	.434	·458	·482	·506	·530	· 555	·579	·602
24	·120	·179	·239	·287	·335	·359	·383	·407	.431	·455	·479	·502	·526	· 550	·574	·598
25	·119	·178	·237	·285	·332	·356	·380	·403	.427	·451	·475	·498	·522	· 546	·570	·593
26	·118	·176	· 235	· 282	·330	·353	·377	·400	·424	·447	·471	·494	·518	·541	·565	·588
27	·117	·175	· 233	· 280	·327	·350	·373	·397	·420	·443	·467	·490	·513	·537	·560	·583
28	·116	·173	· 231	· 277	·324	·347	·370	·393	·416	·439	·462	·486	·509	·532	·555	·578
29	·114	·172	· 229	· 274	·321	·343	·366	·389	·412	·435	·458	·481	·504	·527	·550	·573
30	·113	·170	· 227	· 272	·317	·340	·363	·386	·408	·431	·454	·476	·499	·522	·544	·567
31	·112	·168	·224	·269	·314	·337	·359	·382	·404	·427	·449	·471	·494	·516	·539	·561
32	·111	·166	·222	·266	·311	·333	·355	·378	·400	·422	·444	·466	·488	·511	·533	·555
33	·110	·165	·220	·263	·307	·329	·351	·373	·395	·417	·439	·461	·483	·505	·527	·549
34	·108	·163	·217	·260	·304	·326	·347	·369	·391	·412	·434	·456	·478	·499	·521	·543
35	·107	·161	·214	·257	·300	·322	·343	·365	·386	·408	·429	·450	·472	·493	·515	·536
36	·106	·159	·212	·254	·297	·318	·339	·360	·381	·403	·424	·445	·466	·487	·508	·530
37	·104	·157	·209	·251	·293	·314	·335	·356	·376	·397	·418	·439	·460	·480	·502	·523
38	·103	·155	·206	·247	·289	·310	·330	·351	·371	·392	·413	·433	·454	·475	·495	·516
39	·102	·152	·203	·244	·285	·305	·326	·346	·366	·387	·407	·427	·448	·468	·488	·509
40	·100	·150	·200	·241	·281	·301	·321	·341	·361	·381	·401	·421	·441	·461	·482	·502
41	·099	·148	·198	·237	·277	·296	·316	·337	·356	·376	·395	·415	·435	·455	*474	*494
42	·097	·146	·195	·233	·272	·292	·311	·331	·350	·370	·389	·409	·428	·448	*467	*487
43	·096	·143	·191	·230	·268	·287	·306	·326	·345	·364	·383	·402	·421	·441	*460	*479
44	·094	·141	·188	·226	·264	·283	·301	·320	·339	·358	·377	·396	·414	·433	*452	*471
45	·092	·139	·185	·222	·259	·278	·296	·315	·333	·352	·370	·389	·407	·426	*444	*463
46 47 48 49 50	.091 .089 .088 .086	·136 ·134 ·131 ·129 ·126	·182 ·179 ·175 ·172 ·168	·218 ·214 ·210 ·206 ·202	·255 ·250 ·245 ·240 ·236	·273 ·268 ·263 ·258 ·252	·291 ·286 ·280 ·275 ·269	·309 ·304 ·298 ·292 ·286	·327 ·321 ·315 ·309 ·303	·346 ·339 ·333 ·326 ·320	·364 ·357 ·351 ·344 ·337	·382 ·375 ·368 ·361 ·353	1400 1393 1386 1378 1370	·418 ·411 ·403 ·395 ·387	.437 .429 .421 .412 .404	.455 .447 .438 .430 .421
51 52 53 54 55	·082 ·081 ·079 ·077 ·075	·123 ·121 ·118 ·115 ·113	·165 ·161 ·158 ·154 ·150	·198 ·193 ·189 ·185 ·180	·231 ·226 ·221 ·215 ·210	·247 ·242 ·236 ·231 ·225	·264 ·258 ·252 ·246 ·240	·280 ·274 ·268 ·262 ·255	· 297 · 290 · 284 · 277 · 270	·313 ·306 ·299 ·292 ·285	.330 .322 .315 .308	·346 ·339 ·331 ·323 ·315	·363 ·355 ·347 ·339 ·330	·379 ·371 ·362 ·354 ·346	·396 ·387 ·378 ·370 ·360	·412 ·403 ·394 ·385 ·376
56	·073	·110	·146	· 176	· 205	·220	·234	·249	· 264	·278	·293	·307	·322	·337	·351	·366
57	·071	·107	·143	· 171	· 200	·214	·228	·242	· 257	·271	·285	·300	·314	·328	·342	·357
58	·069	·104	·139	· 166	· 194	·208	·222	·236	· 250	·264	·278	·292	·305	·319	·333	·347
59	·067	·101	·135	· 162	· 189	·202	·216	·229	· 243	·256	·270	·283	·297	·310	·324	·337
60	·065	·098	·131	· 157	· 183	·196	·210	·223	· 236	·249	·262	·275	·288	·301	·314	·327
61	· 063	·095	·127	·152	·178	·190	·203	·216	·228		·254	· 267	·279	·292	·305	·318
62	· 061	·092	·123	·147	·172	·184	·197	·209	·221		·246	· 258	·270	·283	·295	·307
63	· 059	·089	·119	·142	·166	·178	·190	·202	·214		·238	· 250	·262	·274	·285	·297
64	· 057	·086	·115	·138	·161	·172	·184	·195	·207		·230	· 241	·253	·264	·276	·287
65	· 055	·083	·111	·133	·155	·166	·177	·188	·199		·221	· 232	·243	·255	·266	·277
66 67 68 69 7 0	·053 ·051 ·049 ·047 ·045	·074 ·070	·106 ·102 ·098 ·094 ·090	·128 ·123 ·118 ·113 ·107		·160 ·154 ·147 ·141 ·134	·170 ·164 ·157 ·150 ·143	· 181 · 174 · 167 · 160 · 152	·192 ·184 ·177 ·169 ·161	·186		·224 ·215 ·206 ·197 ·188	·234 ·225 ·216 ·206 ·197	.216		· 266 · 256 · 245 · 235 · 224

							AZ	ZIMU	THS							-
Lat.	5°·2	5°·4	5°-6	5°-8	6°-0	6°-2	6°-4	6°·6	6°-8	7°·0	7°-2	7°·4	7°·8	7°∙8	8°·0	8°·2
	1	REDU	JCTI	ON '	TO 7	THE	MEI	RIDL	AN A	AT I	IOUI	R-AN	GLE	OF	r MI	N.
0 4 8 10 12	·681 ·680 ·675 ·671 ·666	.707 .705 .700 .696 .692	·734 ·732 ·727 ·723 ·717	· 760 · 758 · 753 · 749 · 744	· 786 · 784 · 778 · 774 · 769	·812 ·810 ·804 ·800 ·794	·839 ·837 ·830 ·825 ·820	· 865 · 863 · 857 · 852 · 846	·891 ·889 ·882 ·877 ·872	·917 ·915 ·908 ·903 ·897	.944 .942 .935 .930 .923	•970 •968 •961 •955 •949	·996 ·994 ·986 ·981 ·974	1.023 1.021 1.013 1.008 1.000	1.049 1.046 1.039 1.033 1.026	1.075 1.072 1.065 1.059 1.052
14 16 18 19 20	·661 ·655 ·648 ·644 ·640	·686 ·680 ·673 ·669 ·665	·711 ·705 ·697 ·693 ·689	·738 ·730 ·722 ·718 ·714	·763 ·756 ·748 ·744 ·739	·788 ·781 ·772 ·768 ·763	·813 ·806 ·797 ·793 ·788	·839 ·832 ·823 ·818 ·813	·865 ·857 ·847 ·843 ·837	·890 ·882 ·872 ·868 ·862	·916 ·908 ·897 ·892 ·886	.941 .932 .923 .917	·967 ·958 ·948 ·942 ·936	•993 •982 •972 •966 •960	1.018 1.009 .998 .991 .985	1.043 1.034 1.023 1.017 1.010
21 22 23 24 25	·636 ·631 ·627 ·622 ·617	·661 ·656 ·651 ·646 ·641	·685 ·680 ·675 ·670 ·665	·709 ·704 ·699 ·694 ·689	.734 .729 .724 .719 .712	·758 ·753 ·748 ·742 ·736	·783 ·778 ·772 ·766 ·760	·808 ·802 ·797 ·790 ·783	·832 ·826 ·820 ·814 ·808	·857 ·851 ·845 ·838 ·832	·881 ·875 ·868 ·862 ·855	·906 ·899 ·893 ·886 ·879	.930 .924 .917 .910 .903	.954 .948 .941 .934 .926	.979 .972 .965 .958	1.004 .997 .990 .982 .975
26 27 28 29 30	·612 ·607 ·601 ·596 ·590	·636 ·630 ·624 ·618 ·612	·659 ·653 ·648 ·641 ·635	·683 ·677 ·671 ·665 ·658	·706 ·700 ·694 ·687 ·680	·730 ·724 ·717 ·710 ·703	·754 ·748 ·741 ·734 ·726	·777 ·770 ·763 ·756 ·749	·801 ·794 ·787 ·779 ·772	·825 ·818 ·810 ·802 ·794	·848 ·841 ·833 ·825 ·817	·872 ·864 ·856 ·848 ·840	·896 ·888 ·880 ·872 ·862	·919 ·911 ·903 ·894 ·885	.943 .935 .926 .918	·967 ·958 ·950 ·941 ·932
31 32 33 34 35	·584 ·578 ·571 ·565 ·558	·606 ·600 ·593 ·586 ·579	·629 ·622 ·615 ·608 ·601	·651 ·644 ·637 ·630 ·622	·674 ·666 ·659 ·652 ·644	·696 ·689 ·681 ·674 ·666	·718 ·711 ·703 ·695 ·687	·741 ·733 ·725 ·717 ·708	·764 ·756 ·747 ·739 ·730	·786 ·778 ·769 ·760 ·751	·809 ·800 ·791 ·782 ·773	·831 ·823 ·814 ·804 ·795	·854 ·845 ·835 ·826 ·816	·876 ·867 ·857 ·848 ·838	·899 ·890 ·879 ·869 ·859	*922 *911 *901 *891 *880
36 37 38 39 40	·551 ·544 ·537 ·529 ·522	572 •565 •558 •550 •542	.594 .586 .578 .570 .562	·615 ·607 ·599 ·591 ·582	·636 ·628 ·620 ·611 ·603	·657 ·649 ·640 ·631 ·622	·678 ·670 ·661 ·652 ·643	·700 ·691 ·682 ·672 ·663	·721 ·712 ·702 ·693 ·683	.742 .733 .723 .713 .703	· 763 · 754 · 744 · 734 · 723	· 785 · 775 · 764 · 754 · 743	·806 ·796 ·785 ·774 ·763	·827 ·817 ·806 ·795 ·783	·848 ·838 ·827 ·815 ·804	·870 ·859 ·847 ·836 ·824
41 42 43 44 45	·514 ·506 ·498 ·490 ·482	*533 *525 *517 *509 *500	*554 *545 *537 *528 *519	*573 •564 •556 •547 •537	*594 *585 *575 *565 *556	·613 ·604 ·594 ·585 ·575	·632 ·623 ·613 ·603 ·593	·653 ·643 ·633 ·623 ·611	·673 ·662 ·652 ·641 ·630	.693 .682 .671 .660	.712 .702 .690 .679	·732 ·721 ·709 ·698 ·686	.752 .741 .729 .717 .704	·772 ·760 ·748 ·736 ·723	·792 ·780 ·768 ·754 ·741	·812 ·799 ·787 ·774 ·761
46 47 48 49 50	·473 ·465 ·456 ·447 ·438	·491 ·482 ·473 ·464 ·455	·510 ·500 ·490 ·481 ·471	·528 ·518 ·509 ·498 ·488	·546 ·536 ·526 ·516 ·505	·565 ·554 ·544 ·533 ·523	·583 ·572 ·561 ·551 ·540	·600 ·590 ·578 ·567 ·556	·619 ·608 ·597 ·585 ·573	·637 ·626 ·614 ·602 ·590	·656 ·643 ·631 ·619 ·606	·674 ·662 ·649 ·636 ·624	·692 ·678 ·666 ·653 ·640	·711 ·698 ·685 ·671 ·658	·728 ·715 ·702 ·688 ·674	.747 .734 .720 .705 .691
51 52 53 54 55	.429 .420 .410 .401 .391	·446 ·435 ·425 ·415 ·406	·461 ·451 ·441 ·431 ·421	·478 ·468 ·457 ·447 ·436	·495 ·484 ·473 ·462 ·451	·511 ·500 ·488 ·477 ·466	·527 ·516 ·505 ·493 ·481	.544 .532 .521 .508 .496	·561 ·549 ·537 ·524 ·511	· 578 · 565 · 552 · 539 · 526	·594 ·581 ·568 ·555 ·541	·610 ·597 ·584 ·570 ·556	·627 ·614 ·600 ·586 ·572	·644 ·630 ·616 ·602 ·586	·645 ·631 ·616	·676 ·662 ·647 ·632 ·617
56 57 58 59 60	·381 ·371 ·361 ·351 ·341	·395 ·385 ·375 ·365 ·354	·410 ·400 ·389 ·378 ·367	·424 ·413 ·402 ·391 ·380	.439 .428 .416 .405 .393	.454 .442 .430 .418 .406	·469 ·457 ·445 ·431 ·419	·484 ·471 ·459 ·446 ·432	·499 ·486 ·473 ·459 ·446	·513 ·500 ·486 ·471 ·459	·528 ·514 ·500 ·486 ·472	·542 ·528 ·514 ·500 ·485	·558 ·542 ·528 ·513 ·498	·571 ·557 ·542 ·526 ·511	·587 ·571 ·556 ·541 ·524	·601 ·586 ·570 ·554 ·538
61 62 63 64 65	·331 ·320 ·310 ·298 ·287	·342 ·332 ·321 ·310 ·299	·356 ·345 ·333 ·322 ·311	·369 ·357 ·344 ·333 ·321	·381 ·369 ·357 ·345 ·333	·394 ·381 ·369 ·356 ·343	·406 ·394 ·381 ·368 ·355	·419 ·406 ·392 ·379 ·365	·432 ·419 ·405 ·391 ·377	.445 .430 .416 .402 .388	·458 ·443 ·429 ·414 ·399	·470 ·455 ·440 ·425 ·410	·483 ·468 ·452 ·437 ·421	·496 ·480 ·464 ·448 ·432	·508 ·492 ·476 ·460 ·444	•522 •504 •488 •471 •454
66 67 68 69 70	·277 ·266 ·255 ·244 ·233	· 288 · 277 · 265 · 254 · 242	·298 ·286 ·274 ·263 •251	·309 ·297 ·285 ·273 ·260	·319 ·307 ·294 ·282 ·269	·330 ·317 ·304 ·291 ·278	*342 *327 *314 *300 *287	·352 ·338 ·324 ·310 ·296	·362 ·348 ·333 ·319 ·305	·373 ·359 ·344 ·329 314		·395 ·379 ·363 ·348 ·332	·406 ·389 ·373 ·357 ·341	•416 •400 •383 •367 •350	.376	·437 ·420 ·403 ·385 ·368

						A	ZIM	UTHS	S.						
Lat.	8°-4	8°-6	8°·8	9°·0	9°·2	9°-4	9°·8	9°·8	10°·0	10°·2	10°·4	10°·6	10°·8	11°·0	11°-2
	R	EDU	CTIO	N TC	TH	E MI	ERID	IAN	AT I	HOU	R-AN	GLE	OF 1	MI	٧.
0 4 8 10 12	, 1·102 1·099 1·091 1·085 1·078	1·128 1·125 1·117 1·111 1·104	1.154 1.151 1.143 1.137 1.129		1·207 1·204 1·195 1·189 1·181	1.230 1.221 1.214	1·259 1·256 1·247 1·240 1·232	1·286 1·283 1·274 1·267 1·258	1.312 1.309 1.299 1.292 1.283	1.339 1.336 1.326 1.319 1.310	1·362 1·352 1·344	1·392 1·389 1·379 1·371 1·362	1.418 1.415 1.404 1.397 1.387	1·445 1·441 1·431 1·423 1·414	1·471 1·467 1·457 1·449 1·439
14 16 18 19 20	1.069 1.059 1.048 1.042 1.036	1.095 1.085 1.072 1.066 1.059	1·120 1·109 1·098 1·091 1·085	I·134 I·122			1·222 1·211 1·198 1·191 1·184	1·248 1·236 1·223 1·216 1·209	1·273 1·261 1·248 1·241 1·233	1·299 1·287 1·274 1·266 1·258	1·325 1·312 1·298 1·291 1·283	1·350 1·337 1·323 1·315 1·307	1·376 1·363 1·349 1·340 1·332	1·402 1·388 1·374 1·366 1·357	1·427 1·414 1·399 1·391 1·382
21 22 23 24 25	1.029 1.022 1.015 1.007	1.053 1.045 1.038 1.030 1.022	I·078 I·070 I·063 I·055 I·046	1·102 1·094 1·086 1·078 1·069	1·126 1·119 1·111 1·102 1·094		1·176 1·168 1·160 1·151 1·141	1·201 1·193 1·183 1·174 1·165	1·225 1·217 1·208 1·199 1·189	1.250 1.241 1.232 1.223 1.213	1.247	1·299 1·290 1·281 1·271 1·261	1·323 1·314 1·305 1·295 1·285	1·348 1·339 1·330 1·320	1·373 1·364 1·354 1·344 1·333
26 27 28 29 30	•990 •981 •972 •963 •954	1.014 1.005 .996 .987 .977	1.038 1.029 1.010 1.000	1.061 1.051 1.042 1.032 1.022	1.085 1.075 1.066 1.056 1.045		1·131 1·122 1·112 1·101 1·091	1·155 1·145 1·135 1·125 1·114	1·179 1·169 1·159 1·148 1·136	1·203 1·192 1·182 1·171 1·160	1·217 1·206 1·194	1·250 1·239 1·229 1·218 1·206	1·274 1·263 1·252 1·240 1·228	1·298 1·287 1·275 1·263 1·251	1·322 1·311 1·299 1·287 1·274
31 32 33 34 35	.944 .934 .924 .913	·967 ·957 ·946 ·935 ·923	•990 •979 •967 •956 •945	1.001 1.001 .990 .978 .967	1.035 1.024 1.012 1.001 .989	1.035 1.022	1.079 1.068 1.056 1.044 1.032	1·102 1·091 1·078 1·066 1·054	1·125 1·113 1·101 1·088 1·075	1·148 1·136 1·122 1·110 1·096	I·145	1·193 1·181 1·167 1·153 1·140		1·238 1·225 1·212 1·198 1·184	1·261 1·248 1·234 1·220 1·205
36 37 38 39 40	·891 ·879 ·868 ·856 ·844	·912 ·900 ·889 ·876 ·864	.933 .921 .909 .897 .884	•955 •942 •930 •917 •904	·976 ·963 ·951 ·938 ·924	·997 ·984 ·971 ·958 ·944	1.019 1.005 .992 .978 .965	1.027 1.014 1.000			1.061	1·126 1·111 1·096 1·081 1·066		1·169 1·154 1·139 1·123 1·107	1·190 1·175 1·159 1·143 1·127
41 42 43 44 45	.831 .818 .805 .792	·851 ·838 ·825 ·812 ·798	·871 ·858 ·844 ·830 ·816	·891 ·877 ·863 ·849 ·834	·911 ·897 ·883 ·868 ·854	·930 ·916 ·902 ·887 ·872	•950 •936 •921 •906 •891	.971 .955 .940 .925	·991 ·976 ·960 ·944 ·928	1.011 .995 .980 .963	1.030 1.015 .999 .982 .966	1.050 1.034 1.018 1.001 .984	I·070 I·054 I·037 I·020 I·003	1.091 1.073 1.056 1.039 1.021	1·110 1·093 1·076 1·058 1·039
46 47 48 49 50	.765 .751 .737 .723 .708	•783 •769 •754 •740 •725	·802 ·787 ·773 ·757 ·742	·820 ·805 ·790 ·774 ·758	·839 ·823 ·807 ·791 ·775	·856 ·841 ·825 ·809 ·793	·874 ·858 ·842 ·826 ·809	·893 ·877 ·860 ·844 ·827	·912 ·895 ·879 ·861 ·843	•930 •913 •896 •879 •861	.949 .932 .914 .895 .877	·967 ·949 ·931 ·913 ·894	·985 ·968 ·948 ·930 ·911	1.003 .985 .967 .948 .929	1.022 1.003 .985 .965
51 52 53 54 55	•693 •678 •663 •648 •632	·710 ·695 ·679 ·663 ·646	·727 ·710 ·694 ·678 ·662	·743 ·726 ·710 ·694 ·677	•759 •743 •726 •709 •692	·776 ·759 ·742 ·725 ·707	.793 .776 .758 .740 .722	·810 ·792 ·774 ·756 ·737	·826 ·808 ·789 ·771 ·752	·843 ·824 ·805 ·787 ·768	·859 ·840 ·821 ·802 ·783	·876 ·857 ·838 ·818 ·798	·892 ·873 ·854 ·834 ·814	·909 ·890 ·870 ·849 ·829	·926 ·906 ·886 ·865 ·844
56 57 58 59 60	•616 •600 •584 •568 •551	·630 ·614 ·598 ·581 ·564	·645 ·628 ·611 ·594 ·577	·660 ·643 ·625 ·608 ·590	·675 ·658 ·640 ·621 ·603	•690 •672 •654 •635 •616	·704 ·686 ·667 ·649 ·630	·719 ·700 ·681 ·662 ·643	.734 .714 .695 .676 .656	•749 •729 •710 •690 •669	·764 ·744 ·724 ·703 ·683	·778 ·758 ·738 ·717 ·666	.793 .772 .751 .730 .709	·808 ·787 ·765 ·744 ·722	·823 ·802 ·780 ·758 ·736
61 62 63 64 65	*534 *517 *500 *483 *466	*547 *530 *512 *494 *476	·560 ·542 ·524 ·506 ·488	*572 *554 *536 *517 *499	.585 .566 .548 .529	.597 .578 .559 .540 .522	.610 .591 .571 .552 .532	·624 ·604 ·584 ·564 ·544	•636 •616 •596 •575 •555	·649 ·628 ·608 ·587 ·566	·662 ·640 ·619 ·598 ·577	·675 ·654 ·632 ·610 ·588	·688 ·666 ·644 ·622 ·599	•700 •678 •656 •633 •611	·714 ·691 ·668 ·645 ·622
66 67 68 69 70	·448 ·431 ·413 ·395 ·377	*459 *441 *423 *404 *386	*470 *451 *433 *413 *394	•480 •461 •442 •423 •404	·491 ·472 ·453 ·432 ·412	•501 •482 462 •442 •422	·512 ·492 471 ·451 ·431	.523 .502 .481 .461 .440	*534 *513 *492 *470 *449	*545 *523 *501 *480 *458	*555 *533 *511 *489 *467	•566 •544 •522 •499 •476	•576 •554 •531 •508 •485	•588 •565 •541 •518 •495	•598 •574 •551 •527 •503

						A	ZIMI	JTHS							
Lat.	11°·4	11°∙6	11°.8	12°·0	12°-2	12°-4	12°-6	12°-8	13°·0	13°-2	13°·4	13°.6	13°·8	14°·0	14°-2
	R	EDU	CTIO	N TC	TH	Е МІ	ERID	IAN	AT I	HOUE	R-AN(GLE	OF 1	MII	٧.
0 4 8 10 12	1·498 1·494 1·482 1·474 1·464	1.524 1.520 1.509 1.501 1.491	1.550 1.546 1.535 1.526 1.516	1·573 1·562 1·553	1·599	1·626 1·614 1·605			1.705 1.692	1.732	1.758 1.745 1.735	1.789 1.785 1.772 1.762 1.750	1.815 1.811 1.797 1.788 1.775	1.842 1.838 1.824 1.814 1.802	1.869 1.864 1.850 1.840 1.827
14 16 18 19 20	1·453 1·439 1·424 1·416 1·407	1.465 1.450 1.441	1·504 1·490 1·474 1·466 1·457	1.216 1.200 1.491	1·541 1·525 1·516	1·582 1·567 1·550 1·541 1·532	1·592 1·575 1·566	1.601 1.201	1.643 1.626	1.651	1·694 1·676	1·736 1·720 1·702 1·691 1·681	1.745 1.726 1.716	1·787 1·771 1·752 1·742 1·731	1.813 1.796 1.777 1.767 1.756
21 22 23 24 25	1·398 1·389 1·379 1·368 1·357	1.423 1.413 1.403 1.393 1.382	I.437	1.472 1.462 1.451 1.440 1.429	1·486 1·476 1·465	1·522 1·511 1·500 1·489 1·477	1.536	1·571 1·561 1·549 1·538 1·526	1·596 1·585 1·574 1·562 1·550	1.610 1.597 1.585	1.645 1.634 1.622 1.610 1.597	1.670 1.658 1.646 1.634 1.621	1.695 1.683 1.671 1.659 1.645	1·720 1·708 1·696 1·683 1·670	1·744 1·733 1·720 1·707 1·694
26 27 28 29 30	1·346 1·335 1·323 1·310 1·297	1·358 1·346 1·333		1.392	1.429 1.416 1.402	1·465 1·152 1·439 1·426 1·412	1.476 1.463 1.449		1·523 1·509	1.560 1.546 1.532 1.518 1.503	1.570 1.556 1.541	I·594 I·580	1.603	1 641 1 627	1.680 1.665 1.650 1.634 1.618
31 32 33 34 35	1·283 1·270 1·256 1·241 1·227	1.278	1.314 1.300 1.285	1·337 1·323 1·308	1·360 1·345 1·329	1.367	1.389		1.450	1.488 1.472 1.456 1.439 1.422	1·511 1·495 1·478 1·461 1·444	1.534 1.518 1.500 1.483 1.465	1.540		1.601 1.584 1.567 1.549 1.531
36 37 38 39 40	1·180	1.217	1.238 1.221 1.205	I·260 I·242 I·225	1·281 1·264 1·246	1.267	1·323 1·305 1·287		I·366		1·408 1·389 1·370	1.429 1.410	1.411	1.471 1.452 1.431	
41 42 43 44 45	1·131 1·096 1·077 1·059	1.133 1.133	1.134	1.134	1·192 1·153	1.173	1.531 1.515 1.192	1.231 1.210	I·270 I·250 I·230	1.290 1.269 1.248	1.310 1.289 1.268	1.300	1.306	1·368	1.410 1.388 1.366 1.344 1.321
46 47 48 49 50	1.040 1.021 1.002 .983	I.040 I.020 I.000	I·057 I·037 I·017	1.076 1.056 1.035	1.093 1.052	1·112 1·069	1·129 1·108 1·086	1.126	I·165	1.184	1.180 1.157	1.1220 1.124	1.215	1·256 1·232 1·208	1.220
51 52 53 54 55	*943 *922 *902 *880 *859		·975 ·954 ·933 ·911 ·889	*992 *971 *949 *927 *905	1.009 .987 .965 .942	1.004 .981 .958		1.059 1.036 1.013 .989 .966	1.023	I.045 I.020	1.085 1.060 1.036	1.101 1.021	1.003	1.134 1.108 1.083	I·I50 I·I24 I·098
56 57 58 59 60	·837 ·816 ·794 ·771 ·749	·852 ·830 ·807 ·785 ·762	·844 ·821 ·798	·882 ·859 ·836 ·813 ·788	·897 ·873 ·850 ·826 ·802	·911 ·888 ·864 ·840 ·815	·927 ·902 ·877 ·853 ·828	·941 ·917 ·892 ·866 ·841	·956 ·931 ·906 ·881 ·855	•970 •945 •920 •894 •868	·985 ·960 ·934 ·907 ·881	1.000 .974 .948 .922 .894	1.015 .989 .962 .935 .908		1.045 1.018 .991 .962
61 62 63 64 65	•726 •704 •679 •656 •633	·716 ·692 ·668	·751 ·728 ·704 ·679 ·655	·764 ·740 ·716 ·691 ·667	·778 ·753 ·728 ·702 ·677	.715	·803 ·778 ·752 ·726 ·700	·815 ·790 ·764 ·737 ·711	·829 ·802 ·776 ·749 ·722	·842 ·815 ·788 ·761 ·733	·854 ·827 ·800 ·773 ·745	.867 .840 .812 .784 .756	·881 ·853 ·824 ·795 ·767	·893 ·865 ·836 ·808 ·779	·906 ·877 ·848 ·819 ·790
66 67 68 69 70	·609 ·585 ·561 ·537 ·513	·596 ·570 ·546	·581	·591	·652 ·626 ·600 ·574 ·548	·611 ·584		·684 ·657 ·630 ·603 ·576	·695 ·668 ·641 ·612 ·584	·706 ·678 ·650 ·622 ·594	·717 ·689 ·660 ·632 ·603	·728 ·699 ·670 ·641 ·612	·738 ·709 ·680 ·651 ·621	•749 •720 •690 •660 •630	·760 ·730 ·709 ·670 ·639

						A	ZIMU	JTHS							
Lat.	14°·4	14°-6	14°-8	15°·0	15°-2	15°-4	15°-6	15°·8	16°·0	16°·2	16°·4	16°-6	16°·8	17°·0	17°·2
	R	EDU	CTIO	N TC	TH	Е МІ	ERID	IAN	AT Î	HOUE	R-AN	GLE	OF 1	MII	٧.
8 10 12	1.890	1.922 1.917 1.903 1.893 1.880		1.975 1.970 1.956 1.945 1.932		2.023 2.008 1.997	2.055 2.050 2.035 2.024 2.010	2.081 2.076 2.061 2.049 2.036	2·108 2·103 2·088 2·076 2·062	2·130 2·114	2·140 2·128		2·215 2·210 2·193 2·181 2·167		2·268 2·262 2·246 2·234 2·219
14 16 18 19 20	1·839 1·822 1·802 1·792 1·781	1.865 1.848 1.828 1.817 1.806	1.890 1.873 1.853 1.842 1.831	1.916 1.899 1.879 1.868 1.856	I.924 I.903	1.968 1.950 1.929 1.918 1.906	1.976 1.955 1.942			2.051 2.030	2.077 2.055 2.043	2·123 2·104 2·081 2·069 2·057	2.129	2·175 2·155 2·132 2·120 2·107	2·201 2·180 2·157 2·145 2·132
21 22 23 24 25	1·769 1·757 1·745 1·732 1·718	1·794 1·782 1·768 1·756 1·742	1.819 1.807 1.794 1.780 1.766	1.844 1.832 1.818 1.805 1.789	1.868 1.855 1.842 1.828 1.814	1.894 1.881 1.866 1.852 1.838			1.968 1.954 1.940 1.925 1.910	1.965	2.004 1.989 1.974	2.043 2.028 2.014 1.999 1.983	2.068 2.053 2.038 2.023 2.007		2·118 2·103 2·088 2·073 2·056
26 27 28 29 30	1·704 1·689 1·674 1·657 1·641	1.728 1.713 1.697 1.681 1.665	1.751 1.736 1.720 1.704 1.687	1.775 1.759 1.743 1.727 1.710	1.799 1.783 1.767 1.750 1.733		1.831 1.814 1.797	1.870 1.854 1.838 1.820 1.802	1.878		1.926 1.908 1.890	1.966 1.949 1.932 1.914 1.895	1.973	2.014 1.997 1.979 1.960 1.941	2.039 2.022 2.002 1.984 1.964
31 32 33 34 35	1.624 1.607 1.589 1.571 1.552	1.647 1.629 1.611 1.593 1.574	1.670 1.652 1.634 1.615 1.596	1.693 1.675 1.656 1.637 1.618	1.715 1.697 1.678 1.659 1.639		1.723	1.784 1.765 1.745 1.725 1.705	1.807 1.788 1.768 1.748 1.726	1.830 1.810 1.790 1.770 1.749	1·833 1·813 1·792		1.898 1.878 1.857 1.836 1.814	1.921 1.901 1.880 1.858 1.836	1.944 1.924 1.902 1.881 1.858
36 37 38 39 40	1·533 1·513 1·493 1·473 1·452	1.234 1.493		1.598 1.577 1.556 1.535 1.513	1.619 1.598 1.577 1.555 1.533	1.598	1.641 1.619	1.684 1.662 1.640 1.617 1.594			1·726 1·703 1·680	I·724 I·700	1.792 1.769 1.746 1.721 1.697	1.766	1.835 1.812 1.788 1.763 1.737
41 42 43 44 45	1·430 1·409 1·386 1·364 1·340	1.405	1.448	I.445	1.487 1.464 1.440	1.531 1.507 1.483 1.459 1.434	1.527 1.502 1.478	1.571 1.547 1.522 1.497 1.472		1.261	1.606 1.581 1.555	1.600 1.574	1.620	1.639	1.712 1.686 1.659 1.632 1.604
46 47 48 49 50	1·317 1·292 1·268 1·243 1·218	1.310 1.286 1.261	1.329 1.304 1.278	1·371 1·347 1·321 1·295 1·269	1.365 1.313	1·384 1·357 1·330	1.401 1.375 1.348	1.366	1.410		1.474 1.446 1.418	1.464 1.435	1.538 1.510 1.482 1.453 1.424	1.529	1.576 1.547 1.518 1.489 1.458
51 52 53 54 55	1·192 1·167 1·140 1·114 1·087	1·183 1·130	1·199 1·173 1·145	1·216 1·189 1·161	I·232 I·205 I·177	1.249 1.221	1.265 1.237 1.208	1.523	1.298 1.269 1.239	1.285	1·301 1·271	1·347 1·317 1·286	1·394 1·364 1·302 1·271	1.318	1.427 1.396 1.365 1.333 1.301
56 57 58 59 60	1.060 1.032 1.005 .976 .948	1.047 1.018	1.062 1.032 1.003	1.047	1.031 1.001	1·135 1·104 1·074 1·044 1·014	1.120 1.088 1.058	1·134 1·103 1·072	1·148 1·117 1·086	1·194 1·163 1·131 1·099 1·067	1·177 1·146 1·113	1·191 1·159 1·127	I·207	1.221 1.188 1.155	1·236 1·202 1·168
61 62 63 64 65	-918 -889 -860 -831 -801	•902 •873 •843	·915 ·885 ·854	·927 ·896 ·856	·940 ·909 ·878	·952 ·921 ·890	.933	1.009 .978 .945 .913 .880	*990 *957 *924	1.002 .969 .936	·982	1.027 1.994 1.959	1.040	1.053 1.018	.995
66 67 68 69 70	·771 ·740 ·710 ·679 ·648	751 720 689	·761 ·730 ·698	·772 ·740 ·708	·782 ·750 ·718	·792 ·760 ·727	·803 ·770 ·737	·779	·790	·834 ·800 ·765	·809	·855 ·820 ·784		·840 ·804	-813

Showing the reduction at 1 min. from the meridian corresponding to azimuths from 1° to 60° from the meridian.

						A	ZIMU	JTHS							
Lat.	17°·4	17°·6	17°·8	18°-0	18°-2	18°·4	18°-8	18°-8	19°·0	19°-2	19°-4	19°-6	19°-8	20°-0	20°·2
	R	EDU	CTIO	N TO	TH	Е МІ	ERID	IAN	AT I	HOUE	R-AN	GLE	OF 1	MII	٧.
0 4 8 10 12	2·295 2·289 2·273 2·260 2·245	2·322 2·316 2·299 2·287 2·271	2·343 2·326		2·397 2·380 2·367	2·430 2·424 2·406 2·393 2·377	2.431 2.433	2·484 2·478 2·460 2·446 2·430	2·505 2·487 2·473	2·537 2·531 2·512 2·499 2·482	2·558 2·539 2·525	2·591· 2·585 2·566 2·552 2·534	2.612	2.645 2.639 2.619 2.605 2.587	2·665 2·646 2·631
14 16 18 19 20	2·227 2·206 2·183 2·170 2·157	2·253 2·232 2·208 2·196 1·182	2.234	2.260	2·310 2·286 2·272	2.297	2·384 2·361 2·336 2·323 2·308	2·410 2·388 2·362 2·348 2·333	2·436 2·414 2·388 2·374 2·360	2.462 2.439 2.413 2.399 2.384	2·465 2·439	2·514 2·491 2·464 2·450 2·435	2·517 2·490 2·476	2·543 2·516 2·501	2·569 2·541 2·527
21 22 23 24 25	2·143 2·128 2·113 2·097 2·080	2.138	2·178 2·162 2·146	2.188	2.212	2.220		2.286	2·344 2·328 2·311 2·294 2·275	2.336	2·378 2·360	2·419 2·402 2·385 2·367 2·348	2.428 2.411 2.391	2·470 2·453 2·435 2·417 2·398	2·495 2·478 2·460 2·441 2·422
26 27 28 29 30	2.063 2.045 2.027 2.008 1.988	2.069 2.050 2.031	2·093 2·074 2·055		2·141 2·122 2·102	1.126	2·189 2·169 2·149	2.172	2·236 2·216 2·195	2·261 2·241	2·285 2·264 2·243	2·329 2·309 2·288 2·266 2·244	2.311	2.313	2·402 2·381 2·359 2·337 2·314
31 32 33 34 35	1.968 1.947 1.925 1.902 1.880	1.969 1.948 1.925	1.992 1.948	2.015 1.993 1.970	2.038	2.082 2.060 2.038 2.014 1.990	2.084 2.061 2.037	2.106	2.129	2.128	2·175 2·151 2·126	2·221 2·197 2·173 2·148 2·123	2·220 2·196 2·171	2.193	2·291 2·266 2·241 2·216 2·189
36 37 38 39 40	1.857 1.833 1.809 1.784 1.758	1.855 1.830 1.805	1.876 1.851 1.826	1.898 1.873 1.847	1.919 1.893 1.867	1.941 1.915	1.936	1.984 1.957 1.930	2.005 1.978	2.000	2.048 2.020		2.091 2.034	2·112 2·084 2·056	2·134 2·106 2·077
41 42 43 44 45	1.732 1.706 1.679 1.651 1.623	1.726 1.699 1.671	1.746 1.718 1.690	1.709	1.786 1.757 1.728	1.805 1.777 1.748	1.826 1.797 1.767	1.875 1.846 1.817 1.787 1.757	1.836	1.915 1.886 1.855 1.825 1.794	1.875	1.956 1.926 1.895 1.864 1.832	1.946 1.915 1.883	1.966 1.935	2.017 1.986 1.955 1.923 1.890
46 47 48 49 50	1.595 1.566 1.536 1.506 1.475	1.584 1.554 1.523	1.602 1.572 1.541	1.620 1.590 1.559	1.639 1.577	1·657 1·626 1·594	1.676 1.644 1.611			1.698 1.665	1·749 1·716 1·683		1·786 1·751 1·717	I·803 I·735	1.857 1.823 1.789 1.753 1.717
51 52 53 54 55	1.444 1.413 1.381 1.349 1.316	1·429 1·397 1·365	1.447 1.414 1.380	I·463 I·430 I·397	1.480 1.446	1·529 1·496 1·462 1·428 1·394	1.478 1.444	1·563 1·529 1·495 1·460 1·424	1.545 1.511 1.475	1.563 1.491	1·579 1·544	1.23	1.612 1.576 1.539	1.628 1.592 1.555	1.570
56 57 58 59 60	1.250 1.217 1.182	1.265 1.230 1.196		1·294 1·259 1·224	1.309 1.274 1.238	1·359 1·323 1·287 1·251 1·215	1·338 1·302 1·265	1·353 1·316 1·279	1.367	I·382 I·345 I·307	1·434 1·396 1·359 1·320 1·282	1.412 1.373 1.335	1.426 1.387 1.348	1.363	1·455 1·416 1·376
61 62 63 64 65	1·113 1·078 1·042 1·006	1.090 1.018	1.103 1.030	I·116 I·079 I·042	1.128	1.062	1.123 1.077	1·166 1·128 1·089	I·179 I·140 I·100	1.152	1·243 1·204 1·164 1·124 1·084	1.177 1.136	1·229 1·148	1.159	1.254 1.213 1.171
66 67 68 69 70	.933 .897 .860 .823 .785	·907 ·870 ·832	918 880 842	·928 ·890 ·851	939 900 861	.949 .911 .871	·960 ·921 ·880	·970 ·930 ·890		.910	1.002 .961 .919	1.013 .970 .928	1.023 .981 .938	1.034 .991 .948	I.044 I.00I

				····		A	ZIM	UTHS	S.		•				
Lat.	20°-4	20°-6	20°-8	21°·0	21°-2	21°-4	21°-6	21°.8	22°-0	22°-2	22°-4	22°-6	22°-8	23°-0	23°-2
	F	REDU	CTIO	N TO	TH	E M	ERID	IAN	AT I	HOU	R-AN	GLE	OF 1	MI	Ν.
0 4 8 10 12	2.699 2.692 2.673 2.658 2.640		2·754 2·747 2·727 2·712 2·694	2·781 2·774 2·754 2·739 2·720		2·828 2·807 2·792	2.862 2.855 2.834 2.819 2.800	2·889 2·882 2·861 2·845 2·826	2.917 2.910 2.889 2.873 2.853	2.944 2.937 2.915 2.899 2.880	2.964	2·998 2·991 2·953 2·933	3.025 3.018 2.995 2.979 2.959	3.052 3.044 3.022 3.006 2.985	3.080 3.072 3.050 3.032 3.012
14 16 18 19 20	2.619 2.595 2.567 2.552 2.537	2.645 2.621 2.593 2.578 2.562	2.672 2.647 2.618 2.603 2.587	2.698 2.673 2.645 2.630 2.613	2·725 2·700 2·671 2·655 2·639	2.696 2.681	2·777 2·751 2·722 2·706 2·690	2·803 2·777 2·748 2·732 2·715	2·830 2·803 2·774 2·757 2·741	2.857 2.830 2.800 2.784 2.767	2.809	2·909 2·882 2·852 2·835 2·818	2.935 2.908 2.877 2.860 2.843	2.961 2.934 2.903 2.886 2.868	2.987 2.960 2.929 2.912 2.894
21 22 23 24 25	2·520 2·503 2·485 2·466 2·446	2·545 2·528 2·510 2·491 2·471	2·570 2·553 2·534 2·515 2·495	2·596 2·579 2·560 2·541 2·521	2.622 2.603 2.584 2.565 2.545	2·610 2·590	2.672 2.654 2.635 2.615 2.594	2.698 2.679 2.660 2.640 2.619	2·723 2·704 2·685 2·664 2·643	2.749 2.730 2.710 2.690 2.668	2·735 2·714	2·799 2·780 2·760 2·739 2·717	2·824 2·805 2·785 2·764 2·742	2.849 2.830 2.810 2.788 2.766	2·875 2·855 2·835 2·813 2·791
26 27 28 29 30	2·426 2·405 2·383 2·361 2·338	2·451 2·430 2·408 2·385 2·362	2·475 2·453 2·431 2·408 2·385	2·500 2·478 2·456 2·432 2·409	2.479	2·527 2·504 2·480	2.503	2·597 2·574 2·551 2·527 2·502	2.621 2.599 2.575 2.551 2.526	2.645 2.623 2.599 2.574 2.549	2·623 2·599	2.694 2.671 2.647 2.622 2.596	2.719 2.696 2.671 2.646 2.620	2·743 2·720 2·695 2·669 2·643	2·768 2·744 2·719 2·693 2·667
31 32 33 34 35	2·314 2·289 2·264 2·238 2·212	2·337 2·313 2·286 2·260 2·233	2·360 2·335 2·309 2·283 2·256	2·384 2·359 2·333 2·306 2·278	2·407 2·382 2·355 2·328 2·300	2·404 2·377 2·350	2·453 2·427 2·401 2·373 2·345	2·477 2·450 2·423 2·396 2·367	2·500 2·474 2·447 2·418 2·389	2·523 2·496 2·469 2·440 2·411		2.570 2.543 2.515 2.486 2.456	2·594 2·566 2·537 2·508 2·478	2.589 2.560 2.531 2.501	2.640 2.612 2.583 2.553 2.523
36 37 38 39 40	2·184 2·155 2·127 2·098 2·068	2·206 2·177 2·148 2·119 2·089	2·228 2·199 2·170 2·140 2·110	2·250 2·221 2·192 2·161 2·131	2.212	2·264 2·234 2·203	2·316 2·286 2·256 2·225 2·193	2·338 2·308 2·276 2·245 2·213	2·359 2·329 2·298 2·266 2·234	2.288	2·373 2·341 2·309	2·426 2·395 2·362 2·330 2·296	2·447 2·416 2·384 2·351 2·317		2·492 2·459 2·427 2·394 2·359
41 42 43 44 45	2.037 2.006 1.974 1.942 1.909	2.058 2.026 1.962 1.962 1.928	2.078 2.047 2.014 1.981 1.948	2.001		2·107 2·074 2·040	2.127	2·181 2·147 2·113 2·079 2·043	2.168	2.118	2·173 2·137	2.263 2.228 2.193 2.157 2.120	2.176	2·304 2·268 2·233 2·196 2·159	2·324 2·288 2·252 2·215 2·178
46 47 48 49 50	1·876 1·841 1·806 1·771 1·735		1.878 1.842 1.806	1.897 1.861 1.825	1.879	1.934 1.897 1.860	1.953 1.916 1.878	1.970	1.990	2.008 1.970 1.932	1.949	2.045 2.006 1.967		2·121 2·082 2·043 2·003 1·963	2·140 2·100 2·060 2·020 1·979
51 52 53 54 55	1.699 1.662 1.625 1.587 1.548	1.679 1.641 1.603	1.695 1.657 1.618	1.674 1.635	1.729 1.651	1.745 1.706 1.666			1.835 1.796 1.755 1.714 1.673	1.852 1.812 1.771 1.730 1.688	1.830 1.788 1.747	1.846 1.804	1.820		1.938 1.896 1.854 1.811 1.767
56 57 58 59 60	1.470 1.430 1.390	1.485 1.444 1.404	1.540 1.500 1.459 1.418 1.377	I·514 I·473 I·432	1.529 1.488 1.446	1.544	1.559 1.517 1.474	1.574 1.531 1.488	1.589 1.546 1.502	1.216	1.575 1.531	1.632 1.588 1.544		1.661 1.616 1.571	1.717 1.672 1.627 1.581 1.540
61 62 63 64 65	1·309 1·267 1·225 1·183 1·141	1·280 1·238 1·195	1.250	1·305 1·262 1·219	I·319 I·275 I·230	1·375 1·331 1·287 1·243 1·198	1.344 1.255	1·356 1·311 1·267	1.369 1.324 1.279	1.382 1.337	1·394 1·348 1·302	1.312	I 420 I 373 I 326	1.433 1.386 1.338	1.446
66 67 68 69 70	1.098 1.055 1.012 .967	1.066	1.076 1.031 .987	1.086 1.041 996	I.097 I.052 I.006	1·153 1·108 1·062 1·016 ·970	1·118 1·072 1·026	1.032	1.140 1.093 1.045	1.120	1·160 1·113 1·064	1·171 1·123 1·075	1·182 1·133 1·084	1·193 1·094	1.253 1.204 1.154 1.103 1.053

						I	AZIM	UTHS	S.						
Lat.	23°-4	23°-6	23°.8	24°·0	24°-2	24°-4	24°-6	24°-8	25°-0	25°·2	25°·4	25°·6	25°.8	26°·0	26°-2
	R	EDU	CTIO	N TO	TH	E M	ERID	IAN	AT]	HOUI	R-AN	GLE	OF :	MII	ν.
0 4 8 10 12	3·107 3·099 3·077 3·060 3·039	3.103	3·161 3·153 3·130 3·113 3·092	3·188 3·180 3·157 3·140 3·119			3·263 3·239 3·221	3·298 3·290 3·266 3·248 3·226	3·318 3·292 3·275	3·345 3·320	3·348 3·330	3·408 3·400 3·375 3·356 3·334		3.463 3.454 3.429 3.410 3.387	3.491 3.482 3.457 3.438 3.415
14 16 18 19 20	3.015 2.987 2.955 2.937 2.919	3.013	3.006	3.065 3.032 3.015	3.058	3·117 3·066 3·066	3·144 3·111	3.132	3·196 3·163 3·144	3.189	3·250 3·216 3·197	3·307 3·276 3·242 3·223 3·203	3.267	3·360 3·329 3·294 3·274 3·254	3·387 3·356 3·320 3·301 3·281
21 22 23 24 25	2.900 2.880 2.860 2.838 2.815	2.885	2.931		2·981 2·960 2·937	3.028 3.007 2.985 2.963 2.939	3.033 3.010 5.988	3.079 3.058 3.036 3.012 2.988	3.083 3.081 3.038	3.100	3.115	3·182 3·159 3·137 3·113 3·088	3·185 3·162 3·138	3·233 3·211 3·188 3·164 3·138	3·259 3·237 3·214 3·189 3·164
26 27 28 29 30	2·792 2·768 2·743 2·717 2·691	2.767	2.817 2.791 2.764	2.814	2.865 2.839 2.812	2.836	2.915 2.888 2.860	2·964 2·939 2·912 2·884 2·856	2·963 2·936 2·908	2.961	3.012 2.984 2.956	3.009	3.001 3.002	3·113 3·086 3·058 3·029 3·000	3·138 3·110 3·082 3·053 3·024
31 32 33 34 35	2.663 2.635 2.606 2.576 2.545	2.657 2.628 2.598	2.681 2.651 2.621	2.674	2·727 2·697 2·666	2.751	2.774 2.743 2.712	2·797 2·766 2·735	2·821 2·789 2·757	2.813	2.835	2·921 2·890 2·859 2·826 2·792	2.882	2·969 2·937 2·905 2·872 2·837	2·993 2·960 2·928 2·894 2·860
36 37 38 39 40	2·514 2·480 2·448 2·414 2·380	2.469	2·524 2·491 2·457	2·546 2·513 2·477	2·568 2·535 2·499		2.612 2.578 2.542	2.634 2.599 2.563	2.655 2.620 2.584	2.677 2.642 2.606	2.699	2·758 2·721 2·685 2·648 2·611	2·743 2·707 2·670	2·801 2·765 2·729 2·691 2·653	2·825 2·788 2·750 2·713 2·675
41 42 43 44 45	2·345 2·309 2·272 2·235 2·197	2·329 2·255	2·349 2·312 2·274	2·369 2·332 2·294	2·390 2·352 2·313	2·410 2·372 2·333	2·430 2·352 2·352	2·451 2·412 2·373	2.471 2.432 2.392	2.492 2.412	2·551 2·512 2·472 2·431 2·390		2·553 2·513 2·471	2·613 2·573 2·533 2·491 2·449	2·634 2·594 2·553 2·511 2·468
46 47 48 49 50	2·159 2·119 2·079 2·039 1·997	2·138 2·097 2·057	2·156 2·116 2·074	2·175 2·134 2·091	2·152 2·110		2·230 2·188 2·145	2·250 2·206 2·164	2.182	2·287 2·244 2·200	2·305 2·262 2·218	2·368 2·325 2·280 2·236 2·191	2·343 2·299 2·254	2·406 2·362 2·317 2·272 2·226	2·424 2·380 2·335 2·290 2·243
51 52 53 54 55	1.954 1.913 1.870 1.826	1.930 1.886 1.842	1.947 1.903 1.859	1.963 1.919 1.874	1.980 1.935 1.890	1·997 1·952 1·907	2.013	2.031 1.985 1.939	2.047 2.001 1.955	2.065 2.018 1.971	2·034 1·987	2.098 2.051 2.004	2·115 2·067 2·019	2·132 2·036	2·196 2·149 2·100 2·051 2·002
56 57 58 59 60	1.692 1.647 1.600	1.752 1.766 1.660 1.614 1.567	1.722 1.675 1.629	1.737 1.689 1.642	1.751 1.704 1.656		1.781 1.733 1.684	1.795 1.747 1.699	1.811 1.762 1.713	1.826 1.777 1.727	1·791 1·741	1.855	1.871 1.820 1.770	1.835	1.798
61 62 63 64 65	1.458 1.410 1.362	1.519 1.471 1.423 1.374 1.324	1.485 1.436 1.386	1.497 1.448 1.398	1.210	1.472	1.535 1.485 1.434	1.446	1.562	1.522	1·639 1·587 1·535 1·482 1·428	1.600 1.548 1.494	1.613 1.506	1.572	1.535 1.530
66 67 68 69 70	1.113	1·225 1·174 1·123	1.132 1.132	1·246 1·194 1·143	1.152	1·267 1·214 1·162		1.289 1.182	1.192	1.310 1.256 1.202	1·321 1·266 1·211	1.332 1.276 1.221	1.587	I·353 I·241	1·364 1·307 1·251

		-		-		I	AZIM	UTHS	3.						
Lat.	26°-4	28°-8	26°-8	27°·0	27°·2	27°-4	27°·6	27°-8	28°-0	28°-2	28°-4	28°-6	28°-8	29°-0	29°-2
	R	EDU	CTIO	N TO	TH	Е МЕ	ERID	IAN	AT I	HOUF	R-ANC	GLE	OF 1	MIN	٧.
0 4 8 10 12	3.518 3.509 3.484 3.465 3.441	3.546 3.537 3.511 3.492 3.469	3·574 3·565 3·539 3·519 3·495	3.601 3.592 3.566 3.546 3.522	3.629 3.620 3.594 3.574 3.550	3.648 3.621 3.602	3.684 3.675 3.648 3.628 3.604	3.712 3.703 3.676 3.656 3.631		3.759	3·796 3·786 3·758 3·737 3·712	3.823 3.814 3.786 3.765 3.740	3.851 3.841 3.813 3.793 3.767		3.907 3.897 3.869 3.848 3.822
14 16 18 19 20	3.413 3.382 3.346 3.327 3.306	3·441 3·409 3·373 3·353 3·332	3·467 3·434 3·398 3·378 3·358	3.494 3.461 3.425 3.405 3.384			3.574 3.541 3.504 3.484 3.462	3.601 3.568 3.531 3.510 3.488	3.628 3.594 3.557 3.536 3.514	3.655 3.621 3.583 3.562 3.540	3.610	3.709 3.675 3.636 3.615 3.593	3.736 3.702 3.663 3.641 3.619	3.764 3.729 3.690 3.668 3.646	3.791 3.756 3.716 3.695 3.672
21 22 23 24 25	3.285 3.262 3.238 3.213 3.188	3·310 3·287 3·264 3·239 3·213	3·336 3·313 3·289 3·264 2·238	3·362 3·339 3·315 3·290 3·263	3·387 3·364 3·340 3·315 3·288	3·390 3·366	3.439 3.416 3.391 3.366 3.339	3·465 3·442 3·417 3·391 3·364	3·491 3·467 3·443 3·416 3·389	3.493 3.468 3.442 3.414	3.543 3.519 3.494 3.467 3.440	3·569 3·545 3·519 3·493 3·465	3.595 3.571 3.545 3.518 3.490	3.622 3.596 3.570 3.543 3.515	3.648 3.623 3.597 3.570 3.541
26 27 28 29 30	3·162 3·134 3·106 3·077 3·047	3·187 3·159 3·130 3·101 3·071	3·212 3·184 3·155 3·125 3·095	3·237 3·209 3·179 3·149 3·119	3·262 3·233 3·204 3·174 3·143	3·258 3·228 3·198	3·312 3·283 3·253 3·222 3·191	3·337 3·308 3·277 3·247 3·215	3·362 3·332 3·302 3·271 3·238	3·387 3·357 3·327 3·295 3·263	3.412 3.382 3.351 3.319 3.287	3·436 3·407 3·376 3·344 3·311	3.461 3.431 3.400 3.368 3.335	3·486 3·456 3·425 3·392 3·360	3.512 3.482 3.450 3.418 3.384
31 32 33 34 35	3·016 2·984 2·951 2·917 2·882	3.039 3.007 2.974 2.940 2.905	3.063 3.031 2.997 2.963 2.927	3.020	3·111 3·078 3·043 3·008 2·972	3·067	3·158 3·125 3·090 3·055 3·019	3·182 3·148 3·114 3·078 3·041	3·205 3·171 3·136 3·100 3·064	3·229 3·195 3·159 3·123 3·086	3·219 3·184 3·147	3·277 3·243 3·207 3·170 3·132	3·301 3·266 3·230 3·193 3·155	3·325 3·290 3·254 3·216 3·177	3·349 3·314 3·277 3·239 3·201
36 37 38 39 40	2·847 2·809 2·772 2·734 2·695	2·869 2·832 2·795 2·756 2·716	2·891 2·854 2·816 2·778 2·738	2.914 2.876 2.838 2.799 2.759		2·920 2·881	2.980 2.942 2.903 2.863 2.822	3.004 2.965 2.926 2.885 2.844	3.026 2.987 2.947 2.907 2.864	3.048 3.009 2.969 2.928 2.886	3.070 3.030 2.991 2.949 2.907	3.094 3.053 3.013 2.972 2.929	3·116 3·075 3·035 2·993 2·950	3·138 3·097 3·057 3·015 2·972	3·161 3·120 3·079 3·037 2·994
41 42 43 44 45	2.655 2.614 2.573 2.531 2.488	2.676 2.635 2.593 2.550 2.507		2.718 2.676 2.634 2.591 2.547	2·739 2·697 2·655 2·610 2·566	2.631	2·780 2·738 2·694 2·650 2·605	2·802 2·759 2·714 2·670 2·624		2·844 2·800 2·756 2·710 2·664	2.864 2.821 2.776 2.730 2.684	2·886 2·841 2·796 2·750 2·703	2·907 2·862 2·817 2·770 2·723	2·928 2·883 2·837 2·791 2·743	2.948 2.903 2.857 2.810 2.763
46 47 48 49 50	2·444 2·400 2·354 2·308 2·261	2·463 2·418 2·373 2·327 2·280	2·482 2·437 2·391 2·344 2·297	2·502 2·456 2·410 2·363 2·315	2·521 2·475 2·428 2·381 2·333	2·493 2·446	2·559 2·513 2·465 2·417 2·369	2·578 2·531 2·484 2·435 2·386	2·503 2·453	2.21	2.540 2.491	2.656 2.607 2.558 2.508 2.458	2.676 2.627 2.577 2.527 2.476	2.694 2.645 2.596 2.545 2.494	2·714 2·665 2·615 2·564 2·512
51 52 53 54 55	2·213 2·166 2·117 2·068 2·018	2·231 2·184 2·133 2·084 2·033	2·248 2·200 2·150 2·100 2·049	2.117	2.133	2·301 2·251 2·201 2·150 2·097	2·318 2·269 2·218 2·165 2·113	2·335 2·285 2·234 2·182 2·129		2·371 2·320 2·268 2·214 2·160	2·388 2·336 2·284 2·231 2·177	2·406 2·354 2·301 2·247 2·193	2·423 2·371 2·318 2·264 2·209	2.441 2.389 2.334 2.280 2.225	2.459 2.405 2.351 2.296 2.241
56 57 58 59 60	1.864 1.812	1.879	1.998 1.946 1.894 1.841 1.787	1.961 1.909 1.855	1.976 1.923 1.869	1.992 1.937 1.883	2.006 1.952 1.897	2.021 1.967 1.912	2·036 1·981 1·926	2.051 1.996 1.941	2·122 2·067 2·011 1·955 1·898	2.082 2.026 1.969	2.097 2.041 1.984	2·112 2·056 1·998	2·128 2·070
61 62 63 64 65	I·598	1.665	1.678 1.623 1.566	1.691 1.634 1.578		1·717 1·660 1·603	1.673 1.615	1.685		1.769 1.710 1.651	1·840 1·782 1·723 1·664 1·603	1.795 1.735 1.676	1.809 1.749 1.689	1·821 1·761 1·701	1.894 1.834 1.774 1.713 1.651
66 67 68 69 70	1.561	1.328	1·396 1·338 1·280	1.407 1.348 1.290	1.320	1·429 1·369 1·310	1.440 1.380 1.320	1.331	1.461 1.401 1.340	1.472 1.411 1.350	1.544 1.483 1.421 1.360 1.298	1.432	I.442 I.380	1.516 1.452 1.390	1.464

						I	AZIM	UTHS	S.						
Lat.	29°-4	29°·6	29°-8	30°∙0	30°·2	30°∙4	30°∙6	30°-8	31°·0	31°-2	31°·4	31°-6	31°-8	32°.0	32°-2
	R	EDU	CTIO	N TC	TH	Е МІ	ERID	IAN	AT I	HOUL	R-AN	GLE	OF 1	MII	٧.
0 4 8 10 12	3.935 3.925 3.896 3.875 3.849	3.963 3.953 3.924 3.903 3.876	3.981	4.019 4.009 3.980 3.958 3.958	4.038	4.066 4.036 4.014	4.064 4.042	4.069 4.069	4.110	4.147	4·216 4·206 4·175 4·152 4·124	4·245 4·235 4·203 4·181 4·152	4·273 4·262 4·231 4·208 4·180	4·301 4·290 4·259 4·236 4·207	4·330 4·319 4·287 4·263 4·235
14 16 18 19 20	3.818 3.783 3.743 3.721 3.698	3.845 3.809 3.769 3.747 3.724	3·872 3·836 3·796 3·774 3·750	3.900 3.863 3.823 4.801 3.777	3.849	3.876	3.982 3.945 3.903 3.881 3.857	4.009 3.972 3.930 3.907 3.883	3.933	4.063 4.026 3.983 3.960 3.936		4·119 4·080 4·037 4·013 3·988	4.040		4.094
21 22 23 24 25	3.674 3.649 3.623 3.595 3.566	3.700 3.675 3.648 3.621 3.592	3.726 3.700 3.674 3.646 3.617	3.752 3.727 3.700 3.672 3.643	3.778 3.753 3.726 3.698 3.668	3·804 3·779 3·751 3·723 3·693	3.830 3.804 3.777 3.748 3.718	3.857 3.831 3.804 3.775 3.745	3.884 3.857 3.829 3.800 3.770	3.855 3.826	3.936 3.909 3.881 3.852 3.821	3.907 3.877	3.934 3.904	4.015 3.988 3.959 3.929 3.898	3.955
26 27 28 29 30	3·537 3·507 3·475 3·442 3·409	3.562 3.531 3.499 3.466 3.433	3·587 3·556 3·524 3·490 3·457	3.612 3.581 3.548 3.515 3.481	3·574 3·540	3.663 3.598 3.564 3.530	3.589	3.714 3.682 3.648 3.614 3.579		3.663	3·790 3·757 3·723 3·688 3·651	3.815 3.782 3.747 3.712 3.676	3.841 3.808 3.773 3.737 3.701	3.866 3.832 3.797 3.762 3.725	3.857 3.822 3.786
31 32 33 34 35	3·374 3·338 3·301 3·263 3·223	3·397 3·361 3·324 3·286 3·247	3.421 3.385 3.347 3.309 3.270	3.445 3.409 3.371 3.332 3.293	3.469 3.432 3.394 3.355 3.315	3.494 3.457 3.418 3.379 3.339	3.517 3.480 3.442 3.402 3.362	3·542 3·505 3·466 3·426 3·385	3.566 3.528 3.489 3.449 3.408	3.590 3.552 3.513 3.472 3.431	3.614 3.575 3.536 3.495 3.454	3.638 3.600 3.560 3.519 3.477	3.663 3.623 3.583 3.542 3.500	3.687 3.648 3.607 3.566 3.523	3.711 3.672 3.631 3.589 3.547
36 37 38 39 40	3·184 3·142 3·101 3·058 3·015	3·207 3·165 3·124 3·081 3·036	3·229 3·187 3·145 3·102 3·058	3·252 3·210 3·167 3·123 3·079	3·190 3·146	3.211	3·320 3·277 3·234 3·189 3·144	3·342 3·299 3·256 3·211 3·165	3·366 3·222 3·278 3·233 3·187	3·389 3·344 3·300 3·255 3·208	3.411 3.367 3.323 3.277 3.230	3.434 3.390 3.345 3.299 3.252	3.457 3.412 3.367 3.321 3.273	3·480 3·435 3·389 3·343 3·295	3·458 3·412 3·364
41 42 43 44 45		2·991 2·945 2·898 2·851 2·802	3.012 2.966 2.919 2.871 2.822	3.033 2.987 2.940 2.892 2.843	3.008	3.076 3.029 2.981 2.932 2.882	3.002	3·118 3·070 3·022 2·972 2·921	3·140 3·091 3·043 2·992 2·942		3.134	3·104 3·053	3·225 3·175 3·125 3·074 3·021	3·246 3·197 3·146 3·094 3·042	3.167
46 47 48 49 50	2.633 2.581	2·753 2·703 2·652 2·600 2·548	2·773 2·722 2·671 2·619 2·566	2·793 2·741 2·689 2·637 2·584	3·812 2·760 2·708 2·656 2·602		2·851 2·799 2·745 2·692 2·638	2·870 2·818 2·765 2·711 2·656	2·890 2·837 2·784 2·729 2·674	2.910 2.857 2.802 2.747 2.692	2·821 2·766	2.948 2.895 2.840 2.785 2.729	2.968 2.914 2.859 2.803 2.747	2.988 2.934 2.878 2.822 2.765	3.008 2.952 2.897 2.840 2.783
51 52 53 54 55	2·476 2·423 2·368 2·313 2·257			2·529 2·475 2·419 2·363 2·305	2·436 2·379	2·509 2·452 2·395	2.412	2.486	2.445	2·521 2·462	2·653 2·596 2·538 2·479 2·419	2.613 2.555 2.495		2.589	2·724 2·666 2·606 2·545 2·483
56 57 58 59 60	2·201 2·143 2·085 2·027 1·968	2·158 2·100 2·042		2·189 2·130 2·070	2·204 2·145 2·085	2·160 2·099	2·235 2·174 2·114	2·310 2·250 2·189 2·128 2·066	2.204	2·280 2·219 2·157	2·358 2·296 2·234 2·171 2·108			2·343 2·279 2·216	2·421 2·357 2·294 2·230 2·165
61 62 63 64 65	1.908 1.847 1.786 1.725 1.663	1.922 1.860 1.799 1.737 1.674	1.935 1.874 1.813 1.750 1.687	1.762	1.837	1.786	1.863	2.003 1.940 1.876 1.812 1.746	1.824	1.902 1.836	2.044 1.980 1.914 1.849 1.782	1.927 1.861	2.071 2.006 1.940 1.873 1.805	2.086 2.020 1.953 1.886 1.817	2.099 2.032 1.965 1.898 1.829
66 67 68 69 70	I.474 I.410	1.612 1.548 1.484 1.420 1.354	1.624 1.559 1.494 1.430 1.365	1.506		1.592 1.526 1.461	1·537 1·470	1.548	1.692 1.625 1.558 1.491 1.423	1.636 1.569 1.501	1.511	1.659 1.590 1.522	1.738 1.669 1.600 1.531 1.462	1.611	1·761 1·692 1·622 1·551 1·481

							AZII	MUTI	HS.			-				
Lat.	32°-4	32°-6	32°-8	33°∙0	33°·2	33°·4	33°-6	33°.8	34°·0	34°-2	34°·4	34°-6	34°-8	35°∙0	35°-2	35°∙4
	R	EDU	CTIO	N T	O T	HE I	MERI	[DIA]	N A	ГН	OUR-	ANG	LE (OF 1	MI	N.
0 4 8 10 12	4·36 4·35 4·31 4·29 4·26	4·39 4·38 4·34 4·32 4·29	4·41 4·40 4·37 4·35 4·35	4·44 4·43 4·40 4·38 4·35	4·47 4·46 4·43 4·40 4·37	4·50 4·46 4·46 4·43 4·40	4.53 4.52 4.48 4.46 4.43	4·56 4·51 4·49 4·46	4.59 4.58 4.54 4.54 4.49	4.61 4.60 4.57 4.54 4.51	4.64 4.63 4.60 4.57 4.54	4.67 4.66 4.63 4.60 4.57	4·70 4·69 4·65 4·63 4·60	4·73 4·72 4·68 4·66 4·63	4·76 4·75 4·71 4·69 4·65	4·79 4·78 4·74 4·71 4·68
14 16 18 19 2 0	4.23 4.19 4.14 4.12 4.10	4·26 4·22 4·17 4·15 4·12	4.28 4.24 4.20 4.17 4.15	4·31 4·27 4·23 4·20 4·18	4·34 4·30 4·25 4·23 4·20	4·37 4·33 4·28 4·26 4·23	4·39 4·35 4·31 4·28 4·26	4.42 4.38 4.31 4.31 4.28	4.42 4.31 4.34 4.34	4·48 4·36 4·36 4·34	4·50 4·46 4·42 4·39 4·36	4·53 4·49 4·44 4·42 4·39	4·56 4·52 4·47 4·44 4·42	4·59 4·55 4·50 4·47 4·44	4.62 4.57 4.53 4.50 4.47	4.64 4.60 4.55 4.53 4.50
21 22 23 24 25	4.07 4.04 4.01 3.98 3.95	4·10 4·07 4·04 4·01 3·97	4·12 4·09 4·06 4·03 4·00	4·15 4·06 4·06 4·03	4·17 4·15 4·12 4·08 4·05	4·20 4·17 4·14 4·11 4·08	4.23 4.20 4.14 4.10	4.25 4.23 4.19 4.16 4.13	4·28 4·25 4·22 4·19 4·16	4·31 4·28 4·25 4·22 4·18	4.34 4.31 4.27 4.24 4.21	4·36 4·33 4·30 4·27 4·23	4·39 4·36 4·33 4·29 4·26	4.41 4.38 4.35 4.35 4.32	4.44 4.41 4.35 4.35 4.35	4·47 4·44 4·41 4·37 4·34
26 27 28 29 30	3.92 3.88 3.85 3.81 3.77	3.94 3.91 3.87 3.84 3.80	3.97 3.93 3.90 3.86 3.82	3.99 3.96 3.92 3.89 3.85	4.02 3.98 3.95 3.91 3.87	4.05 4.01 3.97 3.94 3.90	4.07 4.03 4.00 3.96 3.96	4·10 4·06 4·02 3·99 3·95	4·12 4·09 4·05 4·01 3·97	4·15 4·11 4·07 4·04 4·00	4·17 4·14 4·10 4·06 4·06	4·20 4·16 4·12 4·09 4·05	4.22 4.13 4.13 4.14	4.52 4.14 4.18 4.14 4.10	4·28 4·24 4·20 4·16 4·12	4·30 4·27 4·23 4·19 4·15
31 32 33 34 35	3.74 3.70 3.65 3.61 3.57	3·76 3·72 3·68 3·64 3·59	3·78 3·74 3·70 3·66 3·62	3.81 3.77 3.73 3.68 3.64	3·83 3·79 3·75 3·71 3·66	3·86 3·82 3·77 3·73 3·69	3.84 3.80 3.75 3.71	3.87 3.82 3.78 3.73	3.89 3.89 3.85 3.80 3.76	3.96 3.91 3.87 3.83 3.78	3.98 3.94 3.89 3.85 3.80	4.00 3.96 3.92 3.87 3.83	4.03 3.99 3.94 3.85	4.05 4.01 3.97 3.92 3.87	4.08 4.04 3.99 3.94 3.90	4·10 4·06 4·01 3·97 3·92
36 37 38 39 40	3·53 3·48 3·43 3·39 3·34	3·55 3·50 3·46 3·41 3·36	3.57 3.53 3.48 3.43 3.38	3.59 3.50 3.45 3.40	3.62 3.57 3.52 3.48 3.43	3·64 3·59 3·55 3·50 3·45	3.66 3.62 3.57 3.52 3.47	3.69 3.64 3.59 3.54 3.49	3.71 3.66 3.61 3.56 3.51	3.73 3.68 3.64 3.59 3.53	3.76 3.71 3.66 3.61 3.56	3·78 2·73 3·68 3·63 3·58	3.80 3.75 3.70 3.65 3.60	3.83 3.78 3.73 3.68 3.62	3.85 3.80 3.75 3.70 3.65	3.87 3.82 3.77 3.72 3.67
41 42 43 44 45	3·29 3·24 3·19 3·3	3.10 3.16 3.51 3.50	3·33 3·28 3·17 3·12	3·35 3·30 3·25 3·14	3·37 3·32 3·27 3·23 3·16	3.40 3.34 3.29 3.40	3.42 3.36 3.31 3.26 3.42	3.44 3.39 3.33 3.28 3.22	3.46 3.41 3.35 3.30 3.24	3·48 3·43 3·37 3·32 3·26	3·50 3·45 3·40 3·34 3·28	3·53 3·47 3·42 3·36 3·30	3·55 3·49 3·44 3·38 3·32	3·57 3·51 3·46 3·40 3·34	3.59 3.54 3.48 3.42 3.36	3.56 3.56 3.50 3.44 3.38
46 47 48 49 50	3.03 2.97 2.92 2.86 2.80	3.05 2.99 2.93 2.88 2.82	3.07 3.01 2.95 2.90 2.84	3.09 3.03 2.97 2.86	3·11 3·05 2·99 2·93 2·87	3·13 3·07 3·01 2·95 2·89	3·15 3·09 3·03 2·97 2·91	3·17 3·11 3·05 2·99 2·93	3·19 3·07 3·01 2·95	3·20 3·15 3·09 3·03 2·97	3·22 3·17 3·11 3·05 2·98	3·24 3·19 3·13 3·06 3·00	3·27 3·20 3·14 3·08 3·02	3.29 3.10 3.10 3.04	3·31 3·25 3·18 3·12 3·06	3·33 3·26 3·20 3·14 3·08
51 52 53 54 55	2·74 2·68 2·62 2·56 2·50	2·76 2·70 2·64 2·58 2·52	2·78 2·72 2·66 2·59 2·53	2·80 2·74 2·67 2·61 2·55	2·81 2·75 2·69 2·63 2·56	2.83 2.77 2.71 2.64 2.58	2·85 2·79 2·72 2·66 2·60	2.87 2.81 2.74 2.68 2.61	2·89 2·82 2·76 2·69 2·63	2·90 2·84 2·78 2·71 2·65	2·92 2·86 2·79 2·73 2·66	2·94 2·88 2·81 2·75 2·68	2·96 2·89 2·83 2·76 2·70	2.98 2.91 2.85 2.78 2.71	2·99 2·93 2·86 2·80 2·73	3.01 2.95 2.88 2.81 2.75
56 57 58 59 60	2·44 2·37 2·31 2·24 2·18	2·45 2·39 2·32 2·26 2·19	2·47 2·40 2·34 2·27 2·21	2·48 2·42 2·35 2·29 2·22	2·50 2·43 2·37 2·30 2·24	2·52 2·45 2·38 2·32 2·25	2·53 2·47 2·40 2·33 2·26	2·55 2·48 2·41 2·35 2·28	2·56 2·50 2·43 2·36 2·29	2·58 2·51 2·44 2·38 2·31	2.60 2.53 2.46 2.39 2.32	2.61 2.54 2.48 2.41 2.34	2.63 2.56 2.49 2.42 2.35	2.64 2.57 2.51 2.44 2.36	2.66 2.59 2.52 2.45 2.38	2.68 2.61 2.54 2.47 2.39
61 62 63 64 65	2·11 2·05 1·98 1·91 1·84	2·13 2·06 1·99 1·92 1·85	2·14 2·07 2·00 1·93 1·86	2·15 2·08 2·02 1·95 1·88	2·17 2·10 2·03 1·96 1·89	2·18 2·11 2·04 1·97 1·90	2·19 2·13 2·06 1·98 1·91	2·21 2·14 2·07 2·00 1·93	2·22 2·15 2·08 2·01 1·94	2·24 2·17 2·09 2·02 1·95	2·25 2·18 2·11 2·03 1·96	2·26 2·19 2·12 2·05 1·97	2.28 2.21 2.13 2.06 1.99	2·29 2·22 2·15 2·07 2·00	2·31 2·23 2·16 2·09 2·01	2·32 2·25 2·17 2·10 2·02
66 67 68 69 70	1.77 1.70 1.63 1.56 1.49	1·78 1·71 1·64 1·57 1·50	1.80 1.72 1.65 1.58 1.51	1.81 1.74 1.66 1.59 1.52	1.82 1.75 1.67 1.60 1.53	1·83 1·76 1·68 1·61 1·54	1.84 1.77 1.70 1.62 1.55	1.85 1.78 1.71 1.63 1.56	1.86 1.79 1.72 1.64 1.57	1.88 1.80 1.73 1.65 1.58	1.89 1.81 1.74 1.66 1.59	1.90 1.83 1.75 1.67 1.60	1.91 1.84 1.76 1.68 1.61	1.92 1.85 1.77 1.69 1.62	1.93 1.86 1.78 1.70 1.63	1.95 1.87 1.79 1.71 1.64

SHOWING THE REDUCTION AT 1 MIN. FROM THE MERIDIAN CORRESPONDING TO AZIMUTHS FROM 1° TO 60° FROM THE MERIDIAN.

							AZII	MUTI	HS.							
Lat.	35°∙6	35°.8	36°.0	36°-2	36°∙4	36°-6	36°.8	37°∙0	37°.2	37°·4	37°∙6	37°∙8	38°.0	38°.2	38°-4	38°-6
	R	EDU	CTIO	N T	O TI	HE N	IERI	DIA	N A	ГНО	OUR-	ANG	LE ()F i	MII	N.
0 4 8 10 12	4·82 4·80 4·77 4·74 4·71	4·84 4·83 4·80 4·77 4·74	4·87 4·86 4·83 4·80 4·77	4·90 4·89 4·85 4·83 4·80	4.93 4.92 4.88 4.86 4.82	4·96 4·95 4·91 4·89 4·85	4·99 4·98 4·94 4·88	5.02 5.01 4.97 4.94 4.91	5.05 5.04 5.00 4.97 4.94	5.08 5.07 5.03 5.00 4.97	5·00 5·03 5·00	5·14 5·12 5·09 5·06 5·02	5·17 5·15 5·11 5·09 5·05	5·19 5·18 5·14 5·12 5·08	5·22 5·21 5·17 5·14 5·11	5·25 5·24 5·20 5·17 5·14
14 16 18 19 20	4.67 4.63 4.58 4.55 4.55	4.70 4.66 4.61 4.58 4.55	4.73 4.68 4.64 4.61 4.58	4·76 4·71 4·66 4·64 4·61	4·78 4·74 4·69 4·66 4·63	4·81 4·77 4·72 4·69 4·66	4·84 4·80 4·75 4·72 4·69	4·87 4·82 4·77 4·75 4·72	4·90 4·85 4·80 4·77 4·74	4.93 4.88 4.83 4.80 4.77	4.96 4.91 4.86 4.83 4.80	4·98 4·94 4·88 4·86 4·83	5.01 4.96 4.91 4.88 4.85	5.04 4.99 4.91 4.88	5.07 5.02 4.97 4.94 4.91	5·10 5·05 5·00 4·97 4·94
21 22 23 24 25	4·50 4·47 4·43 4·40 4·36	4·52 4·49 4·46 4·43 4·39	4·55 4·52 4·49 4·45 4·42	4·58 4·55 4·51 4·48 4·44	4·60 4·57 4·51 4·47	4.63 4.60 4.57 4.53 4.50	4.66 4.63 4.59 4.56 4.52	4·69 4·65 4·62 4·59 4·55	4.71 4.68 4.65 4.61 4.57	4·74 4·71 4·67 4·64 4·60	4·77 4·74 4·70 4·67 4·63	4·79 4·76 4·73 4·69 4·65	4·82 4·79 4·75 4·72 4·68	4·85 4·82 4·78 4·74 4·71	4·88 4·84 4·81 4·77 4·73	4.90 4.87 4.83 4.80 4.76
26 27 28 29 30	4·33 4·29 4·25 4·21 4·17	4·35 4·32 4·28 4·24 4·20	4·38 4·34 4·30 4·26 4·22	4·4I 4·37 4·33 4·29 4·25	4·43 4·39 4·35 4·31 4·27	4·46 4·42 4·38 4·34 4·30	4·48 4·45 4·41 4·36 4·32	4·51 4·47 4·43 4·39 4·35	4·54 4·50 4·46 4·42 4·37	4·56 4·52 4·48 4·44 4·40	4·59 4·55 4·51 4·47 4·42	4.62 4.58 4.53 4.49 4.45	4.64 4.60 4.56 4.52 4.47	4·67 4·63 4·59 4·54 4·50	4·70 4·65 4·61 4·57 4·52	4.72 4.68 4.64 4.59 4.55
31 32 33 34 35	4·13 4·08 4·04 3·99 3·94	4·15 4·11 4·06 4·02 3·97	4·18 4·04 4·04 3·99	4.20 4.16 4.11 4.06 4.02	4.23 4.18 4.14 4.09 4.04	4·25 4·21 4·16 4·11 4·06	4.28 4.23 4.18 4.14 4.09	4·30 4·26 4·21 4·16 4·11	4.33 4.28 4.23 4.18 4.14	4·35 4·31 4·26 4·21 4·16	4·38 4·33 4·28 4·23 4·18	4·40 4·36 4·31 4·26 4·21	4.43 4.38 4.33 4.28 4.23	4·45 4·41 4·36 4·31 4·26	4.48 4.43 4.38 4.33 4.28	4·50 4·46 4·41 4·36 4·30
36 37 38 39 40	3·90 3·85 3·79 3·74 3·69	3·92 3·87 3·82 3·76 3·71	3.94 3.89 3.84 3.79 3.73	3.97 3.92 3.86 3.81 3.76	3.99 3.94 3.89 3.83 3.78	4.01 3.96 3.91 3.86 3.80	4.04 3.98 3.93 3.88 3.82	4.06 4.01 3.96 3.90 3.84	4.08 4.03 3.98 3.92 3.87	4.05 4.00 3.95 3.89	4·13 4·08 4·02 3·97 3·91	4·16 4·10 4·05 3·99 3·99	4·18 4·12 4·01 4·01 3·96	4·20 4·15 4·09 4·04 3·98	4·23 4·17 4·12 4·06 4·00	4·25 4·20 4·14 4·08 4·02
41 42 43 44 45	3.63 3.58 3.52 3.46 3.40	3.66 2.60 3.54 3.48 3.42	3.68 3.62 3.56 3.51 3.45	3.70 3.64 3.59 3.53 3.47	3·72 3·66 3·61 3·55 3·49	3·74 3·69 3·63 3·57 3·51	3·76 3·71 3·65 3·59 3·53	3·79 3·73 3·67 3·61 3·55	3.81 3.75 3.69 3.63 3.57	3·83 3·77 3·71 3·65 3·59	3.85 3.79 3.73 3.67 3.61	3.88 3.82 3.76 3.69 3.63	3.90 3.84 3.78 3.72 3.65	3·92 3·86 3·80 3·74 3·67	3.94 3.88 3.82 3.76 3.69	3.96 3.90 3.84 3.78 3.71
46 47 48 49 50	3°34 3°28 3°22 3°16 3°10	3·36 3·30 3·24 3·18 3·11	3·39 3·32 3·26 3·20 3·13	3.41 3.34 3.28 3.22 3.15	3.43 3.36 3.30 3.23 3.17	3.45 3.38 3.32 3.25 3.19	3.47 3.40 3.34 3.27 3.21	3.49 3.42 3.36 3.29 3.23	3.51 3.44 3.38 3.31 3.24	3·53 3·46 3·40 3·33 3·26	3.55 3.48 3.42 3.35 3.28	3·57 3·50 3·44 3·37 3·30	3·59 3·52 3·46 3·39 3·32	3.61 3.54 3.48 3.41 3.34	3.63 3.56 3.49 3.43 3.36	3.65 3.58 3.51 3.45 3.38
51 52 53 54 55	3.03 2.97 2.90 2.83 2.76	3.05 2.98 2.91 2.85 2.78	3.07 3.00 2.93 2.86 2.79	3.08 3.02 2.95 2.88 2.81	3·10 3·04 2·97 2·90 2·83	3·12 3·05 2·98 2·91 2·84	3·14 3·07 3·00 2·93 2·86	3·16 3·09 3·02 2·95 2·88	3·18 3·11 3·04 2·97 2·90	3·19 3·13 3·05 2·98 2·91	3·21 3·14 3·07 3·00 2·93	3·23 3·16 3·09 3·02 2·94	3·25 3·18 3·11 3·04 2·96	3·27 3·20 3·13 3·05 2·98	3·29 3·22 3·14 3·07 3·00	3·31 3·23 3·16 3·09 3·01
56 57 58 59 60	2.69 2.62 2.55 2.48 2.41	2·71 2·64 2·57 2·49 2·42	2·72 2·65 2·58 2·51 2·44	2.74 2.67 2.60 2.52 2.45	2.76 2.69 2.61 2.54 2.47	2·77 2·70 2·63 2·55 2·48	2·79 2·72 2·64 2·57 2·49	2·81 2·73 2·66 2·58 2·51	2.82 2.75 2.67 2.60 2.52	2·84 2·76 2·69 2·61 2·54	2.86 2.78 2.71 2.63 2.55	2 87 2·80 2·72 2·64 2·57	2·89 2·81 2·74 2·66 2·58	2·90 2·83 2·75 2·67 2·60	2·92 2·84 2·77 2·69 2·61	2.94 2.86 2.78 2.70 2.63
61 62 63 64 65	2:33 2:26 2:19 2:11 2:03	2·35 2·27 2·20 2·12 2·05	2·36 2·29 2·21 2·14 2·06	2·38 2·30 2·22 2·15 2·07	2·39 2·31 2·24 2·16 2·08	2·40 2·33 2·25 2·17 2·10	2·42 2·34 2·26 2·19 2·11	2·43 2·36 2·28 2·20 2·12	2·45 2·37 2·29 2·21 2·13	2·46 2·38 2·30 2·23 2·14	2·48 2·40 2·32 2·24 2·16	2:49 2:41 2:33 2:25 2:17	2·50 2·42 2·34 2·26 2·18	2·52 2·44 2·36 2·28 2·19	2·53 2·45 2·37 2·29 2·21	2·55 2·47 2·38 2·30 2·22
66 67 68 69 70	1.96 1.88 1.80 1.73 1.65	1.97 1.89 1.81 1.74 1.66	1.98 1.90 1.82 1.75 1.67	1.99 1.91 1.84 1.76 1.68	2.01 1.93 1.85 1.77 1.69	2:02 1:94 1:86 1:78 1:70	2·03 1·95 1·87 1·79 1·71	2.04 1.96 1.88 1.80	2.05 1.97 1.89 1.81 1.73	2.06 1.98 1.90 1.82 1.74	2.08 2.00 1.91 1.83 1.75	2·09 2·01 1·92 1·84 1·76	2·10 2·02 1·93 1·85	2·11 2·03 1·95 1·86 1·78	2·12 2·04 1·96 1·87 1·79	2·14 2·05 1·97 1·88 1·80

		1					AZIN	IUTI	IS.							
Lat.	38°.8	39°.0	39°-2	39°·4	39°⋅6	39°-8	40°·0	40°-2	40°·4	40°·6	40°∙8	41°·0	41°-2	41°-4	41°-6	41°-8
	R	EDU	CTIO	N T	ОТІ	HE N	MER	[DIA]	N A	L H	OUR-	ANG	LE (OF 1	MI	٧.
0 4 8 10 12	5·28 5·27 5·23 5·20 5·17	5·31 5·30 5·26 5·23 5·20	5·34 5·33 5·29 5·26 5·22	5·37 5·36 5·32 5·29 5·25	5·40 5·39 5·35 5·32 5·28	5.43 5.42 5.38 5.35 5.31	5·46 5·45 5·41 5·38 5·34	5.49 5.48 5.43 5.41 5.37	5.52 5.51 5.46 5.43 5.40	5·55 5·54 5·46 5·43	5.58 5.56 5.52 5.49 5.46	5.61 5.59 5.55 5.52 5.49	5.64 5.62 5.58 5.55 5.51	5.67 5.65 5.61 5.58 5.54	5.70 5.68 5.64 5.61 5.57	5.73 5.71 5.67 5.64 5.60
14 16 18 19 20	5·12 5·08 5·02 4·99 4·96	5·15 5·05 5·02 4·99	5·18 5·13 5·08 5·05 5·02	5·21 5·16 5·11 5·08 5·05	5.24 5.19 5.14 5.11 5.07	5·27 5·22 5·16 5·13 5·10	5·30 5·25 5·19 5·16 5·13	5·33 5·28 5·22 5·19 5·16	5·35 5·31 5·25 5·22 5·19	5·38 5·33 5·28 5·25 5·21	5·41 5·36 5·30 5·27 5·24	5°44 5°39 5°33 5°30 5°27	5·47 5·42 5·36 5·33 5·30	5·50 5·45 5·36 5·36 5·33	5.53 5.48 5.42 5.39 5.35	5.56 5.51 5.45 5.42 5.38
21 22 23 24 25	4·93 4·90 4·86 4·82 4·79	4·96 4·92 4·89 4·85 4·81	4·99 4·95 4·92 4·88 4·84	5.01 4.98 4.91 4.87	5.04 5.01 4.97 4.93 4.89	5.07 5.03 5.00 4.96 4.92	5·10 5·06 5·03 4·99 4·95	5·12 5·09 5·05 5·01 4·97	5·15 5·12 5·08 5·04 5·00	5·18 5·14 5·11 5·07 5·03	5.21 5.17 5.13 5.10 5.06	5·24 5·20 5·16 5·12 5·08	5·26 5·23 5·19 5·15 5·11	5·29 5·26 5·22 5·18 5·14	5·32 5·28 5·24 5·20 5·16	5·35 5·31 5·27 5·23 5·19
26 27 28 29 30	4·75 4·71 4·66 4·62 4·57	4·77 4·73 4·69 4·64 4·60	4·80 4·76 4·72 4·67 4·63	4·83 4·78 4·74 4·70 4·65	4·85 4·81 4·77 4·72 4·68	4·88 4·84 4·79 4·75 4·70	4.91 4.86 4.82 4.77 4.73	4.93 4.89 4.85 4.80 4.75	4.96 4.92 4.87 4.83 4.78	4.99 4.94 4.90 4.85 4.81	5.01 4.97 4.93 4.88 4.88	5.04 5.00 4.95 4.90 4.86	5.07 5.02 4.98 4.93 4.88	5.09 5.05 5.00 4.96 4.96	5·12 5·08 5·03 4·98 4·93	5·15 5·10 5·06 5·01 4·96
31 32 33 34 35	4.53 4.48 4.43 4.38 4.33	4.55 4.50 4.45 4.40 4.35	4·58 4·53 4·48 4·43 4·38	4.60 4.55 4.50 4.45 4.40	4.63 4.58 4.53 4.48 4.42	4.65 4.60 4.55 4.50 4.45	4.68 4.63 4.58 4.53 4.47	4.70 4.65 4.60 4.55 4.50	4.73 4.68 4.63 4.57 4.52	4·76 4·70 4·65 4·60 4·54	4·78 4·73 4·68 4·62 4·57	4·81 4·76 4·70 4·65 4·59	4·83 4·78 4·73 4·67 4·62	4·86 4·81 4·75 4·70 4·64	4·88 4·83 4·78 4·72 4·67	4.86 4.80 4.75 4.69
36 37 38 39 40	4·27 4·22 4·16 4·10 4·05	4·30 4·24 4·18 4·13 4·07	4·32 4·27 4·21 4·15 4·09	4·35 4·29 4·23 4·17 4·17	4·37 4·31 4·25 4·20 4·14	4·39 4·34 4·28 4·22 4·16	4·42 4·36 4·30 4·24 4·18	4·44 4·38 4·32 4·27 4·27	4·46 4·41 4·35 4·29 4·23	4·49 4·43 4·37 4·31 4·25	4·51 4·45 4·40 4·33 4·27	4·54 4·48 4·42 4·36 4·30	4·56 4·50 4·44 4·38 4·32	4·59 4·53 4·47 4·40 4·34	4.61 4.55 4.49 4.43 4.36	4·63 4·57 4·51 4·45 4·39
41 42 43 44 45	3·99 3·93 3·86 3·80 3·74	4.01 3.95 3.88 3.82 3.76	4.03 3.97 3.91 3.84 3.78	4.05 3.99 3.93 3.86 3.80	4.07 4.01 3.95 3.88 3.82	4·10 4·03 3·97 3·91 3·84	4·12 4·06 3·99 3·93 3·86	4·14 4·08 4·01 3·95 3·88	4·16 4·10 4·04 3·97 3·90	4·19 4·12 4·06 3·99 3·99	4·21 4·14 4·08 4·01 3·94	4·23 4·17 4·10 4·03 3·97	4·25 4·19 4·12 4·06 3·99	4.28 4.21 4.15 4.08 4.01	4·30 4·23 4·17 4·10 4·03	4·32 4·26 4·19 4·12 4·05
46 47 48 49 50	3.67 3.60 3.53 3.46 3.39	3.69 3.62 3.55 3.48 3.41	3.71 3.64 3.57 3.50 3.43	3.73 3.66 3.59 3.52 3.45	3.75 3.68 3.61 3.54 3.47	3.77 3.70 3.63 3.56 3.49	3·79 3·72 3·65 3·58 3·51	3.81 3.74 3.67 3.60 3.53	3·83 3·76 3·69 3·62 3·55	3·85 3·78 3·71 3·64 3·57	3·87 3·80 3·73 3·66 3·59	3.90 3.82 3.75 3.68 3.60	3.92 3.85 3.77 3.70 3.62	3.94 3.87 3.79 3.72 3.64	3·96 3·89 3·81 3·74 3·66	3.98 3.91 3.83 3.76 3.68
51 52 53 54 55	3·32 3·25 3·10 3·10	3·34 3·27 3·20 3·12 3·05	3·36 3·29 3·14 3·06	3·38 3·31 3·23 3·16 3·08	3·40 3·32 3·25 3·17 3·10	3.42 3.34 3.27 3.19 3.11	3.43 3.36 3.28 3.21 3.13	3.45 3.38 3.30 3.23 3.15	3·47 3·40 3·32 3·24 3·16	3.49 3.42 3.34 3.26 3.18	3·51 3·43 3·36 3·28 3·20	3.53 3.45 3.37 3.30 3.22	3·55 3·47 3·39 3·31 3·23	3·57 3·49 3·41 3·33 3·25	3·59 3·51 3·43 3·35 3·27	3.60 3.53 3.45 3.37 3.29
56 57 58 59 60	2.95 2.88 2.80 2.72 2.64	2.97 2.89 2.81 2.74 2.66	2·99 2·91 2·83 2·75 2·67	3.00 2.92 2.85 2.77 2.68	3.02 2.94 2.86 2.78 2.70	3.04 2.96 2.88 2.80 2.71	3.05 2.97 2.89 2.81 2.73	3.07 2.99 2.91 2.83 2.74	3.09 3.01 2.92 2.84 2.76	3·10 3·02 2·94 2·86 2·77	3·12 3·04 2·96 2·87 2·79	3·14 3·05 2·97 2·89 2·80	3·15 3·07 2·99 2·90 2·82	3·17 3·09 3·00 2·92 2·83	3·19 3·10 3·02 2·93 2·85	3·20 3·12 3·04 2·95 2·86
61 62 63 64 65	2·56 2·48 2·40 2·32 2·23	2·57 2·49 2·41 2·33 2·24	2·59 2·51 2·42 2·34 2·26	2·60 2·52 2·44 2·35 2·27	2.62 2.54 2.45 2.37 2.28	2.63 2.55 2.46 2.38 2.29	2.65 2.56 2.48 2.39 2.31	2.66 2.58 2.49 2.41 2.32	2.67 2.59 2.50 2.42 2.33	2.69 2.60 2.52 2.43 2.34	2·70 2·62 2·53 2·45 2·36	2·72 2·63 2·55 2·46 2·37	2·73 2·65 2·56 2·47 2·38	2·75 2·66 2·57 2·48 2·39	2·76 2·67 2·59 2·50 2·41	2·78 2·69 2·60 2·51 2·42
66 67 68 69 70	2·15 2·06 1·98 1·89 1·81	2·16 2·07 1·99 1·90 1·82	2·17 2·09 2·00 1·91 1·83	2·18 2·10 2·01 1·92 1·84	2·20 2·11 2·02 1·93 1·85	2·21 2·12 2·03 1·94 1·86	2·22 2·13 2·05 1·96 1·87	2·23 2·15 2·06 1·97 1·88	2·24 2·16 2·07 1·98 1·89	2·26 2·17 2·08 1·99 1·90	2·27 2·18 2·09 2·00 1·91	2·28 2·19 2·10 2·01 1·92	2·29 2·20 2·11 2·02 1·93	2·30 2·21 2·12 2·03 1·94	2·32 2·23 2·13 2·04 1·95	2·33 2·24 2·15 2·05 1·96

SHOWING THE REDUCTION AT 1 MIN. FROM THE MERIDIAN CORRESPONDING TO AZIMUTHS FROM 1° TO 60° FROM THE MERIDIAN.

							AZI	MUT	HS.					-		
Lat.	42°-0	42°-2	42°-4	42°-6	42°-8	43°·0	43°-2	43°-4	43°-6	43°-8	44°·0	44°-2	44°-4	44°-6	44°-8	45°∙0
	R	EDU	CTIC	N I	T O	HE I	MER	IDIA	N A	ТН	OUR	-ANG	LE	OF 1	MI	N.
° 0 4 8 10 12	5·76 5·74 5·70 5·67 5·63	5·79 5·77 5·73 5·70 5·66	5·82 5·80 5·76 5·73 5·69	5.85 5.83 5.79 5.76 5.72	5.88 5.86 5.82 5.79 5.75	5.91 5.89 5.85 5.82 5.78	5.94 5.92 5.88 5.85 5.81	5.97 5.95 5.91 5.88 5.84	6.00 5.99 5.91 5.91 5.87	6·03 6·02 5·97 5·94 5·90	6.06 6.05 6.00 5.97 5.93	6.09 6.08 6.03 6.00 5.96	6·12 6·03 6·03 5·99	6·15 6·14 6·09 6·06 6·02	6·18 6·17 6·12 6·09 6·05	6·21 6·20 6·15 6·12 6·08
14 16 18 19 20	5·59 5·53 5·48 5·44 5·41	5.62 5.56 5.50 5.47 5.44	5.65 5.59 5.53 5.50 5.47	5.67 5.62 5.56 5.53 5.50	5·70 5·65 5·59 5·56 5·52	5.73 5.68 5.62 5.59 5.55	5·76 5·71 5·65 5·61 5·58	5·79 5·74 5·68 5·64 5·61	5·82 5·77 5·70 5·67 5·64	5.85 5.80 5.73 5.70 5.67	5.88 5.83 5.76 5.73 5.69	5.91 5.85 5.79 5.76 5.72	5.88 5.82 5.79 5.75	5.97 5.91 5.85 5.82 5.78	6.00 5.94 5.88 5.85 5.81	6·03 5·97 5·91 5·87 5·84
21 22 23 24 25	5·37 5·34 5·30 5·26 5·22	5·40 5·36 5·33 5·29 5·24	5·43 5·39 5·35 5·31 5·27	5·46 5·42 5·38 5·34 5·30	5·49 5·45 5·41 5·37 5·33	5·52 5·48 5·44 5·40 5·35	5.54 5.51 5.47 5.42 5.38	5.57 5.53 5.49 5.45 5.41	5.60 5.56 5.52 5.48 5.44	5.63 5.59 5.55 5.46	5.66 5.62 5.58 5.54 5.49	5.69 5.65 5.61 5.56 5.52	5·71 5·67 5·63 5·59 5·55	5·74 5·70 5·66 5·62 5·58	5·77 5·73 5·69 5·65 5·60	5·80 5·76 5·72 5·68 5·63
26 27 28 29 30	5·17 5·08 5·04 4·99	5·20 5·16 5·11 5·06 5·01	5·23 5·18 5·14 5·09 5·04	5·26 5·21 5·16 5·11 5·06	5·28 5·24 5·19 5·14 5·09	5·31 5·26 5·22 5·17 5·12	5·34 5·29 5·24 5·19 5·14	5·36 5·32 5·27 5·22 5·17	5·39 5·35 5·30 5·25 5·20	5·42 5·37 5·32 5·27 5·22	5.45 5.40 5.35 5.30 5.25	5.47 5.43 5.38 5.33 5.27	5·50 5·45 5·40 5·35 5·30	5.53 5.48 5.43 5.38 5.38	5·56 5·51 5·46 5·41 5·35	5·58 5·54 5·49 5·43 5·38
31 32 33 34 35	4.94 4.88 4.83 4.77 4.72	4.96 4.91 4.85 4.80 4.74	4.99 4.93 4.88 4.82 4.77	5.01 4.96 4.90 4.85 4.79	5.04 4.98 4.93 4.87 4.82	5.06 5.01 4.95 4.90 4.84	5.09 5.04 4.98 4.92 4.86	5·12 5·06 5·01 4·95 4·89	5·14 5·09 5·03 4·97 4·91	5·17 5·11 5·06 5·00 4·94	5·19 5·14 5·08 5·02 4·96	5·22 5·16 5·11 5·05 4·99	5·25 5·19 5·07 5·01	5·27 5·22 5·16 5·10 5·04	5·30 5·24 5·13 5·06	5·33 5·27 5·15 5·09
36 37 38 39 40	4·66 4·60 4·54 4·47 4·41	4.68 4.62 4.56 4.50 4.43	4.71 4.65 4.58 4.52 4.46	4·73 4·67 4·61 4·54 4·48	4.76 4.69 4.63 4.57 4.50	4·78 4·72 4·66 4·59 4·53	4·80 4·74 4·68 4·62 4·55	4·83 4·77 4·70 4·64 4·57	4·85 4·79 4·73 4·66 4·60	4.88 4.82 4.75 4.69 4.62	4·90 4·84 4·77 4·71 4·64	4·93 4·86 4·80 4·73 4·67	4·95 4·89 4·82 4·76 4·69	4·98 4·91 4·85 4·78 4·71	5.00 4.94 4.87 4.80 4.74	5·03 4·96 4·90 4·83 4·76
41 42 43 44 45	4·35 4·28 4·21 4·14 4·07	4·37 4·30 4·23 4·16 4·09	4·39 4·32 4·18 4·11	4.41 4.35 4.28 4.21 4.13	4.44 4.37 4.30 4.23 4.16	4·46 4·39 4·32 4·25 4·18	4·48 4·41 4·34 4·27 4·20	4·50 4·44 4·37 4·29 4·22	4·53 4·46 4·39 4·32 4·24	4·55 4·48 4·41 4·34 4·26	4.57 4.50 4.43 4.36 4.28	4.60 4.53 4.45 4.38 4.31	4·62 4·55 4·48 4·40 4·33	4·64 4·57 4·50 4·42 4·35	4·67 4·59 4·52 4·45 4·37	4·69 4·62 4·54 4·47 4·39
46 47 48 49 50	4.00 3.93 3.85 3.78 3.70	4.02 3.95 3.87 3.80 3.72	4.04 3.97 3.89 3.82 3.74	4.06 3.99 3.91 3.84 3.76	4.08 4.01 3.93 3.86 3.78	4·10 4·03 3·95 3·88 3·80	4·12 4·05 3·97 3·90 3·82	4·15 4·07 3·99 3·92 3·84	4·17 4·09 4·01 3·94 3·86	4·19 4·11 4·03 3·96 3·88	4·21 4·13 4·05 3·97 3·90	4·23 4·15 4·08 4·00 3·91	4·25 4·17 4·10 4·01 3·93	4·27 4·20 4·12 4·04 3·95	4·29 4·22 4·14 4·06 3·97	4·32 4·24 4·16 4·08 3·99
51 52 53 54 55	3.62 3.54 3.47 3.38 3.30	3.64 3.56 3.48 3.40 3.32	3.66 3.58 3.50 3.42 3.34	3.68 3.60 3.52 3.44 3.35	3·70 3·62 3·54 3·45 3·37	3·72 3·64 3·56 3·47 3·39	3.74 3.66 3.57 3.49 3.41	3·76 3·67 3·59 3·51 3·42	3·77 3·69 3·61 3·53 3·44	3·79 3·71 3·63 3·54 3·46	3·81 3·73 3·65 3·56 3·47	3·83 3·75 3·67 3·58 3·49	3·85 3·77 3·68 3·60 3·51	3·87 3·79 3·70 3·62 3·53	3·89 3·81 3·72 3·63 3·55	3·91 3·82 3·74 3·65 3·56
56 57 58 59 60	3·05 2·96	3·24 3·15 3·07 2·98 2·89	3·25 3·17 3·08 3·00 2·91	3·27 3·18 3·10 3·01 2·92	3·29 3·20 3·11 3·03 2·94	3·30 3·22 3·13 3·04 2·95	3·32 3·23 3·15 3·06 2·97	3·34 3·25 3·16 3·07 2·98	3·35 3·27 3·18 3·09 3·00	3·37 3·28 3·20 3·10 3·01	3·39 3·30 3·21 3·12 3·03	3·41 3·32 3·23 3·14 3·04	3·42 3·33 3·24 3·15 3·06	3·44 3·35 3·26 3·17 3·08	3·46 3·37 3·28 3·18 3·09	3·47 3·38 3·29 3·20 3·11
61 62 63 64 65	2·70 2·61 2·52	2·81 2·72 2·63 2·54 2·45	2·82 2·73 2·64 2·55 2·46	2·84 2·75 2·66 2·56 2·47	2·85 2·76 2·67 2·58 2·48	2·86 2·77 2·68 2·59 2·50	2·88 2·79 2·70 2·60 2·51	2·89 2·80 2·71 2·62 2·52	2·91 2·82 2·72 2·63 2·53	2·92 2·83 2·74 2·64 2·55	2·94 2·84 2·75 2·66 2·56	2·95 2·86 2·76 2·67 2·57		2·98 2·89 2·79 2·70 2·60	3.00 2.90 2.81 2.71 2.61	3·01 2·92 2·82 2·72 2·63
66 67 68 69 70	2·25 2·16 2·06	2·35 2·26 2·17 2·07 1·98		2·38 2·28 2·19 2·10 2·00		2·40 2·31 2·21 2·12 2·02	2·42 2·32 2·22 2·13 2·03		2.12	2·45 2·36 2·26 2·16 2·06	2·46 2·37 2·27 2·17 2·07	2·48 2·38 2·28 2·18 2·08	2·39 2·29 2·19	2·50 2·40 2·30 2·20 2·10	2.32	2·53 2·43 2·33 2·23 2·12

						A	AZIM	UTHS	S.						
Lat.	45°·1	45° ⋅2	45°·3	45°-4	45°-5	45°-6	45°·7	45° ⋅8	45° ∙9	46°· 0	46°·1	46°-2	46°-3	46°·4	46°-5
	R	EDU	CTIO	N TO) TH	E M	ERID	IAN	AT :	HOU	R-AN	GLE	OF 1	MII	N.
0 2 4 6 8	6·23 6·22 6·21 6·19 6·17	6·24 6·24 6·23 6·21 6·18	6·26 6·25 6·24 6·22 6·20	6·27 6·27 6·26 6·24 6·21	6·29 6·29 6·27 6·25 6·23	6·31 6·30 6·29 6·27 6·24	6·32 6·32 6·31 6·29 6·26	6·34 6·33 6·32 6·30 6·27	6·35 6·35 6·34 6·32 6·29	6·37 6·36 6·35 6·33 6·31	6·38 6·38 6·37 6·35 6·32	6·40 6·39 6·38 6·36 6·34	6.41 6.40 6.38 6.35	6·43 6·42 6·41 6·39 6·37	6·44 6·44 6·43 6·41 6·38
9	6·15	6·17	6·18	6·20	6·21	6·23	6·24	6·26	6·27	6·29	6·30	6·32	6·33	6·35	6·37
10	6·13	6·15	6·16	6·18	6·19	6·21	6·23	6·24	6·26	6·27	6·29	6·30	6·32	6·33	6·35
11	6·11	6·13	6·14	6·16	6·17	6·19	6·21	6·22	6·24	6·25	6·27	6·28	6·30	6·31	6·33
12	6·09	6·11	6·12	6·14	6·15	6·17	6·18	6·20	6·21	6·23	6·24	6·26	6·27	6·29	6·30
13	6·07	6·08	6·10	6·11	6·13	6·14	6·16	6·17	6·19	6·20	6·22	6·23	6·25	6·26	6·28
14	6.04	6.06	6.07	6.09	6·10	6·12	6·13	6·15	6·16	6·18	6·19	6·21	6·22	6·24	6·25
15	6.02	6.03	6.05	6.06	6·08	6·09	6·10	6·12	6·13	6·15	6·16	6·18	6·19	6·21	6·22
16	5.99	6.00	6.02	6.03	6·05	6·06	6·08	6·09	6·11	6·12	6·14	6·15	6·17	6·18	6·20
17	5.96	5.97	5.99	6.00	6·02	6·03	6·04	6·06	6·07	6·09	6·10	6·12	6·13	6·15	6·16
18	5.92	5.94	5.95	5.97	5·98	6·00	6·01	6·03	6·04	6·05	6·07	6·08	6·10	6·11	6·13
19	5.89	5.90	5·92	5.93	5.95	5.96	5.98	5.99	6.01	6.02	6·03	6.05	6.06	6.08	6.09
20	5.85	5.87	5·88	5.90	5.91	5.93	5.94	5.95	5.97	5.98	6·00	6.01	6.03	6.04	6.06
21	5.81	5.83	5·84	5.86	5.87	5.89	5.90	5.91	5.93	5.94	5·96	5.97	5.99	6.00	6.02
22	5.77	5.79	5·80	5.82	5.83	5.85	5.86	5.87	5.89	5.90	5·92	5.93	5.95	5.96	5.98
23	5.73	5.75	5·76	5.78	5.79	5.80	5.82	5.83	5.85	5.86	5·88	5.89	5.90	5.92	5.93
24	5.69	5.70	5·72	5.73	5.75	5.76	5.77	5.79	5.80	5.82	5·83	5.84	5.86	5.87	5.89
25	5.65	5.66	5.67	5.69	5.70	5.71	5.73	5.74	5.76	5·77	5·78	5·80	5.81	5·83	5.84
26	5.60	5.61	5.63	5.64	5.65	5.67	5.68	5.70	5.71	5·72	5·74	5·75	5.76	5·78	5.79
27	5.55	5.56	5.58	5.59	5.60	5.62	5.63	5.65	5.66	5·67	5·69	5·70	5.71	5·73	5.74
28	5.50	5.51	5.53	5.54	5.55	5.57	5.58	5.59	5.61	5·62	5·64	5·65	5.66	5·68	5.69
29	5.45	5.46	5.47	5.49	5.50	5.52	5.53	5.54	5.56	5·57	5·58	5·60	5.61	5·62	5.64
30	5.39	5.41	5.42	5.43	5.45	5.46	5.47	5.49	5.50	5·51	5·53	5·54	5.55	5·57	5.58
						1	AZIM	UTH	5.						
Lat.	46°-6	46°.7	46°-8	46°-9	47°.0	47°·1	47°-2	47°-3	47°-4	47°-5	47°-6	47°-7	47°-8	47°-9	48°-0
	R	EDU	CTIO	N TO) TH	E M	ERID	IAN	AT	HOU.	R-AN	GLE	OF :	r MII	N.
0 2 4 6 8	6·46 6·46 6·44 6·42 6·40	6·48 6·47 6·46 6·44 6·41	6·49 6·49 6·48 6·46 6·43	6.51 6.50 6.49 6.47 6.44	6·52 6·52 6·51 6·49 6·46	6·54 6·53 6·52 6·50 6·47	6.55 6.55 6.54 6.52 6.49	6·57 6·56 6·55 6·53 6·51	6.58 6.58 6.57 6.55 6.55	6.60 6.60 6.58 6.56 6.54	6.62 6.61 6.60 6.58 6.55	6.63 6.63 6.62 6.59 6.57	6.65 6.64 6.63 6.61 6.58	6.66 6.65 6.63 6.60	6.68 6.67 6.66 6.64 6.61
9	6·38	6·40	6·41	6.43	6·44	6·46	6·47	6·49	6·50	6·52	6·53	6.55	6.56	6·58	6.60
10	6·36	6·38	6·39	6.41	6·42	6·44	6·45	6·47	6·48	6·50	6·51	6.53	6.55	6·56	6.58
11	6·34	6·36	6·37	6.39	6·40	6·42	6·43	6·45	6·46	6·48	6·49	6.51	6.53	6·54	6.56
12	6·32	6·33	6·35	6.36	6·38	6·40	6·41	6·43	6·44	6·46	6·47	6.49	6.50	6·52	6.53
13	6·29	6·31	6·32	6.34	6·35	6·37	6·38	6·40	6·42	6·43	6·45	6.46	6.48	6·49	6.51
14	6·27	6·28	6·30	6·31	6·33	6·34	6·36	6·37	6·39	6·40	6·42	6·43	6.45	6·47	6·48
15	6·24	6·25	6·27	6·28	6·30	6·31	6·33	6·34	6·36	6·37	6·39	6·40	6.42	6·44	6·45
16	6·21	6·23	6·24	6·25	6·27	6·28	6·30	6·31	6·33	6·34	6·36	6·37	6.39	6·41	6·42
17	6·18	6·19	6·21	6·22	6·24	6·25	6·27	6·28	6·30	6·31	6·33	6·34	6.36	6·37	6·39
18	6·14	6·16	6·17	6·19	6·20	6·22	6·23	6·25	6·26	6·28	6·29	6·31	6.32	6·34	6·35
19	6·11	6·12	6·14	6·15	6·17	6·18	6·20	6·21	6·23	6.24	6·26	6·27	6·28	6·30	6·31
20	6·07	6·09	6·10	6·11	6·13	6·14	6·16	6·17	6·19	6.20	6·22	6·23	6·25	6·26	6·27
21	6·03	6·05	6·06	6·07	6·09	6·10	6·12	6·13	6·15	6.16	6·18	6·19	6·20	6·22	6·23
22	5·99	6·00	6·02	6·03	6·05	6·06	6·08	6·09	6·11	6.12	6·13	6·15	6·16	6·18	6·19
23	5·95	5·96	5·98	5·99	6·00	6·02	6·03	6·05	6·06	6.08	6·09	6·10	6·12	6·13	6·15
24	5·90	5·92	5·93	5·94	5·96	5·97	5·99	6·00	6·01	6.03	6·04	6·06	6·07	6 09	6·10
25	5.86	5·87	5·88	5·90	5.91	5·93	5·94	5·95	5·97	5·98	6.00	6·01	6 02	6·04	6.05
26	5.81	5·82	5·83	5·85	5.86	5·88	5·89	5·90	5·92	5·93	5.95	5·96	5.97	5·99	6.00
27	5.76	5·77	5·78	5·80	5.81	5·83	5·84	5·85	5·87	5·88	5.89	5·91	5.92	5·94	5.95
28	5.70	5·72	5·73	5·75	5.76	5·77	5·79	5·80	5·81	5·83	5.84	5·86	5.87	5·88	5.90
29	5.65	5·66	5·68	5·69	5.70	5·72	5·73	5·75	5·76	5·77	5.79	5·80	5.81	5·83	5.84
30	5.59	5·61	5·62	5·63	5.65	5·66	5·67	5·69	5·70	5·72	5.73	5·74	5.76	5·77	5.78

						A	AZIM	UTHS	S.						
Lat.	48°·1	48°-2	48°-3	48°-4	48°∙5	48°-6	48°-7	4 8°⋅8	48°-9	49°-0	49°·1	49°-2	49°-3	49°-4	49°-5
	R	EDU	CTIO	N TO) TH	E MI	ERID	IAN	AT I	HOUE	R-AN	GLE	OF 1	MIN	٧.
°0 2 4 6 8	6.69 6.69 6.68 6.66 6.63	6.71 6.71 6.69 6.67 6.64	6·73 6·72 6·71 6·69 6·66	6·74 6·74 6·73 6·70 6·68	6·76 6·75 6·74 6·72 6·69	6·77 6·77 6·76 6·74 6·71	6·79 - 6·78 6·77 6·75 6·72	6·80 6·80 6·79 6·77 6·74	6.82 6.82 6.80 6.78 6.75	6.84 6.83 6.82 6.80 6.77	6.85 6.85 6.84 6.81 6.79	6.87 6.86 6.85 6.83 6.80	6.88 6.88 6.87 6.85 6.82	6.90 6.89 6.88 6.86 6.83	6.91 6.90 6.88 6.85
9	6.61	6.63	6.64	6.66	6.67	6.69	6·70	6·72	6·74	6·75	6·77	6·78	6·80	6.81	6·83
10	6.59	6.61	6.62	6.64	6.65	6.67	6·68	6·70	6·72	6·73	6·75	6·76	6·78	6.79	6·81
11	6.57	6.59	6.60	6.62	6.63	6.65	6·66	6·68	6·69	6·71	6·73	6·74	6·76	6.77	6·79
12	6.55	6.56	6.58	6.59	6.61	6.63	6·64	6·65	6·67	6·69	6·70	6·72	6·73	6.75	6·76
13	6.52	6.54	6.55	6.57	6.58	6.60	6·61	6·63	6·64	6·66	6·68	6·69	6·71	6.72	6·74
14	6·50	6.51	6·53	6·54	6 56	6·57	6·59	6·60	6·62	6.63	6.65	6.66	6.68	6·69	6·71
15	6·47	6.48	6·50	6·51	6·53	6·54	6·56	6·57	6·59	6.60	6.62	6.63	6.65	6·66	6·68
16	6·44	6.45	6·46	6·48	6·50	6·51	6·53	6·54	6·56	6.57	6.59	6.60	6.62	6·63	6·65
17	6·40	6.42	6·43	6·45	6·46	6·48	6·49	6·51	6·52	6.54	6.55	6.57	6.58	6·60	6·61
18	6·37	6.38	6·40	6·41	6·43	6 44	6 46	6·47	6·49	6.50	6.52	6.53	6.55	6·56	6·58
19	6·33	6·34	6·36	6·37	6·39	6·40	6·42	6·43	6·45	6·46	6·48	6·49	6·51	6·52	6.54
20	6·29	6·30	6·32	6·33	6·35	6·36	6·38	6·39	6·41	6·42	6·44	6·45	6·47	6·48	6.50
21	6·25	6·26	6·28	6·29	6·31	6·32	6·34	6·35	6·37	6·38	6·40	6·41	6·43	6·44	6.46
22	6·21	6·22	6·24	6·25	6·26	6·28	6·29	6·31	6·32	6·34	6·35	6·37	6·38	6·40	6.41
23	6·16	6·18	6·19	6·21	6·22	6·23	6·25	6·26	6·28	6·29	6·31	6·32	6·34	6·35	6.37
24	6·11	6·13	6·14	6·16	6·17	6·19	6·20	6·26	6·23	6·24	6·26	6·27	6·29	6·30	6.32
25	6.07	6.08	6.09	6·11	6·12	6·14	6·15	6·17	6·18	6·19	6·21	6·22	6·24	6·25	6·27
26	6.02	6.03	6.04	6·06	6·07	6·09	6·10	6·12	6·13	6·14	6·16	6·17	6·19	6·20	6·22
27	5.96	5.98	5.99	6·01	6·02	6·03	6·05	6·06	6·08	6·09	6·11	6·12	6·13	6·15	6·16
28	5.91	5.92	5.94	5·95	5·97	5·98	5·99	6·01	6·02	6·04	6·05	6·06	6·08	6·09	6·11
29	5.86	5.87	5.88	5·90	5·91	5·92	5·94	5·95	5·97	5·98	5·99	6·01	6·02	6·03	6·05
30	5.80	5.81	5.82	5·84	8·85	5·87	5·88	5·89	5·91	5·92	5·93	5·95	5·96	5·97	5·99
						I	AZIM	UTHS	S.						
Lat.	49°-8	49°-7	49°-8	49°-9	50°.0	50°·1	50°∙2	50°∙3	50°-4	50°∙5	50°-6	50°.7	50°⋅8	50°-9	51°·0
	R	EDU	CTIO	N TO) TH	E M	ERID	IAN	AT 1	HOUI	R-AN	GLE	OF :	r MII	N.
0 2 4 6 8	6.93 6.93 6.91 6.89 6.86	6·95 6·94 6·93 6·91 6·88	6·96 6·95 6·92 6·90	6·98 6·97 6·96 6·94 6·91	6·99 6·98 6·96 6·93	7.01 7.00 6.99 6.97 6.94	7.03 7.02 7.01 6.99 6.96	7·04 7·04 7·03 7·00 6·97	7.06 7.05 7.04 7.02 6.99	7.07 7.07 7.06 7.04 7.01	7·09 7·09 7·07 7·05 7·02	7·11 7·10 7·09 7·07 7·04	7·12 7·12 7·11 7·08 7·05	7·14 7·13 7·12 7·10 7·07	7·15 7·15 7·14 7·12 7·09
9	6.85	6.86	6.88	6.89	6.81	6.92	6·94	6.96	6.97	6·99	7·00	7.02	7·03	7.05	7.07
10	6.83	6.84	6.86	6.87	6.89	6.90	6·92	6.94	6.95	6·97	6·98	7.00	7·01	7.03	7.05
11	6.80	6.82	6.84	6.85	6.87	6.88	6·90	6.91	6.93	6·94	6·96	6.98	6·99	7.01	7.02
12	6.78	6.80	6.81	6.83	6.84	6.86	6·87	6.89	6.90	6·92	6·94	6.95	6·97	6.98	7.00
13	6.75	6.77	6.78	6.80	6.81	6.83	6·85	6.86	6.88	6·89	6·91	6.92	6·94	6.96	6.97
14	6.72	6·74	6·76	6·77	6·79	6·80	6·82	6.83	6.85	6.86	6.88	6.89	6.91	6·93	6·94
15	6.69	6·71	6·73	6·74	6·76	6·77	6·79	6.80	6.82	6.83	6.85	6.86	6.88	6·89	6·91
16	6.66	6·68	6·69	6·71	6·72	6·74	6·76	6.77	6.78	6.80	6.82	6.83	6.85	6·86	6·88
17	6.63	6·64	6·66	6·67	6·69	6·71	6·72	6.73	6.75	6.77	6.78	6.80	6.81	6·83	6·84
18	6.59	6·61	6·62	6·64	6·65	6·67	6·68	6.70	6.71	6.73	6.74	6.76	6.77	6·79	6·80
19	6·55	6·57	6·58	6.60	6.61	6.63	6.64	6.66	6.67	6.69	6·70	6·72	6·73	6·75	6.76
20	6·51	6·53	6·54	6.56	5.57	6.59	6.60	6.62	6.63	6.65	6·66	6·68	6·69	6·71	6.72
21	6·47	6·48	6·50	6.51	6.53	6.54	6.56	6.57	6.59	6.60	6·62	6·63	6·65	6·66	6.68
22	6·43	6·44	6·46	6.47	6.48	6.50	6.51	6.53	6.54	6.56	6·57	6·59	6·60	6·62	6.63
23	6·38	6·39	6·41	6.42	6.44	6.45	6.47	6.48	6.50	6.51	6·53	6·54	6·56	6·57	6.59
24	6·38	6·35	6·36	6.38	6.39	6.40	6.42	6.43	6.45	6.46	6·48	6·49	6·51	6·52	6.54
25	6 28	6·30	6·31	6·33	6·34	6·35	6·37	6·38	6·40	6·41	6·43	6·44	6·46	6·47	6·48
26	6·23	6·24	6·26	6·27	6·29	6·30	6·32	6·33	6·34	6·36	6·37	6·39	6·40	6·42	6·43
27	6·18	6·19	6·20	6·22	6·23	6·25	6·26	6·28	6·29	6·30	6·32	6·33	6·35	6·36	6·38
28	6·12	6·13	6·15	6·16	6·18	6·19	6·20	6·22	6·23	6·25	6·26	6·27	6·29	6·30	6·32
29	6·06	6·08	6·09	6·10	6·12	6·13	6·14	6·16	6·17	6·19	6·20	6·21	6·23	6·24	6·26
30	6·00	6·02	6·03	6·04	6·06	6·07	6·08	6·10	6·11	6·13	6·14	6·15	6·17	6·18	6·20

						A	AZIM	UTHS	S.	***					
Lat.	51°·1	51°-2	51°∙3	51°∙4	51°∙5	51°-6	51°.7	51°.8	51°∙9	52°-0	52°·1	52°-2	52°-3	52°-4	52°-5
	I	REDU	CTIO	N TO) TH	E M	ERIL	OIAN	AT	HOU.	R-AN	GLE	OF	ı MI	N.
° 0	7·17	7·19	7·20	7·22	7·24	7·25	7·27	7·28	7·30	7·32	7·33	7·35	7·36	7·38	7·40
2	7·17	7·18	7·20	7·21	7·23	7·25	7·26	7·28	7·29	7·31	7·33	7·34	7·36	7·36	7·39
4	7·15	7·17	7·19	7·20	7·22	7·23	7·25	7·27	7·28	7·30	7·32	7·33	7·35	7·36	7·38
6	7·13	7·15	7·16	7·18	7·20	7·21	7·23	7·24	7·26	7·28	7·29	7·31	7·32	7·34	7·36
8	7·10	7·12	7·13	7·15	7·17	7·18	7·20	7·21	7·23	7·24	7·26	7·28	7·29	7·31	7·33
9	7·08	7·10	7·11	7·13	7·15	7·16	7·18	7·19	7·21	7·23	7·24	7·26	7·27	7·29	7·31
10	7·06	7·08	7·09	7·11	7·13	7·14	7·16	7·17	7·19	7·20	7·22	7·24	7·25	7·27	7·28
11	7·04	7·05	7·07	7·09	7·10	7·12	7·13	7·15	7·17	7·18	7·20	7·21	7·23	7·25	7·26
12	7·01	7·03	7·05	7·06	7·08	7·09	7·11	7·12	7·14	7·16	7·17	7·19	7·20	7·22	7·24
13	6·99	7·00	7·02	7·03	7·05	7·07	7·08	7·10	7·11	7·13	7·14	7·16	7·18	7·19	7·21
14	6.96	6.97	6·99	7·00	7.02	7·04	7·05	7.07	7.08	7·10	7·11	7·13	7·15	7·16	7·18
15	6.93	6.94	6·96	6·97	6.99	7·00	7·02	7.03	7.05	7·07	7·08	7·10	7·11	7·13	7·14
16	6.89	6.91	6·92	6·94	6.95	6·97	6·99	7.00	7.02	7·03	7·04	7·06	7·08	7·10	7·11
17	6.86	6.87	6·89	6·90	6.92	6·93	6·95	6.97	6.98	7·00	7·01	7·03	7·04	7·06	7·07
18	6.82	6.83	6·85	6·87	6.88	6·90	6·91	6.93	6.94	6·96	6·97	6·99	7·00	7·02	7·03
19 20 21 22 23 24	6·78 6·74 6·69 6·65 6·60 6·55	6·79 6·75 6·71 6·66 6·61 6·56	6.81 6.77 6.72 6.68 6.63 6.58	6.83 6.78 6.74 6.69 6.64 6.59	6.84 6.80 6.75 6.71 6.66 6.61	6.86 6.81 6.77 6.72 6.67 6.62	6.87 6.83 6.78 6.74 6.69 6.64	6.89. 6.84 6.80 6.75 6.70 6.65	6.90 6.86 6.81 6.77 6.72 6.67	6.92 6.87 6.83 6.78 6.73 6.68	6·93 6·89 6·84 6·80 6·75 6·70	6.95 6.90 6.86 6.81 6.76 6.71	6.96 6.92 6.88 6.83 6.78 6.73	6·98 6·94 6·89 6·84 6·79	6.99 6.95 6.91 6.86 6.81 6.76
25	6·50	6·51	6·53	6·54	6·56	6·57	6·59	6·60	6.62	6.63	6.64	6.66	6.68	6.69	6·70
26	6·45	6·46	6·47	6·49	6·50	6·52	6·53	6·55	6.56	6.58	6.59	6.60	6.62	6.63	6·65
27	6·39	6·40	6·42	6·43	6·45	6·46	6·48	6·49	6.50	6.52	6.53	6.55	6.56	6.58	6·59
28	6·33	6·35	6·36	6·37	6·39	6·40	6·42	6·43	6.44	6.46	6.47	6.49	6.50	6.52	6·53
29	6·27	6·29	6·30	6·31	6·33	6·34	6·36	6·37	6.38	6.40	6.41	6.43	6.44	6.46	6·47
30	6·21	6·22	6·24	6·25	6·27	6·28	6·29	6·31	6.32	6.34	6.35	6.36	6.38	6.39	6·41
		·			·		AZIM	UTH	S.						
Lat.	52°-6	52°.7	52°-8	52°-9	53°∙0	53°-1	53°-2	53°.3	53°·4	53°∙5	53°.6	53°.7	53°-8	53°∙9	54°-0
	I	REDU	CTIC	N TO	O TE	IE M	ERII	OIAN	AT	HOU	R-AN	GLE	OF	ı MI	N.
°0	7·41	7·43	7·45	7·46	7·48	7·49	7·51	7·53	7·54	7·56	7·58	7·59	7.61	7.63	7.64
2	7·41	7·42	7·44	7·46	7·47	7·49	7·51	7·52	7·54	7·56	7·57	7·59	7.60	7.62	7.64
4	7·40	7·41	7·43	7·44	7·46	7·48	7·49	7·51	7·53	7·54	7·56	7·58	7.59	7.61	7.62
6	7·37	7·39	7·40	7·42	7·44	7·45	7·47	7·49	7·50	7·52	7·53	7·55	7.57	7.58	7.60
8	7·34	7·36	7·37	7·39	7·41	7·42	7·44	7·45	7·47	7·49	7·50	7·52	7.54	7.55	7.57
9	7·32	7·34	7·35	7·37	7·39	7·40	7·42	7:43	7·45	7.47	7·48	7·50	7·52	7·53	7.55
10	7·30	7·32	7·33	7·35	7·37	7·38	7·40	7:41	7·43	7.45	7·46	7·48	7·49	7·51	7.53
11	7·28	7·29	7·31	7·33	7·34	7·36	7·37	7:39	7·41	7.42	7·44	7·45	7·47	7·49	7.50
12	7·25	7·27	7·28	7·30	7·32	7·33	7·35	7:36	7·38	7.40	7·41	7·43	7·44	7·46	7.48
13	7·22	7 24	7·25	7·27	7·29	7·30	7·32	7:33	7·35	7.37	7·38	7·40	7•41	7·43	7.45
14	7·19	7·21	7·22	7·24	7·26	7·27	7·29	7·30	7·32	7·34	7·35	7·37	7·38	7·40	7·42
15	7·16	7·18	7·19	7·21	7·22	7·24	7·26	7·27	7·29	7·31	7·32	7·33	7·35	7·37	7·38
16	7·13	7·14	7·16	7·17	7·19	7·20	7·22	7·24	7·25	7·27	7·28	7·30	7·32	7·33	7·35
17	7·09	7·11	7·12	7·14	7·15	7·17	7·18	7·20	7·21	7·23	7·25	7·26	7·28	7·29	7·31
18	7·05	7·07	7·08	7·10	7·11	7·13	7·14	7·16	7·17	7·19	7·21	7·22	7·24	7·25	7·27
19	7.01	7.03	7.04	7.06	7.07	7.09	7·10	7·12	7·13	7·15	7·16	7·18	7·20	7·21	7·23
20	6.97	6.98	7.00	7.01	7.03	7.04	7·06	7·07	7·09	7·10	7·12	7·14	7·15	7·17	7·18
21	6.92	6.94	6.95	6.97	6.98	7.00	7·01	7·03	7·04	7·06	7·07	7·09	7·10	7·12	7·13
22	6.87	6.89	6.90	6.92	6.93	6.95	6·96	6·98	6·99	7·01	7·03	7·04	7·06	7·07	7·09
23	6.82	6.84	8.85	6.87	6.88	6.90	6·91	6·93	6·94	6·96	6·97	6·99	7·01	7·02	7·04
24	6.77	6.79	6.80	6.82	6.83	6.85	6·86	6·88	6·89	6·91	6·92	6·94	6·95	6·97	6·98
25	6·72	6·73	6·75	6·76	6·78	6·79	6.81	6.82	6.84	6·85	6.87	6.88	6·90	6•91	6·93
26	6·66	6·68	6·69	6·71	6·72	6·74	6.75	6.77	6.78	6·80	6.81	6.83	6·84	6·85	6·87
27	6·60	6·62	6·63	6·65	6·66	6·68	6.69	6.71	6.72	6·74	6.75	6.77	6·78	6·79	6·81
28	6·55	6·56	6·57	6·59	6·60	6·62	6.63	6.65	6.66	6·68	6.69	6.70	6·72	6·73	6·75
29	6·48	6·50	6·51	6·53	6·54	6·56	6.57	6.58	6.60	6·61	6.63	6.64	6·66	6·67	6·68
30	6·42	6·43	6·45	6·46	6·48	6·49	6.51	6.52	6.53	6·55	6.56	6.58	6·59	6·60	6·62

Showing the reduction at 1 min. from the meridian corresponding to azimuths from 1° to 60° from the meridian.

						A	ZIM	UTHS	3.	*					
Lat.	54°·1	54°-2	54°·3	54°-4	54°-5	54°-6	54°-7	54°·8	54°-9	55°-0	55°·1	55°-2	55°·3	55°-4	55°·5
-	R	EDUC	CTIO	OT V	TH	E ME	RID	IAN	AT F	HOUF	R-ANC	GLE	OF 1	MIN	١.
° 0	7.66	7.68	7.69	7·71	7·73	7·74	7·76	7·78	7·79	7.81	7·83	7·84	7·86	7·88	7·89
2	7.65	7.67	7.69	7·70	7·72	7·74	7·75	7·77	7·79	7.80	7·82	7·84	7·85	7·87	7·89
4	7.64	7.66	7.67	7·69	7·71	7·72	7·74	7·76	7·77	7.79	7·81	7·82	7·84	7·86	7·87
6	7.62	7.63	7.65	7•67	7·68	7·70	7·72	7·73	7·75	7.77	7·78	7·80	7·82	7·83	7·85
8	7.59	7.60	7.62	7·63	7·65	7·67	7·68	7·70	7·72	7.73	7·75	7·77	7·78	7·80	7·82
9	7·57	7.58	7.60	7.61	7·63	7·65	7.66	7.68	7.70	7·71	7·73	7·74	7·76	7·78	7·79
10	7·54	7.56	7.58	7.59	7·61	7·63	7.64	7.66	7.67	7·69	7·71	7·72	7·74	7·76	7·77
11	7·52	7.53	7.55	7.57	7·56	7·60	7.62	7.63	7.65	7·67	7·68	7·70	7·71	7·73	7·75
12	7·49	7.51	7.52	7.54	7·56	7·57	7.59	7.61	7.62	7·64	7·65	7·67	7·69	7·70	7·72
13	7·46	7.48	7.49	7.51	7·53	7·54	7.56	7.58	7.59	7·61	7·62	7·64	7·66	7·67	7·69
14 15 16 17 18	7·43 7·40 7·36 7·32 7·28	7:45 7:41 7:38 7:34 7:30	7·46 7·43 7·40 7·36 7·32	7·48 7·45 7·41 7·37 7·33	7·50 7·46 7·43 7·39 7·35	7·51 7·48 7·40 7·36	7·53 7·49 7·46 7·42 7·38	7·54 7·51 7·47 7·44 7•39	7·56 7·53 7·49 7·45 7·45	7·58 7·54 7·51 7·47 7·43	7·59 7·56 7·52 7·48 7·44	7.61 7.57 7.54 7.50 7.46	7·63 7·59 7·55 7·51 7·47	7.64 7.61 7.57 7.53 7.49	7·66 7·62 7·59 7·55 7·50
19	7·24	7·26	7·27	7·29	7·30	7·32	7·34	7·35	7·37	7·38	7·40	7·41	7·43	7·45	7·46
20	7·20	7·21	7·23	7·24	7·26	7·27	7·29	7·31	7·32	7·34	7·35	7·37	7·38	7·40	7·42
21	7·15	7·17	7·18	7·20	7·21	7·23	7·24	7·26	7·27	7·29	7·30	7·32	7·34	7·35	7·37
22	7·10	7·12	7·13	7·15	7·16	7·18	7·19	7·21	7·22	7·24	7·25	7·27	7·29	7·30	7·32
23	7·05	7·07	7·08	7·10	7·11	7·13	7·14	7·16	7·17	7·19	7·20	7·22	7·23	7·25	7·26
24	7·00	7·01	7·03	7·04	7·06	7·07	7·09	7·10	7·12	7·13	7·15	7·16	7·18	7·19	7·21
25	6·94	6·96	6.97	6·99	7.00	7·02	7·03	7.05	7.06	7.08	7·09	7·11	7·12	7·14	7·15
26	6·88	6·90	6.91	6·93	6.94	6·96	6·97	6.99	7.00	7.02	7·03	7·05	7·06	7·08	7·09
27	6·82	6·84	6.85	6·87	6.88	6·90	6·91	6.93	6.94	6.96	6·97	6·99	7·00	7·02	7·03
28	6·76	6·78	6.79	6·81	6.82	6·84	6·85	6.87	6.88	6.89	6·91	6·92	6·94	6·95	6·97
29	6·70	6·71	6.73	6·74	6.76	6·77	6·79	6.80	6.82	6.83	6·84	6·86	6·87	6·89	6·90
30	6·63	6·65	6.66	6·68	6.69	6·70	6·72	7.73	6.75	6.76	6·78	6·79	6·81	6·82	6·83
						A	AZIM	UTHS	S.						
Lat.	55°-6	55°.7	55°.8	55°-9	56°∙0	56°·1	56°∙2	56°.3	56°-4	56°-5	56°-6	56°-7	56°-8	56°-9	57°-0
	R	EDU	CTIO	N TO) TH	E M	ERID	IAN	AT I	HOU	R-AN	GLE	OF :	r MI	N.
0 2 4 6 8	7.91 7.90 7.89 7.87 7.83	7·93 7·92 7·91 7·88 7·85	7·94 7·94 7·92 7·90 7·87	7·96 7·95 7·94 7·91 7·88	7·97 7·96 7·95 7·92 7·89	7·99 7·99 7·97 7·95 7·92	8.00 7.99 7.97 7.93	8.03 8.02 8.01 7.98 7.95	8.04 8.04 8.02 8.00 7.96	8.06 8.05 8.04 8.02 7.98	8.08 8.07 8.06 8.03 8.00	8.09 8.09 8.07 8.05 8.02	8·11 8·11 8·09 8·07 8·03	8·13 8·12 8·11 8·08 8·05	8·14 8·14 8·13 8·10 8·07
9	7.81	7.83	7·84	7·86	7.87	7·89	7·91	7·93	7·94	7·96	7·98	7·99	8·01	8·03	8·04
10	7.79	7.81	7·82	7·84	7.84	7·87	7·89	7·90	7·92	7·94	7·95	7·97	7·99	8·00	8·02
11	7.76	7.78	7·80	7·81	7.82	7·85	7·86	7·88	7·90	7·91	7·93	7·95	7·96	7·98	8·00
12	7.74	7.75	7·77	7·78	7.79	7·82	7·83	7·85	7·87	7·88	7·90	7·92	7·93	7·95	7·97
13	7.71	7.72	7·74	7·75	7.76	7·79	7·80	7·82	7·84	7·85	7·87	7·89	7·90	7·92	7·94
14	7.67	7.69	7·71	7·72	7·73	7·76	7·77	7·79	7·80	7·82	7·84	7·85	7·87	7·89	7·90
15	7.64	7.66	7·67	7·68	7·69	7·72	7·74	7·75	7·77	7·78	7·80	7·82	7·83	7·85	7·87
16	7.60	7.62	7·63	7·65	7·66	7·68	7·70	7·72	7·73	7·75	7·76	7·78	7·80	7·81	7·83
17	7.56	7.58	7·59	7·61	7·63	7·64	7·66	7·68	7·69	7·71	7·72	7·74	7·76	7·77	7·79
18	7.52	7.54	7·55	7·57	7·59	7·60	7·62	7·63	7·65	7·67	7·68	7·70	7·71	7·73	7·75
19	7·48	7·49	7·51	7·53	7·54	7·56	7·57	7·59	7.60	7.62	7.64	7.65	7.67	7.68	7.70
20	7·43	7·45	7·46	7·48	7·49	7·51	7·53	7·54	7.56	7.57	7.59	7.61	7.62	7.64	7.65
21	7·38	7·40	7·41	7·43	7·45	7·46	7·48	7·49	7.51	7.52	7.54	7.56	7.57	7.59	7.60
22	7·33	7·35	7·36	7·38	7·40	7·41	7·43	7·44	7.46	7.47	7.49	7.50	7.52	7.54	7.55
23	7·28	7·29	7·31	7·33	7·34	7·36	7·37	7·39	7.40	7.42	7.43	7.45	7.47	7.48	7.50
24	7·22	7·24	7·25	7·27	7·29	7·30	7·32	7·33	7.35	7.36	7.38	7.39	7.41	7.42	7.44
25	7·17	7·18	7·20	7·21	7·23	7·24	7·26	7·27	7·29	7·30	7·32	7·33	7·35	7·37	7·38
26	7·11	7·12	7·14	7·15	7·17	7·18	7·20	7·21	7·23	7·24	7·26	7·27	7·29	7·30	7·32
27	7·05	7·06	7·08	7·09	7·11	7·12	7·14	7·15	7·17	7·18	7·20	7·21	7·23	7·24	7·26
28	6·98	7·00	7·01	7·03	7·04	7·06	7·07	7·09	7·10	7·12	7·13	7·15	7·16	7·18	7·19
29	6·92	6·93	6·95	6·96	6·98	6·99	7·00	7·02	7·03	7·05	7·06	7·08	7·09	7·11	7·12
30	6·85	6·86	6·88	6·89	6·91	6·92	6·94	6·95	6·97	6·98	6·99	7·01	7·02	7·04	7·05

						,	AZIM	UTH	5.						
Lat.	57°·1	57°·2	57°·3	57°-4	57°-5	57°-6	57°.7	57°·8	57°·9	58°-0	58°·1	58°-2	58°·3	58°-4	58°·5
	1	REDU	CTIC	N TO	O TH	E MI	ERID	IAN	AT I	IOUR	-ANO	LE C	OF 1	MIN.	
0	8·16	8·18	8·20	8·21	8·23	8·25	8·26	8·28	8·30	8·31	8·33	8·35	8·37	8·38	8·40
2	8·16	8·17	8·19	8·21	8·22	8·24	8·26	8·28	8·29	8·31	8·33	8·34	8·36	8·38	8·40
4	8·14	8·16	8·18	8·19	8·21	8·23	8·24	8·26	8·28	8·29	8·31	8·33	8·35	8·36	8·38
6	8·12	8·13	8·15	8·17	8·18	8·20	8·22	8·24	8·25	8·27	8·29	8·30	8·32	8·34	8·35
8	8·08	8·10	8·12	8·13	8·15	8·17	8·18	8·20	8·22	8·23	8·25	8·27	8·28	8·30	8·35
9	8.06	8.08	8.09	8·11	8·13	8·14	8·16	8·18	8·20	8·21	8·23	8·25	8·26	8·28	8·30
10	8.04	8.05	8.07	8·09	8·10	8 12	8·14	8·15	8·17	8·19	8·21	8·22	8·24	8·26	8·27
11	8.01	8.03	8.05	8·06	8·08	8·10	8·11	8·13	8·15	8·16	8·18	8·20	8·21	8·23	8·25
12	7.98	8.00	8.02	8·03	8·05	8·07	8·08	8·10	8·12	8·13	8·15	8·17	8·18	8·20	8·22
13	7.95	7.97	7.99	8·00	8·02	8·03	8·05	8·07	8·08	8·10	8·12	8·14	8·15	8·17	8·19
14	7·92	7.94	7·95	7·97	7·98	8·00	8·02	8.03	8.05	8.07	8.08	8·10	8·12	8·13	8·15
15	7·88	7.90	7·91	7·93	7·95	7·96	7·98	8.00	8.01	8.03	8.05	8·06	8·08	8·10	8·11
16	7·85	7.86	7·88	7·89	7·91	7·93	7·94	7.96	7.98	7.99	8.01	8·02	8·04	8·06	8·08
17	7·81	7.82	7·84	7·85	7·87	7·89	7·90	7.92	7.94	7.95	7.97	7·98	8·00	8·02	8·03
18	7·76	7.78	7·79	7·81	7·83	7·84	7·86	7.87	7.89	7.91	7.92	7·94	7·96	7·97	7·99
19	7·72	7·73	7·75	7·77	7·78	7·80	7·81	7·83	7·85	7.86	7·88	7·89	7.91	7·93	7·94
20	7·67	7·68	7·70	7·72	7·73	7·75	7·77	7·78	7·80	7.81	7·83	7·84	7.86	7·88	7·89
21	7·62	7·63	7·65	7·67	7·68	7·70	7·71	7·73	7·75	7.76	7·78	7·79	7.81	7·83	7·84
22	7·57	7·58	7·60	7·61	7·63	7·65	7·66	7·68	7·69	7.71	7·72	7·74	7.76	7·77	7·79
23	7·51	7·53	7·54	7·56	7·58	7·59	7·61	7·62	7·64	7.65	7·67	7·69	7.70	7·72	7·73
24	7·46	7·47	7·49	7·50	7·52	7·53	7·55	7·56	7·58	7.60	7·61	7·63	7.64	7·66	7 67
25	7·40	7·41	7·43	7·44	7·46	7:47	7:49	7·50	7·52	7·54	7·55	7·57	7·58	7·60	7.61
26	7·34	7·35	7·37	7·38	7·40	7:41	7:43	7·44	7·46	7·47	7·49	7·50	7·52	7·53	7.55
27	7·27	7·29	7·30	7·32	7·33	7:35	7:36	7·38	7·39	7·41	7·42	7·44	7·45	7·47	7.48
28	7·21	7·22	7·24	7·25	7·27	7:28	7:30	7·31	7·33	7·34	7·36	7·37	7·39	7·40	7.42
29	7·14	7·15	7·17	7·18	7·20	7:21	7:23	7·24	7·26	7·27	7·29	7·30	7·32	7·33	7.35
30	7·07	7·08	7·10	7·11	7·13	7:14	7:16	7·17	7·19	7·20	7·22	7·23	7·25	7·26	7.27
						1	AZIM	UTH	S.						
Lat.	58°-8	58°.7	58°∙8	58°-9	59°∙0	59°·1	59°-2	59°-3	59°-4	59°-5	59°∙6	59°-7	59°-8	59°∙9	60°∙0
	R	EDUC	TION	V TO	TH	E ME	ERID	IAN .	AT H	OUR	-ANG	LE C	F 1	MIN.	
0 2 4 6 8	8·42 8·41 8·40 8·37 8·34	8·43 8·43 8·41 8·39 8·35	8·45 8·45 8·43 8·41 8·37	8·47 8·46 8·45 8·42 8·39	8·49 8·48 8·47 8·44 8·40	8·50 8·50 8·48 8·46 8·42	8·52 8·52 8·50 8·47 8·44	8.54 8.53 8.52 8.49 8.46	8·56 8·55 8·54 8·51 8·47	8.57 8.57 8.55 8.53 8.49	8.59 8.58 8.57 8.54 8.51	8.60 8.59 8.56 8.52	8.63 8.62 8.61 8.58 8.54	8.64 8.64 8.62 8.60 8.56	8.66 8.65 8.64 8.61 8.58
9	8·31	8·33	8·35	8·37	8·38	8·40	8·42	8·43	8·45	8·47	8·48	8.50	8·52	8·54	8·55
10	8·29	8·31	8·32	8·34	8·36	8·37	8·39	8·41	8·43	8·44	8·46	8.48	8·49	8·51	8·53
11	8·26	8·28	8·30	8·31	8·33	8·35	8·37	8·38	8·40	8·42	8·43	8.45	8·47	8·48	8·50
12	8·23	8·25	8·27	8·28	8·30	8·32	8·34	8·35	8·37	8·39	8·40	8.42	8·44	8·45	8·47
13	8·20	8·22	8·23	8·25	8·27	8·29	8·30	8·32	8·34	8·35	8·37	8.39	8·40	8·42	8·44
14	8·17	8·18	8·20	8·22	8·23	8·25	8·27	8·29	8·30	8·32	8·34	8·35	8·37	8·39	8·40
15	8·13	8·15	8·16	8·18	8·20	8·21	8·23	8·25	8·26	8·28	8·30	8·31	8·33	8·35	8·36
16	8·09	8·11	8·12	8·14	8·16	8·17	8·19	8·21	8·22	8·24	8·26	8·27	8·29	8·31	8·32
17	8·05	8·07	8·08	8·10	8·12	8·13	8·15	8·17	8·18	8·20	8·22	8·23	8·25	8·27	8·28
18	8·01	8·02	8·04	8·05	8·07	8·09	8·10	8·12	8·14	8·15	8·17	8·19	8·20	8·22	8·24
19	7·96	7·98	7·99	8·01	8·02	8·04	8.06	8.07	8.09	8·11	8·12	8·14	8·16	8·17	8·19
20	7·91	7·93	7·94	7·96	7·97	7·99	8.01	8.02	8.04	8·06	8·07	8·09	8·11	8·12	8·14
21	7·86	7·87	7·89	7·91	7·92	7·94	7.96	7.97	7.99	8·00	8·02	8·04	8·05	8·07	8·08
22	7·80	7·82	7·84	7·85	7·87	7·88	7.90	7.92	7.93	7·95	7·96	7·98	8·00	8·01	8·03
23	7·75	7·76	7·78	7·80	7·81	7·83	7.84	7.86	7.88	7·89	7·91	7·92	7·94	7·96	7·97
24	7·69	7·71	7·72	7·74	7·75	7·77	7.78	7.80	7.82	7·83	7·85	7·86	7·88	7·90	7·91
25	7·63	7.64	7.66	7.68	7·69	7·71	7·72	7.74	7.75	7·77	7·79	7·80	7·82	7.83	7.85
26	7·57	7.58	7.60	7.61	7·63	7·64	7·66	7.67	7.69	7·71	7·72	7·74	7·75	7.77	7.78
27	7·50	7.52	7.53	7.55	7·56	7·58	7·59	7.61	7.62	7·64	7·65	7·67	7·68	7.70	7.72
28	7·43	7.45	7.46	7.48	7·49	7·51	7·52	7.54	7.56	7·57	7·58	7·60	7·61	7.63	7.65
29	7·36	7.38	7.39	7.41	7·42	7·44	7·45	7.47	7.48	7·50	7·51	7·53	7·54	7.56	7.57
30	7·29	7.30	7.32	7.33	7·35	7·36	7·38	7.39	7.41	7·42	7·44	7·45	7·47	7.48	7.50

HOUR-ANGLE LIMITS FOR EX-MERIDIAN TABLES VIIIa. AND VIIIb.

THE TABLE SHOWS THE LIMITS WITHIN WHICH THE REDUCTION AT 1 MIN., AS GIVEN IN TABLES VIIIa. AND VIIIb. WHEN MULTIPLIED BY THE NUMBER OF MINUTES IN TABLE BELOW, WILL NOT GIVE A GREATER ERROR IN REDUCTION THAN 0½'.

		L.	ATIT	UDE	AN	D D	ECLI	NAT	ION	OF	SAM	E N.	AME			
Lat.							DEC	LINA	ATIO	N.						
Lat.	0°	2°	4°	6°	8°	10°	15°	20°	25°	30°	35°	40°	45°	50°	60°	70°
0 1 2 3 4 5 6 8	M 14 n 27 n 29 l 29 l 30 l 30 l 31 l 32 l	M. 28 n 14 n 14 n 23 l 24 l 25 l 26 l 27 l	M. 38 g 30 g 25 g 14 n 13 n 18 l 20 l 22 l	M. 37 g 33 g 28 g 23 g 20 g 14 g 17 l 20 l	M. 37 g 35 g 28 g 23 g 23 g 20 g 17 g	M. 39 g g 35 g g 28 g 26 g 23 g g 21 g g 16 g	M. 42 g g 39 g 36 g g 34 g g 32 g g 28 g g 23 g g 19 g	M. 44 g 42 g 40 g 38 g 35 g 35 g 34 g 30 g 26 g	M. 46 g 45 g 43 g 42 g 41 g 40 g 39 g 37 g 31 g	M. 48 g 47 g 46 g 45 g 43 g 41 g 39 g	M. 51 gg gg 48 gg 47 g 46 gg 44 gg 42 g	M. 53 g g 50 g g 49 g 48 g 48 g 47 g 44 g	M. 55 8 8 8 8 55 8 8 8 8 8 8 8 8	M. 58 g 56 g 56 g 55 g 55 g 52 g 52 g	M. 63 g 62 g 62 g 62 g 62 g 60 g 60 g 57 g	M. 71 g 71 g 70 g 69 g 68 g 67 g 66 g 66 g
12 15 20 25 30 35	33l 271 281 301 321 341	291 251 271 281 301 321	261 221 241 271 291 311	23 l 26 l 23 l 26 l 28 l 30 l	241 201 241 261 281	201 191 221 251 271	15 g 18 l 17 l 21 l 24 l	24 g 18 g 18 l 16 l 20 l	28 g 25 g 16 g 91 151	37 g 30 g 24 g 13 l	39 g 39 g 39 g 27 l 12 l	44 g 43 g 42 g 44 g 27 l 13 l	46 g 44 g 42 g 43 g 50 g 26 l	50 g 48 g 46 g 46 g 46 g 59 g	57 g 55 g 53 g 51 g 48 g 47 g	66 g 65 g 63 g 61 g 59 g 57 g
40 45 50 55 60	351 381 391 401 421	341 361 371 401 411	33 l 34 l 35 l 38 l 40 l	321 341 351 371 391	311 321 341 371 391	301 321 351 371 391	271 301 331 361 391	231 271 321 341 391	201 241 281 321 351	161 211 251 291 321	101 161 211 251 291	101 161 211 261	111 111 171 231	261 131 121 191	50 g 65 g 30 l 15 l	56 g 54 g 54 g 59 g 48 l

I]	VFER	IOR '	TRAN	SIT.					
	DE	CLINA	ATIO	V.					
	Lat.	35°	4 0°	45°	50°	55°	60°	65°	70°
Note. g Signifies that true reduction is greater than tabular reduction. l Signifies that true reduction is less than tabular reduction. signifies that there will be no error in the reduction within the limits given greater than of.	25 30 35 40 45 50 55 60	M	M	M 601 601 591	M 681 651 631 621	M. 801 751 701 681 671	M. .: .: .: .: .: .: .: .: .: .: .: .: .:	M 103 g 112 g 1801 1101 901 861 781	M. 88 g 95 g 107 g 123 g 172 g 120 l 105 l

]	LATI	TUD	E A	ND :	DECI	LINA	TION	OF	CO	NTR	ARY	NA	ME.		
Lat.							D	ECLI	NAT	ION.						
Lat.	0°	2°	4°	6°	8°	10°	15°	20°	25°	30°	35°	40°	45°	50°	60°	70°
٥	М.	M.	M.	M.	М.	м.	M.	M.	м.	М.	М.	М.	M.	M.	M.	M.
I 2	14 n 27 n	42 n 48 l	45 g 80 n	45 g 51 g	43 g 50 g	42 g 44 g	43 g 45 g	45 g 46 g	48 g 50 g	50 g 52 g	52 g 54 g	55 g 56 g	57 g 58 g	59 g	62 g 63 g	71 g 72 g
3 4 5	29 l 29 l	381 361	55 l 47 l	100 n 56 l	62 g	55 g	50 g	50 g	54 g	54 g	55 g	57 g	58 g	60 g	63 g	73 g
5	30 l	361	40 Î	521	70 l	66 g 120 n	56 g 62 g	55 g 58 g	56 g 59 g	56 g 59 g	58 g 59 g	58 g 58 g	58 g 60 g	61 g 62 g	65 g 67 g	74 g 74 g
6 8	30 l 31 l	371 361	39 l 40 l	45 l 45 l	581 521	70 l 59 l	74 g 110 l	60 g 70 g	62 g 66 g	58 g 68 g	58 g 66 g	60 g 63 g	64 g 64 g	64 g 66 g	68 g 69 g	75 g 76 g
10 12	321 331	361 361	40 l 32 l	42 l 34 l	481 361	52 l 40 l	72 l 46 l	110 g 58 l	74 n 74 l	80 g 90 n	72 g 88 g	68 g	68 g	70 g	70 g 72 g	76 g
15	271	30 l	33 Ì	341	36 l	39 l	481	531	601	741	110 n	98 g	80 g	76 g	74 g	80 g
20 25	281 301	32 l 34 l	321 341	35 l 35 l	361 371	381	441	49 l	541	601	721	901	130 n	100 g	90 g	
30	32 l	331	35 l	371	371	39 l 39 l	43 l 43 l	46 l 46 l	50 l 49 l	56 l 53 l	62 l 61 l	70 l	861	150 l 86 l	90 g	• •
35 40	34 l 35 l	35 l 36 l	36 l 38 l	38 l 39 l	39 l 40 l	40 l 40 l	42 l 42 l	45 l 44 l	481 481	52 l 52 l	561 561	62 l 60 l	69 l 65 l	781		• •
			Ĭ .		·				401	321	201		051		•••	• •
45 50	381 391	381 401	39 l 40 l	39 l 41 l	41 l 42 l	42 l 43 l	44 l 45 l	461 471	49 l 49 l	52 l 52 l	55 l 55 l	561		::	••	
55 60	401	411	421	421	431	441	461	481	491	52 l	33.	• •	::			- : :
- 50	42 l	42 l	441	44 l	451	45 l	461	481	50 l			• •	••		•••	••

REDUCTION AT 1 MIN. FROM THE MERIDIAN IN LAT. 0° CORRESPONDING TO AZIMUTHS FROM 74° TO 26° 36′.

Azim.	Redn.	Azim.	Redn.	Azim.	Redn.	Azim.	Redn.	Azim.	Redn.	Azim.	Redn.	Azim.	Redn.
74 00 73 59 58	11·303 11·300 11·296 11·293	52 50	10.878 10.871 10.865 10.858	36 34	10.432 10.425 10.419 10.412	20 18	9.997 9.991 9.985 9.979			48 46	9.162 9.156 9.150 9.144	60 34 32 60 30 28	
56 73 55 54 53 52	11·290 11·286 11·279 11·276 11·273	46 44 42 71 40 38	10·852 10·845 10·838 10·832 10·825 10·818	69 30 28 26 24 22	10·406 10·399 10·393 10·386 10·374	14 67 10 8 6	9·972 9·966 9·960	56 54 52	9·550 9·544 9·538 9·532 9·525 9·519	62 40 38 36	9·138 9·132 9·126 9·120 9·114	24 22 60 20 18	8·736 8·730 8·724
73 50 48 46 44	11·269 11·262 11·255 11·249 11·242	34 32 71 30 28	10.812 10.805 10.798 10.792 10.785	18 16 14 12	10·367 10·361 10·348 10·348	67 00 66 58 56		46 44 42 64 40	9.513 9.507 9.501 9.495 9.489	62 30 28 26	9·102 9·096 9·090 9·084	14 12 60 10	8.701 8.695 8.689 8.684
38 36 34	11·235 11·228 11·221 11·215 11·208	22	10·779 10·772 10·765 10·759 10·752	4 2	10·335 10·329 10·322 10·316 10·309	48 46	9·903 9·897 9·891 9·884 9·878	34 32	9·483 9·476 9·470 9·464 9·458	16	9.072 9.066 9.060 9.055 9.049		8·672 8·666 8·660 8·654 8·649
28 26 24	11·201 11·194 11·187 11·181 11·174	71 10 8	10.732	56 54 52	10·303 10·296 10·290 10·284 10·277	66 40 38 36	9·872 9·866 9·859 9·853 9·847	24 22 64 20	9·452 9·446 9·440 9·434 9·428	62 10 8 6 4 2	9.043 9.037 9.031 9.025 9.019		8.643 8.637 8.631 8.625 8.619
18 16 14	11·167 11·160 11·154 11·147 11·140	71 00 70 58	10·713 10·706 10·699 10·693 10·686		10·271 10·264 10·258 10·251 10·245	28 26	9.834	14 12	9·422 9·416 9·409 9·403 9·397	54		38	8.614 8.608 8.602 8.596 8.591
· 6	11·133 11·126 11·120 11·113 11·106	52 50 48	10.680 10.673 10.667 10.660 10.653	36 34 32	10·239 10·232 10·226 10·220 10·213	66 20 18 16	9·809 9·803 9·797 9·791 9·785	64 00	9·391 9·385 9·379 9·373 9·367	61 50 48 46 44 42	8·977 9·971 8·965	59 30 28	8·585 8·579 8·573 8·567 8·562
72 58 56 54	11.099 11.093 11.086 11.079 11.072	42	10.647 10.640 10.634 10.627 10.621	28 26 24 22 68 20	10·207 10·200 10·194 10·188 10·181	66 10	-	54 52	9·361 9·355 9·349 9·343 9·337	38 36	8·942 8·936	50 20	8·556 8·550 8·544 8·538 8·533
48	11.066 11.059 11.052 11.045 11.039	70 30 28		16 14 12	10·175 10·168 10·162 10·156 10·149		9.741	44	9.312	28	8·912 8·906	59 10 8	8·527 8·521 8·515 8·510 8·504
38 36	11.032 11.025 11.019 11.012 11.005	70 20 18	10·575 10·568 10·562	6 4 2	10·143 10·137 10·130 10·124 10·118	65 50 48 46	9.716 9.710 9.704 9.698 9.692	34	9.282	18	8.883 8.877	59 00 58 58	8·498 8·492 8·487 8·481 8·475
28 26 24	10.985	70 IO 8	10.542	56 54 52	10·111 10·105 10·099 10·086	65 46	9.685 9.679 9.673 9.667 9.661	63 20	9·270 9·264 9·258 9·252 9·246	8 6	8.853	48	
18 16 14	10·965 10·958 10·952 10·945 10·938	70 00 69 58	10·516 10·510 10·503 10·497 10·490	44 42	10.080 10.073 10.067 10.061 10.054	65 30 28 26	9.654 9.648 9.642 9.636 9.630	63 10	9·240 9·234 9·228 9·222 9·216	60 58 56 54	8.836 8.830 8.824 8.818 8.812	58 40 38	8·441 8·435 8·429 8·423 8·418
8	10.011	52 69 50 48	10·484 10·477 10·471 10·464 10·458	32	10.042 10.035 10.029	65 20	9.624 9.617 9.605 9.605		9.204	48	8·795 8·789	58 30	8·412 8·406 8·400 8·395 8·389
71 58	10.898 10.891 10.885	42	10·451 10·438	26	10·016 10·010 10·004	65 10	9·593 9·581 9·581	54	9·180 1 9·174 2 9·168	38	8.777 8.771 8.765		8·383 8·377 8·372

REDUCTION AT 1 MIN. FROM THE MERIDIAN IN LAT. 0° CORRESPONDING TO AZIMUTHS FROM 74° TO 26° 36'.

Azim. Re	edn. A	zim.	Redn.	Azim.	Redn.	Azim.	Redn.	Azim.	Redn.	Azim.	Redn.	Azim.	Redn.
58 18 8 8 16 8 14 8 12 8 5 10 8 10 8	·360 5		7.976	44 42	7.604 7.599 7.593 7.588 7.582	28 26 24	7·235 7·230 7·224 7·219 7·214	12 49 IO	6·873 6·867 6·862 6·857 6·852	54 52	6.517 6.512 6.507 6.502 6.496	40 38 36	6·167 6·162 6·157 6·152 6·147
6 8· 4 8·	·326		7·953 7·948 7·942 7·936 7·931	36 34 32 53 30 28	7·572 7·566 7·561	18 16 14	7·208 7·203 7·198 7·192 7·187		6.846 6.841 6.836 6.831 6.825	44 42	6·491 6·486 6·481 6·476 6·471	44 30 28 26	6·142 6·137 6·132 6·127 6·122
56 8 54 8 52 8	·309 303 ·297 ·292 ·286	42 55 40 38 36 34	7·925 7·920 7·914 7·909 7·903	24 22	7.533	8	7·181 7·176 7·171 7·165 7·160	48		36 34 32	6·465 6·460 6·455 6·450 6·445	44 20 18 16	6.000 6.101 6.100 6.111
46 8	·269		7.897 7.892 7.886 7.881 7.875	14	7.506	50 58 56 54	7 155 7·149 7·144 7·139 7·133	42	6·794 6·788 6·783 6·778 6·773	24 22	6·434 6·429	44 10	6.091 6.086 6.081 6.076 6.071
38 8 36 8 34 8 32 8 57 30 8	·241 ·235	22 55 20 18 16 14	7·870 7·864 7·858 7·853 7·847	53 00		48 46 44	7·128 7·123 7·117 7·112 7·107	48 30	6·757 6·752	14 12	6.409	44 00 43 58	6.050
26 8 24 8	212		7·842 7·836 7·831 7·825 7·820	56 54 52 52 50 48	7.462	38 36 34	7·101 7·096 7·090 7·085 7·080	48 20 18			6.383	52 43 50 48 46 44	6.035 6.030 6.025
16 8 14 8 12 8		55 00	7·814 7·808 7·803 7·797 7·792	44 42 52 40	7·441 7·435 7·430 7·424 7·419	28 26 24	7·074 7·069 7·064 7·058 7·053	12		56 54 52	6·362 6·357 6·352 6·347 6·342	43 40	
4 8	•161 •156 •150	52 54 50 48 46 44	7·786 7·781 7·775 7·770 7·764	34	7·403 7·397	18	7·037	02		46 44 42	6·336 6·331 6·326 6·321 6·316	32 43 30 28 26 24	5.984 5.979 5.974
56 8 54 8	127	42 54 40 38 36 36 34	7·759 7·753 7·748 7·742 7·737	24		8	7·010 7·005	54 52 47 50 48 46	6.657 6.652 6.647	36 34 32	6·311 6·306 6·300 6·295 6·290	43 20 18 16	5.959 5.954 5.949
46 8 44 8 42 8	·110 ·105 ·099 ·094 ·088	32 54 30 28 26 24	7·731 7·726 7·720 7·714 7·709		7:343	49 58 56	6·994 6·989 6·984 6·979 6·973	47 40	6.631 6.626 6.621	26 24 22	6·285 6·280 6·275 6·270 6·265	43 10 8 6	5.934 5.929 5.924
36 8 34 8	·071 ·065	16	7·703 7·698 7·692 7·687 7·681	52 00	7·332 7·327 7·321 7·316 7·311	48 46 44	6·968 6·963 6·957 6·952 6·947	47 30 28	6.611 6.605 6.600 6.595 6.590	16 14 12	6·259 6·254 6·249 6·244 6·239	56	5.914 5.909 5.904 5.899 5.894
28 8 26 8 24 8 22 8 56 20 8	*049 *043 *037	54 10 8 6	7·676 7·670 7·665 7·659 7·654	54 52 51 50	7·305 7·300 7·294 7·289 7·284	38 36 34	6·941 6·936 6·931 6·926 6·920	47 20 18	6·585 6·579 6·574 6·569 6·564	6 4 2	6·234 6·229 6·224 6·218 6·213	48 46	5.889 5.884 5.878 5.873 5.868
18 8 16 8 14 8 12 8 56 10 8	·020 ·015 ·009	54 00 53 58 56	7.648 7.643 7.637 7.632 7.626	44 42 51 40	7·278 7·273 7·267 7·262 7·257	28 26 24	6.915 6.910 6.904 6.899 6.894	47 10	6·559 6·553 6·548 6•543 6·538	56 54 52	6·208 6·203 6·198 6·193 6·188	42 42 40 38 36	
8 7 6 7 56 4 7		50	7·621 7·615 7·610	34	7·251 7·246 7·241	18	6·889 6·883 6·878		6·533 6·527 6·522		6·183 6·178 6·172	32 42 30 42 28	5.838 5.833 5.828

REDUCTION AT 1 MIN. FROM THE MERIDIAN IN LAT. 0° CORRESPONDING TO AZIMUTHS FROM 74° TO 26° 36′.

Azim.	Redn.	Azim.	Redn.	Azim.	Redn.	Azim.	Redn.	Azim.	Redn.	Azim.	Redn.	Azim.	Redn.
22 42 20	5.818	40° 10° 8° 6° 4° 4° 2° 2° 2° 2° 2° 2° 2° 2° 2° 2° 2° 2° 2°	5.484 5.479 5.474 5.469 5.464	52	5.136 2.141	35 38 36 34 32 35 30	4·811 4·806	33 20 18	4·496 4·491 4·486 4·481 4·477	4 2 31 00	4·174 4·169 4·165 4·160 4·155	28 50 48 46 44 42	3.847
	5·798 5·793 5·788 5·783 5·778	40 00 39 58 56 54 52	5.459 5.455 5.450 5.445 5.440	44 42 37 40 38 36	5·111 5·116 5·111	28 26 24 22 35 20	4·787 4·782	33 10 8 6 4	4.472 4.467 4.462 4.458 4.453	56 54 52 30 50 48	4·141 4·136	28 40 38 36 34 32	3.823
6 4 2 42 00 41 58	5.773 5.768 5.763 5.758 5.753	39 50 48 46 44 42	5.430	34 32 37 30 28 26	5.097 5.092 5.087	18 16 14 12 35 10	4·768 4·763 4·758	56	4·448 4·443 4·439 4·434 4·429	44 42 30 40		28 30 28 26 24 22	3.805 3.800 3.795
56 54 52 41 50 48	5.748 5.743 5.738 5.733 5.728	39 40 38 36 34 32	5·405 5·400 5·395	24 22 37 20 18	5.072 5.068 5.063	8 6 4 2 35 00	4·744 4·739 4·734	32 50 48	4.424 4.420 4.415 4.410 4.405	34		28 20 18 16 14 12	3·782 3·777 3·772
46 44 42 41 40 38	5.718 5.713 5.708	39 30 28 26 24 22	5·371 5·371	37 10 8	5.048	34 58 56 54 52 34 50	4.720 4.715 4.710	32 40 38 36	4·401 4·396 4·386 4·382	22	4.075 4.071 4.066	28 10 8 6 4 2	3.758
36 34 32 41 30 28	5.693 5.688 5.683	39 20 18 16 14	5·356 5·351 5·346	37 oc 36 58	5.024 5.019 5.014	48 46 44 42 34 49	4.696 4.691 4.686	32 32 30 28 26 24	4·372 4·367 4·363		4.052 4.047 4.043	28 00 27 58 56 54 52	3·735 3·731 3·726
26 24 22 41 20 18	5.668 5.663 5.658	39 10 8 6 4 2	5·327 5·322	36 56 48	5.000 4.995 4.990	36 36 34 32 34 30	4.662 4.662		4.349	2	4.029 4.024 4.019	27 50 48 46 44 42	3·707
14 12	5·638 5·633	39 00 38 58 56 54 52	5·307 5·302 5·297	36 46 36 38	4·975 4·971 4·966	28 26 24 22 34 20	4·648 4·643 4·638	32 10	4·330 4·325 4·320 4·315 4·315	54	3.996	38	3·684 3·680
6 4 2 41 00 40 58	5.618 5.613 5.608	38 50 48 46 44 42	5·277 5·273	36 36 36 28 28	4.951 4.946 4.941	16	4.619	32 00 31 58 56 54	4·301 4·297 4·292	46 44 42 29 40 38	3.982 3.977 3.972	27 30 28 26 24 22	3.666 3.661 3.657
56 54 52 40 50 48	5.593 5.588 5.583	38 36 34	5·263 5·258 5·253 5·248 5·248	36 20 16	4·927 4·922 4·917	34 00	4.600	3I 50	4.268	36 34 32 29 30 28	3.958 3.954 3.949	27 20 18 16 14	3.643 3.638 3.634
	5.568 5.564 5.559	28 26 24	5.229		4.903	54 54 55	3 4·581 5 4·576 4 4·572 2 4·567 0 4·562		4.254	29 20	3.931 3.931	27 10 8 6 4 2	3.620 3.615 3.610
34 32 40 30	5.549 5.544 5.539 5.534 5.529	16	5·214 5·209 5·204 5·199 5·194	36 o	4 4·883 2 4·879 0 4·874 8 4·869 6 4·864	4.	4.557 4.553 4.548 4.543 4.543 4.538	31 30 28 26	4·235 4·231 4·226 4·221 4·216	14	3.917 3.912 3.907 3.903 3.898	26 58 56 54	3.601 3.597 3.592 3.587 3.583
	5.216 5.214 5.209	8	5·180 5·175	35 5	2 4.855	3:	3 4.534 5 4.529 4 4.524 2 4.519 5 4.515	18	4·212 4·207 3 4·202 5 4·198 4·193		3.889	44	
16 14 12	5°499 5°494 5°489	-	5·165 5·160 5·155		4 4·835 2 4·830 0 4·826	20	3 4.510 5 4.505 4 4.500	31 10	4·188 4·183 4·179	56 54 28 52	3·870 3·865 3·861		3·555 3·550 3·546

REDUCTION AT 1 MIN. FROM THE MERIDIAN CORRESPONDING TO THE LATITUDE VARIATION TAKEN FROM THE AZIMUTH TABLE.

Lat. Var.	Redn.	Lat. Var.	Redn.	Lat. Var.	Redn.	Lat. Var.	Redn.	Lat. Var.	Redn.	Lat. Var.	Redn.	Lat. Var.	Redn.
Sec. 8.00 8.01 8.02 8.03 8.04	3.541 3.537 3.533 3.529 3.525	Sec 8.68 8.69 8.70 8.71 8.72	3·290 3·286 3·283 3·280 3·276	Sec. 9.36 9.37 9.38 9.39 9.40	3.071 3.068 3.065 3.062 3.059	Sec. 10.04 10.05 10.06 10.07 10.08	2·879 2·876 2·874 2·871 2·868	Sec. 10·72 10·73 10·74 10·75 10·76	2·708 2·705 2·703 2·701 2·698	Sec. 11.40 11.41 11.42 11.43 11.44	2·555 2·553 2·551 2·549 2·547	Sec. 12.08 12.09 12.10 12.11 12.12	2.419 2.417 2.415 2.413 2.411
8.05 8.06 8.07 8.08 8.09	3.521 3.517 3.513 3.510 3.506	8·73 8·74 8·75 8·76 8·77	3·273 3·269 3·266 3·263 2·259	9.41 9.42 9.43 9.44 9.45	3.056 3.050 3.050 3.047 3.044	10.13 10.15 10.10 10.00	2·866 2·863 2·860 2·858 2·855	10.77 10.78 20.79 10.80 10.81	2.696 2.693 2.691 2.689 2.686	11.45 11.46 11.47 11.48 11.49	2·545 2·543 2·541 2·539 2·537	12·13 12·14 12·15 12·16 12·17	2.410 2.408 2.406 2.404 2.402
8·10 8·11 8·12 8·13 8·14	3·502 3·498 3·494 3·490 3·486	8·78 8·79 8·80 8·81 8·82	3·256 3·253 3·249 3·246 3·242	9·46 9·47 9·48 9·49 9·50	3.042 3.039 3.036 3.033 3.030	10.14 10.15 10.16 10.17	2·852 2·850 2·847 2·845 2·842	10·82 10·83 10·84 10·85 10·86	2.684 2.682 2.679 2.677 2.675	11.50 11.51 11.52 11.53 11.54	2·534 2·532 2·530 2·528 2·526	12·18 12·19 12·20 12·21	2·400 2·398 2·396 2·395 2·393
8·15 8·16 8·17 8·18 8·19	3·483 3·479 3·475 3·471 3·467	8.83 8.84 8.85 8.86 8.87	3·239 3·236 3·232 3·229 3·226	9.51 9.52 9.53 9.54 9.55	3.027 3.024 3.021 3.018 3.015	10.19 10.20 10.21 10.23	2·839 2·837 2·834 2·832 2·829	10.87 10.88 10.89 10.90 10.91	2.672 2.670 2.668 2.666 2.663	11.55 11.56 11.57 11.58 11.59	2·524 2·522 2·520 2·518 2·516	12·23 12·24 12·25 12·26 12·27	2·391 2·389 2·387 2·385 2·383
8·20 8·21 8·22 8·23 8·24	3.463 3.460 3.456 3.452 3.448	8.88 8.89 8.90 8.91 8.92	3·222 3·216 3·216 3·209	9:56 9:57 9:58 9:59 9:60	3.012 3.009 3.007 3.004 3.001	10·24 10·25 10·26 10·27 10·28	2·826 2·824 2·821 2·819 2·816	10·92 10·93 10·94 10·95 10·96	2.661 2.659 2.656 2.654 2.652	11.60 11.61 11.62 11.63 11.64	2.514 2.512 2.510 2.508 2.506	12·28 12·29 12·30 12·31 12·32	2·382 2·380 2·378 2·376 2·374
8·25 8·26 8·27 8·28 8·29	3.445 3.441 3.437 3.433 3.430	8·93 8·94 8·95 8·96 8·97	3·206 3·203 3·196 3·196	9.61 9.62 9.63 9.64 9.65	2·998 2·995 2·992 2·989 2·986	10°29 10°30 10°31 10°32 10°33	2·814 2·811 2·809 2·806 2·803	10.97 10.98 10.99 11.00	2.650 2.647 2.645 2.643 2.641	11.65 11.66 11.67 11.68 11.69	2·504 2·502 2·500 2·498 2·496	12·33 12·34 12·35 12·36 12·37	2·372 2·371 2·369 2·367 2·365
8·30 8·31 8·32 8·33 8·34	3·426 3·422 3·418 3·415 3·411	8·98 8·99 9·00 9·01	3·190 3·186 3·180 3·177	9.66 9.67 9.68 9.69 9.70	2·984 2·981 2·978 2·975 2·972	10·34 10·35 10·36 10·37 10·38	2·801 2·798 2·796 2·793 2·791	11.02 11.03 11.04 11.05 11.06	2.638 2.636 2.634 2.632 2.629	11.70 11.71 11.72 11.73 11.74	2·494 2·491 2·489 2·487 2·485	12·38 12·39 12·40 12·41 12·42	2·363 2·361 2·360 2·358 2·356
8·35 8·36 8·37 8·38 8·39	3·407 3·404 3·400 3·396 3·393	9.03 9.04 9.05 9.06 9.07	3·174 3·170 3·167 3·164 3·161	9.71 9.72 9.73 9.74 9.75	2·969 2·967 2·964 2·961 2·958	10·39 10·40 10·41 10·42 10·43	2·788 2·786 2·783 2·781 2·778	11.07 11.08 11.09 11.10	2.627 2.625 2.623 2.620 2.618	11.75 11.76 11.77 11.78 11.79	2·484 2·482 2·480 2·477 2·475	12·43 12·44 12·45 12·46 12·47	2·354 2·352 2·351 2·349 2·347
8·40 8·41 8·42 8·43	3·389 3·386 3·382 3·378 3·375	9·08 9·10 9·11 9·12	3·158 3·151 3·148 3·145	9·76 9·77 9·78 9·79 9·80	2.955 2.953 2.950 2.947 2.944	10.44 10.45 10.46 10.47 10.48	2·776 2·773 2·771 2·768 2·766	11·12 11·13 11·14 11·15 11·16	2.616 2.614 2.612 2.609 2.607	11.80 11.81 11.82 11.83 11.84	2·473 2·472 2·470 2·468 2·466	12·48 12·49 12·50 12·51 12·52	2·345 2·343 2·342 2·340 2·338
8-45 8-46 8-47 8-48 8-49	3·371 3·367 3·364 3·360 3·357	9·17 9·16 9·16 9·19	3·142 3·136 3·136 3·139	9.81 9.82 9.83 9.84 9.85	2.941 2.939 2.936 2.933 2.930	10·49 10·50 10·51 10·52 10·53	2.763 2.761 2.758 2.756 2.754	11·17 11·18 11·19 11·20 11·21	2.605 2.603 2.601 2.598 2.596	11.85 11.86 11.87 11.88 11.89	2·464 2·462 2·460 2·458 2·456	12·53 12·54 12·55 12·56 12·57	2·336 2·334 2·333 2·331 2·329
8·50 8·51 8·52 8·53 8·54	3'353 3'350 3'346 3'342 3'339	9·18 9·19 9·20 9·21 9·22	3·126 3·123 3·117 3·114	9.86 9.87 9.88 9.89 9.90	2·928 2·925 2·922 2·919 2·917	10.54 10.55 10.56 10.57 10.58	2.751 2.749 2.746 2.744 2.741	11·22 11·23 11·24 11·25 11·26	2.594 2.592 2.590 2.588 2.585	11.90 11.91 11.93 11.94		12·58 12·59 12·60 12·61 12·62	2·327 2·326 2·324 2·322 2·320
8·55 8·56 8·57 8·58 8·59	3'335 3'332 3'328 3'325 3'321	9·23 9·24 9·25 9·26 9·27	3.102 3.102 3.102 3.101	9.91 9.93 9.94 9.95	2·914 2·911 2·908 2·906 2·903	10.59 10.60 10.61 10.62 10.63	2·739 2·736 2·734 2·732 2·729	11.27 11.28 11.29 11.31	2·583 2·581 2·579 2·577 2·575	11.95 11.96 11.97 11.98 11.99	2·444 2·442 2·440 2·438 2·436	12.63 12.64 12.65 12.66 12.67	2·319 2·317 2·315 2·313 2·312
8.60 8.61 8.62 8.63 8.64	3·318 3·314 3·307 3·304	9·28 9·30 9·31 9·32	3.096 3.093 3.090 3.087 3.084	9.96 9.97 9.98 9.99	2·900 2·898 2·895 2·892 2·890	10.64 10.65 10.66 10.67 10.68	2·727 2·724 2·722 2·720 2·717	11·32 11·33 11·34 11·35 11·36	2·572 2·570 2·568 2·566 2·564	12.00 12.01 12.02 12.03 12.04	2·434 2·432 2·431 2·429 2·427	12.68 12.69 12.70 12.71 12.72	2·310 2·308 2·306 2·305 2·303
8·65 8·66 8·67	3·300 3·297 3·293	9:33 9:34 9:35	3.074 3.074	10.03 10.03	2.887 2.884 2.882	10·69 10·70 10·71	2·715 2·713 2·710	11·37 11·38 11·39	2·562 2·560 2·558	12.05 12.06 12.07	2.425 2.423 2.421	12·73 12·74 12·75	2·298 2·299 2·301

REDUCTION AT 1 MIN. FROM THE MERIDIAN CORRESPONDING TO THE LATITUDE VARIATION TAKEN FROM THE AZIMUTH TABLE.

Lat. Var.	Redn.												
Sec. 12.76 12.77 12.78 12.79 12.80	2·296 2·294 2·292 2·291 2·289	Sec. 13.44 13.45 13.46 13.47 13.48	2·185 2·182 2·181 2·180 2·178	Sec. 14·12 14·13 14·14 14·15 14·16	2.084 2.082 2.081 2.079 2.078	Sec. 14.80 14.81 14.82 14.84 14.86	1.991 1.990 1.989 1.986 1.983	Sec. 16·14 16·16 16·18 16·20 16·22	1.831 1.829 1.827 1.824 1.822	Sec. 17.50 17.52 17.54 17.56 17.58	1.693 1.691 1.689 1.687 1.685	Sec. 18.86 18.88 18.90 18.92 18.94	1.574 1.572 1.570 1.568 1.567
12.81 12.82 12.83 12.84 12.85	2·287 2·286 2·284 2·282 2·281	13·49 13·50 13·51 13·52 13·53	2·177 2·175 2·174 2·172 2·170	14·17 14·18 14·19 14·20 14·21	2.077 2.075 2.074 2.072 2.071	14.88 14.90 14.92 14.94 14.96	1·981 1·979 1·976 1·974 1·971	16·24 16·26 16·28 16·30 16·32	1.820 1.818 1.816 1.814 1.811	17.60 17.62 17.64 17.66 17.68	1.683 1.681 1.679 1.678 1.676	18·96 18·98 19·00 19·02	1.565 1.563 1.562 1.560 1.559
12.86 12.87 12.88 12.89 12.90	2·279 2·277 2·276 2·274 2·272	13.54 13.55 13.56 13.57 13.58	2·169 2·167 2·166 2·164 2·163	14·22 14·23 14·24 14·25 14·26	2.070 2.068 2.067 2.066 2.064	14.98 15.00 15.02 15.04 15.06	1·968 1·966 1·963 1·961 1·958	16·34 16·36 16·38 16·40 16·42	1.809 1.807 1.805 1.803 1.801	17·70 17·72 17·74 17·76 17·78	1.674 1.672 1.670 1.668 1.666	19.06 19.10 19.12 19.14	1.557 1.555 1.554 1.552 1.551
12·91 12·93 12·94 12·95	2·271 2·269 2·267 2·265 2·264	13.59 13.60 13.61 13.62 13.63	2·161 2·160 2·158 2·157 2·155	14·27 14·28 14·29 14·30	2.063 2.061 2.060 2.059 2.057	15.08 15.10 15.12 15.14 15.16	1.956 1.953 1.951 1.948 1.946	16·44 14·46 16·48 16·50 16·52	1.799 1.797 1.794 1.792 1.790	17.80 17.82 17.84 17.86 17.88	1.665 1.663 1.661 1.659 1.657	19·16 19·20 19·22 19·24	1.549 1.548 1.546 1.544 1.543
12·96 12·97 12·98 12·99 13·00	2·262 2·260 2·259 2·257 2·255	13.64 13.65 13.66 13.67 13.68	2·154 2·152 2·151 2·149 2·148	14·32 14·33 14·34 14·35 14·36	2·056 2·055 2·053 2·052 2·050	15·18 15·20 15·22 15·24 15·26	1.943 1.941 1.939 1.936 1.934	16·54 16·58 16·60 16·62	1·788 1·786 1·784 1·782 1·780	17·90 17·92 17·94 17·96 17·98	1.656 1.654 1.652 1.650 1.648	19·26 19·28 19·30 19·32	1.541 1.540 1.538 1.537 1.535
13.01 13.02 13.03 13.04 13.05	2·254 2·252 2·250 2·249 2·247	13.69 13.70 13.71 13.72 13.73	2·147 2·145 2·144 2·142 2·141	14·37 14·38 14·39 14·40 14·41	2·049 2·048 2·046 2·045 2·043	15·28 15·30 15·32 15·34 15·36	1.931 1.929 1.926 1.924 1.921	16.64 16.66 16.68 16.70 16.72	1.778 1.775 1.773 1.771 1.769	18.00 18.02 18.04 18.06 18.08	1 647 1 645 1 643 1 641 1 640	19·36 19·38 19·40 19·42	1.533 1.532 1.530 1.529 1.527
13.06 13.07 13.08 13.09	2·244 2·242 2·240	13·74 13·75 13·76 13·77 13·78	2·139 2·138 2·136 2·135 2·133	14·42 14·43 14·44 14·45 14·46	2.042 2.041 2.039 2.038 2.037	15·38 15·40 15·42 15·44 15·46	1·919 1·914 1·914 1·919	16·74 16·76 16·78 16·80 16·82	1.767 1.765 1.763 1.761 1.759	18·10 18·12 18·14 18·16 18·18	1.638 1.636 1.634 1.632 1.631	19·46 19·48 19·50 19·52 19·54	1.526 1.524 1.523 1.521 1.520
13·11 13·12 13·13 13·14 13·15	2·235 2·234 2·232	13.79 13.80 13.81 13.82 13.83	2.127	14·47 14·48 14·49 14·50	2·035 2·034 2·031 2·030	15·48 15·50 15·52 15·54 15·56	1·907 1·905 1·902 1·900 1·897	16.84 16.86 16.88 16.90 16.92	1.757 1.755 1.753 1.751 1.749	18·20 18·22 18·24 18·26 18·28	1.629 1.627 1.625 1.624 1.622	19·56 19·58 19·60 19·62 19·64	1.518 1.517 1.515 1.513 1.512
13·16 13·17 13·18 13·19 13·20	2·228 2·226 2·224	13.84 13.85 13.86 13.87 13.88	2·123 2·121 2·120	14·52 14·53 14·54 14·55 14·56	2·028 2·027 2·026 2·025 2·023	15.58 15.60 15.62 15.64 15.66	1·895 1·892 1·890 1·888 1·885	16·94 16·98 17·00 17·02		18·30 18·32 18·34 18·36 18·38	1.620 1.618 1.617 1.615 1.614	19.66 19.68 19.70 19.72 19.74	1.510 1.509 1.507 1.506 1.504
13·21 13·22 13·23 13·24 13·25	2·218 2·216	13·89 13·91 13·92 13·93	2·115 2·114 2·112	14·57 14·58 14·59 14·60 14·61	2.022 2.021 2.019 2.018 2.016	15.68 15.70 15.72 15.74 15.76	1.883 1.881 1.878 1.876 1.874	17.04 17.06 17.08 17.10 17.12	1.731	18·40 18·42 18·44 18·46 18·48	1.610 1.608 1.607	19.76 19.78 19.80 19.82 19.84	1.503 1.502 1.500 1.499 1.497
13·26 13·27 13·28 13·29 13·30	2.211	13·94 13·95 13·96 13·97 13·98	2·108 2·107 2·105	14.62 14.63 14.64 14.65 14.66	2.015 2.014 2.012 2.011 2.010	15.78 15.80 15.82 15.84 15.86	1·867 1·865	17·14 17·16 17·18 17·20 17·22	1.725 1.723 1.721	18·50 18·52 18·54 18·56 18·58	1.600 1.598	19.86 19.88 19.90 19.92 19.94	1·496 1·494 1·491 1·490
13·31 13·33 13·34 13·35	2·204 2·202 2·200	13·99 14·00 14·01 14·03	2·100 2·099 2·098	14.67 14.68 14.69 14.70 14.71	2.002	15.88 15.90 15.92 15.94 15.96	1.858 1.856 1.853	17·24 17·26 17·28 17·30 17·32	1·715 1·713 1·711	18.60 18.62 18.64 18.66 18.68	1·593 1·591 1·590	19.96 19.98 20.00 20.02 20.04	1·488 1·487 1·485 1·484 1·482
13·36 13·37 13·38 13·39 13·40	2·195 2·194 2·192	14.04 14.05 14.06 14.07 14.08	2.093 2.091	14·72 14·73 14·74 14·75 14·76	2.001 1.999 1.998	15.98 16.00 16.02 16.04 16.06	1.847 1.844 1.842	17·34 17·36 17·38 17·40 17·42	1·706 1·704 1·702	18·70 18·72 18·74 18·76 18·78	1.585 1.583 1.581	20.06 20.08 20.10 20.12 20.14	1.477
13·41 13·42 13·43	2.188	14·09 14·10 14·11	2.086	14·77 14·78 14·79	1·995 1·994 1·993	16·12	1.835	17·44 17·46 17·48	1.696	18.80 18.82 18.84	1.576	20·16 20·18 20·20	1.473

REDUCTION AT 1 MIN. FROM THE MERIDIAN CORRESPONDING TO THE LATITUDE VARIATIONS TAKEN FROM THE AZIMUTH TABLE.

Lat. Var.	Redn.	Lat. Var.	Redn.	Lat. Var.	Redn.								
Sec. 20·22 20·24 20·26 20·28 20·30	1·469 1·468 1·466 1·465 1·464	Sec. 21.58 21.60 21.62 21.64 21.66	1·378 1·377 1·376 1·375 1·373	Sec. 23.88 23.92 23.96 24.00 24.04	1·247 1·245 1·243 1·241 1·239	Sec. 26.60 26.64 26.68 26.72 26.76	1.121 1.120 1.118 1.116 1.115	Sec. 29.32 29.36 29.40 29.44 29.48	1.018 1.017 1.016 1.014 1.013	Sec. 32.04 32.08 32.12 32.16 32.20	·933 ·931 ·930 ·929 ·928	Sec. 34.76 34.80 34.84 34.88 34.92	-860 -859 -858 -857 -856
20·32 20·34 20·36 20·38 20·40	1.462 1.461 1.459 1.458	21.68 21.70 21.72 21.74 21.76	1·372 1·371 1·370 1·368 1·367	24·08 24·12 24·16 24·20 24·24	1·237 1·235 1·233 1·231 1·229	26·80 26·84 26·88 26·92 26·96	1·113 1·112 1·110 1·108 1·107	29·52 29·56 29·60 29·64 29·68	1.012 1.010 1.009 1.007 1.006	32·24 32·28 32·32 32·36 32·40	·927 ·926 ·925 ·924 ·922	34.96 35.00 35.10 35.20 35.30	·855 ·854 ·852 ·850 ·847
20.42 20.44 20.46 20.48 20.50	1.455 1.454 1.452 1.451 1.450	21.78 21.80 21.82 21.84 21.86	1·366 1·365 1·363 1·362 1·361	24·28 24·32 24·36 24·40 24·44	1·227 1·225 1·223 1·221 1·219	27·00 27·04 27·08 27·12 27·16	1·105 1·103 1·102 1·100 1·099	29·72 29·76 29·80 29·84 29·88	1.005 1.003 1.001 1.001	32·44 32·48 32·52 32·56 32·60	•921 •920 •919 •918 •917	35·40 35·50 35·60 35·70 35·80	·845 ·842 ·840 ·838 ·835
20·52 20·54 20·56 20·58 20·60	1.448 1.447 1.445 1.444 1.443	21.88 21.90 21.92 21.94 21.96	1.360 1.358 1.357 1.356 1.355	24·48 24·52 24·56 24·60 24·64	1·217 1·215 1·213 1·211 1·209	27·20 27·24 27·28 27·32 27·36	1·097 1·095 1·094 1·092 1·091	29·92 29·96 30·00 30·04 30·08	•998 •997 •995 •994 •993	32·64 32·68 32·72 32·76 32·80	·916 ·914 ·913 ·912 ·911	35.30 36.30 36.30 36.30	·833 ·831 ·828 ·826 ·824
20.62 20.64 20.66 20.68 20.70	1.441 1.440 1.439 1.437 1.436	21.98 22.00 22.04 22.08 22.12	1.354 1.352 1.350 1.348 1.345	24.68 24.72 24.76 24.80 24.84	1·208 1·206 1·204 1·202 1·200	27·40 27·44 27·48 27·52 27·56	1.089 1.088 1.086 1.084 1.083	30·12 30·20 30·24 30·28	•992 •990 •989 •988 •986	32·84 32·88 32·92 32·96 33·00	•910 •909 908 •907 •906	36·40 36·50 36·60 36·70 36·80	·822 ·819 ·817 ·815 ·813
20·72 20·74 20·76 20·78 20·80	1.435 1.433 1.432 1.430 1.429	22·16 22·20 22·24 22·28 22·32	1.343 1.340 1.338 1.336	24.88 24.92 24.96 25.00 25.04	1·198 1·196 1·194 1·192 1·190	27.60 27.64 27.68 27.72 27.76	1.081 1.080 1.078 1.077 1.075	30·32 30·36 30·40 30·44 30·48	•985 •984 •982 •981 •980	33.04 33.08 33.12 33.16 33.20	·905 ·903 ·902 ·901 ·900	36·90 37·10 37·20 37·30	·811 ·808 ·806 ·804 ·802
20·82 20·84 20·86 20·88 20·90	1.428 1.426 1.425 1.424 1.422	22·36 22·40 22·44 22·48 22·52	1·331 1·329 1·326 1·324 1·322	25.08 25.12 25.16 25.20 25.24	1·189 1·187 1·185 1·183 1·181	27·80 27·84 27·88 27·92 27·96	1.074 1.072 1.071 1.069 1.067	30·52 30·56 30·60 30·64 30·68	·979 ·977 ·976 ·975 ·974	33·24 33·28 33·36 33·40	·899 ·898 ·897 ·896 •895	37·40 37·50 37·60 37·70 37·80	·800 •798 •796 •793 •791
20·92 20·94 20·96 20·98 21·00	1.421 1.420 1.418 1.417 1.416	22·56 22·60 22·64 22·68 22·72	1.319 1.317 1.313 1.310	25·28 25·32 25·36 25·40 25·44	1·179 1·177 1·176 1·174 1·172	28.00 28.04 28.08 28.12 28.16	1.066 1.064 1.063 1.061 1.060	30·72 30·76 30·80 30·84 30·88	·972 ·971 ·970 ·969 ·967	33.44 33.48 33.52 33.56 33.60	·894 ·893 ·892 ·891 ·890	37.90 38.00 38.10 38.20 38.30	·789 ·787 ·785 ·783 ·781
21.02 21.04 21.06 21.08 21.10	1.414 1.413 1.410 1.409	22.76 22.80 22.84 22.88 22.92	1·308 1·306 1·303 1·301 1·299	25.48 25.52 25.56 25.60 25.64	1·170 1·168 1·167 1·165 1·163	28·20 28·24 28·28 28·32 28·36	1.059 1.057 1.056 1.054 1.053	30.92 30.96 31.00 31.04 31.08	•966 •965 •964 •962 •961	33.64 33.68 33.72 33.76 33.80	·889 ·888 ·886 ·885 ·884	38·40 38·50 38·60 38·70 38·80	·779 ·777 ·775 ·773 ·771
21·12 21·14 21·16 21·18 21·20	1.408 1.406 1.405 1.404 1.403	22.96 23.00 23.04 23.08 23.12	1·297 1·294 1·292 1·290 1·288	25.68 25.72 25.76 25.80 25.84	1·161 1·159 1·158 1·156 1·154	28·40 28·44 28·48 28·52 28·56	1.051 1.050 1.048 1.047 1.045	31·12 31·16 31·20 31·24 31·28	•960 •959 •958 •956 •955	33.84 33.88 33.92 33.96 34.00	·883 ·882 ·881 ·880 ·879	38.90 39.10 39.10 39.30	·769 ·767 ·765 ·763 ·761
21·22 21·24 21·26 21·28 21 30	1.401 1.400 1.399 1.397 1.396	23·16 23·20 23·24 23·28 23·32	1·286 1·284 1·281 1·279 1·277	25.88 25.92 25.96 26.00 26.04	1·152 1·150 1·149 1·147 1·145	28.60 28.64 28.68 28.72 28.76	1.044 1.042 1.041 1.039 1.038	31·32 31·36 31·40 31·44 31·48	954 953 952 950 949	34.04 34.08 34.12 34.16 34.20	·878 ·877 ·876 ·875 ·874	39.40 39.50 39.60 39.70 39.80	.759 .757 .756 .754 .752
21·32 21·34 21·36 21·38 21·40	1·395 1·393 1·391 1·390	23·36 23·40 23·44 23·48 23·52	1·275 1·273 1·270 1·268 1·266	26·08 26·12 26·16 26·20 26·24	1·143 1·142 1·140 1·138 1·137	28·80 28·84 28·88 28·92 28·96	1.037 1.035 1.034 1.032 1.031	31·52 31·56 31·64 31·68	·948 ·947 ·946 ·944 ·943	34·24 34·32 34·36 34·40	·873 ·872 ·871 ·870 ·869	39.90 40.00 40.10 40.30	.750 .748 .746 .744 .742
21·42 21·44 21·46 21·48 21·50	1·388 1·387 1·386 1·385 1·383	23.56 23.60 23.64 23.68 23.72	1·264 1·262 1·260 1·258 1·256	26·28 26·32 26·36 26·40 26·44	1·135 1·131 1·130 1·128	29.00 29.04 29.08 29.12 29.16	1.030 1.028 1.027 1.025 1.024	31·72 31·76 31·80 31·84 31·88	•942 •941 •940 •938 •937	34·44 34·48 34·52 34·56 34·60	·868 ·867 ·866 ·865 ·864	40·40 40·50 40·60 40·70 40·80	·741 ·739 ·737 ·735 ·733
21·52 21·54 21·56	1·382 1·381 1·380	23·76 23·80 23·84	1·254 1·252 1·249	26·48 26·52 26·56	1·126 1·125 1·123	29.24	1.023 1.021 1.020	31.96 31.96	•936 •935 •934	34·64 34·68 34·72	·863 ·862 ·861	40.00 41.00 41.10	·732 ·730 ·728

REDUCTION AT 1 MIN. FROM THE MERIDIAN CORRESPONDING TO THE LATITUDE VARIATIONS TAKEN FROM THE AZIMUTH TABLE—continued.

Lat. Var.	Redn.	Lat. Var.	Redn.										
Sec. 41·20 41·30 41·40 41·50 41·60	·726 ·725 ·723 ·721 ·719	Sec. 48.00 48.10 48.20 48.30 48.40	·624 ·623 ·621 ·620 ·619	Sec. 59.60 59.80 60.00 60.20 60.40	·503 ·501 ·499 ·498 ·496	Sec. 73·20 73·40 73·60 73·80 74·00	·409 ·408 ·407 ·406 ·405	Sec. 86.80 87.00 87.20 87.40 87.60	345 345 344 343 342	Sec. 102.0 103.0 104.0 105.0 106.0	·294 ·291 ·288 ·286 ·283	Sec. 210 220 230 240 250	·143 ·136 ·130 ·125 ·120
41.70 41.80 41.90 42.00 42.10	·718 ·716 ·714 ·713 ·711	48·50 48·60 48·70 48·80 48·90	·617 ·616 ·615 ·614 ·612	60.60 60.80 61.00 61.20 61.40	·494 ·493 ·491 ·490 ·488	74·20 74·40 74·60 74·80 75·00	.404 .403 .402 .401 .400	87.80 88.00 88.20 88.40 88.60	·341 ·341 ·340 ·339 ·338	107.0 108.0 109.0 110.0	·280 ·278 ·275 ·273 ·270	260 270 280 290 300	·115 ·111 ·107 ·103 ·100
42·20 42·30 42·40 42·50 42·60	·709 ·708 ·706 ·704 ·703	49.00 49.10 49.30 49.40	·611 ·610 ·609 ·607 ·606	61.60 61.80 62.00 62.20 62.40	·486 ·485 ·483 ·482 ·480	75·20 75·40 75·60 75·80 76·00	·399 ·398 ·397 ·395 ·394	88.80 89.00 89.20 89.40 89.60	·338 ·337 ·336 ·335 ·335	112.0 113.0 114.0 116.0	·268 ·265 ·263 ·261 ·259	310 320 330 340 350	·097 ·094 ·091 ·088 ·086
42.70 42.80 42.90 43.00 43.10	·701 ·699 ·698 ·696 ·694	49.50 49.60 49.70 49.80 49.90	·605 ·604 ·603 ·601 ·600	62.60 62.80 63.00 63.20 63.40	479 477 476 474 473	76·20 76·40 76·60 76·80 77·00	·393 ·392 ·391 ·390 ·389	89·80 90·00 90·20 90·40 90·60	334 333 332 332 331	117.0 118.0 119.0 120.0	·256 ·254 ·252 ·250 ·248	360 370 380 390 400	·083 ·081 ·079 ·077 ·075
43·20 43·30 43·40 43·50 43·60	·693 ·691 ·690 ·688 ·687	50.00 50.20 50.40 50.60 50.80	·599 ·597 ·594 ·592 ·590	63.60 63.80 64.00 64.20 64.40	·471 ·470 ·468 ·467 ·465	77:20 77:40 77:60 77:80 78:00	·388 ·387 ·386 ·385 ·384	90·80 91·20 91·40 91·60	·330 ·330 ·329 ·328 ·327	122·0 123·0 124·0 125·0 126·0	·246 ·244 ·242 ·240 ·238	410 420 430 440 450	·073 ·071 ·070 ·068 ·067
43.70 43.80 43.90 44.00 44.10	·684 ·683 ·682 ·680 ·679	51.00 51.20 51.40 51.60 51.80	·587 ·585 ·583 ·580 ·578	64.60 64.80 65.00 65.20 65.40	·464 ·462 ·461 ·460 ·458	78·20 78·40 78·60 78·80 79·00	·383 ·382 ·381 ·380 ·379	91·80 92·00 92·40 92·60	•327 •326 •325 •325 •324	127·0 128·0 129·0 130·0 132·0	·236 ·234 ·233 ·231 ·227	460 470 480 490 500	·065 ·064 ·062 ·061 ·060
44·20 44·30 44·40 44·50 44·60	·677 ·676 ·674 ·673 ·671	52·00 52·20 52·40 52·60 52·80	·576 ·574 ·572 ·569 ·567	65.60 65.80 66.00 66.20 66.40	·457 ·455 ·454 ·453 ·451	79·20 79·40 79·80 80·00	·378 ·377 ·377 ·376 ·375	92·80 93·20 93·40 93·60	·323 ·322 ·322 ·321 ·320	134.0 136.0 138.0 140.0	·224 ·221 ·217 ·214 ·211	510 520 530 540 550	·059 058 ·057 ·056 ·055
44.70 44.80 44.90 45.00 45.10	·670 ·668 ·667 ·665 ·664	53.00 53.20 53.40 53.60 53.80	·565 ·563 ·561 ·559 ·557	66.60 66.80 67.00 67.20 67.40	.450 .449 .447 .446 .445	80·20 80·40 80·60 80·80 81·00	374 373 372 371 370	93·80 94·00 94·20 94·40 94·60	·320 ·319 ·318 ·318 ·317	144.0 146.0 148.0 150.0 152.0	·208 ·205 ·203 ·200 ·197	560 570 580 590 600	·054 ·053 ·052 ·051 ·050
45·20 45·30 45·40 45·50 45·60	·662 ·661 ·659 ·658 ·657	54.00 54.20 54.40 54.60 54.80	·555 ·553 ·551 ·549 ·547	67.60 67.80 68.00 68.20 68.40	.443 .442 .441 .439 .438	81·20 81·40 81·60 81·80 82·00	·369 ·368 ·367 ·366 ·366	94·80 95·00 95·20 95·40 95·60	·316 ·316 ·315 ·314 ·314	154.0 156.0 158.0 160.0 162.0	·195 ·192 ·190 ·187 ·185	620 640 660 680 700	•048 •047 •045 •044 •043
45.70 45.80 45.90 46.00 46.10	·655 ·654 ·652 ·651 ·649	55.00 55.20 55.40 55.60 55.80	*545 *543 *541 *539 *537	68.60 68.80 69.00 69.20 69.40	*437 *436 *434 *433 *432	82·20 82·40 82·60 82·80 83·00	•365 •364 •363 •362 •361	95.80 96.00 96.20 96.40 96.60	•313 •312 •311 •310	164.0 166.0 168.0 170.0	•183 •181 •179 •176 •174	720 740 760 780 800	·042 ·041 ·039 ·038 ·037
46·20 46·30 46·40 46·50 46·60	·648 ·647 ·645 ·644 ·643	56.00 56.20 56.40 56.60 56.80	*535 *533 *531 *529 *527	69.60 69.80 70.00 70.20 70.40	•431 •429 •428 •427 •426	83·20 83 40 83·60 83·80 84·00	•360 •360 •359 •358 •357	96·80 97·00 97·20 97·40 97·60	·310 ·309 ·308 ·308 ·307	174.0 176.0 178.0 180.0 182.0	·172 ·170 ·168 ·167 ·165	850 900 950 1000 1100	·035 ·033 ·032 ·030 ·027
46.70 46.80 46.90 47.00 47.10	·641 ·640 ·639 ·637 ·636	57.00 57.20 57.40 57.60 57.80	·526 ·524 ·522 ·520 ·518	70.60 70.80 71.00 71.20 71.40	.425 .423 .422 .421 .420	84·20 84·40 84·60 84·80 85·00	•356 •355 •354 •354 •353	97.80 98.00 98.20 98.40 98.60	·307 ·306 ·305 ·305 ·304	184.0 186.0 188.0 190.0 192.0	·163 ·161 ·160 ·158 ·156	1200 1300 1400 1600 1800	·025 ·023 ·021 ·019 ·017
47·20 47·30 47·40 47·50 47·60	·634 ·633 ·632 ·630 ·629	58.00 58.20 58.40 58.60 58.80	·517 ·515 ·513 ·510	71.60 71.80 72.00 72.20 72.40	·419 ·417 ·416 ·415 ·414	85·20 85·40 85·60 85·80 86·00	*352 *351 *350 *349 *349	98·80 99·00 99·20 99·40 99·60	·304 ·303 ·302 ·302 ·301	194.0 196.0 198.0 200.0 202.0	·155 ·153 ·152 ·150 ·149	2000 2500 3000 3500 4000	*015 *012 *010 *009 *007
47•70 47•80 47 90	·628 ·626 ·625	59·00 59·20 59·40	·508 ·506 ·504	72.60 72.80 73.00	.413 .412 .411	86·20 86·40 86·60	·348 ·347 ·346	101.00 100.00 30.80	·300 ·300 ·297	204·0 206·0 208·0	·147 ·146 ·144	4500 5000 6000	·007 ·006 ·005

ERROR IN LATITUDE DUE TO AN ERROR OF 4 SECS. IN TIME OR 1' OF LONGITUDE.

Azi- muths.	LATITUDES.															
A	0°	5°	10°	15°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	40°
2 4 6 8	.03 .07 .11 .14 .18	.03 .07 .10 .14 .18	.03 .07 .10 .14	.03 .07 .10 .14	.03 .07 .10 .13	.03 .07 .10 .13	, .03 .06 .10 .13	.03 .06 .10 .13	.03 .06 .09 .13	.03 .06 .09 .12	.03 .06 .09 .12	.03 .06 .09 .12	.03 .06 .09 .12	.03 .06 .09 .11	.03 .06 .08 .11	.03 .05 .08 .11
12	·21	·21	·21	·21	·20	·20	·20	·19	·19	·19	·18	·18	·18	·17	·17	·16
14	·25	·25	·25	·24	·24	·23	·23	·23	·22	·22	·22	·21	·21	·20	·20	·19
16	·29	·29	·28	·28	·27	·27	·27	·26	·26	·25	25	·24	·24	·23	·23	·22
18	·32	·32	·32	·31	·31	·31	·30	·30	·29	·29	·28	·28	·27	·26	·26	·25
20	·36	·36	·36	·35	·35	·34	·34	·33	·33	·32	·32	·31	·30	·29	·29	·28
22 24 26 28 30	.40 .45 .49 .53	*40 *44 *49 *53 *58	·40 ·44 ·48 ·52 ·57	·39 ·43 ·47 ·51 ·56	·38 ·42 ·46 ·51 ·55	•38 •42 •46 •50 •54	·37 ·41 ·45 ·49 ·54	*37 *41 *45 *49 *53	·36 ·40 ·44 ·48 ·52	·36 ·39 ·43 ·47 ·51	·35 ·39 ·42 ·46 ·50	·34 ·38 ·41 ·45 ·49	*33 *37 *40 *44 *48	·33 ·36 ·39 ·43 ·47	·32 ·35 ·38 ·42 ·45	·31 ·34 ·37 ·41 ·44
32	·62	•62	·62	·60	•59	•59	·58	·57	·56	·55	·54	·53	·52	·51	.49	·48
34	·67	•67	·66	·65	•64	•63	·63	·62	·61	·60	·58	·57	·56	·55	.53	·52
36	·73	•72	·72	·70	•69	•68	·67	·66	·65	·64	·63	·62	·60	·59	.57	·56
38	·78	•78	·77	·75	•74	•73	·72	·71	·70	·69	·68	·66	·65	·63	.62	·60
40	·84	•84	·83	·81	•80	•79	·78	·77	·75	·74	·73	·71	·70	·68	.66	·64
41	·87	·87	·86	·84	·83	·82	·81	·79	•78	·77	·75	.74	·72	·70	·69	·67
42	·90	·90	·89	·87	·86	·85	·83	·82	•81	·79	·78	.76	·75	·73	·71	·69
43	·93	·93	·92	·90	·89	·88	·86	·85	•84	·82	·81	.79	·77	·75	·73	·71
44	·97	·96	95	·93	·92	·91	·90	·88	•87	·85	·84	.82	·80	·78	·76	·74
45	I·00	I·00	·98	·97	·95	·94	·93	·91	•90	·88	·87	.85	·83	·81	·79	·77
46 47 48 49 50	1.05 1.07 1.11 1.15 1.19	1.03 1.07 1.11 1.15 1.19	1.02 1.06 1.09 1.13 1.17	1.00 1.04 1.07 1.11 1.15	·98 1·02 1·06 1·09 1·13	·97 I·01 I·04 I·08 I·12	•96 •99 1•03 1•07 1•10	·95 ·98 1·01 1·05 1·09	.93 .96 1.00 1.03	·91 ·95 ·98 I·02 I·05	·90 ·93 ·96 I·00 I·03	·88 ·91 ·94 ·98 1·01	·86 ·89 ·92 ·95 ·99	·84 ·87 ·90 ·93 ·96	·82 ·84 ·88 ·91 ·94	·79 ·82 ·85 ·88 ·91
51	1·23	1·23	1·22	1·19	1·17	1·16	1·14	1·13	1·11	1.09	1.07	1.05	1 02	1.00	.97	.95
52	1·28	1·28	1·26	1·24	1·22	1·20	1·19	1·17	1·15	1.13	1.11	1.09	1.06	1 04	1.01	.98
53	1·33	1·32	1·31	1·28	1·26	1·25	1·23	1·21	1·19	1.17	1.15	1.13	1.10	1.07	1.05	1 02
54	1·38	1·38	1·36	1·33	1·31	1·29	1·28	1·26	1·24	1.22	1.19	1.17	1.14	1.11	1.08	1.05
55	1·43	1·42	1·41	1·38	1·36	1·34	1·32	1·30	1·28	1.26	1.24	1.21	1.18	1.16	1.13	1.09
56	1·48	1·48	1·46	1·43	1.41	1·39	1·37	1·35	1·33	1·31	1·28	1·26	1·23	1·20	1·17	I·14
57	1·54	1·53	1·52	1·49	1.46	1·45	1·43	1·41	1·38	1·36	1·33	1·31	1·28	1·25	1·21	I 18
58	1·60	1·59	1·58	1·55	1.52	1·50	1·48	1·46	1·44	1·41	1·39	1·36	1·33	1·29	1·26	I·23
59	1·66	1·66	1·64	1·61	1.58	1·56	1·54	1·52	1·50	1·47	1·44	1·41	1·38	1·35	1·31	I·27
60	1·73	1·73	1·71	1·67	1.65	1·63	1·61	1·58	1·56	1·53	1·50	1·47	1·44	1·40	1·36	I·33
61	1.80	1·80	1·78	1·74	1·72	1·71	1·67	1·65	1·62	1·59	1.56	1·53	1.50	1·46	1·42	1·38
62	1.88	1·87	1·85	1·82	1·79	1·77	1·74	1·72	1·69	1·66	1.63	1·59	1.56	1·52	1·48	1·44
63	1.96	1·95	1·93	1·90	1·87	1·84	1·82	1·79	1·76	1·73	1.70	1·66	1.63	1·59	1·55	1·50
64	2.05	2·04	2·02	1·98	1·95	1·93	1·90	1·87	1·84	1·81	1.78	1·74	1.70	1·66	1·62	1·57
65	2.14	2·14	2·11	2·07	2·04	2·02	1·99	1·96	1·93	1·89	1.86	1·82	1.78	1·74	1·69	1·64
66 67 68 69 70	2·25 2·36 2·48 2·61 2·75	2·24 2·35 2·47 2·59 2·74	2·2I 2·32 2·44 2·57 2·7I	2·17 2·28 2·39 2·52 2·65	2·14 2·24 2·35 2·48 2·61	2·11 2·21 2·33 2·45 2·58	2·08 2·18 2·30 2·42 2·55	2·05 2·15 2·26 2·38 2·51	2·02 2·12 2·22 2·34 2·47		1.95 2.04 2.14 2.26 2.38	1.90 2.00 2.10 2.33	1.86 1.95 2.05 2.16 2.28	1.82 1.91 2.00 2.11 2.22	1.77 1.86 1.95 2.05 2.16	1·72 1·80 1·90 2·00 2·10
71	2·90	2·89	2·86	2·81	2·76	2·73	2.69	2.65	2.61	2·56	2·51	2·46	2·41	2·35	2·29	2·22
72	3·08	3·07	3·03	2·97	2·93	2·89	2.85	2.81	2.77	2·72	2·67	2·61	2·55	2 49	2·43	2·36
73	3·27	3·26	3·22	3·16	3·11	3·07	3.03	2.99	2.94	2·89	2·83	2·77	2·71	2·65	2·58	2·51
74	3·48	3·47	3·43	3·37	3·32	3·28	3.23	3.19	3.13	3·08	3·02	2·96	2·89	2·82	2·75	2·67
75	3·73	3·72	3·68	3·60	3·55	3·51	3.46	3.41	3.35	3·30	3·23	3·16	3·09	3·02	2·94	2·86
76	4.01	4.00	3.95	3·87	3.81	3·77	3·72	3·66	3.60	3.54	4·46	3.40	3·33	3°24	3·16	3·07
77	4.33	4.31	4.27	4·18	4.12	4·07	4·02	3·96	3.89	3.82		3.67	3·59	3°50	3·41	3·32
78	4.70	4.69	4.63	4·54	4.47	4·42	4·36	4·30	4.23	4.15		3.99	3·90	3°81	3·71	3·60
79	5.14	5.12	5.07	4·97	4.89	4·83	4·77	4·70	4.62	4.54		4.36	4·27	4°16	4·05	3·94
80	5.67	5.65	5.59	5·48	5.39	5·33	5·26	5·18	5.10	5.01		4.81	4·70	4°59	4·47	4·34
81 82 83 84 85	6·31 7·12 8·14 9·51 11·43	6·29 7·09 8·11 9·48 11·38		6·10 6·87 7·86 9·19 11·04	6.00 6.77 7.74 9.05 10.87	5·93 6·69 7·65 8·94 10·74	5·85 6·60 7·55 8·82 10·60	5·77 6·50 7·44 8·69 10·44	5.68 6.40 7.32 8.55 10.27	5.57 6.28 7.19 8.40 10.09	7.05	5·35 6·03 6·91 8·07 9·69	5.23 5.90 6.75 7.89 9.48	5·11 5·76 6·59 7·70 9·24	4.97 5.61 6.42 7.50 9.01	4·84 5·45 6·24 7·29 8·75

TABLE IX. ERROR IN LATITUDE DUE TO AN ERROR OF 4 SECS. IN TIME OR 1' OF LONGITUDE.

Azi- muths.	LATITUDES.															
Az	42°	44°	46°	48°	4 9°	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°	60°
6 8	.03 .05 .08 .10	.03 .05 .08 .10	.02 .05 .07 .10	.02 .05 .07 .09	.02 .05 .07 .09	.02 .04 .07 .09	.02 .04 .07 .09	.02 .04 .06 .09	.02 .04 .06 .08	.02 .04 .06 .08	.02 .04 .06 .08	.02 .04 .06 .08	.02 .04 .06 .08	.02 .04 .06 .07	.02 .04 .05 .07	•02 •03 •05 •07 •09
12	·16	·15	·15	·14	·14	·14	·13	·13	·13	·12	·12	•12	·12	·11	·11	·11
14	·19	·18	·17	·17	·16	·16	·16	·15	·15	·15	·14	•14	·14	·13	·13	·12
16	·21	·21	·20	·19	·19	·18	·18	·18	·17	·17	·16	•16	·16	·15	·15	·14
18	·24	·23	·23	·22	·21	·21	·20	·20	·20	·19	·19	•18	·18	·17	·17	·16
20	·27	·26	·25	·24	·24	·23	·23	·22	·22	·21	·21	•20	·20	·19	·19	·18
22	·30	·29	·28	·27	·27	·26	·25	·25	·24	·24	·23	·23	·22	·21	·21	·20
24	·33	·32	·31	·30	·29	·29	·28	·27	·27	·26	·26	·25	·24	·24	·23	·22
26	·36	·35	·34	·33	·32	·31	·31	·30	·29	·29	·28	·27	·27	·26	·25	·24
28	·40	·38	·37	·36	·35	·34	·33	·33	·32	·31	·30	·30	·29	·28	·27	·27
30	·43	·42	·40	·39	·38	·37	·36	·36	·35	·34	·33	·32	·31	·31	·30	·29
32	·46	*45	.43	·42	*41	·40	·39	*38	·38	*37	·36	*35	*34	*33	*32	·31
34	·50	*49	.47	·45	*44	·43	·42	*42	·41	*40	·39	*38	*37	*36	*35	·34
36	·54	*52	.50	·49	*48	·47	·46	*45	·44	*43	·42	*41	*40	*39	*37	·36
38	·58	*56	.54	·52	*51	·50	·49	*48	·47	*46	·45	*44	*43	*41	*40	·39
40	·62	*60	.58	·56	*55	·54	·53	*52	·51	*49	·48	*47	*46	*44	*43	·42
41	·65	·63	•60	·58	·57	•56	·55	*54	·52	•51	.50	·49	*47	·46	*45	·43
42	·67	·65	•63	·60	59	•58	·57	*55	·54	•53	.52	·50	*49	·48	*46	·45
43	·69	·67	•65	·62	·61	•60	·59	*57	·56	•55	.53	·52	*51	·49	*48	·47
44	·72	·69	•67	·65	·63	•62	·61	*59	·58	•57	.55	·54	*53	·51	*50	·48
45	·74	·72	•69	·67	·66	•64	·63	•62	·60	•59	.57	·56	*54	·53	*52	·50
46 47 48 49 50	.77 .80 .83 .85	.74 .77 .80 .83	·72 ·74 ·77 ·80 ·83	·69 ·72 ·74 ·77 ·80	·68 ·70 ·73 ·75 ·78	·67 ·69 ·71 ·74 ·77	·65 ·67 ·70 ·72 ·75	·64 ·66 ·68 ·71 ·73	·62 ·65 ·67 ·69 ·72	·61 ·63 ·65 ·68 ·70	•59 •62 •64 •66 •68	·58 ·60 ·62 ·64 ·67	·56 ·58 ·60 ·63 ·65	·55 ·57 ·59 ·61 ·63	53 •55 •57 •59 •61	·52 ·54 ·56 ·58 ·60
51 52 53 54 55	•92 •95 •99 1•02 1•06	·89 ·92 ·95 ·99 I·03	•86 •89 •92 •96 •99	•83 •86 •89 •92 •96	·81 ·84 ·87 ·90 ·94	•79 •82 •85 •88 •92	.78 .81 .84 .87	•76 •79 •82 •85 •88	*74 *77 *80 *83 *86	.73 .75 .78 .81	·71 ·73 ·76 ·79 ·82	·69 ·72 ·74 ·77 ·80	·67 ·70 ·72 ·75 ·78	·65 ·68 ·70 ·73 ·76	·64 ·66 ·68 ·71 ·74	·62 ·64 ·66 ·69 ·71
56	1·10	1.07	1.03	*99	·97	·95	.93	·91	.89	·87	·85	·83	·81	•79	•76	.74
57	1·14	1.11	1.07	1.03	I·01	·99	.97	·95	.93	·91	·88	·86	·84	•82	•79	.77
58	1·19	1.15	1.11	1.07	I·05	I·03	1.01	·99	.96	·94	·92	·89	·87	•85	•82	.80
59	1·24	1.20	1.16	1.11	I·09	I·07	1.05	1·02	I.00	·98	·95	·93	·91	•88	•86	.83
60	1·29	1.25	1.20	1.16	I·14	I·II	1.09	1·07	I.04	I·02	·99	·97	·94	•92	•89	.87
61	1.34	1.30	1·25	1·21	1·18	1·16	1·14	1·11	1.09	1.06	1.05	1.01	·98	*96	.93	·90
62	1.40	1.35	1·31	1·26	1·23	1·21	1·18	1·16	1.13	1.11	1.08	1.05	1·02	1.00	.97	·94
63	1.46	1.41	1·36	1·31	1·29	1·26	1·24	1·21	1.18	1.15	1.13	1.10	1·07	1.04	1.01	·98
64	1.52	1.47	1·42	1·37	1·34	1·32	1·29	1·26	1.23	1.21	1.18	1.15	1·12	1.09	1.06	I·03
65	1.59	1.54	1·49	1·43	1·41	1·38	1·35	1·32	1.29	1.26	1.23	1.20	1·17	1.14	1.10	I·07
66	1.67	1.62	1.56	1.50	1.47	1.44		1·38	1.35	1·32	1·29	1·26	1·22	1·19	1·16	1·12
67	1.75	1.69	1.64	1.58	1.55	1.51		1·45	1.42	1·38	1·35	1·32	1·28	1·25	1·21	1·18
68	1.84	1.78	1.72	1.66	1.62	1.59		1·52	1.49	1·45	1·42	1·38	1·35	1·31	1·27	1·24
69	1.94	1.87	1.81	1.74	1.71	1.67		1·60	1.57	1·53	1·49	1·46	1·42	1·38	1·34	1·30
70	2.04	1.98	1.91	1.84	1.80	1.77		1·69	1.65	1·61	1·58	1·54	1·50	1·46	1·41	1·37
71	2·16	2·09	2.02	1.94	1.91	1.87	1.83	1.79	1.75	1.71	1.67	1.62	1.58	1.54	1.50	1·45
72	2·29	2·21	2.14	2.06	2.02	1.98	1.94	1.89	1.85	1.81	1.77	1.72	1.68	1.63	1.59	1·54
73	2·43	2·35	2.27	2.19	2.15	2.10	2.06	2.01	1.97	1.92	1.88	1.83	1.78	1.73	1.68	1·64
74	2·59	2·51	2.42	2.33	2.29	2.24	2.19	2.15	2.10	2.05	2.00	1.95	1.90	1.85	1.80	1·74
75	2·77	2·68	2.59	2.50	2.45	2.40	2.35	2.30	2.25	2.19	2.14	2.09	2.03	1.98	1.92	1·87
76	2.98	2-89	2·79	2.68	2·63	2·58	2·52	2.47	2.41	2·36	2·30	2·24	2·18	2·13	2·07	2·01
77	3.22	3·12	3·01	2.90	2·84	2·78	2·73	2.67	2.61	2·55	2·48	2·42	2·36	2·30	2·23	2·17
78	3.50	3·38	3·27	3.15	3·09	3·02	2·96	2.90	2.83	2·77	2·70	2·63	2·56	2·49	2·42	2·35
79	3.82	3·70	3·57	3.44	3·38	3·31	3·24	3.17	3.10	3·02	2·95	2·88	2·80	2·73	2·65	2·57
80	4.21	4·08	3·94	3.79	3·72	3·65	3·57	3.49	3.41	3·33	3·25	3·17	3·09	3·01	2·92	2·84
81	4·69	4.54	4·39	4·22	4·14	4·06	3.97	3·89	3·80	3.71	3·62	3.53	3.44	3·35	3.25	3·16
82	5·29	5.12	4·94	4·76	4·67	4·57	4.48	4·38	4·28	4.18	4·08	3.98	3.87	3·77	3.66	3·56
83	6·05	5.86	5·66	5·45	5·34	5·23	5.12	5•01	4 90	4.79	4·67	4.55	4.43	4·31	4.19	4·07
84	7·07	6.84	6·61	6·37	6·24	6·12	5.99	5·86	5·73	5.59	5·46	5.32	5.18	5·04	4.90	4·76
85	8·49	8.22	7·94	7·65	7·50	7·35	7.19	7·04	6·88	6.72	6·56	6.39	6.22	6·06	5.89	5·71

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Sta	r's Name.	Mag.	Right Ascension.	Annual Change.	Declination.	Annual Change.
a Andromedæ β Cassiopeiæ a Phœnicis a Cassiopeiæ β Ceti	(Alpheratz) (Schedar) (Deneb Kaitos)	2·1 2·4 2·4 Var. 2·2	H. M. S. 0 3 56·4 0 4 34·9 0 22 2·2 0 35 37·1 0 39 16·4	s. +3.09 3.12 2.95 3.38 3.00	N. 28 36 56 N. 58 40 32 S. 42 46 23 N. 56 3 57 S. 18 27 30	+20.0 +20.0 -20.0 +19.8 -19.8
γ Cassiopeiæ β Andromedæ δ Cassiopeiæ α Ursæ Minoris α Eridani	(Mirach) (Polaris) (Achernar)	2·3 2·4 2·8 2·1 0·5	0 51 30.4 I 4 54.7 I 20 10.7 I 28 47.1 I 34 30.7	+3.59 3.34 3.86 28.26 2.23	N. 60 15 5 N. 35 9 53 N. 59 47 20 N. 88 50 48 S. 57 40 25	+19.5 +19.2 +18.8 +18.6 -18.4
β Arietis γ¹ Andromedæ α Arietis α Ceti α Persei	(Almach) (Hamel) (Meskar) (Mirfak)	2·7 2·3 2·2 2·8 1·9	1 49 53·1 1 58 36·8 2 2 19·3 2 57 46·9 3 18 10·5	+3·30 3·67 3·36 3·13 4·27	N. 20 23 17 N. 41 55 3 N. 23 3 23 N. 3 45 11 N. 49 33 22	+17.8 +17.4 +17.3 +14.3 +13.0
α Tauri α Aurigæ β Orionis γ Orionis β Tauri	(Aldebaran) (Capella) (Rigel) (Bellatrix) (Nath)	1·1 0·2 0·3 1·7 1·8	4 30 59·0 5 10 20·0 5 10 24·2 5 20 31·1 5 20 51·3	+3.44 4.42 2.88 3.22 3.79	N. 16 20 14 N. 45 54 42 S. 8 18 1 N. 6 16 21 N. 28 32 9	+ 7·6 + 4·3 - 4·3 + 3·4 + 3·4
α Leporis e Orionis ζ Orionis α Columbæ κ Orionis	(Alnilam) (1st *) (Phact) (Saiph)	2·7 1·7 2·0 2·7 2·2	5 28 56·2 5 31 50·9 5 36 25·1 5 36 32·1 5 43 40·7	+2.65 3.04 3.03 2.17 2.84	S. 17 52 59 S. 1 15 22 S. 1 59 15 S. 34 7 10 S. 9 41 58	- 2·7 - 2·5 - 2·1 - 2·0 - I·4
α Orionis β Aurigæ θ Aurigæ β Canis Majoris α Argus	(Betelguese) (Menkalinan)	Var. 2·1 2·7 2·0 -1·0	5 50 30·9 5 53 13·3 5 53 51·4 6 18 54·7 6 22 2·6	+3·25 4·41 4·09 2·64 1·33	N. 7 23 31 N. 44 56 23 N. 37 12 27 S. 17 54 45 S. 52 38 54	+ 0.8 + 0.6 + 0.5 + 1.7 + 1.9
γ Geminorum α Canis Majoris τ Argus . c Canis Majoris δ Canis Majoris	(Alhena) (Sirius)	2.8	6 32 44.7 6 41 21.3 6 47 48.1 6 55 14.7 7 4 53.6	+3.46 2.68 1.49 2.36 2.44	N. 16 28 25 S. 16 35 52 S. 50 30 44 S. 28 51 16 S. 26 15 22	- 2.9 + 3.6 + 4.2 + 4.8 + 5.6
π Argus η Canis Majoris α² Geminorum α Canis Minoris β Geminorum	(Castor) (Procyon) (Pollux)	2·7 2·4 2·0 0·5 1·2	7 14 6·3 7 20 41·6 7 29 6·9 7 34 48·0 7 40 3·3	+2·12 2·37 3·85 3·19 3·72	S. 36 56 34 S. 29 8 5 N. 32 4 42 N. 5 26 45 N. 28 14 5	+ 6·4 + 6·9 - 7·6 - 8·1 - 8·5
ζ Argus γ Argus ε Argus δ Argus β Argus		2·3 1·9 1·7 2·0 1·7	8 0 33.7 8 6 53.0 8 20 45.0 8 42 19.5 9 12 15.7	+2·11 1·85 1·24 1·66 0·70	S. 39 45 38 S. 47 4 58 S. 59 13 57 S. 54 23 35 S. 69 21 46	+10·1 +10·5 +11·6 +13·0 +14·9
κ Argus κ Argus α Hydræ α Leonis γ¹ Leonis	(Tureis) (Alphard) (Regulus) (Algeiba)	2·2 2·6 2·2 1·3 2·6	9 14 47·2 9 19 26·9 9 23 21·7 10 3 47·6 10 15 14·0	+1.61 1.86 2.95 3.22 3.29	S. 58 54 50 S. 54 38 36 S. 8 17 7 N. 12 23 17 N. 20 16 37	+15·1 +15·3 +15·5 -17·5 -18·0
υ Argus β Ursæ Majoris α Ursæ Majoris δ Leonis β Leonis	(Dubhe) (Zosma) (Denebola)	2·8 2·4 2·0 2·6 2·2	10 43 4.0 10 56 39.7 10 58 25.9 11 9 32.2 11 44 40.5	+2.57 3.63 3.75 3.18 3.10	S. 48 57 57 N. 56 50 37 N. 62 12 56 N. 20 59 42 N. 15 3 10	+18.9 -19.3 -19.3 -19.6 -20.0

THE MEAN PLACES OF 108 OF THE BRIGHTEST STARS—continued.

Star's Name.	Mag.	Right Ascension.	Annual Change.	Declination.	Annual Change.
γ Ursæ Majoris (<i>Phecda</i>) δ Centauri	2·5 2·8 2·7 1·6 1·6	H. M. S. 11 49 18·8 12 3 53·7 12 11 22·9 12 21 48·2 12 26 23·1	s. +3·16 3·10 3·09 3·32 3·31	N. 54 10 23 S. 50 14 37 S. 17 3 52 S. 62 37 21 S. 56 37 54	-20.0 +20.0 +20.0 +20.0 +19.9
γ Centauri	2·4	12 36 46·1	+3·31	S. 48 29 16	+19.8
	1·5	12 42 41·2	3·49	S. 59 13 8	+19.7
	1·8	12 50 15·0	2·63	N. 56 25 35	-19.6
	2·4	13 20 28·0	2·41	N. 55 22 27	-18.8
	1·2	13 20 39·6	3·16	S. 10 42 46	+18.8
e Centauri η Ursæ Majoris (Benetnasch) ζ Centauri β Centauri θ Centauri	2.6	13 34 25.8	+3.78	S. 53 I 47	+18.4
	1.9	13 44 9.2	2.38	N. 49 44 32	-18.0
	2.8	13 50 10.0	3.73	S. 46 51 56	+17.8
	0.8	13 57 44.6	4.21	S. 59 57 31	+17.5
	2.1	14 1 37.0	3.56	S. 35 56 50	+17.3
α Boötis (Arcturus) η Centauri α² Centauri α Lupi ε² Boötis	0·3	14 11 44.3	+2.81	N. 19 37 47	- 16·8
	2·7	14 30 2.4	3.80	S. 41 46 50	+ 15·9
	0·3	14 33 45.6	4.54	S. 60 28 45	+ 15·7
	2·5	14 36 12.1	3.98	S. 47 1 11	+ 15·6
	2·6	14 41 13.9	2.62	N. 27 26 10	- 15·3
β Ursæ Minoris (Kochab) β Lupi	2·2	14 50 56·7	-0.20	N. 74 30 25	-14.7
	2·7	14 52 53·4	+3.92	S. 42 47 18	+14.6
	2·3	15 31 2·8	2.53	N. 27 0 12	-12.1
	2·8	15 40 1·8	2.94	N. 6 41 44	-11.5
	2·5	15 55 14·7	3.54	S. 22 22 40	+10.4
Scorpii (Akrab) Scorpii (Antares) Scorpii (Antares) Scorpii Sc	2·9	16 0 26·0	+3.48	S. 19 34 15	+10·0
	1·3	16 24 7·9	3.67	S. 26 14 31	+ 8·1
	2·7	16 32 25·3	3.30	S. 10 23 37	+ 7·5
	1·9	16 39 32·8	6.32	S. 68 52 17	+ 6·9
	2·3	16 44 35·4	3.93	S. 34 8 18	+ 6·5
η Ophiuchi	2·6	17 5 26·6	+3.44	S. 15 37 9	+ 4.7
	2·7	17 18 8·9	4.98	S. 55 26 59	+ 3.6
	1·8	17 27 46·0	4.07	S. 37 2 31	+ 2.8
	2·1	17 30 56·5	2.78	N. 12 37 18	- 2.5
	2·0	17 31 8·2	4.31	S. 42 56 39	+ 2.5
κ Scorpii (Rastaban) (Sagittarii (Kaus Australis) α Lyræ (Vega)	2·6	17 36 32·3	+4·15	S. 38 59 11	+ 2.0
	2·4	17 54 36·5	1·39	N. 51 29 55	- 0.5
	1·9	18 18 27·8	3·99	S. 34 25 34	- 1.6
	0·1	18 34 1·6	2 o1	N. 38 42 11	+ 3.0
	2·1	18 49 56·0	3·72	S. 26 24 16	+ 4.3
S Sagittarii o Octantis (South Pole Star) a Aquilæ (Altair) a Pavonis y Cygni	2·7	18 57 8.4	+3.82	S. 30 0 15	- 4.9
	5·5	19 22 55.7	95.91	S. 89 13 50	- 7.2
	0·9	19 46 35.2	2.89	N. 8 38 25	+ 9.0
	2·0	20 18 51.0	4.76	S. 57 0 42	- 11.4
	2·3	20 19 8.5	2.15	N. 39 58 51	+ 11.4
a Cygni (Deneb) e Cygni a Cephei (Alderamin) e Pegasi a Gruis	1.3 2.6 2.5 1.9	20 38 30·0 20 42 43·9 21 16 31·7 21 39 57·7 22 2 49·1	+2.04 2.40 1.41 2.94 3.78	N. 44 58 21 N. 33 38 51 N. 62 13 15 N. 9 28 49 S. 47 22 41	+12.8 +13.1 +15.2 +16.4 -17.5
β Gruis (Fomalhaut) a Piscis Australis (Fomalhaut) a Pegasi (Markab)	2·1	22 37 32·3	+3.58	S. 47 20 5	-18·8
	1·3	22 52 54·1	3.30	S. 30 4 42	-19·2
	2·6	23 0 28·5	2.98	N. 14 44 32	+19·4

Note.—In this table + means add, and - means subtract. In the column headed "Mag." the adopted unit of brightness is designated r.o. The magnitudes of stars are determined to tenths of a magnitude with reference to this adopted unit: thus the value - r.4 for Sirius indicates that that star is $2\cdot4$ magnitudes brighter than the unit: the value $0\cdot3$ for Arcturus indicates that that star is seven-tenths of a magnitude brighter than the unit.

APPROXIMATE APPARENT TIMES OF THE MERIDIAN PASSAGES OF THE PRINCIPAL FIXED STARS AT GREENWICH ON THE FIRST DAY OF EACH MONTH, 1910.

	Name.	Mag.	Jan.	Feb.	Mar.	April.	May.	June.	July. Aug	g. Sept.	Oct.	Nov.	Dec.
†S.	a Andromedæ β Cassiopeiæ a¹ Crucis a Phænicis γ Crucis	2·1 2·4 1·0 2·4 1·6	H. M. 5 18 5 19 5 36 5 36 5 41	H. M. 3 6 3 7 3 24 3 24 3 29	1 17 1 18 1 35 1 35	23 20 23 21 23 38 23 38	21 29 21 30 21 47 21 47	19 27 19 27 19 44 19 45	H. M. H. 17 23 15 17 23 15 17 40 15 17 41 15 17 45 15	8 13 23 19 13 23 36 13 40 36 13 41	11 34 11 35 11 52 11 53	9 39 9 40 9 57 9 57	7 36 7 36 7 53 7 54
ts. tn.	β Ceti β Crucis Ursæ Majoris γ Cassiopeiæ β Andromedæ	2·2 1·5 1·8 2·3 2·4	5 54 5 57 6 4 6 6 6 19	3 41 3 45 3 52 3 54 4 7	1 56 2 3	0 10	22 IS 22 IS	20 5 20 13 20 14	17 58 15 18 1 15 18 9 16 18 10 16 18 23 16	57 14 1 4 14 9 6 14 10	12 13 12 21 12 22	10 18 10 25 10 26	8 14 8 22 8 23
†N.	δ Cassiopeiæ ζ¹ Ursæ Majoris Polaris Achernar η Ursæ Majoris	2·8 2·1 2·1 0·5 1·9	6 34 6 35 6 41 6 49 6 58	4 22 4 23 4 29 4 37 4 46	2 34 2 39 2 48	0 40 0 46 0 54	22 46 22 51 22 59	20 43 20 49 20 57	18 39 16 18 39 16 18 45 16 18 53 16	35 14 39 41 14 46 49 14 53	12 51 12 59	11 3	8 52 8 59 9 6
†S. †S.	β Arietis β Centauri γ¹ Andromedæ θ Centauri a Arietis	2·7 0·8 2·2 2·1 2·2	7 4 7 12 7 13 7 16 7 16	4 52 5 0 5 1 5 4 5 4	3 11 3 12 3 15	I 17 I 18 I 21	23 23 23 23 23 26	21 21 5 21 24	19 8 17 19 16 17 19 17 17 19 20 17 19 21 17	12 15 16 13 15 17 16 15 20	13 29 13 32	11 32 11 33 11 36	9 29 9 30 9 33
†S. †N.	a Centauri B Ursæ Minoris a Ceti a Persei Aldebaran	1.0 2.2 2.8 1.9 1.1	7 48 8 5 8 12 8 32 9 44	5 35 5 53 6 0 6 20 7 32	4 4 4 4 4 3	2 17	0 20	22 13 5 22 20 7 22 40	19 52 17 20 9 18 20 16 18 20 36 18 21 49 19	5 16 9 12 16 16 32 16 36	14 21 14 28 14 48	12 32 12 53	10 22
†S.	a Tri. Australis Capella Rigel Orionis Tauri		9 53 10 24 10 24 10 34 10 34	7 41 8 12 8 12 8 22 8 22	6 23 6 23 6 33	4 29 4 30 4 40	2 38	8 0 36 9 0 36 9 0 46	21 57 19 22 28 20 22 28 20 22 38 20 22 39 20	24 18 28 24 18 28 34 18 38	3 16 40 3 16 40 3 16 50	14 44 14 45 14 55	12 41
	a Leporis c Orionis ζ Orionis κ Orionis Betelguese	2·7 1·7 2·0 2·2 Var.	10 45 10 50 10 57	8 30 8 33 8 38 8 45 8 52	6 44 6 49 6 56	4 51	3 4	0 0 58 4 I 2 2 I 9	22 47 20 3 22 50 20 22 54 20 23 1 20 23 8 21	46 18 50 51 18 54 57 19 3	17 6	15 11 15 18	13 3 13 7 13 14
	β Aurigæ θ Aurigæ β Canis Majoris Canopus γ Geminorum	2·1 2·7 2·0 -1·0 1·9	11 7 11 32	8 54 8 55 9 20 9 23 9 34	7 3	5 41	3 42	2 I 20 7 I 45 0 I 48	23 11 21 23 11 21 23 37 21 23 40 21 23 50 21	32 19 32 35 19 40	17 24 717 49 017 52	15 28 15 53	13 25 13 50 13 53
†Ν.	Vega Sirius Argus Canis Majoris Canis Majoris	0·1 -1·4 2·8 1·6 2·0	12 8	9 35 9 43 9 49 9 56	7 54 8 6 8 8	6 6 7 6 14	4 10	9 2 7 6 2 13 3 2 21	23 52 21 7 0 3 21 8 0 10 22 1 0 17 22 0 0 27 22	55 19 5 1 20 8 20 1	18 18 18 18 3 18 25	16 15 16 22 16 29	14 18
	π Argus η Canis Majoris Castor Procyon Pollux	2.0	12 34 12 42 12 48	10 36	8 33 8 4 8 4	6 46 6 48 7 6 54	4 4	9 2 46 7 2 5 3 3 6	0 36 22 0 42 22 0 51 22 0 56 22 1 2 22	34 20 3 42 20 4	8 18 50 6 18 59 2 19 4	16 55 17 3	14 51 15 0 15 5
†S.	γ Argus γ Argus α Pavonis α Argus α Cygni		13 20 13 32 13 34	II 20 II 20	9 3	7 26	5 3 5 4 5 4	5 3 34	1 28 23 1 40 23 5 1 42 23	20 21 2. 32 21 3	119 37 6 19 48 8 19 50	17 41 17 52 17 55	15 37 2 15 49 5 15 51
	δ Argus β Argus ι Argus κ Argus α Hydræ	2.2	14 25 14 28 14 32	12 13 12 16 12 20	10 2	4 8 31 7 8 33 1 8 38	6 4	0 4 38	2 34 0 2 36 0 5 2 41 0	32 22 33 36 22 33	20 42 20 44 720 49	18 46 18 49 18 53	16 42 16 45 16 50

APPROXIMATE APPARENT TIMES OF THE MERIDIAN PASSAGES OF THE PRINCIPAL FIXED STARS AT GREENWICH ON THE FIRST DAY OF EACH MONTH, 1910—contd.

	Name.	Mag.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
†S.	α Gruis Regulus γ' Leonis β Gruis μ Argus		15 16	13 3 13 4 13 16 13 38	11 49	9 21 9 22 9 34 9 56	7 30 7 31 7 43 8 5	5 28 5 29 5 40 6 2	3 24 3 25 3 36 3 59	I 19 I 20 I 32 I 54	23 20 23 21 23 32 23 55	22 7	19 36 19 37 19 49 20 11	17 34 17 45
	β Ursæ Majoris Dubhe δ Leonis β Leonis γ Ursæ Majoris		16 11 16 22 16 57	14 10	12 10 12 21 12 56	10 28	8 26 8 37 9 12	6 23 6 34 7 9	4 19 4 30 5 6	2 15 2 26 3 I	0 19 0 30 1 5	22 39 23 14	20 32 20 43 21 18	18 26 18 28 18 39 19 14 19 19
	δ Centauri γ Corvi α¹ Crucis γ Crucis γ Centauri	2·8 2·7 1·0 1·6 2·4	17 23 17 34 17 38	15 12 15 22 15 27	13 23 13 33 13 38	II 40 II 44	9 38 9 49 9 53	7 36 7 46 7 51	5 32 5 43 5 47	3 28 3 38 3 43	I 32 I 42 I 47	23 51 23 55	2I 44 2I 55	19 41 19 51 19 56
†N.	β Crucis c Ursæ Majoris γ Cassiopeiæ ζ¹ Ursæ Majoris Spica	1.8 2.3 2.1 1.2	18 2 18 3 18 32	15 50 15 52 16 21	14 3 14 32	12 8 12 9 12 38		8 15 8 16 8 45	6 II 6 I2 6 4I	4 6 4 8 4 37	2 II 2 I2 2 4I	0 23 0 24 0 53	22 23 22 24 22 53	20 12 20 19 20 21 20 50 20 50
†N. †S.	Polaris Achernar Centauri Ursæ Majoris Centauri	2.6	18 46 18 46 18 56	16 35 16 34	14 46 14 46	12 52	II I	8 59 8 59 9 9	6 55 6 55 7 5	4 51 4 50 5 0	2 55 2 55 3 4	I 7 I 7 I 17		2I 4 2I 4 2I 13
	β Centauri θ Centauri Arcturus η Centauri α² Centauri	0·8 2·1 0·3 2·7 1·0	19 13 19 23	17 12 17 30	15 13 15 23 15 41	13 48	11 28 11 39 11 57	9 26	7 22 7 32 7 50	5 17 5 28 5 46	3 22 3 32 3 50	I 34 I 44 2 2	23 34 23 44 0 7	
†N.	a Lupi e³ Boötis β Ursæ Minoris β Lupi a Persei	2·5 2·6 2·2 2·7 1·9	19 53 20 3 20 4	17 41 17 51 17 53	16 2 16 4	13 59 14 9 14 10	12 18 12 19	10 17	8 12 8 13	5 57 6 7 6 9	4 II 4 II 4 I3	2 13 2 23 2 25	0 18 0 28 0 29	22 5 22 10 22 20 22 22 22 47
	Alphacca a Serpentis δ Scorpii β¹ Scorpii Antares	2·3 2·8 2·5 2·7 1·3	21 7 21 12	18 40 18 55 19 0	16 51 17 6	14 58 15 13 15 18	13 7 13 22 13 27	II 4 II 19 II 24	9 0 9 15 9 21	6 56 7 11 7 16	5 15 5 20	3 12 3 27 3 32	I 16 I 32 I 37	23 24 23 29
tN.	Capella Capella	2·7 1·9 2·3 2·6 0·2	21 51 21 56 22 17	19 39 19 44 20 5	17 50 17 55 18 16	16 23	14 6 14 11 14 32	12 3 12 8 12 29	9 59 10 5 10 25	7 55 8 0 8 21	5 59 6 4 6 25	4 11 4 16 4 37	2 16 2 21 2 42	o 18 o 38
	β Aræ λ Scorpii α Ophiuchi θ Scorpii κ Scorpii	2·I	22 29 22 39 22 42 22 42 22 48	20 27 20 30 20 30	18 38 18 42 18 42	16 45 16 48 16 48	14 54 14 57 14 57	12 52 12 55 1.3 55	10 48 10 51 10 51	8 43 8 46 8 46	6 47 6 51 6 51	5 0 5 3 5 3	3 4 3 7 3 7	I 4
†N.	β Aurigæ γ Draconis ε Sagittarii Canopus Vega	-1.0	23 6 23 29	21 21	19 5 19 29 19 33	17 12 17 36 17 39	15 21 15 44 15 48	13 18 13 42 13 46	II 42	9 10 9 34 9 37	7 14 7 38 7 42	5 26 5 50 5 54	3 3I 3 54	I 54
ts.	τ Argus σ Sagittarii ς Sagittarii Altaiτ γ Argus	2·8 2·1 2·7 0·9 1·9	0 5 0 12	21 49 21 56 22 46	20 7 20 57	18 7 18 14 19 3	16 16 16 23 17 12	14 13 14 21 15 10	12 7 12 10 12 17 13 6 13 26	10 5 10 12 11 2	8 9 8 16 9 6	6 22 6 29 7 18	4 33 5 22	2 30 3 19

tN. or tS.—These times relate to the Meridian Passages of Circumpolar Stars at the Inferior Transit, N. or S. denoting the Declination of the Star.

APPROXIMATE APPARENT TIMES OF THE MERIDIAN PASSAGES OF THE PRINCIPAL FIXED STARS AT GREENWICH ON THE FIRST DAY OF EACH MONTH, 1910—contd.

	Name.	Mag. Jan.	Feb.	Mar. April	May. June.	July. Aug.	Sept. Oc	. Nov.	Dec.
†s. †s. †s.	a Pavonis γ Cygni ε Argus α Cygni δ Argus ε Cygni β Argus ι Argus ι Argus ι Argus α Cephei κ Argus	1.7 I 30 1.3 I 54	23 18 23 18 23 20 23 37 23 41 23 42 0 15 0 18	21 29 19 36 21 29 19 36 21 31 19 38 21 49 19 55 21 53 19 59 21 53 20 0 22 22 20 29 22 25 20 32 22 27 20 33	18 8 16 6	13 38 11 34 13 39 11 34 13 40 11 36 13 58 11 53 14 2 11 57 14 2 11 57 14 34 12 27 14 36 12 31	9 38 7 9 38 7 9 40 7 9 58 8 10 1 8 10 2 8 10 31 8 10 34 8 10 36 8	50 5 54 51 5 55 52 5 56 10 6 14 14 6 18 14 6 18 44 6 48 46 6 50 48 6 52	4 12 4 15 4 15 4 45 4 47
†N. †N. †S. †S.	Dubhe a Pegasi γ Ursæ Majoris δ Centauri	2·5 2 55 1·9 3 11 2·1 3 5 1·3 4 2·4 4 11 2·6 4 11 2·6 4 11 2·5 5 5 2·8 5 11 2·4 5 5	5 0 43 7 1 5 2 1 40 7 1 55 1 1 59 3 2 1 5 2 3 1 2 52 3 3 6	22 50 20 57 23 13 21 19 23 47 21 54 0 6 22 9 0 10 22 13 0 12 22 15 0 14 22 17 1 3 23 6 1 17 23 20	19 6 17 3 19 28 17 26 20 318 0 20 18 18 16 20 22 18 19 20 24 18 21 20 26 18 23 21 15 19 12 21 29 19 27	14 59 12 55 15 22 13 17 15 56 13 52 16 12 14 7 16 16 14 11 16 17 14 13 16 19 14 15 17 8 15 4	10 59 9 711 22 9 211 56 10 712 12 10 12 15 10 12 17 10 12 19 10 13 8 11 13 22 11	11 7 15 34 7 38 9 8 12 24 8 28 28 8 32 29 8 34 31 8 36 20 9 24	5 12 5 35 6 10 6 25 6 29 6 30 6 32 7 21 7 36
†S. †S. †N. †N. †N. †N. †N. †N.	α Lupi β Aræ γ Draconis α Cephei β Cassiopeiæ α Phœnicis	2·4 17 3 2·4 18 1 2·8 18 3	5 38 8 19 8 8 56 12 17 7 15 5 1 15 22 7 16 5 2 16 20	2 47 0 54 3 49 1 56 6 30 4 37 7 7 5 14 10 28 8 35 13 16 11 23 13 33 11 40 14 16 12 23 14 31 12 38 15 10 13 16	2 46 0 44 3 23 I 20 6 44 4 42 9 32 7 29 9 49 7 47 IO 32 8 29 IO 47 8 45	19 54 17 50 22 36 20 31 23 12 21 8 2 38 0 33 5 25 3 21 5 43 3 38 6 25 4 21 6 41 4 36	15 54 14 18 36 16 3 19 12 17 122 34 20 1 25 23 1 42 23 2 25 0 2 40 0	25 15 29 46 18 50 34 21 38	10 7 12 49 13 25 16 47 19 34 19 52 20 34 20 49

†N. or †S.—These times relate to the Meridian Passage of Circumpolar Stars at the *Inferior* Transit, N. or S. denoting the Declination of the Star.

CORRECTION OF THE TIMES IN THE PRECEDING TABLE FOR THE DAY OF THE MONTH (to be subtracted).

				(**) DC 31							
Days.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1 2 3 4 5 6 7 8 9	H. M. 0 0 0 4 0 9 0 13 0 18 0 22 0 26 0 30 0 35 0 39	H. M. 0 0 0 4 0 8 0 12 0 16 0 20 0 24 0 28 0 32 0 36	H. M. 0 0 0 4 0 7 0 11 0 15 0 19 0 22 0 26 0 30 0 33	H. M. 0 0 0 4 0 7 0 11 0 15 0 18 0 22 0 26 0 29 0 33	H. M. O O O 4 O 8 O II O I5 O I9 O 23 O 27 O 30 O 35	H. M. 0 0 0 4 0 8 0 12 0 16 0 21 0 25 0 29 0 33 0 37	H. M. 0 0 0 4 0 8 0 12 0 16 0 21 0 25 0 29 0 33 0 37	H. M. 0 0 0 4 0 8 0 12 0 15 0 19 0 23 0 27 0 31 0 35	H. M. O O O 4 O 7 O II O I4 O 18 O 22 O 25 O 29 O 32	H. M. 0 0 0 4 0 7 0 11 0 15 0 18 0 22 0 25 0 29 0 33	H. M. 0 0 0 4 0 8 0 12 0 16 0 20 0 24 0 28 0 32 0 36	H. M. 0 0 0 4 0 9 0 13 0 17 0 22 0 26 0 30 0 35 0 39
11 12 13 14 15 16 17 18 19 20	0 43 0 48 0 52 0 56 1 1 1 5 1 9 1 13 1 18 1 22	0 40 0 44 0 48 0 52 0 56 1 0 1 3 1 7 1 11 1 15	0 37 0 41 0 44 0 48 0 52 0 55 0 59 1 2 1 6 1 10	0 36 0 40 0 44 0 48 0 51 0 55 0 59 1 2 1 6 1 10	0 39 0 42 0 46 0 50 0 54 0 58 1 2 1 6 1 10 1 14	0 41 0 45 0 49 0 54 0 58 1 2 1 6 1 10 1 14 1 19	0 41 0 45 0 49 0 53 0 57 I I 1 5 I 9 I I3 I 17	0 38 0 42 0 46 0 50 0 53 0 57 I I 5 I 8 I 12	0 36 0 40 0 43 0 47 0 50 0 54 0 58 1 1 1 5 1 8	0 37 0 40 0 44 0 48 0 51 0 55 0 59 1 3 1 6 1 10	0 40 0 44 0 48 0 52 0 56 I 0 I 4 I 9 I I3 I 17	0 44 0 48 0 52 0 57 1 1 1 6 1 10 1 15 1 19 1 24
21 22 23 24 25 26 27 28 29 30 31	1 26 1 31 1 35 1 39 1 43 1 47 1 51 1 56 2 0 2 4 2 8	1 19 1 23 1 26 1 30 1 34 1 38 1 42 1 45	1 14 1 17 1 21 1 24 1 28 1 32 1 35 1 39 1 43 1 46 1 50	1 13 1 17 1 21 1 25 1 28 1 32 1 36 1 40 1 44 1 47	1 18 1 22 1 26, 1 30 1 34 1 38 1 42 1 46 1 50 1 55 1 59	1 23 1 27 1 31 1 35 1 39 1 44 1 48 1 52 1 56 2 0	I 2I I 25 I 29 I 33 I 37 I 4I I 45 I 49 I 53 I 57 2 I	1 16 1 19 1 23 1 27 1 31 1 34 1 38 1 42 1 45 1 49 1 52	1 12 1 16 1 19 1 23 1 26 1 30 1 34 1 37 1 41	1 14 1 18 1 21 1 25 1 29 1 33 1 37 1 41 1 44 1 48 1 52	1 21 1 25 1 30 1 34 1 38 1 42 1 47 1 51 1 55 1 59	1 28 1 32 1 37 1 41 1 46 1 50 1 55 1 59 2 3 2 8 2 12

CALCULATED REDUCTION AND AZIMUTH TABLES FOR BRIGHT STARS.

			STARS IN O				
			SIDERIAL TIMES	WITHIN T	HE LIMI	rs of Red	ouction Tables.
			Stars.	Before Me	er. Pass.	Mer. Pass.	After Mer. Pass.
ALPHABETICAL OF STA		DER	a Andromedæ † a¹ Crucis † β Crucis † ε Urs. Majoris Achernar	H. M. I 23 8 22 22 22 43 22 35 0 7	Bearing N.E. S.W. S.W. N.W. S.E.	H. M. O 4 O 22 O 43 O 50 I 35	H. M. Bearing 1 00 N.W. 2 22 S.E. 2 43 S.E. 3 5 N.E. 3 3 S.W.
	mag.	Page Re- ferences.	† η Urs. Majoris † α^2 Centauri α Persei Aldebaran	23 29 0 35 2 4 3 21	N.W. S.W. N.E. (N.E.	1 44 2 35 3 18 } 4 31	3 59 N.E. 4 35 S.E. 4 32 N.W. 5 41 \ S.W.
1. Achernar 2. Aldebaran 3. Altair	0.0	310-314 315-317 318-319	† a Tri. Australis	1	\S.E. S.W. N.E.	4 40	5 41 \ S.W. 6 40 S.E. 6 24 N.W.
4. a Andromedæ 5. Antares		320-321	Rigel	4 14	S.E. N.E. N.E.	} 5 10	6 6 {S.W. N.W. N.W.
6. Arcturus 7. β Argus 8. ε Argus	1.7	324-325 326-329 330-333	Betelguese Canopus † Vega	4 55 5 8 3 34	S.E. S.E. N.W.	6 22 6 34	7 36 S.W. 9 34 N.E.
9. Betelguese	Var. — 1·0	334-335 336-341	Sirius	5 31	{ S.E. { N.E. { N.E.	} 6 41	7 51 {S.W. N.W. N.W.
11. Capella 12. a^2 Centauri 13. a^1 Crucis 14. β Crucis 15. α Cygni	1.0	342-347 348-351 352-355 330-333 356-359	Procyon Pollux † a Pavonis • Argus	6 39 6 44 6 19 7 7	S.E. N.E. S.E. S.W. S.E.	7 35 7 40 8 19 8 21	8 31 {S.W. 8 36 {N.W. 10 19 S.E. 9 35 S.W.
16. Dubhe 17. Fomalhaut 18. a Pavonis 19. a Persei 20. Polaris	2·0 1·3 2·0 1·9 2·1	360-363 364-365 366-369 370-373 308-309	† α Cygni β Argus Regulus α Urs. Majoris α ¹ Crucis	6 39 7 42 9 8 9 44 11 8	N.W. S.E. N.E. S.E. N.E. S.E.	8 39 9 12 } 10 4 10 58 12 22	10 39 N.E. 10 42 S.W. 11 00 {N.W. S.W. 12 12 N.W. 13 36 S.W.
21. Pollux 22. Procyon 23. Regulus 24. Rigel 25. Sirius	1·2 0·5 1·3 0·3 -1·4	374-375 376-377 378-379 380-381 382-384	β Crucis ε Urs. Majoris Spica † Achernar η Urs. Majoris	11 29 11 20 12 11 11 35 12 14	S.E. N.E. S.E. N.E. S.W. N.E.	12 43 12 50 } 13 21 13 35 13 44	13 57 S.W. 14 20 N.W. 14 31 S.W. 15 35 S.E. 15 14 N.W.
26. Spica 27. a Tri. Australis 28. e Ursæ Majoris 29. ŋ Ursæ Majoris 30. Vega	1.8	388-391 392-397	Arcturus a² Centauri † a Persei Antares † a Tri. Austral	15 28	{ N.E. S.E. S.E. N.W. S.E. S.E.	14 12 14 35 15 18 16 24 16 39	15 8 {N.W. S.W. 15 49 S.W. 17 18 N.E. 17 20 S.W. 17 53 S.W.
			† Capella Canopus Vega Altair a Pavonis	15 22 17 10 18 51	(NE	17 10 18 22 18 34 }19 47 20 19	20 10 N.E. 21 22 S.E. 19 58 N.W. 20 43 {N.W. 21 33 S.W.
			† ϵ Argus . α Cygni . † β Argus . Fomalhaut . † α Urs. Majori	19 25 19 12 21 57	N.E. S.W. S.E.	20 21 20 39 21 12 22 53 22 58	22 21 S.E. 21 53 N.W. 23 12 S.E. 23 49 S.W. 0 58 N.E.

[†] Denotes the Inferior Meridian Passage of Circumpolar Stars.

Note.—The bearings $\left\{ \begin{array}{l} N.E. \\ S.E. \end{array} \right\} \begin{array}{l} N.W. \end{array}$ etc., mean that the Star will be in the N.E., N.W., etc., quadrant before and after Meridian Passage. If the declination of Star is South of observer's latitude, the Star will of course bear South when passing the Meridian, and North when declination is North of observer.

REDUCTION TO THE MERIDIAN TABLE FOR * POLARIS, YEAR 1915.

AT HOUR-ANGLES FROM UPPER MERIDIAN.

Add Reduction to obtain Meridian Altitude.

Annual Variation.

AT HOUR-ANGLES FROM LOWER MERIDIAN.
Subtract Reduction to obtain Meridian Altitude.

ij.	les.					L	ATIT	rt	JDES	3.					after
Hour	Angles.	1	0°		20°		30°		40°		50°		60°		da, a
	10	•	0.1	0	0.1	•	0.1		0.1	•	0.1	0	0.1		Add to reda, before 1915. Subt. from reda, after 1915.
	20 30		0.9		0.9		0.9		0.9		0.9		0.9		to
	40		I.I		1.1		1.1		I.I		1.1		1.1		Add t
	50		1.6		1.6		1.6	1	1.7		1.7		1.7		412
1	0		2.4		2.4		2.4		2.4		2.4		2.4		0.01
	10		3.5		3.5		3.2		3.2		3.3		3.3	l	0.01
1	20		4.5		4.5		4.5		4.5		4.3		4.3		0.03
	30		5.3		5.3		5.3		5.3		5.4		5.4		0.03
ł	40		6·5		6·5 7·8		6·5		6.5		6·6 8·0		6·6		0.03
l	50		, 0		7.0		7-0	1	7.9		0.0		0.0		0.03
п	0		9.3		9.3		9.3		9.4		9.4		9.5		0.04
	10		10.0		10.0		10.0		11.0		11.0		11.1		0.02
ı	20		12.5	1	12.2		12.6		12.7		12.7		12.8		0.02
	30		14.3	l	14.3		14.4		14.5		14.5		14.7		0.02
	40		18·1		16.2		16.3		16.4		16.4		16.6		0.07
1	50		10.1		10.2		18.3		18.4		18.5		18.7		0.08
ш	o		20.2		20.3		20.4		20.5		20.6		20.8		0.09
1	10		22.4		22.5		22.6		22.7		22.8	1	23.0		0.10
1	20		24.6		24.7		24.8		24.9		25.1		25.3		0.11
1	30		27.0		27.1		27.2		27.3		27.5		27.7		0.13
	40		29.5		29.6		29.7		29.8		30.0		30.3	i	0.13
l	50		32.1		32.2		32.3	1	32.4		32.6		32.9	ı	0.14
IV	o		34.7	1	34.8		34'9		35.0		35.2		35.5		0.12
- '	IO		37°4		37.5		37.6		37.7		37.9		38.2	ı	0.19
	20		40° I		40.2		40.3		40.4		40.6		40.0		0.12
	30		42.8		42.9		43.0		43.2		43.4		43.7	ı	0.19
	40		45.6		45.7		45.8	3	46.0		46.2		46.5		0.50
l	50	1	48•4		48.5		48.€	1	48.8		49.0		49.3	l	0.31
Ιv	0		51.2		51.3		51.5		51.6		51.9		52.2		0.22
ľ	10		54·1		54.3		54.4		54.5		54.8		55·I		0.24
	20		57.0		57.1		57:3		57.4		57.7		58·I		0.22
l	30		0.0		0.1		0.5	2	0.4	I	0.7	τ	1.0		0.26
l	40		2.9	I	3.1		3.5				3.6	I	4.0		0.28
	50	I	6.0	I	6.1	I	6.2	1	6.4	I	6.6	I	7.0		0.50
VI	0	I	9.0	1	9.1	I	9.3	,	9.5	r	9.7	ı	IO I		0.31
						_				_		-			f & Pol

		-			LATITUDES.								110.		····		
ino.	es.					L	47	ΓI٦	ľ	I	ES	•					
HoH	Angles.	1	l0°		:	50°	-	80°			40°		50	•		60	۰
	м.	۰	٥.	1	•	0.1	0	0.	,	0	,			,	۰		,
0	10										0.1		0	'n)·I
	20		0.			0.9		0.			0.9			·3			3
l	30 40		ı.			1.0		I.			1.0			٠0			0
	50		ī.			1.6		ī.			1.6			٠6			.6
1	,		_	1				_			- `	1					
1	0		2.	3		2.3		2	3		2:3	3	2	٠3		2	:-3
	10		3.	2		3.5	ı	3			3.	t l		٠.			١٠
1	20		4			4°I		4			4			٠I			۰0
	30		5.			5.5			2		5:			٠ī			٠I
ı	40			4		6.4			4		6.			.3			.3
1	50		7	8		7.7		7	7		7.	7	7	٠6		7	7•5
П	o		9.	ار.		9.2		9	. т		9.	ri Ti	0	۰0		۶	3.9
۱ "	10		10.			10.2		10			10.			•6			0.5
1	20		12			12.4		12			12.			•2			2.1
1	30		14			14.1		14			14.		13				3.8
1	40		16·	I		16·0		15	٠9		15.	9	15	•8		15	·6
	50		18	0		18.0		17	٠9		17.		17	•7		I7	7•6
I			1											0		_	ا ہے ا
m	_		20			20.0		20		1	19.		19				9.6
1	10		22			22.2		22			22.0		21				3.9
	30		24			24.4		24			24:		26				5.2
	40		29			29.3		29			29		28				3.7
i i	50		31			31.8		31			31.		31				1.2
	J		J-	9		J- °		J-	1		J- '		J-	_		٥.	
IV	0		34	. 5		34.4		34	.3		34"	2	34				3.7
1	10		37			37.1		37			36.	8	36	•6		36	5.4
1	20		39			39.8		39			391		39				0.0
	30		42			42.5		42			42"		42			•	.7
	40		45	4		45.2		45			45		44				1.4
	50		48	2		48.0		47	9		47	7	47	• 5	ļ	47	7.2
Ιv	0		51	ار.		50.9		50	. 7		50.	6	50	. 3		50	0.0
Ι'	10		53			53.7		53			53.		53				8.5
ı	20		56	8		56.6		56			56.		56				.7
ı	30		59			59.6		59			59		59				3.7
ı	40			7	I	2.6			4	I		2 1		.0			6٠
1	50		5	7	I	5.6	I	5	4	I	5:	3 1	5	.0	I	4	ŀ ·6
VI	^		Ω.	١		8.6		Ω			g.,		Q	٠.	_		7.7
AT	0	I	٥,	8		8.6	<u> </u>	0	•5	1	0'	3 1	- 0	-1	1		7

For Azimuths of * Polaris see page 309.

Examples in the Use of the above Table.

Example 1.—On April 2nd, 1914, at 3 h. 30 m. a.m., A.T. Sp. in latitude by D.R. 40°15′ N., longitude 11° W. Required the approximate altitude of * Polaris for setting the sextant for an observation to obtain the latitude. Height of eye, 42 ft.

Mer. pass of % in 1910 (p Cor. for 4 years (see p. xx	305) 0 44 a.m. below Pole.	Lat' by D.R. P.D. of *	40 15 N. -1 9'2	∦'s Dl.	88 50 8 N. 90 0 0
Mer. pass. in 1914 Time at ship	o 46 a.m. 3 30 a.m.	Mer. alt. 42 ft. cor. (p. 413)	39 5°8 + 7°5	P.D.	1 9'2 N.
	Pole) 2 44 gives reduction 16.8.	Reduction	+ 10.8		
Reduction at 2 40=15'9 Cor.	2×4 =+'8	Alt. for sextant	39 30 N.		
True reduction 16.8	+*9				

Example 2.—On April 2nd, 1914, at 3 h. 35 m. a.m., A.T. Sp. in latitude by D.R. 40° 15′ N., longitude 11° W. Observed altitude of * Polaris was found to be 39° 40′ N. Height of eye, 42 ft. Required the latitude.

Obsd. alt. of * Eye, 42 ft. (cor. p. 413)	39 40 N.	Mer. pass. of * in 1914 Time of observation	н. м. -0 46 а.т. 3 35 а.т.	Reduction 17.6 Cor. for year +1
Reduction	39 32.2 - 17.7	* 's Approx. H.A. (below Pe	ole) 2 49 gives reduction 17	7. True reduction 17.7
Mer. alt. (below Pole) P. dist. in 1914	39 14.8	%'s Sidereal H.A. would l may be made from the acce	be nearly 1 m. greater; thi	s correction, if required,
Latitude	40 24'0 N.	greater for 6 hours.	Heration table (page 412).	It will be hearty I ill.

STAR POLARIS AZIMUTH TABLE FOR YEAR 1915.

⊹'s Hr.		LATITUDES.													
Angle.	0°	10°	20°	30°	35°	40°	45°	50°	55°	60°	65°	Angle.			
					AZ	IMUTI	HS.								
H. M. 0 0 0 20 0 40	0.0 0.1 0.2	0.0 0.1 0.2	0.0 0.1 0.2	0.0 0.1 0.2	0.0 0.1 0.2	0.0 0.1 0.3	0.0 0.1 0.3	0.0 0.2 0.3	0.0 0.2 0.4	0.0 0.2 0.4 0.6	0.0 0.3 0.5	H. M. 12 0 11 40 11 20			
I 20 I 40	0.4	0·4 0·5	0·4 0·5	0.2	0·5 0·6	0·5 0·6	0·6 0·7	0·6 0·8	0·7 0·8	0.8	0.0	10 40 10 20			
2 0 2 20 2 40	0·6 0·7 0·7	0.6 0.7 0.8	0·6 0·7 0·8	0·7 0·8 0·9	0·7 0·8 0·9	0·7 0·9 1·0	0.8 0.8	1.1 1.0	1.3 1.1 1.0	1·3 1·5	1.4 1.6 1.7	10 0 9 40 9 20			
3 0 3 20 3 40	o·9 o·9	0.8 0.0	0.0 0.0	1.1 1.0	1.1 1.1 1.0	I·I I·I I·2	1·1 1·2 1·3	1·3 1·4 1·5	1·4 1·5 1·6	1.8 1.8	1.0 2.1 2.2	9 0 8 40 8 20			
4 0 4 20 4 40	1.1 1.0 1.0	1.1 1.1 1.0	1.1 1.1 1.1	I·I I·2 I·2	1·3 1·3	I·4 I·4	1.4 1.5 1.5	1.5 1.6 1.7	1·5 1·8 1·9	2·0 2·1 2·2	2·4 2·5 2·6	8 0 7 40 7 20			
5 0 5 20 5 40 6 0	1.1 1.1 1.1 1.1	1·1 1·1 1·2 1·2	I·2 I·2 I·2 I·2	1.3 1.3 1.3	1·3 1·4 1·4 1·4	1·4 1·5 1·5 1·5	1.6 1.6 1.6	1.7 1.8 1.8 1.8	1·9 2·0 2·0 2·0	2·3 2·3 2·3	2·6 2·7 2·7 2·7	7 0 6 40 6 20 6 0			

For the twelve hours before the meridian passage (above the Pole) it is east of north, and for the twelve hours after it is west of north.

DIAGRAM to illustrate the Apparent Motion of Star a Ursæ Minoris (Polaris) round the Pole. Declination of Star in 1915, 88° 51" 6" N.; Right Ascension, 1 h. 29 m. 15s.

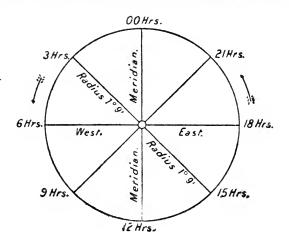


TABLE XV.

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. $\stackrel{\star}{\mathcal{H}}$ ACHERNAR.

Lat.	m. 4	1 m.	1 m		n.	m. 20	m. 22	m. 24	26	m. 28	30	m. 32	m. 34	36	38	m. 40	42	m. 44
N.		,						F	REDU	JCTI	ONS.		_					
28 24 20 16	0·3 0·3 0·3	1.1 1.1 1.0	2.3	3 4	.0 .1 .3	6·2 6·5 6·7 7·0	7·5 7·8 8·1 8·5	8·9 9·7 10·1	10.9	13.2	14.2	16.5	17·9 18·7 19·4 20·2	20·0 20·9 21·8 22·7	22·3 23·3 24·3 25·3	24·7 25·8 26·9 28·0	27·3 28·4 29·6 30·8	29.9 31.2 32.5 33.8
12 8 4 0	0.3 0.3 0.3	1·3 1·3 1·3	2.0	7 4	·7 ·9 ·1	7·3 7·6 7·9 8·3	8·8 9·2 9·6 10·0	10·5 11·4 11·4	13.4	14.9	16·4 17·1 17·8 18·6	19.4	21·1 21·9 22·9	23.6 24.6 25.6 26.7	26·3 27·4 28·5 29·8	29·1 30·3 31·6 33·0	32·1 33·4 34·8 36·3	35·2 36·7 38·2 39·9
8. 4 8 12 16	0·3 0·4 0·4 0·4	1.4 1.5 1.6	3·3 3·4 3·6	4 6	5·5 5·8 5·1	8·7 9·6 10·1	10·5 11·0 11 6	12·5 13·1 13 8 14·5	16.1	18.7	20.4	23.5	25.0 26.2 27.5 29.1	28·0 29·3 30·9 32·6	31·1 32·7 34·4 36·3	34·5 36·2 38·0 40·2	38·0 39·9 41·9 44·2	41·7 43·7 46·0 48·5
18 20 22 24	0.4 0.4 0.4 0.5	1.7 1.8 1.8	3.5 4.6 4.6	9 6	5·7 5·9 7·1	10.4 10.7 11.1	12·6 13·0 13·4 13·9	15·6 16·6	18.1	21.7	24.1	27.4	30.0 30.0 30.0	33·6 34·6 35·8 37·0	37.4 38.5 39.8 41.2	41.4 42.7 44.1 45.6	45.5 47.0 48.5 50.3	49.9 51.5 53.2 55.1
26 28 30 32 34	0·5 0·5 0·5 0·5 0·6	1.9 2.1 2.2 2.3	4:4:4:5:	5 8	77 3.0 3.7 3.7	12·0 12·5 13·0 13·7 14·4	14·5 15·1 15·7 16·5 17·4	17·2 17·9 18·7 19·6	21.0	24·3 25·4 26·7	27·9 29·1 20·6	31·7 34·7	34.4 35.8 37.3 39.2 41.2	38·5 40·0 41·8 43·8 46·1	42·8 44·5 46·5 48·7 51·3	47.4 49.3 51.4 53.9 56.7	52·1 54·3 56·6 59·3 62·4	57·2 59·5 62·0 65·0 68·3
	<u>' </u>	1						<u> </u>					<u>'</u>					
Lat.	m. 45	m. 46	m. 47	m. 48	m. 49	50 m.	1 m. 51	52 52	53	m. 54	55	m. 56		m.	m. 58	5 n		m. 60
N.						,			1									
28 26 24 22 20	32·6 33·3	32·7 33·4 34·1 34·8 35·5	34·8 35·6 36·3	36·3 37·1 37·9	37.9 38.6	39.4 40.2 41.1	41.8 42.7	42·6 43·5 44·4	43°3 44°3 45°2 46°1 47°0	45.0 45.9 46.9 47.8 48.8	46·7 47·7 48·6 49·6 50·6	0 49° 0 50°	4 0 4 0 4 0	50·1 0 51·2 0 52·2 0 53·3 0 54·4 0	51.9 55.1 55.1 56.3	0 5 0 5 0 5	3.7 0 4.8 0 5.9 0 7.0 0 8.2 I	55.5 56.6 57.8 59.0 0.2
18 16 14 12 10	35.4 36.1	36·2 36·9 37·7 38·5 39·2	38·6 39·3 40·1	40·2 41·0 41·9	41.9 42.7 43.6	43.6 44.5 45.4	45°4 46°3	47·1 48·1 49·1	49.9	49.8 50.8 51.8 52.9 54.0	51.7 52.7 53.8 54.8 56.0	0 54	60 70 80	55.4 0 56.6 0 57.7 0 58.9 1 0.1 1	57.4 58.6 59.7 0.9 2.2	I	9.4 I 0.6 I 1.8 I 3.0 I	1.4 2.6 3.9 5.2 6.5
8 6 4 2 0	40.0 40.8	40·0 40·9 41·7 42·6 43·5	42·7 43·6 44·5	44°5 45°4 46°4	46·3 47·3 48·3	48·2 49·2 50·3	50·2 51·2 52·3		54·2 55·3 56·5	55·1 56·2 57·4 58·6 59·9	58·3 59·5 60·8	1 3.	2 I 4 I 7 I 0 I 3 I	1·3 1 2·6 1 3·9 1 5·2 1 6·6 1	3.4 4.7 6.1 7.5 9.0	I	5.6 I 7.0 I 8.4 I 9.8 I	7·8 9·2 10·7 12·2 13·7
S. 2 4 6 8 10	43·6 44·6 45·7	44.5 45.5 46.6 47.8 48.9	47·5 48·7 49·8	49·5 50·7 52·0	51·6 52·8 54·1	53·7 55·0 56·3	55.9 57.2 58.6	59·4 60·9	60·3 61·7 63·2	61·2 62·6 64·0 65·6 67·2	64·9 66·4 68·0	I 5. I 7. I 10.	4 1 1	8·1 1 9·6 1 11·2 1 12·9 1	10·5 12·1 13·7 15·5	I I	2·9 I 4·5 I 6·2 I 8·1 I	15·3 17·0 18·8 20·7 22·7
12 14 16 18 20	49°3 50°7 52°2	50·2 51·5 53·0 54·5 56·2	53·8 55 2 56·9	56·0 57·6 59·3	58·4 60·0	60·7 62·4 64·2	63·2 64·9 66·8	65·6 67·5 69·4	68·2 70·0 72·I	68·9 70·7 72·7 74·8 77 I	73·3 75·3 77·5		0 I I I I 2 3 I 2	16·6 18·7 1 20·8 1 23·2 1 25·7	19·3 21·4 23·6 26·1 28·7	I 20 I 20 I 20	2.0 I 4.2 I 6.5 I 9.0 I	24.8 27.0 29.4 32.0 34.8
22 24 25 26 27 28	57·6 58·6 59·7 60·9	58·1 60·1 61·2 62·4 63·6 64·9	62·7 63·9 65·1 66·3	65·3 66·5 67·8 69·1	68·0 69·3 70·6	70·8 72·1 73·4 74·9	73·6 74·9 76·3 77·8	76·5 77·9 79·3 80·8	79.4 80.8 82.3 83.9	79.6 82.3 83.8 85.4 87.0 88.8		I 33.	4 I 3 7 I 3 4 I 3	28·5 I 33·2 I 34·9 I 36·7 I	31.5 34.7 36.4 38.1 40.0 42.0	I 3: I 3: I 4: I 4:	4·7 I 7·9 I 9·6 I 1·4 I 3·4 I	37·8 41·1 42·9 44·8 46·8 48·9
29 30 31 32 33 34	64·8 66·3 67·9 69·6	66·2 67·7 69·2 70·9 72·6 74·5	70·6 72·2 73·9 75·7	73·5 75·2 77·0 78·9	76·6 78·3 80·1 82·1	79·6 81·4 83·4 85·4	82·8 84·6 86·6 88·8	86.0 87.9 90.0	89·2 91·2 93·4 95·6	96.8	93·9 95·9 98·0 100·3 102·7	1 37· 1 43· 1 43·	2 I 4 3 I 4 5 I 4 9 I 4 4 I 5	10.6 12.8 15.0 17.5 1 10.1 1	44·I 46·3 48·6 51·I 53·8 56·7	I 42 I 42 I 52 I 54 I 54	7.6 I 9.8 I 2.3 I 4.8 I 7.6 2	51·1 53·5 56·0 58·6 1·4 4·5

Lat.	m. 61	m. 62	63	m. 64	m. 65	m. 66	67		n. 88	m. 69	m. 70	m.	m		n.	m. 74
N.						RE	DUC.	CIOL	NS.							
26 24 22 20 18 16	0 58.5 0 59.7 1 1.0 1 2.2 1 3.4 1 4.7	1 1.7 1 3.0 1 4.2 1 5.5	1 3.7 1 5.0 1 6.3	I 5.7 I 7.1 I 8.4	1 7.8 1 9.1 1 10.5 1 12.0	1 11.	9 I I2 3 I I3 7 I I4 2 I I6	·0 I I	14·11 15·6 1 17·11 18·71	21.0	1 20·1 1 21·7 1 23·3	I 20. I 22. I 24. I 25.	7 I 2 4 I 2 0 I 2 7 I 2	3·0 I 4·7 I 6·4 I 8·1 I	25·3 I 27·0 I 28·8 I 30·6 I	33.0 33.0
14 12 10 8 6 4 2	1 13.0 1 11.2	1 9.6 1 11.0 1 12.4 1 13.9 1 15.4	1 11.8 1 13.2 1 14.7 1 16.3	1 14·1 1 15·6 1 17·1 1 18·7	1 14.9 1 16.4 1 17.9 1 19.5 1 21.1 1 22.8 1 24.5	I 18. I 20. I 21.	7 I 2I 3 I 22 9 I 24 6 I 26 3 I 27	·1 1 2 ·7 1 2 ·4 1 2 ·1 1 2	23·5 I 25·2 I 26·9 I 28·7 I	26·0 27·7 29·4 31·3 33·1	1 28.4 1 30.2 1 32.0 1 33.0	1 30· 1 34· 1 36·	9 I 3 8 I 3 6 I 3 6 I 3	3·5 I 5·4 I 7·3 I 9·3 I	36·11 38·01 40·01 42·01	38·7 40·7 42·7 44·8 46·9
S. 0 2 4 6 8 10	I 21.4	I 22.2	1 24.8 1 26.8	I 27.5	1 26·3 1 28·2 1 30·2 1 32·3 1 34·4 1 36·7	I 35.	9 I 35 I I 37	.01 7	38.6 I 40.8 I	43.7 46.2	I 44.3 I 46.7	I 47°	3 I 5	0·3 I 2·8 I 5·4 I	53°3 I	50.3
12 14 16 17 18	I 29.9 I 33.7 I 35.0	I 32.8 I 35.3 I 36.7	3 1 35.7 3 1 38.4 7 1 39.8	1 41.4 1 42.9 1 44.4	1 39·2 1 41·8 1 44·6 1 46·0 1 47·6 1 49·1	I 44. I 47. I 49.	9 I 48 7 I 50 2 I 52 8 I 54	0.01 0.01 0.01	51·2 I 54·2 I 55·8 I 57·4 2	57·5 59·1 0·8	1 57·6 2 0·8 2 2·9 2 4·2	2 0 3 2 4 5 2 5	92 22 92 72 I	9.4 2	4.4 2 7.7 2 11.1 2 12.9 2 14.8 2	16·5 18·4
20 21 22 23 24	I 41.0 I 42.7	1 44.3 1 46.0	5 I 45.9 3 I 47.6 5 I 49.4	I 49.2 I 50.9 I 52.8	1 50·8 1 52·5 1 54·3 1 56·2 1 58·2	I 55. I 57. I 59.	9 I 59 8 2 I 7 2 3	7.5 2	1.0 2 2.8 2 4.8 2 6.8 2 9.0 2	6.4	2 9.9 2 12.0 2 14.1	2 17	52 I 72 I 92 2	7·2 2 9·4 2 1·6 2	20·9 2 23·1 2 25·5 2	24·7 26·9 29·3
25 26 27 28 29	I 48.2 I 50.3 I 52.4	1 53.8	7 I 53.2 7 I 55.2 8 I 57.4 9 I 59.7 4 2 2.1	2 1.0	2 2·4 2 4·7 2 7·1	2 6· 2 8·	1 2 9 4 2 12)·8 2 2·2 2 1·7 2	13·6 2 16·0 2 18·6 2	14·9 17·4 19·9 22·6 25·4	2 23.	2 2 25 3 2 27 5 2 30	·1 2 2 3 ·6 2 3	9·1 2 1·8 2 4·7 2	33·1 2 35·9 2 38·8 2	40.0 43.0
30 31 32 33 34	1 57·1 1 59·7 2 2·4 2 5·4 2 8·5	2 3·5 2 6·3 2 0·3	2 7.4 2 10.3 2 13.4	2 11.3	2 12.4 2 15.2 2 18.3 2 21.5 2 25.0	2 19· 2 22· 2 25·	2 2 23 4 2 26 7 2 20	3·3 2 5·5 2	27·4 2 30·7 2 34·2 2	34·9 38·5	2 39	8 2 40 2 2 43 9 2 47	·1 2 4 ·6 2 4 ·4 2 5	4.4.2 8.0.2 1.8.2	48·7 2 52·4 2	56·9 53·1
		Т	RUE	BEA:	RING	OR	AZII	TUN	н о			HER			,	
Lat.	m. 4	m.		n. m 6 20		28	m. 32	36	40	m. 44	m. 48	m. 52	m. 60	70	80	m. 90
N.			1	1			ZIM		1			_ 1		ء ا	1 .	
30 20 10 5	0.5 0.6 0.6 0.6 0.6	0 1·1 1·1 1·2 1·2 1·3	1.6 2 1.7 2 1.8 2		7 3·2 7 3·3 9 3·5 0 3·6	3.8 3.8 4.0 4.2 4.4	4·3 4·4 4·6 4·8 5·0	4·8 4·9 5·2 5·4 5·7	5·3 5·5 5·7 6·0 6·3		6.4 6.5 6.9 7.2 7.5	6·9 7·0 7·4 7·7 8·1	8.0 8.1 8.5 8.9 9.3		10.7	12·6 13·0
S. 5 10 14 18	0·7 0·7 0·8 0·8	1·3 1·5 1·6 1·7	2.3	2·6 3· 3·1 3· 3·3 4·	6 4·3 9 4·6	4.7 5.1 5.4 5.8	5·3 5·8 6·2 6·6	6·0 6·5 6·9 7·4	6·7 7·2 7·7 8·3	7·8 8·4	8·0 8·5 9·1 9·8	8·6 9·9 10·6	9°9 10°6 11°3 12°1	12.2	12·9 13·8 14·7 15·8	15.4
20 22 24 26	1.0	1.7 1.8 1.9 2.0	2.7	3·5 4·1 3·9 4·1 5·	6 5·5 8 5·8 1 6·1	6·1 6·4 6·7 7·1	6·9 7·3 7·6 8·1	7·8 8·1 8·6 9·0	1	9.9		12.8	12·7 13·2 13·6	15·2 15·9 16·7	17·1 17·9 18·8	18·2 18·9 19·8 20·7
28 30 32 34	I·2 I·2	2·2 2·3 2·5 2·7	3.5	1·3 5 1·6 5 1·9 6	7 6·9 7 7·3	7·5 8·0 8·5 9·2	8·5 9·1 9·7 10·4	9.5 10.2 10.9 11.7	11.5	13.1	12·5 13·3 14·2 15·3	13·5 14·3 15·4	15·4 16·3 17·4 18·6	17·6 18·7 19·8 21·2	20·9 22·I	24.3

TABLE XV.

* ACHERNAR.

Lat.		m. 75	1	m 76	3		m.	J	1	m. 78	1	m. 79	_		n. 80		m. 81			m. 82		m. 83	I	m. 84	1	m. 85	1	m. 88	1	m. 87		m. 88
N.													_				_			ONS							,					
26 25 24 23 22	0 I I I I	30·	01	3	1·4 2·4 3·3	I	33 34 35	·8 ·7	I I I	36 37 38	3 I 2 I 2 I	39°	777	I I	41. 42.	2 I 2 I 3 I	4:	3·7 4·8 5·8	I I	46.3	I	47.7 48.8 49.9 51.0 52.2	I I	51· 53·	4 I 6 I 7 I	54. 55.	1 I 2 I 4 I		7 I 9 2	59		3·4 4·6
21 20 19 18 17	1 1 1 1	33° 34° 35°	61	3 3	6·1 7·1 8·1	I	38 39 40	.6 .6	I I I	41	21	43° 44° 45°	8 8 8	I I	46.	4 I 4 I 5 I	49 50 51	9.0 0.1 1.2	I I I	51·7 52·8 53·9	I	53·3 54·4 55·5 56·7 57·8	I I I	57. 58. 59.	3 2	59° 1° 2°		3· 5·	5 2 7 2 9 2 1 2 3 2	5· 6· 8·	3 2 5 2 7 2 0 2 2 2	8·4 9·6
16 15 14 13 12	I	38· 39·	4 I 3 I	4	1·0 2·0 3·0	I	43 44 45	·6 ·7	I I I	46.	3 I 4 I	49°	0 1 2	I I I	51·	7 I 8 I 9 I	54 55 56	4·5 5·6 5·8	I I	56·2 57·3 58·4 59·6 0·8	2 2	59.0 0.1 1.3 2.5 3.7	2 2 2	3° 4° 5°	8 2 0 2 2 2 4 2 6 2	5°: 7°: 8°:	4 2	10.	8 2 1 2 3 2	11. 13.	8 2 1 2 4 2	13·5 14·8 16·1 17·4 18·8
11 10 9 8 7	1 1 1 1	44.	3 I 4 I 4 I	4	6·1 7·1 8·2	I I I	48 49 51	·9 ·9	I I	51. 52. 53.	6 I 7 I 9 I	53° 54° 55° 56° 57°	5 6 8	I	56. 57. 58. 59.	3 2 5 2 7 2	1	9·1 9·2 1·4 2·6 3·9	2 2 2	2·0 3·2 4·4 5·6 6·9	2 2	8.7	2 2 2	10.	1 2 4 2 7 2	13.	2 5 2 8 2	16.	2 2 2	18.	4 2 7 2 I 2	20 I 21·5 22·9 24·3 25·7
6 5 4 3 2	I I I	47° 48° 49° 50° 52° 53°	6 I 7 I 9 I 0 I	53 53 53	1·5 2·6 3·8	I I I	54 55 56 58	·4 ·6 ·8 ·0	1 1 1 2	57. 58. 59.	3 2 5 2	2·	1 3 5 8 1	2 2 2 2	3·3 4·6 5·9 7·2 8·5	2 2 2 2 2	6 7 8	9.3	2 2 2 2	9.4 10.7 12.1 13.4	2 2 2	12·5 13·9 16·6	2 2 2 2	15.	7 2 2 5 2 9 2	20·3 21·2 23·2	2 2 2 2	23·5 25·6 26·5	2 2 2 2 2	25· 26· 28· 29·	3 2 2 3 2	27·2 28·6 30·1 31·7 33·2 34·8
S. 0 1 2 3 4		54° 55° 56° 58 59°	6 I 9 I I 2	59		2 2	3 4	·5 ·7 ·0 ·4 ·7	2 2 2	4· 6· 7·	5 2 8 2 2 2 6 2 0 2	8·	4 8	2 2 2	11·2 12·6 14·6	2 2 2	15	·8	2 2 2	17·7 19·1 20·6	2 2	21.0 22.5 24.0	2 2 2	24·3 25·8 27·4	3 2 2 4 2	27°2 29°2 30°8	2 2 2 2	31·1 32·7	2 2 2	34°. 36°.	2 2 2 2	36·4 38·0 39·7 41·4 43·1
5 6 7 8 9	2 2 2 2 2	3.	8 2 1 2 5 2 0 2 4 2	6	3.2	2 2 2	8 10 11	6	2 2 2	11. 13.	92	16· 16·	2 2 7 2 3 2	2 :	18·5 20·6 21·7	2 2 2	21 23 25	·9 ·5	2 2 2	25·4 27·0 28·7	2 2 2	27·2 28·8 30·5 32·2 34·0	2 2 2	32·3 34·1 35·8	2 2 2	35.6 37.6 39.4	2 2	39·5	2 2	44.9	2 2 2	44.9 46.8 48.6 50.6 52.5
10 11 12 13 14	2	9.	5 2 1 2 8 2	14	5·3	2 2 2	16 18	·3 ·0	2 :	21· 23·	8 2 5 2 3 2	21· 23· 25· 26· 28·	3 2	2 :	26·9 28·7 30·6	2 2 2	30 32 34	·5	2 2 2	34·1 36·0 37·9	2 2 2	35.9 37.7 39.7 41.7 43.7	2 2 2	41.4 43.4 45.5	2 2	45·2 47·2 49·3	2 2 2	49.0	2 2	54.5 57.1	2 3	54.6 56.6 58.8 1.0 3.3
15 16 17 18 19	2 2 2	20· 22·	12	23	1·7 3·7	2 2 2	25 27 29	4	2 :	33. 33.	1 2 2 2	37.	9 2	2 :	36·5 38·7 40·9	2 2	40 42 44	·3 ·5	2 2 2	44·2 46·4 48·7	2 2 2	45.9 48.1 50.3 52.7 55.2	2 2 2	54·3 56·7	2 2 3	56.0	3 3	0·0 2·4 4·9	3 3	9.0	3 3	5.7 8.1 10.6 13.2 15.9
20 21 22 23 24	2 2 2	30:	5 2 8 2 2 2	34 34	2·3 1·7 7·2	2 2 2	36 38	6	2 .	40° 42° 45°	1 2 6 2 2 2	44	5 2	2 :	48·1 50·7 53·4	2 2 2	52 54 57	·8 ·6	2	53·6 56·2 58·9 1·8 4·7	3	57.7 0.4 3.1 6.0 9.0	3	7.4	3	8.8	3	19.0	3	17.4	3	18·8 21·7 24·8 27·9 31·3
25 26 27 28 29	2 2 2	38· 41· 44· 47· 50·	2 2 2 2 2	45	·3 ·3	2 2 2	49° 52° 55°	5	2 :	56· 56·	7 2	4.0	2 3	3	2·3	3	6 10 13	.5	3	11·1 14·5 18·1	3 3 3	12·2 15·5 19·0 22·6 26·5	3	20.0	3	24.5 28.1	3 3	29·1 32·8 36·7	3	33.7 37.5 41.4	3	38·4 42·2 46·2
30 31 32 33 34	2 2 3 3 3	5.0	63 43 63	6	2·I	3 3	10.	9	3 :	15	3 3 7 3	20:	3 3	3 4	20·5 24·8 29·4	3 3	25 29 34	·6 3	3 :	30·0 34·5 39·2	3	30·5 34·8 39·4 44·2 49·4	3 3	39·7 44·3 49·3	3	44.6 49.3 54.9	3	54.4 59.5	3	54·6 59·5 4·6	3 4 4	54·9 59·6 4·6 9·9 15·5

TABLE XV.

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

* ACHERNAR.

Lat.	m.	m. 8	m. 12	m. 16	m. 20	m. 24	m. 26	m.	m. 30	m. 32	m. 34	m. 36	m. 38	m 40	m. 42	m. 44
S.								UCTI	ONS.							
34 38 42 46 50	0·2 0·2 0·2 0·2 0·2	0.9 0.9 0.8 0.8	2·1 2·0 1·9 1·8	3·7 3·6 3·4 3·2 3·0	5.8 5.5 5.3 5.0 4.7	8:4 8:0 7:6 7:2 6:8	9.8 9.4 8.9 8.5 8.0	11.4 10.9 10.4 9.8 9.3	13.0 12.4 11.9 11.2 10.6	14·8 14·2 13·5 12·8	16·8 16·0 15·3 14·4 13·6	18·8 17·9 17·1 16·2 15·3	20·9 20·0 19·0 18·0	23·2 22·1 21·1 20·0 18·8	25·5 24·4 23·2 22·0 20·8	28.0 26.7 25.5 24.1 22.8
54 58 60	0·2 0·2 0·2	0·7 0·7 0·6	1·6 1·5 1·4	2·8 2·6 2·5	4.4 4.1	6·4 5·9 5·7	7·5 7·0 6·7	8·7 8·1 7·8	8.9 8.3	11·4 10·5 10·1	11.4 11.4	14·3 12·8	14·3 14·3	17·7 16·4 15·8	19·5 18·1 17·4	19·1 19·9
Lat.	m. 45	m. 46	m.	m.	m. 49	m. 50	m.	m. 52	m. 53	m. 54	m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
S.							RED	UCTI	ONS.							
34 36 38 40	29·3 28·6 28·0 27·3 26·6	30.6 29.9 29.2 28.5 27.8	31·9 31·2 30·5 29·8 29·0	33·3 32·6 31·8 31·0	34.7 33.9 33.1 32.3 31.6	36·1 35·3 34·5 33·7 32·9	37.6 36.7 35.9 35.0 34.2	39·1 38·2 37·3 36·4 35·5	40.6 39.7 38.7 37.9 36.9	42·1 41·2 40·2 39·3 38·3	43.7 42.7 41.7 40.7 39.7	45°3 44°3 43°2 42°2 41°2	46.9 45.8 44.8 43.7 42.7	48.5 47.5 46.4 45.3 44.2	50·2 49·1 48·0 46·9 45·7	51.9 50.8 49.6 48.4 47.3
44 46 48 50 52	26·0 25·3 24·6 23·8 23·1	27·1 26·4 25·7 24·9 24·1	28·3 27·5 26·8 26·0 25·2	29·5 28·7 27·9 27·1 26·3	30·8 29·9 29·1 28·2 27·4	32·0 31·2 30·3 29·4 28·5	33·3 32·4 31·5 30·6 29·6	34·6 33·7 32·8 31·8 30·8	36·0 35·0 34·0 33·1	37·3 36·3 35·3 34·3 33·2	38·7 37·7 36·7 35·6 34·5	40·2 39·1 38·0 36·9 35·7	41.6 40.5 39.3 38.2 37.0	43·I 41·9 40·7 39·6 38·4	44.5 43.4 42.2 40.9 39.7	46.0 44.8 43.6 42.3 41.0
54 56 58 60	22.4 21.6 20.8 19.9	23·4 22·6 21·7 20·8	24·4 23·5 22·7 21·8	25.4 24.6 23.6 22.7	26·5 25·6 24·6 23·6	27.6 26.6 25.7 24.6	28·7 27·7 26·7 25·6	29·8 28·8 27·7 26·6	31·0 29·9 28·8 27·7	32·2 31·1 29·9 28·7	33.4 32.2 31.0 29.8	34.6 33.4 32.2 30.9	35·8 34·6 33·3 32·0	37·1 35·8 34·5 34·1	38·4 37·1 35·7 34·3	39·7 38·3 36·9 35·4
							1]	HOU:	R.							
Lat.	m. 0	m. 1	m. 2	m. 3	m. 4	m. 5	m. 6	m. 7	m. 8	m. 9	10 m.	m. 11	m. 12	13	m. 14	m. 15
S.							RED	UCTI	ONS				1		1	
34 36 38 40 42	51·9 50·8 49·6 48·4 47·3	53.7 52.5 51.3 50.1 48.8	55.4 54.2 53.0 51.7 50.4	57·2 55·9 54·7 53·4 52·1	59·1 57·7 56·4 55·1 53·7	60·9 59·5 58·2 56·8 55·4	62·8 61·4 60·0 58·6 57·1	64.7 63.2 61.8 60.3 58.9	66.6 65.1 63.6 62.1 60.6	68.6 67.0 65.5 64.0 62.4	70.6 69.0 67.4 65.8 64.2	72.6 70.9 69.3 67.7 66.0	74·6 72·9 71·3 69·6 67·9	76·7 75·0 73·3 71·5 69·8	78.8 77.0 75.3 73.5 71.7	80.9 79.1 77.3 75.5 73.7
44 46 47 48 49 50	46·0 44·8 44·2 43·6 43·0	47.6 46.3 45.7 45.0 44.4	49·2 47·9 47·2 46·5 45·8	50·7 49·4 48·7 48·0 47·3 46·6	52.4 51.0 50.3 49.6 48.8 48.1	54.0 52.6 51.8 51.1 50.4	55.7 54.2 53.4 52.7 51.9	57.4 55.8 55.1 54.3 53.5	59·1 57·5 56·7 55·9 55·1	59.2 58.4 57.6 56.7	62.6 60.9 60.1 59.2 58.4	64.4 62.7 61.8 60.9 60.1	66·2 64·4 63·6 62·6 61·8 60·8	68.0 66.2 65.3 64.4 63.5	69.9 68.0 67.1 66.2 65.2	71.8 69.9 69.0 68.0 67.0
51 52 53 54 55	42·3 41·7 41·0 40·3 39·7 39·0	43.7 43.1 42.4 41.7 41.0 40.3	45·2 44·5 43·8 43·1 42·4 41·6	45.9 45.2 44.5 43.7 43.0	47.4 46.6 45.9 45.1	49.6 48.9 48.1 47.3 46.6 45.7	51·2 50·4 49·6 48·8 48·0 47·1	52.7 51.9 51.1 50.3 49.5 48.6	54·3 53·5 52·6 51·8 50·9	55.9 55.0 54.2 53.3 52.4 51.5	57.5 56.6 55.8 54.9 54.0 53.0	59·2 58·3 57·4 56·4 55·5 54·6	59.9 59.0 58.0 57.1 56.1	61.6 60.6 59.7 58.7	63·3 62·3 60·3 59·3	65.0 64.0 63.0 61.9
56 57 58 59 60	38·3 37·6 36·9 36·2 35·4	38·9 38·1	40·9 40·2 39·4 38·6 37·8	42·2 41·5 40·7 39·9 39·1	43.6 42.8 42.0 41.2 40.3	45.0 44.1 43.3	46·3 45·5 44·6 43·8 42·9	47·7 46·9 46·0 45·1 44·2	49·2 48·3 47·4 46·4 45·5	50.6 49.7 48.8 47.8 46.8	52·1 51·1 50·2 49·2	53.6 52.6 51.6 50.6	55·1 54·1 53·1 52·0	56·6 55·6 54·5	58·2 57·1 56·0 54·9	59·8 58·7 57·6 56·4
Tat				0	HOU	R.						I	HOU	R.		
Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	30 m.	m. 40	m. 50	m. 00] m. 10	m. 20	30	1 m.	50	m. 60
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36 40 44	0.5 0.5 0.5	1.1 1.1 1.1	1.6 1.6	2·1 2·2 2·2	2·7 2·7 2·7	3.3 3.5 3.5	4.0 4.0	5·3 5·4 5·4	6·7 6·8	8.0 8.0 8.0	9·3 9·4 9·5	10.6	11.9 12.0 12.1	13·1 13·2 13·4	14·4 14·5 14·8	15.6 15.8 16.0
48 52 56 60	0.6 0.6 0.6	1·1 1·1 1·2 1·2	1·7 1·7 1·8	2·3 2·3 2·4	2·8 2·8 2·9 3·0	3·3 3·4 3·5 3·6	4·2 4·3 4·4 4·5	5·5 5·7 5·8 6·0	7·1 7·3 7·5	8·3 8·5 8·7 9·0	9.7 9.9 10.2 10.5	11.0 11.3 11.6	12·4 12·7 13·1 13·5	13·7 14·1 14·5 15·0	15·1 15·4 15·9 16·5	16·8 17·3 18·0

REDUCTION TO THE MERIDIAN TABLE NEAR THE MERIDIAN BELOW THE POLE. $\stackrel{\star}{\mathcal{H}}$ ACHERNAR.

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Lat.	m. 16	m. 17	18	19	20 m.	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26	m. 27	m. 28	m. 29	m. 30	m. 31
S.		1			. 1		F	REDU	JCTIC	ONS.	4	. 1	1		ı	
34 35 36 37 38	83·1 82·2 81·3 80·4 79·4	84.4	86.6 85.6 84.6	88.8 87.8 86.8	90.0 90.0	94.4 93.3 92.3 91.2 90.2	96·7 95·6 94·5 93·5 92·4	99.0 97.9 96.8 95.7 94.6	101.4 100.3 99.2 98.0 96.9	103.8 102.7 101.5 100.4 99.2	106·2 105·1 103·9 102·7 101·5	107·5 1 106·3 1	111·2 109·9 108·7 107·5	113.7 112.4 111.2 109.9 108.7	116·2 114·9 113·7 112·4 111·1	118.8 117.5 116.2 114.9 113.5
39 40 41 42 43	78·5 77·6 76·6 75·7 74·7	78·6 77·7 76·7	81·7 80·7 79·7 78·7	83.8 82.8 81.7 80.7	85.9 84.9 83.8 82.8	87·0 85·9 84·8	91·3 90·2 89·1 88·0 86·9	93.5 92.4 91.3 90.2 89.0	95.8 94.6 93.5 92.3 91.2	98·0 96·9 95·7 94·5 93·3	97.9 96.7 95.5	101·4 100·2 99·0 97·7	105.0 103.8 102.5 101.2	107·4 106·1 104·8 103·5 102·2	109.8 108.5 107.2 105.9 104.5	112·2 110·9 109·5 108·2 106·8
44 45 46 47 48 49	73.7 72.8 71.8 70.8 69.8 68.8	75.7 74.7 73.7 72.7 71.7	75.6	78·6	80·6 79·5 78·4	80.4	85.8 84.7 83.5 82.4 81.2 80.1	87.9 86.7 85.6 84.4 83.2 82.0	90.0 88.8 87.6 86.4 85.2 84.0	92·1 90·9 89·7 88·5 87·2 86·0	94.3 93.1 91.8 90.6 89.3 88.0	96·5 95·2 93·9 92·7 91·4	98·7 97·4 96·1 94·8 93·5	99.6 98.3 96.9 95.6	103.2 101.8 100.5 99.1 97.7	105.5 104.1 102.7 101.3 99.9 98.4
50 51 52	67·8 66·8 65·7	69·6 68·5 67·5		73·2	75·I 74·0	77·0 75·8	78·9 77·7 76·5	80·8 79·6 78·3	82·7 81·5 80·2	84·7 83·4 82·1	86·7 85·4 84·1	88·7 87·4 86·0	90·7 89·4 88·0	92·8 91·4 90·0	94.9 93.5 92.0	97·0 95·5 94·0
Lat.			l m	1 m	(====				HOUI							
	m. 32	m. 33	34	m. 35	36	m. 37	38	39	40	m. 41	m. 42	43	1 44		m. 45	m. 46
34 35 36 37 38	120.0 118.7 117.4 116.0	122·6 121·3 119·9 118·5	125·3 123·9 121·1	127·9 126·5 125·1	132·0 130·6 129·1 127·7 126·2	133.3 130.3 138.8	136. 134. 131.	0 138· 5 137· 0 135· 4 134·	3 143·1 7 141·5 2 140·0 7 138·4 1 136·8	144·3 142·7 141·1 139·5	2 28·8 2 27·2 2 25·5 2 23·9 2 22·2	2 30.0 2 28.3 2 26.7 2 25.0	2 3 3 2 3 7 2 2 0 2 2	34.6 2 32.9 2 31.2 2 29.5 2 27.8 2	35·8 34·1 32·3 30·6	2 40·5 2 38·7 2 37·0 2 35·2 2 33·5
39 40 41 42 43	111.9 110.6 109.3	115·8 114·4 113·0 111·5	118·2 115·4 113·9	119.3 117.8 116.3	124.7 123.3 121.8 120.3 118.8	125.8	128 126 125 123	4 131 8 129 3 127 7 126	135.2 135.2 133.6 14132.0 130.4 128.8 127.1	136·3 134·6 133·0	2 18·9 2 17·3 2 15·6 2 13·9 2 12·2	2 21·6 3 2 19·9 5 2 18·2 0 2 16·9	5 2 2 9 2 2 2 2 2 5 2 1	26·I 2 24·4 2 22·6 2 20·9 2 19·I 2	27·1 25·3 23·6 21·8	2 31.7 2 29.9 2 28.1 2 26.3 2 24.5 2 22.6
45 46 47 48 49	106·4 104·9 102·1	108·7 107·2 105·8 104·3	100.2	113.3	115.7 114.2 112.6 111.0	118.	120 118 117 115	5 123 9 121 3 119 7 118	·0 125·5 ·3 123·8 ·7 122·1 ·0 120·4	127·9 126·2 124·5 122·8	2 10·5 2 8·5 2 7·6 2 5·2 2 3·4	2 13·0 2 11·2 2 2 7·0	2 2 1 2 2 1 4 2 1 5 2 1	15.6 2 13.8 2 11.9 2 10.1 2 8.2 2	18·1 16·3 14·5 12·6	2 20·8 2 18·9 2 17·0 2 15·1 2 13·2
50 51 52	99·1 96·1	99.7	101.0	104.0	107·8 106·2 104·6	108.4	1110	6 112	·6 116·9 ·9 115·2	117.4	2 1.6 1 59.8 1 57.9	2 4.0	1 2	6·4 2 4·5 2 2·5 2	8·8 6·8	2 11·2 2 9·2 2 7·2
Lat.	m.	1 m	1	n. 1	m. 1	m.		I	HOUI	R. 1	m. 1	m.	m. 1	m.	m.	m.
	47	48		19	50	51	5		53	54	55	56	57	58	59	60
36 37 38	2 36.	7 2 44 9 2 42 1 2 41 3 2 39	1.7 2 4 2.9 2 4 1.0 2 4	44·0 2 42·1 2	50.7 48.8 47.0 45.1	2 53·8 2 51·9 2 50·0 2 48·0	2 2 2 2 2	51.02	2·0 3 0·0 3 58·0 3 56·0 2 54·0 2	57·1 3	6·3 4·2 2·2 0·1	3 7.4 3 3 5.3 3 3 3.2 3	12·7 10·6 8·5 6·3	3 13.8 3 11.6 3 9.5	3 19·2 3 17·0 3 14·8 3 12·6	3 22·5 3 20·3 3 18·1 3 15·8
42	2 32 2 30 2 29 2 27	7 2 35 9 2 33 9 2 31 2 2 29	3.6 2 1.8 2 1.9 2	38·4 2 36·5 2 34·6 2 32·6 2	43.2 41.2 39.3 37.4 35.4 33.4	2 44·1 2 42·2 2 40·2 2 38·2	2 2 4 2 2 4	47·1 2 45·1 2 43·0 2 41·0 2	52.0 2 50.0 2 48.0 2 45.9 2 43.9 2 41.8 2	53.0 2 50.9 2 48.8 2 46.7 2	56.0 53.9 51.8 49.6	3 I·I 3 2 59·0 3 2 56·9 3 2 54·7 2 2 52·5 2 2 50·4 2	57·7 55·5	3 2·9 3 0·7 2 58·4	3 8·2 3 6·0 3 3·7	3 9.0 3 4.4
45 46 47 48 49	2 23: 2 19: 2 17: 2 15:	4 2 20 5 2 2 6 2 2 6 2 2 7 2 18	0·0 2 4·1 2 2·2 2 0·2 2	28·7 2 26·8 2 24·8 2 22·7 2	31·4 29·4 27·4 25·3	2 34.2 2 32.3 2 30.3 2 28.6	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	36·9 2 34·8 2 32·7 2 30·6 2 28·5 2	39.7 2 37.6 2 35.4 2 33.3 2	42.5 2 40.3 2 38.2 2 36.0 2	45.3 43.1 40.9 38.7	2 48·1 2 2 45·9 2 2 43·7 2 2 41·4 2 2 39·1 2	51.0 48.8 46.5 44.2 41.8	2 53.9 2 51.6 2 49.3 2 46.9 2 44.6	2 56·8 2 54·5 2 52·1 2 49·7 2 47·3	2 59·8 2 57·4 2 55·0 2 52·6 2 50·I
50 51 52	2 11.	72 1	6·1 2	18·6 2	21.2	2 23.	7 2	26·3 2	28·9 2 26·6 2 24·4 2	31.52	34.1	2 36·8 2 2 34·4 2 2 32·0 2	39·5	2 42.2	2 44 9	2 47·6 2 45·I

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. \bigstar ALDEBARAN.

Lat.	m. 2	m. 4	m. 6	m. 8	m. 10	m. 12	m. 14	m. 16	m. 18	m. 20	m. 21	m. 22	1 m.	m. 24	m. 25	m. 26
N.								UCT							1	,
40 42 44 46 48	0.2 0.2 0.2 0.2 0.2	1.0 0.9 0.8 0.7 0.6	2:2 1:9 1:6 1:4	3·8 3·4 3·1 2·8 2·6	6.0 5.4 4.9 4.4 4.0	8.6 7.7 7.0 6.3 5.8	11.7 10.5 9.5 8.6 7.8	15·3 13·7 12·4 11·3 10·2	19·3 17·4 15·7 14·2 12·9	23.8 21.4 19.4 17.5 15.9	26·2 23·6 21·3 19·3 17·6	28·7 25·9 23·4 21·2 19·3	31·4 28·3 25·6 23·2 21·1	34·I 30·7 27·8 25·2 22·9	37·0 33·3 30·1 27·3 24·9	40.0 36.0 32.6 29.6 26.9
50 52 54 56 58 60	0.1 0.1 0.1 0.1 0.1 0.1	0·6 0·5 0·5 0·4 0·4	1·3 1·2 1·1 1·0 0·9 0·8	2·3 2·1 1·9 1·8 1·6 1·5	3.6 3.3 3.0 2.8 2.5 2.3	5·2 4·8 4·3 4·0 3·6 3·3	7·1 6·5 5·9 5·4 4·9 4·5	9·3 8·5 7·7 7·0 6·4 5·8	11·8 10·7 9·8 8·9 8·1 7·4	14·5 13·2 12·0 11·0 9·1	16·0 14·6 13·3 12·1 11·0 10·0	17.6 16.0 14.6 13.3 12.1	19·2 17·5 15·9 14·5 13·2 12·0	20·9 19·0 17·3 15·8 14·4 13·1	22.6 20.6 18.8 17.1 15.6 14.2	24·5 22·3 20·3 18·5 16·9 15·3
8. 10 12 14 16 18	0·3 0·3 0·2 0·2	1.0 0.0 0.0	2·5 2·3 2·2 2·0 1·9	4.5 4.1 3.9 3.6 3.4	7·0 6·5 6·0 5·6 5·3	10·0 9·3 8·7 8·1 7·6	13·6 12·6 11·8 11·0 10·4	17·7 16·5 15·4 14·4 13·5	22·4 20·8 19·4 18·2 17·1	27·6 25·7 24·0 22·4 21·1	30·4 28·3 26·4 24·7 23·2	33.4 31.0 29.0 27.1 25.5	36·4 33·9 31·6 29·6 27·8	39·6 36·9 34·4 32·2 30·3	43.0 40.0 37.3 34.9 32.8	46·4 43·2 40·3 37·8 35·5
20 22 24 26 30	0·2 0·2 0·2 0·2	0·8 0·7 0·7 0·7 0·6	1·8 1·7 1·6 1·5 1·4	3·2 3·0 2·8 2·7 2·4	5.0 4.7 4.4 4.2 3.8	7·2 6·7 6·4 6·0 5·4	9·7 9·2 8·7 8·2 7·4	12·7 12·0 11·3 10·7 9·6	16·1 15·2 14·3 13·6 12·2	19·8 18·7 17·7 16·7 15·0	21·8 20·6 19·5 18·4 16·5	24.0 22.6 21.4 20.2 18.1	26·2 24·7 23·3 22·1 19·8	28·5 26·9 25·4 24·0 21·6	30·9 29·1 27·5 26·0 23·3	33.4 31.5 29.8 28.2 25.3
35 40 50 60	0.1 0.1 0.1	0.2 0.2 0.4 0.3	1.0 0.8 0.6	2·1 1·9 1·4 1·0	3°3 2°9 2°2 1°6	4.4 4.1 3.2 5.3	6·5 5·7 4·3 3·2	8·4 7·4 5·6 4·1	10·7 9·4 7·1 5·2	13·1 11·4 8·8 6·5	14·5 12·7 9·7 7·1	15·9 14·0 10·6 7·8	17·4 15·3 11·6 8·5	18·9 16·6 12·7 9·3	20·5 18·0 13·7 10·1	22·2 19·5 14·9 10·9
Lat.	m.	m.	m.	m. 1	m.	1 m.	m.	(m.	m.							
N.	27	28	29	30	31	32	RED	UCT	IONS	36	1 37	38	39	40	41	42
41 42 43 44 45	40·9 38·8 36·9 35·1 33·4	43·9 41·7 39·6 37·7 35·9	47·0 44·7 42·5 40·4 38·5	50·3 47·7 45·4 43·2 41·2	53.6 50.9 48.5 46.1 43.9	57·1 54·2 51·6 49·1 46·8	60·7 57·6 54·8 52·2 49·7	64·3 61·1 58·1 55·3 52·7	68·1 64·6 61·5 58·6 55·8	71.9 68.3 65.0 61.9 59.0	75·8 72·1 68·6 65·3 62·3	79.9 75.9 72.3 68.8 65.6	84.0 79.9 76.0 72.4 69.0	88·2 83·9 79·9 76·1 72·5	92.6 88.1 83.8 79.9 76.1	97.0 92.3 87.9 83.7 79.8
46 47 48 49 50	31·8 30·4 29·0 27·6 26·4	34·2 32·6 31·1 29·7 28·3	36·7 35·0 33·4 31·8 30·4	39·2 37·4 35·7 34·0 32·5	41.9 39.9 38.1 36.3 34.7	44.6 42.5 40.6 38.7 36.9	47·4 45·2 43·1 41·1 39·3	50·3 47·9 45·7 43·6 41·7	53·2 50·8 48·4 46·2 44·I	56·2 53·6 51·2 48·9 46·6	59.4 56.6 54.0 51.6 49.2	62·5 59·7 56·9 54·4 51·9	65·8 62·8 59·9 5 7·2 54·6	69·1 66·0 63·0 60·1 57·4	72·6 69·3 66·1 63·1 60·3	76·1 72·6 69·3 66·2 63·2
51 52 54 56 58 60	25·2 24·0 21·9 20·0 18·2 16·5	27·1 25·8 23·6 21·5 19·5 17·8	29.0 27.7 25.3 23.0 21.0 19.0	31·0 29·6 27·0 24·6 22·4 20·4	33·1 31·6 28·8 26·3 23·9 21·8	35·3 33·7 30·7 28·0 25·5 23·2	37·5 35·8 32·6 29·8 27·1 24·6	39.8 38.0 34.6 31.6 28.8 26.1	42·1 40·2 36·7 33·4 30·5 27·7	44.5 42.5 38.8 35.4 32.2 29.3	47.0 44.9 41.0 37.3 34.0 30.9	49.6 47.3 43.2 39.4 35.9 32.6	52·2 49·8 45·5 41·5 37·8 34·3	54·8 52·4 47·8 43·6 39·7 36·1	57.6 55.0 50.2 45.8 41.7 37.9	60·4 57·7 52·6 48·0 43·7 39·8
S. 16 17 18 19 20	40·7 39·4 38·2 37·1 36·0	43.7 42.4 41.1 39.9 38.7	46·9 45·4 44·c 42·7 41·5	50·1 48·6 47·1 45·7 44·3	53·5 51·8 50·2 48·8 47·3	56·9 55·2 53·5 51·9 50·4	60·5 58·7 56·9 55·2 53·6	64·2 62·2 60·3 58·6 56·8	67·9 65·8 63·8 62·0 60·2	71·8 69·6 67·5 65·5 63·6	75·8 73·5 71·2 69·2 67·1	79·8 77·4 75·1 72·9 70·7	84·0 81·4 79·0 76·7 74·4	88·2 85·6 83·0 80·6 78·2	92·6 89·8 87·1 84·6 82·1	97·1 94·1 91·3 88·7 86·1
22 24 26 28 30 32	34.0 32.1 30.4 28.8 27.3 25.9	36·5 34·5 32·6 30·9 29·3 27·8	39·1 37·0 35·0 33·2 31·4 29·8	41.8 39.5 37.4 35.5 33.6 31.9	44.7 42.2 40.0 37.9 35.9 34.1	47.6 45.0 42.6 40.3 38.2 36.3	50·5 47·8 45·2 42·9 40·6 38·6	53.6 50.7 48.0 45.5 43.1 40.9	56·8 53·7 50·8 48·2 45·7 43·3	60·0 56·8 53·7 50·9 48·3 45·8	63·4 59·9 56·7 53·8 51·0 48·4	66.8 63.2 59.8 56.7 53.7 51.0	70·3 66·5 62·9 59·7 56·6 53·7	73·9 69·9 66·2 62·7 59·5 56·5	77.6 73.4 69.5 65.9 62.4 59.3	81·4 76·9 72·9 69·1 65·5 62·2
34 36 40 45 50 60	24.5 23.3 21.0 18.3 16.0 11.8	26·4 25·1 22·6 19·7 17·2 12·6	28·3 26·9 24·2 21·1 18·5 13·6	30·3 28·7 25·9 22·6 19·8 14·5	32·3 30·7 27·7 24·2 21·1 15·5	34.4 32.7 29.5 25.8 22.5 16.5	36·6 34·8 31·3 27·4 23·9 17·5	38·8 36·9 33·2 29·1 25·4 18·6	41·1 39·1 35·2 30·9 26·9 19·7	43.5 41.3 37.2 32.6 28.5 20.9	45.9 43.6 39.3 34.5 30.1 22.1	48·4 46·0 41·5 36·3 31·7 23·3	51.0 48.4 43.7 38.3 33.4 24.5	53.6 50.9 45.9 40.2 35.1 25.8	56·3 53·5 48·2 42·3 36·9 27·1	59·1 56·1 50·6 44·4 38·7 28·4

* ALDEBARAN.

Lat.	m 43		m. 44	m. 45	1 m. 46	1 m.		m. 48	m. 49	m. 50	m. 51	m. 52		3	m. 54	m. 55	m. 56
N.								REDU						,			
41 42 43 44 45 46	I 3 I 3 I 2 I 2	6·6 1 2·0 1 7·6 1 3·6 1	36·2 31·7 27·4	I 45 I 40 I 35 I 31	9 1 55 5 1 50 5 1 44 8 1 39 3 1 35 1 30	1 I 54 8 I 49 9 I 44 3 I 39	·7 I ·3 I ·2 I ·3 I	53.8 I 48.5 I 43.5 I	4.3 2 58.4 2 52.9 1 47.7 1	9·2 3·1 57·4 52·0	2 14·2 2 7·9 2 2·0 1 56·4	2 19 2 12 2 6 2 0	·8 2 1 ·8 2 1 ·8 2	4.5 2 7.8 2 1.4 2 5.4 2	29.8 2 22.8 2 16.2 2	35·1 2 27·9 2 21·1 2 14·7 2	40·5 33·1 26·0 19·4
47 48 49 50 51 52	I I I I		16.0 12.5 9.3 6.2	I 19 I 15 I 12 I 9		9 I 26 I I 22 6 I I8	·4 I ·5 I ·8 I ·3 I	26·0 I 22·2 I 18·5 I	33.7 I 29.5 I 25.5 I 21.7 I	37·5 33·1 29·0 25·0	1 41·3 1 36·8 1 32·5 1 28·4	I 45 I 40 I 36 I 31	·2 I 4 ·5 I 4 ·1 I 3 ·8 I 3	9·2 I 4·4 I 9·7 I	53·2 I 48·2 I 43·4 I 38·9 I	57·3 2	1·5 56·1 51·0 46·1
53 54 55 56 57 58	0 5 0 5 0 5 0 4	2·7 0 0·3 0 8·0 0	57·7 55·1 52·6 50·3	1 0 0 57 0 55 0 52	3 1 3	0 I 5 2 I 2 5 I 0 9 0 57	·7 I ·8 I ·0 I ·2 0	8·5 I 5·4 I 2·5 I 59·7 I	8·1 1 5·1 1 2·1 1	14·2 10·9 7·7	1 17·2 1 13·7 1 10·4 1 7·2	1 20 1 16 1 13 1 9	61 1	3·2 I 19·5 I 16·0 I 12·5 I	26·3 I 22·5 I 18·8 I 15·3 I	33.6 29.5 25.5 21.7 18.0 14.5	32·7 28·6 24·6 20·8
\$. 20 21 22 23 24	I 2 I 2 I 2	7·7 I 5·2 I 2·9 I	31·7 29·1 26·7	1 35 1 33 1 30	6 I 42 8 I 40 2 I 37 6 I 34 I 32	0 I 44 3 I 4 I 6 I 38	3 I 4 I 7 I	48.7 I 45.7 I 42.8 I	53·2 I 50·0 I 47·0 I	57.7 54.5 51.3	2 2·4 1 59·0 1 55·7	2 7 2 3 2 0	·12 1 ·62	1.92	16·8 2 13·0 2 9·4 2	25·8 2 21·7·8 2 17·8 2 14·1 2	2 26·8 2 22·8 2 18·9
26 28 30 32 34	I I I	6·3 1 2·4 1 8·7 1 5·2 1 1·9 1	15.7 11.8 8.2	1 19 1 15 1 11	5 I 27 I I 22 I I 18 3 I I4 7 I 10	6 I 26 4 I 21 5 I 17	·8 I ·7 I	29.9 I 25.3 I 21.0 I	33.6 I 28.8 I 24.3 I	37·4 32·4 27·7	1 41·2 1 36·1 1 31·2	I 45 I 39 I 34	·8 I 2	19·2 I 13·6 I 38·4 I	53·3 I 47·5 I 42·1 I	57.4 51.5 45.9	2 1·6 1 55·5 1 49·7
36 38 40 42 44 46	0 5 0 5 0 5 0 4	3·0 0 0·3 0	58·4 55·5 52·7 50·0	0 58 0 55 0 52	1 1 3	8 I 6 6 57 6 6 6 57	·6 I ·2 I ·0 I	9.4 I 5.9 I 2.6 I 59.4 I	12·3 I 5·2 I 1·9 I	15·2 11·5 7·8 4·4	1 18·2 1 14·3 1 10·6 1 7·0	1 21 1 17 1 13 1 9	·3 I 2 ·2 I 2 ·3 I	24·4 I 20·2 I 16·2 I 12·3 I	27·6 I 23·2 I 19·0 I	35.6 30.8 26.3 21.9 17.8	1 34·1 1 29·4 1 24·9 1 20·6
48 50 52 54 56 60	0 4 0 3 0 3	0·5 0 8·3 0 6·1 0	42.4 40.1 37.8	0 44 0 41 0 39 0 37	9 0 49 4 0 46 9 0 43 5 0 41 1 0 38 6 0 34	3 0 48 8 0 45 2 0 43 8 0 40	·4 0 ·7 0 ·0 0	50.4 0 47.6 0 44.9 0 42.2 0	52.5 0 49.6 0 46.8 0	54.7 51.6 48.7 45.8	o 56·9 o 53·7 o 50·6 o 47·6	0 59 0 55 0 52 0 49	·80 : ·60 :	54·70 51·40	53.4	6·1 2·4 58·8 55·3	1 4.7 1 1.0 57.4
			TF	UE	BEA	RING	OI	R AZ	IMU	CH C	F X	- AL	DEE	3ARA	AN.		
Lat.	m. 4	8 m	12 m.		20 m.	m. 24	m. 28	m. 32	m. 36	m. 40	m. 44	m. 48	1 m. 52	56	60 m.	70 m.	80 m.
N.								AZI	MUT						1		
40 42 44	2.4 2.5 2.1	4.4	1 6.6	8.8		14·1 13·1 12·3	16.4 15.3 14.3	18·7 17·4 16·3	20·9 19·4 18·2	21.2 20.2	25·2 23·5 22·1	27·2 25·5 23·9	29·2 27·4 25·8		31.1	35.6	39·8 37·7
46 50 55 60	1·9 1·7 1·5 1·4	3.	5 5.2	6.0	8·6 7·7	11·5 10·3 9·2 8·3	13.4 12.0 10.7 9.7	15·3 13·7 12·2 11·1	17·2 15·4 13·7 12·4	19.0 17.1 15.2 13.8	20·8 18·7 16·7 15·2	22.6 20.3 18.2 16.5	24·3 22·0 19·7 17·9	21.1	25.1	29·I	35.9 32.8 29.6 27.1
S. 10 12 14	2·2 2·0 1·9	4.	0 6.0	8.0	10.0	12·8 12·0 11·2	14·8 13·1	16·8 15·8 14·9	18·8 17·6 16·6	20.7 19.5 18.4	22·5 21·2 20·1	24.4 23.0 21.7	26·1 24·7 23·4	26.3	28.0	31.8	37·1 35·3 33·7
16 20 25	1·8 1·6 1·5	3.	2 4.1	8 6.5	8·ó	10·6 9·6 8·7	12·4 11·2 10·1		15.8	17·4 15·8 14·3	19·1 17·3 15·7	20·7 18·8 17·0	22·2 20·3 18·4	21.7	23.1	26.6	
30 40 50 60	1·3 1·2 1·0	2.	3 3.	4.6	5.8	7·9 6·9 6·3 5·9	9·2 8·0 7·3 6·9	8.4	11·8 10·3 9·4 8·9	13·1 11·4 10·4 9·9	14·4 12·6 11·5 10·8	15·6 13·7 12·5 11·8	16·9 14·8 13·4 12·8	15.0	17.0	19.7	25·3 22·4 20·6 19·6

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. ** ALDEBARAN.

Lat.		m. 57		m. 58	I	m. 59		m. 60		m. 61		m. 62		m. 63	_	m. 64		m. 65		m. 66		n. 37	m. 68		69		m. 70
N.]	RED	U	CTI	_												
41 42 43 44 45		31.1	2 2	0.0 51.6 43.6 36.2	2 2 2	57·2 49·0 41·3	3 2 2	2.9	3 2	17·9 8·7 0·1 51·9 44·2	3 2	24·1 14·6 5·7 57·3	3	30·3 20·6 11·5 2·8 54·6	3	17.2	3 3	23.I	3	30.0	3 3	35·0 25·4	3 41 3 31	2 3	5 4 3	7.2/3	15.8 4.2 53.3 43.0
46 47 48 49 50	2 2 2	11.6	2 2	16·1	2 2 2	20·6	2 2	25·2 18·8 12·7	2 2	29·9 23·3 17·0	2 2 2	34.7 27.9 21.4	2 2	39.5 32.5 25.8 19.5	2 2	44.4 37.2 30.3	2 2	49.4 41.9 34.9	2 2	46·8 39·5	2 2 2	59·4 51·6 44·2	3 4 2 56 2 48	·6 3	5:	9·8 3 1·5 3	58.5
51 52 53 54 55	1	40·4 36·0	I	48.6	I	52·3 47·4 42·6	I I I	50°9 46°0	I I I	5°3 59°8 54°6 49°5 44°7	I	3°7 58°3 53°1	2 2 I	13·4 7·6 2·0 56·5 51·5	2 2 2	5·8 0·3	2 2	9·6 4·0	2 2 2	19.6	2 2 2	23·7 17·5	2 27 2 21 2 15	·5 2	2	2·1 2 5·5 2 9·2 2	43.4 36.4 29.6 23.1 16.8
56 57 58 59 60	I I I	23·7 19·9 16·3	I I	26·6 22·7 18·9	I	29·5 25·5 21·6	I I	28·4 24·3	I I I	35·6 31·3 27·1	I I	38·7 34·2 29·9	I I	32.8	I I	45·0 40·3 35·7	I I I	48·2 43·4 38·7	I I I	46.5	I I	49·7	I 58 I 52 I 47	·9 I	50	1.6 2 5.1 1	50.8 50.4 54.0 48.8
S. 20 21 22 23 24	2 2 2	31·9 27·7 23·8	2 2	37·1 32·8 28·7	2 2	42·3 37·9 33·7	2 2	47·7 43·1 38·8	2 2	43.9	2 2 2	53·8 49·2	3 2	9.4 4.2 59.3 54.5 49.9	3	9·8 4·8 59·9	3 3	15.6	3 3 3	21·4 16·1 10·9	3 3 3	27.3	3 33 3 27 3 22	·63	33	9·3 3 3·5 3 7·9 3	51.6 45.3 39.4 33.7 28.1
25 26 27 28 29	2 2 2 2 2	12.7	2 2	17.2	2 2	21·9 18·2 14·6	2 2	26·6 22·8 19·1	2 2 2	23.7	2 2 2	36·2 28·3	2 2	45.5 41.2 37.0 33.0 29.1	2 2 2	46·2 41·9 37·8	2 2	51·2 46·9 42·6	2 2 2	51·9 47·5	3 2 2	1·6 56·9 52·4	3 6 3 2 2 57	·8 3 ·1 3	I	2·2 3 7·3 3 2·5 3	
30 31 32 33 34	I I	50.7	2 I I		2 2 I	4·6 1·5 58·4	2 2 2	12·1 8·8 5·6 2·4 59·3	2 2	0.7	2	17.3	2	T8-2	2,	26.1	2	30.6	2	35.2	2	39.8	2 44	4 2	49	0.2	58·4 53·9 49·6 45·4 41·3
35 36 37 38 39	I I I	42.6 40.0 37.5	I I	46·1 43·5 40·9	I I	49.7 47.0 44.3	I I I	50·6 47·8	I I		2 1 1	58·0	2 2 I	8·0 4·8 1·7 58·7 55·7	2 2 2	8·8 5·5 2·4	2 2	9.4	2 2	16.8 13.3	2 2 2	20·8 17·3 13·9	2 25 2 21 2 17	·0 2 ·4 2 ·8 2	20	0·2 2 5·5 2 1·8 2	37·3 33·4 29·6 25·9 22·2
40 41 42 43 44	I I I	30·2 27·9 25·7	I I	33·4 31·0 28·7	I	36·6 34·1	I I	39·8 37·3 34·8	I I I	43·1 40·5 37·9	I I	46·5 43·8 41·1	I I I	52·8 49·9 47·1 44·4 41·7	I I	53·4 50·5 47·7	I I	56·9 53·9	2 1 1	54.4	2 2 I	4·1 0·9 57·8	2 7 2 4 2 I	·7 2	1 1 2		8.4
45 46 47 48 49	I I	19·1 17·0 15·0	I I I	19·7 17·6	I I	24·7 22·5 20·2	I I I	27·6 25·2 23·0	I I I	30·5 28·1 25·7	I I	33.4 31.0 28.5	I I I	33.9	I I I	39·5 36·8 34·3	I I I	42·6 39·9 37·2	I I	45.7 42.9 40.2	I I	48·9 46·0 43·2	I 52 I 49 I 46	·I I	55 54	5·4 I	58.7
50 51 52 53 54	I I I I		I I	11.3	I I	13·8 11·7 9·7	I I I	16·3 14·1 12·0	I I	18·8 16·6 14·4	I I	21·4 19·1 16·8	I I	24.0	[[[26·7 24·2 21·8	I I I	29·4 26·9 24·4	I I	32·I 29·5 27·0	I I	34·9 32·2 29·6	1 37 1 35 1 32	·7 I	33	0.6 7.7 1.9	46·4 43·5 40·6 37·7 34·8
55 56 57 58 59 60	0 0	1·3 59·4 57·6 55·7 53·9 52·1	I 0 0	57·7 55·8	I 0 0	57.7	I I O	5·8 3·7 1·7 59·7	I I I	8.0 5.8 3.8 1.7 59.6	I I I	10.5	I I I	10.7	I I I	14.7 12.4 10.1 7.9	I I I	17·1 14·7 12·3 10·0	III	19.4 17.0 14.5 12.1	I I I	21·8 19·3 16·8 14·3	I 24 I 21 I I9 I I6	·3 1	2 2 2	6·7 4·0 1·4 8·8	29·2 26·5 23·7 21·0 18·3

REDUCTION TO THE MERIDIAN FOR HOUR-ANGLES FROM UPPER MERIDIAN. $\stackrel{\cdot}{\mathcal{H}}$ ALTAIR.

Lat.	m. 2	m. 4	m.	m.	m. 10	m. 12	m. 14	m. 16	m. 18	m. 20	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26
N.							RED	UCTI	ONS.							
34 36 38 40	0·2 0·2 0·2 0·2	1.0 0.9 0.8 0.7	2·2 2·0 1·8 1·7	4.0 3.6 3.3 3.0	6·2 5·7 5·2 4·7	9.0 8.3 7.5 6.8	12·2 11·2 9·3	15·9 14·6 13·3 12·1	20·1 18·4 16·8 15·3	24·8 22·6 20·7 19·0	27·4 24·9 22·8 20·9	30·1 27·4 25·0 22·9	32·8 29·9 27·3 25·1	35·7 32·5 29·7 27·3	38·7 35·3 32·2 29·6	41.8 38.1 34.8 32.0
42 44 46 48	0·2 0·2 0·1 0·1	0·7 0·6 0·6 0·5	1·6 1·4 1·3 1·2	2·8 2·6 2·3 2·2	4.4 4.0 3.7 3.4	6·3 5·8 5·3 4·9	8·5 7·8 7·2 6·7	11·1 10·3 9·4 8·7	14·1 13·0 11·9	17·4 16·0 14·8 13·6	19·2 17·7 16·3 15·0	21·1 19·4 17·9 16·5	23.0 21.2 19.5 18.0	25.0 23.1 21.2 19.6	27·2 25·0 23·0 21·2	29·4 27·0 24·9 23·0
50 52 54 56 60	0.1 0.1 0.1 0.1 0.1	0·5 0·4 0·4 0·4 0·3	1·1 1·0 0·9 0·7	2.0 1.8 1.7 1.6 1.3	3·1 2·9 2·7 2·5 2·1	4.5 4.2 3.8 3.5 3.0	6·1 5·7 5·2 4·8 4·0	8·0 7·4 6·8 6·3 5·3	9°4 8°6 7°9 6°7	12·5 11·6 10·7 9·8 8·3	13.8 12.8 11.8 10.8 9.1	15·2 14·0 12·9 11·9	16·6 15·3 14·1 13·0	18·1 16·7 15·3 14·1 11·9	19.6 18.1 16.6 15.3	21·2 19·5 18·0 16·6 14·0
\$. 20 22 24 26 28 30	0·2 0·2 0·2 0·2 0·2	1.0 0.9 0.9 0.8 0.7 0.7	2·2 2·1 1·9 1·8 1·7	4·0 3·7 3·5 3·2 3·0 2·8	6·3 5·9 5·5 5·1 4·8 4·5	9·1 8·4 7·8 7·8 6·4	12·3 11·4 10·7 9·9 9·3 8·7	16·1 14·9 13·9 13·0 12·2 11·4	20·4 18·9 17·6 16·5 15·4 14·5	25·2 23·4 21·8 20·3 19·0 17·9	27.8 25.8 24.0 22.4 21.0 19.7	30·5 28·3 26·3 24·6 23·0 21·6	33·3 30·9 28·8 26·9 25·2 23·6	36·2 33·6 31·3 29·2 27·4 25·7	39·3 36·4 33·9 31·7 29·7 27·9	42.4 39.3 36.7 34.3 32.1 30.1
32 34 36 40 50 60	0·2 0·1 0·1 0·1 0·1 0·1	0·7 0·6 0·6 0·5 0·4	1·5 1·4 1·3 1·2 0·9 0·6	2·7 2·5 2·4 2·1 1·5	4·2 3·9 3·7 3·3 2·4 1·7	6·0 5·7 5·3 4·7 3·5 2·5	8·2 7·7 7·3 6·4 4·8 3·4	10·7 10·1 9·5 8·4 6·2 4·4	13.6 12.8 12.0 10.7 7.9 5.6	16.8 15.8 14.8 13.2 9.7 6.9	18·5 17·4 16·4 14·5 10·7 7·6	20·3 19·1 18·0 15·9 11·8 8·4	22·2 20·8 19·6 17·4 12·8 9·2	24·1 22·7 21·4 18·9 14·0 10·0	26·2 24·6 23·2 20·6 15·2 10·8	28·3 26·6 25·1 22·2 16·4 11·7
Lat.	m. 27	m. 28	m. 29	m. 30	m. 31	m. 32	m. 33	m. 34	m. 35	m. 36	m. 37	m. 38	m. 39	m.	m. 41	m. 42
N.		20	20	- 00	. 01	- 0.0			IONS			, 00				
36 37 38 39 40	41.0 39.2 37.5 35.9 34.4	44·I 42·I 40·3 38·6 37·0	47·2 45·2 43·2 41·4 39·7	50·5 48·3 46·2 44·2 42·4	53.9 51.5 49.3 47.2 45.2	57·3 54·8 52·5 50·3 48·2	60·9 58·3 55·8 53·4 51·2	64.6 61.8 59.1 56.6 54.3	68·4 65·4 62·6 59·9 57·5	72·2 69·1 66·2 63·4 60·7	76·2 72·9 69·8 66·9 64·1	80·3 76·8 73·5 70·5 67·6	84·5 80·8 77·4 74·1 71·1	88.7 84.9 81.3 77.9 74.7	93·1 89·1 85·3 81·8 78·4	97.6 93.4 89.4 85.7 82.2
41 42 43 44 46	33.0 31.6 30.3 29.1 26.8	35.5 34.0 32.6 31.3 28.8	38·0 36·4 35·0 33·6 30·9	40.6 39.0 37.4 35.9 33.1	43.4 41.6 39.9 38.3 35.3	46·2 44·3 42·5 40·8 37·6	49·I 47·I 45·2 43·4 40·0	52·0 49·9 47·9 46·0 42·4	55·1 52·9 50·7 48·7 44·9	58·2 55·9 53·6 51·5 47·5	61·5 59·0 56·6 54·4 50·1	64.8 62.2 59.7 57.3 52.8	68·2 65·4 62·8 60·3 55·6	71.7 68.8 66.0 63.4 58.5	75·2 72·2 69·3 66·5 61·4	78·9 75·7 72·7 69·9 64·4
48 50 52 54 56	24·8 22·8 21·1 19·4 17·9	26·6 24·6 22·6 20·9 19·2	28·5 26·3 24·3 22·4 20·6	30·5 28·2 26·0 23·9 22·0	32·6 30·1 27·7 25·6 23·5	34·7 32·0 29·5 27·2 25·1	36·9 34·0 31·4 28·9 26·6	39·1 36·1 30·7 28·3	41.4 38.2 35.3 32.5 29.9	43·8 40·4 37·3 34·4 31·7	46·3 42·7 39·4 36·3 33·4	48.8 45.0 41.5 38.3 35.3	51.3 47.4 43.7 40.3 37.1	54.0 49.8 46.0 42.4 39.0	56·7 52·3 48·3 44·5 41·0	59.4 54.9 50.6 46.7 43.0
S. 24 25 26 27 28	39·5 38·2 36·9 35·7 34·6	42·5 41·0 39·7 38·4 37·2	45.5 44.0 42.6 41.2 39.9	48·7 47·1 45·5 44·0 42·6	52.0 50.2 48.6 47.0 45.5	55.3 53.5 51.7 50.0 48.5	58.8 56.8 55.0 53.2 51.5	62·3 60·2 58·3 56·4 54·6	66.0 63.8 61.7 59.7 57.8	69·7 67·4 65·2 63·1 61·1	73.6 71.1 68.8 66.6 64.5	77.6 75.0 72.6 70.2 68.0	81.6 78.9 76.4 73.9 71.6	85.8 82.9 80.2 77.7 75.2	90·0 87·0 84·2 81·6 79·0	94·3 91·2 88·3 85·5 82·8
30 32 34 36 38	32·5 30·5 28·7 27·0 25·4	34·9 32·8 30·8 29·0 27·3	37.4 35.2 33.1 31.1 29.3	40·0 37·6 35·4 33·3 31·4	42·7 40·1 37·8 35·5 33·5	45.5 42.7 40.2 37.9 35.7	48·3 45·4 42·7 40·2 37·9	51·3 48·2 45·4 42·7 40·2	54·3 51·0 48·0 45·2 42·6	57.4 54.0 50.8 47.8 45.1	60·6 57·0 53·6 50·5 47·6	63.9 60.1 56.5 53.2 50.2	67·3 63·2 59·5 56·0 52·8	70·7 66·5 62·6 58·9 55·5	74·2 69·8 65·7 61·9 58·3	77·8 73·2 68·9 64·9 61·2
40 42 44 46 48	24·0 22·6 21·3 20·0 18·8	25·8 24·3 22·9 21·5 20·2	27.6 26.0 24.5 23.1 21.7	29.6 27.8 26.2 24.7 23.2	31·5 29·7 28·0 26·4 24·8	33·6 31·7 29·8 28·1 26·4	35.7 33.7 31.7 29.9 28.1	37·9 35·7 33·6 31·7 29·8	40·2 37·8 35·6 33·6 31·6	42.5 40.0 37.7 35.5 33.4	44.8 42.3 39.8 37.5 35.3	47·3 44·6 42·0 39·5 37·2	49·8 46·9 44·2 41·6 39·2	52·3 49·3 46·5 43·8 41·2	55.0 51.8 48.8 46.0 43.3	57.6 54.3 51.2 48.2 45.4
50 52 54 56	17·7 16·6 15·6 14·6	19·0 17·9 16·7	20·4 19·2 17·9 16·8	21·8 20·5 19·2 18·0	23·3 21·9 20·5 19·2	24·8 23·3 21·8 20·4	26·4 24·8 23·2 21·7	28·0 26·3 24·7 23·1	29·7 27·9 26·1 24·4	31.4 29.5 27.6 25.8	33·2 31·1 29·2 27·3	35.0 32.8 30.8 28.8	36·8 34·6 32·4 30·3	38·7 36·4 34·1 31·9	40·7 38·2 35·8 33·5	42.7 40.1 37.2 35.1

* ALTAIR.

Lat.	m. 43		m.	m. 45	m. 46	1 m		m. 48	m. 49	m. 50	m. 51	m. 52	5 m		m. 54	m. 55	m. 56
N.								REDI	JCTI	ONS.				-			
36 37 38 39 40	I 37 I 33 I 29	2.1 1 7.8 1 3.6 1 3.8 1	37.9	1 46·8 1 42·3 1 38·1	i 56. i 51. i 46. i 42. i 38.	4 I 56 8 I 51 4 I 46	·7 I		5·9 2 0·7 2 55·7	2 0.3	2 16·0 2 10·4 2 5·1	2 21 2 15 2 9	·4 2 2	6·4 2 0·4 2 4·7 2	38·4 31·8 25·5 29·6 14·0 2	44.0 37.2 30.8 24.7 18.8	42·7 36·1 29·8
41 42 43 44 45	I 10	.1 I	19.6	1 26·6 1 23·2 1 10·0	1 23	4 I 34 8 I 36 4 I 27	·3 I	42·4 I 38·3 I 34·4 I 30·7 I 27·I I	38·3 1 34·4 1	1 46·4 1 42·2 1 38·2	0 50·6 1 46·2 1 42·1	I 54 I 50 I 46	·9 I 5	4.2 I	54.11	3.1 2	7·4 2·5
46 47 48 49 50	I 4 I 2 O 59	7.4 I 1.8 I 2.3 I 3.8 I		1 10·9 1 8·1 1 5·4	1 11.	0 I I7 I I I4 3 I II	·2 I ·2 I	23.7 I 20.5 I 17.3 I 14.3 I 11.4 I	23·8 1 20·5 1 17·4 1	27.2	1 30·6 1 27·1 1 23·7	I 34 I 30 I 27	·II 3 ·5 I 3 ·0 I 3	7.7 I 3.9 I	41.3 I 37.4 I	45.0 I	48·8 44·6 40·6
51 52 53 54 55	0 53 0 51 0 48	·0 0	51.2	58·1 55·8 53·5	0 58 0 55	6 I 3	·8 I ·8 I ·8 I ·8 I	3.3 I	8·7 1 6·0 1 3·4 1 0·8 1	5.9	1 14·3 1 11·4 1 8·6	I 17 I 14 I II	2 I I 2 I I	0·2 I 7·0 I 4·0 I	26·5 I 23·2 I 19·9 I 16·7 I 13·7 I	26·2 1 22·8 1 19·6 1	29·3 25·8 22·4
56 57 58 59 60	0 43 0 41 0 39	·4 0 ·7 0	45·2 0 43·4 0 41·6 0	47·3 45·4 43·5	0 47	4 0 51 4 0 49 4 0 47	·6 0 ·4 0 ·4 0	56.0 0 53.8 0 51.5 0 49.4 0 47.3 0	56.0 c	58·3 55·9 53·5	1 0.6 0 58.1 0 55.7	I 3 I 0 0 57	0 I 04 I 09 I	5·4 I 2·7 I 0·I I	10·7 I 7·8 I 5·1 I 2·3 I 59·7 I	13·3 10·3 7·5 4·6 1·9	12·9 9·9 7·0
\$. 28 29 30 31 32	I 24 I 21 I IQ	·1 I	27·9 1 25·3 1 22·7 1	31·9 29·1 26·4	I 33.	9 I 40 0 I 37 2 I 34	. I I I	47.6 I 44.3 I 41.1 I 38.1 I 35.1 I	48·6 1 45·3 1 42·1 1	52·9 49·5 46·2	I 57·4 I 53·8 I 50·4	2 I I 58 I 54	·92 ·22 ·7 I 5	6·5 2 2·7 2 9·0 2	15·3 2 11·2 2 7·3 2 3·5 2 59·8 2		20.8
34 36 38 40 42	I 4	·0 I	11.1	14·3 10·1	1 9.	6 I 21 2 I I6 0 I I2	·0 I	29.6 I 24.4 I 19.6 I 15.1 I 10.8 I	27·9 1 22·9 1	26·3 26·3	1 35·1 1 29·7 1 24·6	I 38 I 33 I 27	·8 I 4	2·6 I 6·7 I I·3 I	46.4 I	50·3 I	54·3 47·8 41·7
44 46 48 50 52	0 50 0 47 0 44	·50 ·60	49.8	55·3 52·0 48·9	0 57	8 I 6 4 0 56 I 0 53	3 0		5.5 1 1.6 1 57.9 1	1 4.1	1 10·8 1 6·7 1 2·7	I I3 I 9 I 5	.9 1 1	6.4 I	24·2 I 19·3 I 14·7 I 10·2 I 6·0 I	22·2 I 17·4 I 12·8 I	25.2
			TR	UE	BEA	RIN	G C	R AZ	ZIMU	TH (OF -	← AI	LTAI	R.			
Lat.	m. 4	8.	m. 12	16	m. 20	m. 24	m. 28		36	1 m. 40	m. 44	m. 48	m. 52	56	60 m.	m. 70	80
N.		1		1				1	MUT			,			,		1
34 36 38 40	2·3 2·2 2·0 1·9	4.6 4.3 4.0 3.8	6.9 6.4 6.0 5.7	9·2 8·6 8·0 7·6	11·4 10·7 10·0 9·4		13.0	15.9	20·2 18·9 17·8 16·8	22·3 20·9 19·7 18·6	24·3 22·8 21·5 20·3	26·3 24·7 23·3 22·1	28·2 26·6 25·1 23·8	30·2 28·4 26·9 25·5	30.2		40.6 38.6 36.7 35.1
45 50 60	1.2	3·3 3·0 2·5	5.0 4.5 3.8	6·7 6·0 5·1	8·3 7·5 6·3	10.0 8.9 7.6	10·2 8·8	111.9	14·8 13·4 11·3	16·4 14·8 12·6	18·0 16·3 13·8	19·6 17·7 15·1	21·2 19·1 16·3	22·7 20·5 17·6	22.0	28·0 25·4 21·9	31·6 28·8 24·9
S. 20 22 24 26	2·1 1·9 1·8 1·7	4·I 3·9 3·5	6·2 5·8 5·5 5·2	8·2 7·7 7·3 6·9	10·2 9·6 9·1 8·6	12·2 11·5 10·9 10·3	14.2	15.2	18·0 17·0 16·1 15·4	19·9 18·8 17·8	21·7 20·6 19·5 18·6	23.2 22.3 21.2 20.2	25·3 24·0 22·8 21·8	27·0 25·6 24·4 23·3	27.2	32·7 31·1 29·7 28·5	36·4 34·7 33·3 31·9
30 35 40 50 60	1.6 1.4 1.3 1.2 1.1	3.2 2.9 2.6 2.3 2.1	4.7 4.3 3.9 3.5 3.5	6·3 5·7 5·3 4·6 4·2	7·9 7·1 6·6 5·8 5·3	9·4 8·6 7·9 6·9 6·4	11.0 10.0 9.2 8.1 7.4	11.4	14.0 12.8 11.8 10.4 9.5	15·5 14·1 13·0 11·5 10·6	17.0 15.5 14.3 12.6 11.6	18·5 16·9 15·6 13·8 12·7	20·0 18·2 16·8 14·9 13·7	21.4 19.5 18.1 16.0 14.8	17.2	26·3 24·1 22·4 20·0 18·4	29.6 27.3 25.4 22.7 21.0

TABLE XV.
REDUCTION TO THE MERIDIAN FOR HOUR-ANGLES FROM UPPER MERIDIAN.

+ α ANDROMEDÆ.

Lat	.	m.	m.	m.		m.	m. 12	m. 14	m. 16	m. 18	m. 20	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26
N.								RE	DUC	ΓΙΟΝ	S.						
53 54 55 56		0°2	0·7 0·6 0·6 0·6	1·3 1·4 1·3	2.4	, 1·2 3·9 3·7 3·5	6.0 5.7 5.3 5.0	8·2 7·7 7·3 6·8	10·7 10·1 9·5 8·9	13·5 12·7 12·0 11·3	16·7 15·7 14·8 13·9	18·4 17·3 16·3 15·3	20·1 19·0 17·9 16·8	22.0 20.7 19.5 18.4	23·9 22·5 21·2	25·9 24·4 23·0 21·7	
57 58 59 60		0.1	0·5 0·5 0·4	I·2 I·1 I·0 I·0	2.0	3·3 3·1 2·9 2·8	4.7 4.2 4.0	6·4 6·1 5·7 5·4	8·4 7·9 7·5 7·1	10.6 10.0 9.5 8.9	13·1 12·4 11·7 11·0	14·5 13·6 12·9 12·1	15·9 15·0 14·1 13·3	17·3 16·3 15·4 14·5	18·9 17·8 16·8 15·8	20·5 19·3 18·2 17·2	22·1 20·9 19·7
\$. 0 2 4 6 8		0·2 0·2 0·2	0·9 0·8 0·8 0·8	2·I 2·0 I·9 I·8	3.6 3.4 3.2	6·0 5·6 5·3 5·0 4·8	8·6 8·1 7·6 7·2 6·9	11.7 11.0 10.4 9.8 9.3	15·2 14·4 13·5 12·8 12·2	19·3 18·2 17·1 16·2 15·4	23·8 22·4 21·1 20·0 19·0	26·2 24·7 23·3 22·0 20·9	28·8 27·1 25·5 24·2 22·9	31·4 29·5 27·9 26·4 25·1	34·2 32·1 30·3 28·7 27·3	32.3	37·7 35·6 33·7
10 12 15 20 25		0·2 0·2 0·1	0·7 0·7 0·6 0·6 0·5	1.6 1.6 1.4 1.3	2.8	4·5 4·3 4·0 3·6 3·6	6·5 6·2 5·8 5·2 4·6	8·9 8·4 7·9 7·0 6·3	11.6 11.0 10.3 9.2 8.3	14·6 13·9 11·6 10·4	18·0 17·2 16·0 14·3 12·9	19·9 18·9 17·6 15·8 14·2	21·8 20·8 19·4 17·3 15·6	23·8 22·7 21·2 19·0 17·0	25·9 24·7 23·0 20·6 18·6	25.0	29·0 27·0 24·2
30 35 40 45 50 55		0.I 0.I 0.I	0·5 0·4 0·4 0·3 0·3	0.9 0.8 0.8 0.7 0.6	1.7 1.3 1.3	2·9 2·6 2·4 2·1 1·9	4·2 3·8 3·4 3·0 2·7 2·4	5.7 5.1 4.6 4.1 3.7 3.2	7:4 6:7 6:0 5:4 4:8 4:2	9°4 8°5 7°6 6°8 6°1 5°4	11.6 10.5 9.4 8.4 7.5 6.6	12.8 11.6 10.4 9.3 8.3 7.3	14·1 12·7 11·4 10·2 9·1 8·0	15.4 13.9 12.5 11.2 9.9 8.8	16·7 15·1 13·6 12·2 10·8	16·4 14·7 13·2	17·7 15·9 14·3 12·7
_	m. ·	1 m.	m.	(m.	(m.	m	. (m	. m	m.	m.	m. 4	m.	, m.		a. (m.	m.
Lat.	27	28	29		31	32		3 34		36	37	38	39		0	41	42
N. 53 54 55 56	30·2 28·5 26·8 25·3	30.6	30	8 35· 9 33	0 37·4 0 35·2	39 37	5 39	9 47 3 44 9 42	7 50·5 9 47·5 3 44·8	53·3 50·2 47·3	56·3 53·0	0 59·3 0 55·8 0 52·6 0 49·7	0 55	4 0	5.5 I 1.7 I 58.2 I	8·8 4·8 1·1	° 1 12·1 1 7·9 1 4·1 1 0·5
57 58 59 60	23·8 22·5 21·2	24.2	25.	9 27.	7 29·6 I 27·9	3I 29	5 33 7 31	·5 35 ·6 33	5 37.6	42·I 39·7 37·5 35·4	44.5 42.0 39.6 37.4	0 44.2	0 46	5 0 2	8.9 0	48.5	0 57·1 0 53·9 0 50·8 0 48·0
8. 0 1 2 3 4	43·1 41·8 40·6 39·4 38·3	43.6	48.	2 51· 7 50· 4 48·	5 54.9 0 53.3 6 51.8	56 55	5 62 8 60 2 58	·0 67 ·1 65 ·3 64 ·6 62 ·0 60	9 69·7 0 67·7 2 65·8	71.6 69.6	80·1 77·7 75·5 73·4 71·4	1 19.6	I 26. I 23. I 21.	2 I 3 7 I 2 4 I 2	80·5 I 8·0 I 5·5 I	32.3	1 42.6 1 39.6 1 36.8 1 34.1 1 31.5
5 6 8 10 12	37·3 36·3 34·5 32·8 31·2	39·0 37·0 35·3	39.	8 44· 7 42· 8 40·	7 47 2 5 45 3 4 43 3	7 50 48	·8 54 ·3 51 ·9 48	0 57 3 54 8 51	3 60.6	60·9 58·0	69·5 67·7 64·3 61·2 58·3	I 11.3 I 7.7 I 4.5	1 11	3 1 1		22·8 18·7 14·9	1 29·1 1 26·8 1 22·5 1 18·5 1 14·9
14 16 18 20 22	29.8 28.5 27.2 26.1 25.0	30.6		8 35. 4 33. 1 32.	I 37:	39 38 36	9 42 2 40 6 38	·4 45 ·6 43 ·9 41	49.9 0 47.7 1 45.6 3 43.7 5 41.9	50.4 48.3 46.2	53·2 51·0 48·8	o 58.7 o 56.1 o 53.7 o 51.5 o 49.3	0 59 0 56 0 54	6 0 5	5.0 I 2.1 I 9.5 I 7.0 0 4.6 0	2·4 59·8	I II·5 I 8·4 I 5·5 I 2·7 I 0·I
24 26 28 30 32	24.0 23.0 21.2 20.3	24.7	25.	5 28· 4 27· 4 26·	6 31.6 4 30.3 2 29.6 1 27.9 0 26.7	32 30 29	2 34 9 32 7 31	3 36 9 34 6 33	9 37.0	39·I 37·5	41·3	0 47.3 0 45.4 0 43.5 0 41.8 0 40.1	0 47	8 0 5	8·2 0 6·3 0	52·8 50·6 48·6	0 5/·7 0 55·3 0 53·1 0 51·0 0 49·0
36 40 44 48 52 56	18·7 17·2 15·7 14·4 13·0	16.5	18.	8 21. 6 17. 6 16.	1 24.6 2 22.6 4 20.7 7 18.6 1 17.2 5 15.5	24 22 20 18	1 25 1 23 2 21 3 19	6 27 5 24 4 22 5 20	2 28·8 9 26·4 8 24·1	30·5 27·9 25·5 23·2	32·2 26·9 24·5	o 36.9 o 34.0 o 31.1 o 28.4 o 25.8 o 23.2	0 35° 0 32° 0 29° 0 27°	8 0 3 9 0 3 2 0 2	7.6 0 4.5 0 1.5 0 8.6 0	39·5 36·2 30·0	0 45·I 0 41·4 0 38·0 0 34·7 0 31·5 0 28·4

 \star a ANDROMEDÆ.

Lat.	m. 43	m. 44			m. 46	m. 47	m. 48	1 m		m. 50	m. 51	m. 52	53	54		m. 55	m. 56
N.			1				RE	1	CTIO	NS.			,			,	
53 54 55 56	1 15·5 1 11·1 1 7·1 1 3·3	1 10	·4 I	13.3 1	26·0 1 21·1 1 16·5 1 12·3 1	24·6 19·8	I 28	2 1 2	6.61	41·1 1 35·4 1 30·0 1 25·0 1	33.6 30.1	I 42.	9 I 46 2 I 40	·8 1 50 ·8 1 44 ·2 1 38	1.2 1	1.5 2 54.7 1 48.3 1 42.3 1	52.1
57 58 59 60 8.	0 53.3	0 59 0 55	.70	5·3 I 1·7 I 58·2 I 55·0 0	4.4 I 0.8 I	3.4	1 10 1 6	·oli i	2.9 1	20·3 I 15·8 I 11·6 I 7·6 I	18.8	I 17.	9 I 25 3 I 20	*9 I 33 *0 I 28 *3 I 23 *8 I I8	8·1 I 3·2 I	31·3 I	34·6 29·4
0 1 2 3 4	I 44.3 I 41.3	I 49 I 45 I 43	.0 I	57·3 2 53·9 I 50·7 I 47·6 I 44·7 I	55.2 I	57.1	2 9 2 5	·0 2 1 ·4 2 1 ·0 2	4.3 2	23·7 2 19·6 2 15·7 2 12·0 2 8·5 2	25·0 21·0	2 20· 2 26· 2 22·	5 2 36 4 2 31 4 2 27	7 2 40 2 2 41 8 2 3 7 2 3 8 2 2	1·8 2 7·4 2 3·1 2	47.6 2 43.0 2 38.6 2	53.5 48.7 44.2
5 6 7 8 10	I 28.6	I 35 I 32 I 30	·11 :	42.0 I 39.3 I 36.8 I 34.4 I 29.9 I	43.7 I 41.1 I 38.6 I	48·I 45·4 42·8		·7 I 5 ·8 I 5 ·I I 5	4·3 I	5°2 2 2°0 2 58°9 2 56°0 2 50°5 I	6·8 3·6 0·6	2 11.	6 2 16 4 2 13 2 2 10	1 2 2 1 6 2 2 1 1 1 1 0 2 1 1 9 2	1·6 2 8·1 2 4·8 2	26·7 2 23·1 2	31·9 28·2 24·6
12 14 16 18 20	1 14.9	1 18 1 15 1 11	4 I 0 I 8 I	25·8 I 22·0 I 18·4 I 15·0 I	25.6 I 21.9 I 18.4 I	29·3 25·4 21·8	I 33	·I I 3 ·O I 3 ·2 I 2	6·9 I 2·7 I 8·8 I	36.4 I	44.8 40.3 36.0	I 48.	2 I 48 8 I 43	0 1 5 0 1 5 0 1 5 0 1 4	2·2 I 7·4 I	1·5 2 56·3 2 51·4 I	0°5 55°4
22 24 26 28 30 32	1 3.0 1 0.4 0 58.0 0 55.7 0 53.4 0 51.3	I 3 I 0 0 58 0 55	·91 ·71 ·31 ·90	6·1 I 3·5 I 0·9 I	3.6 I	15·1 12·1 9·2 6·4 3·7 1·2	1 15 1 12 1 9 1 6	1 1 1	8·3 I	18·2 I 15·0 I 12·I I	24.7 21.3 18.0	1 28· 1 24· 1 21· 1 17·	0 I 3I 5 I 27 I I 24 9 I 20	1 3 3 4 1 3 3 4 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	4·8 I I·0 I 7·4 I 3·9 I	38·3 I 34·4 I 30·6 I 27·0 I	41.8 37.8 33.9 30.2
34 36 38 40 42 44	0 49·2 0 47·2 0 45·3 0 43·4 0 41·6	0 51 0 49 0 47 0 45 0 43	·5 0 3 ·4 0 4 ·5 0 4	53.90	56·3 0 54·0 0 51·8 0 49·7 0 47·6 0	56·4 54·1 51·8 49·7	0 58 0 56 0 54 0 51	4 0 5 1 0 5 8 0 5	3·8 I I·2 I 8·7 I 6·3 0	6.4 I 3.7 I 1.1 I 58.6 I 56.2 0 53.8 0	6·3 3·6 1·0 58·4	1 0. 1 0. 1 0.	8 1 14 9 1 11 1 1 8 4 1 5 7 1 3	3.6 I I 3.8 I I	7·3 I 4·2 I	20·2 I	23·1 19·8 16·5 13·4 10·3
46 48 50 52 54 56	0 38·1 0 36·4 0 34·7 0 33·0	0 39 0 38 0 36 0 34 0 32	90 4 10 3 60 3	41·70 39·80 38·00 36·10	43.5 0 41.6 0 39.7 0 37.8 0 35.9 0	45°4 43°4 41°4 39°4 37°4	0 47 0 45 0 43 0 41 0 39	4 0 4 3 0 4 2 0 4 1 0 4	9.4 0 7.2 0 5.0 0 2.8 0	51·4 0 49·1 0 46·8 0 44·6 0 42·3 0 40·1 0	53.5 51.1 48.7 46.4 44.0	0 55° 0 53° 0 50° 0 48°	6 0 57 1 0 55 6 0 52 2 0 50 8 0 47	7·7 0 5 5·1 0 5 2·6 0 5 0·0 0 5 7·5 0 4 5·1 0 4	9·9 I 7·2 0 4·5 0 1·9 0 9·3 0	2·1 1 59·3 1 56·6 0 53·9 0 51·2 0	4°4 1°5 58°6 55°8 53°0
		TR	UE	BEA	RIN	G OI	R AZ	ZIMU	JTH	OF	Χ α	ANI	ROM	IEDA	E.		
Lat.	m.	m. 8	m. 12	m. 16	m. 20	m. 24	m. 28	m. 32	m. 36	1 m.	m. 44	m. 48	m. 52	m. 56	m. 60	m. 70	m. 80
N.							A	ZIM	UTH	S.							
60 58 56 54 53 0	1.7 1.8 1.9 2.0 2.1 1.8	3.4 3.6 3.8 4.1 4.2 3.6	5·1 5·4 5·7 6·1 6·4 5·5	6·7 7·1 7·6 8·2 8·5 7·3	8·4 8·9 9·5 10·2 10·6 9·1	10·1 10·7 11·4 12·2 12·6 10·8	11·7 12·4 13·3 14·2 14·7 12·6	13·4 14·2 15·1 16·2 16·8 14·3	15·0 15·9 17·0 18·1 18·8 16·0	17·7 18·8 20·1		19·9 21·1 22·4 23·9 24·7 20·8	21·5 22·7 24·1 25·7 26·6 22·4	23·1 24·4 25·9 27·5 28·5 23·9	24·7 26·1 27·6 29·3 30·3 25·4	28·5 30·1 31·8 33·7 34·8 28·8	32·3 34·0 35·9 37·9 39·0 32·1
\$. 2 4 6 10	1·7 1·6 1·5 1·4	3.4 3.2 3.1 2.8	5·2 4·9 4·6 4·2	6·8 6·5 6·1 5·6	8·5 8·1 7·7 7·0	10·2 9·7 9·2 8·4	11·2 10·7 9·7	13·5 12·8 12·1 11·1	15·1 14·3 13·6 12·4	15.8	17.3	19·7 18·7 17·9 16·4	20.2	21.6 20.6 18.9	24·I 22·9 21·9 20·I	26.2	30·6 29·3 28·1 26·0
15 20 25 30	1.3 1.1 1.1	2·5 2·3 2·2 2·1	3·8 3·3 3·3	5·I 4·7 4·4 4·1	6·3 5·8 5·4 5·1	7·6 7·0 6·5 6·1	8·8 8·1 7·6 7·2	9·3 8·7 8·2	11.3 10.4 9.7 9.2	12·5 10·8 10·2	11.8	14·9 13·8 12·9 12·2	16·1 14·9 13·9	15.0	18·4 17·0 16·0 15·2	21·2 19·7 18·5 17·6	23·9 22·3 21·0 19·9
35 40 50 60	0.0 0.0 1.0	2.0 1.9 1.8 1.8	2·9 2·8 2·7 2·6	3.9 3.8 3.6 3.5	4·9 4·7 4·5 4·4	5·9 5·6 5·4 5·3	6.8 6.3 6.3	7·8 7·5 7·1 7·0	8·8 8·5 8·0 7·9	9·7 9·4 8·9 8·8	10·7 10·3 9·8 9·6	11·2 10·7	12.1	13·6 13·1 12·5 12·3	14·5 14·0 13·1	15.6	19·1 18·5 17·7 17·5

TABLE XV.

REDUCTION TO THE MERIDIAN FOR HOUR-ANGLES FROM UPPER MERIDIAN.

* ANTARES.

Lat.	m. 2	1 m.	6 m.	8 m.	10 m.	12 m.	14 m.	16	m. 18	20 m.	m. 21	m. 22	23	m. 24	m. 25	m. 26
N.							RED	UCT	IONS	•						
0 2 4 6 8	0·2 0·2 0·2 0·2	1.0 1.0 0.9 0.8 0.8.	2·3 2·2 2·1 1·9 1·8	4·2 3·9 3·7 3·5 3·3	6.6 6.2 5.8 5.5 5.5	9·5 8·9 8·4 7·9 7·4	13.0 12.1 11.4 10.7 10.1	16.9 15.8 14.8 14.0 13.2	21·4 20·0 18·8 17·7 16·7	26·4 24·6 23·1 21·8 20·6	29.0 27.1 25.5 24.0 22.7	31.8 29.8 27.9 26.3 24.9	34·8 32·5 30·5 28·7 27·2	37·8 35·3 33·2 29·5	41.0 38.3 36.0 33.9 32.0	44.2 41.4 38.9 36.6 34.6
10 12 14 16 18	0.5 0.5 0.1 0.1	0·8 0·7 0·7 0·6 0·6	1.7 1.6 1.6 1.5 1.4	3·I 2·9 2·8 2·7 2·5	4.9 4.6 4.4 4.2 4.0	7.0 6.6 6.3 6.0 5.7	9.6 8.9 8.6 8.2 7.8	12·5 11·8 11·2 10·7 10·2	15.8 15.0 14.2 13.6 12.9	19·5 18·5 17·6 16·8 16·0	21·5 20·4 19·4 18·5 17·6	23.6 22.4 21.3 20.2 19.3	25·7 24·4 23·2 22·1 21·1	28·0 26·6 25·3 24·1 22·9	30·3 28·8 27·4 26·1 24·9	32·8 31·1 29·6 28·2 26·9
20 22 24 26 30	0.1 0.1 0.1 0.1 0.1	0.6 0.6 0.5 0.5	1.3 1.3 1.3 1.1	2.4 2.3 2.2 2.1 1.9	3.8 3.6 3.5 3.3 3.1	5.5 5.2 5.0 4.8 4.4	7.5 7.1 6.8 6.5 6.0	9·7 9·3 8·9 8·5 7·8	12·3 11·8 10·8 9·9	15·3 14·6 13·9 13·3 12·2	16·8 16·1 15·4 14·7 13·5	18·4 17·6 16·8 16·1 14·8	20·1 19·2 18·4 17·6 16·1	21·9 20·9 20·0 19·2 17·6	23·8 22·7 21·7 20·8 19·1	25.7 24.5 23.5 22.5 20.6
35 40 45 50 55 60	0.0 0.1 0.1 0.1 0.1 0.1	0°4 0°4 0°3 0°3 0°3	1.0 0.9 0.8 0.7 0.6 0.5	1.8 1.4 1.2 1.1	2:7 2:5 2:2 1:9 1:5	3.9 3.5 3.1 2.8 2.4 2.1	5·4 4·8 4·3 3·8 3·3 2·9	7.0 6.3 5.6 5.0 4.3 3.8	8·9 8·0 7·1 6·3 5·5 4·8	9.8 8.8 7.8 6.8 5.9	12·1 10·8 9·6 8·6 7·5 6·5	13·3 11·9 10·6 9·4 8·2 7·1	14·5 13·0 11·6 10·3 9·0 7·8	15·8 14·1 12·6 11·2 9·8 8·5	17·1 15·3 13·7 12·1 10·6 9·2	18·5 16·6 14·8 13·1 11·5 9·9
Tot	m. _[m.	m.	m.	m.	m.	(m.	ı m.	m.	m.	m.	m,	m.	m.	m.	1 m.
Lat.	27	28	29	30	31	32	DEL	UCT	1 35	36	37	38	39	40	41	42
0 1 2 3 4	47.6 46.0 44.6 43.2 41.9	51·2 49·5 47·9 46·4 45·0	54·8 53·0 51·3 49·7 48·2	58.6 56.7 54.9 53.2 51.6	62·5 60·4 58·5 56·7 55·0	66·5 64·3 62·3 60·4 58·6	70.6 68.3 66.2 64.1 62.2	74.9 72.5 70.2 68.0 66.0	79°2 76°7 74°3 72°0 69°8	83.7 81.0 78.5 76.1 73.8	88.3 85.5 82.8 80.2 77.9	93.0 90.0 87.2 84.5 82.0	97.8 94.7 91.7 88.9 86.3	102·8 99·5 96·4 93·5 90·7	104·4 101·1	100.4
5 6 7 8 9	40.6 39.5 38.3 37.3 36.3	43.7 42.4 41.2 40.1 39.0	46·8 45·4 44·2 43·0 41·8	50·0 48·6 47·2 45·9 44·7	53.4 51.8 50.4 49.0 47.7	56·8 55·2 53·7 52·2 50·8	60·4 58·7 57·0 55·5 54·0	64.0 62.2 60.5 58.8 57.3	67·8 65·9 64·0 62·3 60·6	71.6 69.6 67.7 65.8 64.1	75·6 73·5 71·4 69·5 67·6	79.7 77.4 75.3 73.2 71.3	83·8 81·4 79·2 77·1 75·0	88·1 85·6 83·2 81·0 78·9	92.4 89.8 87.4 85.0 82.8	96·9 94·2 91·6 89·1 86·8
10 11 12 13 14	35·3 34·4 33·6 32·7 31·9	38·0 37·0 36·1 35·1 34·3	40·7 39·7 38·7 37·7 36·8	43·5 42·4 41·3 40·3 39·3	46·5 45·3 44·1 43·0 42·0	49.5 48.2 47.0 45.8 44.7	52.6 51.2 49.9 48.7 47.5	55·8 54·3 53·0 51·7 50·4	59.0 57.5 56.1 54.7 53.4	62·4 60·8 59·3 57·8 56·4	65·9 64·2 62·6 61·1 59·6	69·4 67·7 66·0 64·4 62·8	73·1 71·2 69·4 67·8 66·1	76·8 74·9 73·0 71·2 69·5	80.6 78.6 76.6 74.8 73.0	84.6 82.4 80.4 78.4 76.5
16 18 20 22 24	30·4 29·0 27·7 26·5 25·3	32·7 31·2 29·8 28·4 27·2	35.0 33.4 31.9 30.5 29.2	37·5 35·7 34·1 32·6 31·2	38·1 36·4 34·8 33·3	42.6 40.6 38.8 37.1 35.5	45·3 43·2 41·3 39·4 37·7	48·0 45·8 43·8 41·8 40·0	50·9 48·5 46·4 44·3 42·4	53.8 51.3 49.0 46.9 44.8	56·8 54·2 51·8 49·5 47·3	59.9 57.1 54.6 52.2 49.9	63.0 60.1 57.5 54.9 52.6	66·3 63·2 60·4 57·8 55·3	69·6 66·4 63·4 60·7 58·0	72·9 69·6 66·5 63·6 60·9
26 28 30 32 34 36	24·2 23·2 22·2 21·3 20·4 19·5	26·0 24·9 23·9 22·9 21·0	27:9 26:7 25:6 24:5 23:5 22:5	29·9 28·6 27·4 26·2 25·1 24·1	31·9 30·5 29·2 28·0 26·8 25·7	34.0 32.5 31.1 29.8 28.6 27.4	36·1 34·6 33·1 31·7 30·4 29·1	38·3 36·7 35·1 33·7 32·2 30·9	40.6 38.9 37.2 35.7 34.2 32.7	42.9 41.1 39.4 37.7 36.1 34.6		47.8 45.8 43.8 42.0 40.2 38.5	50·3 48·2 46·2 44·2 42·4 40·6	52·9 50·7 48·5 46·5 44·6 42·7	55.6 53.2 51.0 48.8 46.8 44.8	58·3 55·8 53·5 51·2 49·1 47·0
38 40 42 44 46 48	18·7 17·9 17·1 16·3 15·6 14·8	20·1 19·2 18·4 17·5 16·7 16·0	21.5 20.6 19.7 18.8 17.9 17.1	23.0 22.0 21.1 20.1 19.2 18.3	24.6 23.5 22.5 21.5 20.5 19.6	26·2 25·1 24·0 22·9 21·8 20·8	27·8 26·6 25·5 24·3 23·2 22·1	29.5 28.3 27.0 25.8 24.7 23.5	31·3 30·0 28·6 27·4 26·1 24·9	33·1 31·7 30·3 29·0 27·6 26·3	35.0 33.5 32.0 30.6 29.2 27.8	36·9 35·3 33·7 32·2 30·8 29·4	38·8 37·2 35·5 34·0 32·4 30·9	40·9 39·1 37·4 35·7 34·1 32·5	42.9 41.1 39.3 37.5 35.8 34.2	45.0 43.1 41.2 39.4 37.6 35.8
50 52 54 56 58 60	14·1 13·4 12·7 12·0 11·4 10·7	15·2 14·4 13·7 12·9 12·2 11·5	16·3 15·5 14·7 13·9 13·1 12·3	17.4 16.6 15.7 14.9 14.0 13.2	18·6 17·7 16·8 15·9 15·0 14·1	19.8 18.8 17.9 16.9 16.0 15.0	21·1 20·0 19·0 18·0 17·0 16·0	22.4 21.3 20.2 19.1 18.0 17.0	23.7 22.5 21.4 20.2 19.1 18.0	25·1 23·8 22·6 21·4 20·2 19·0	26·5 25·2 23·9 22·6 21·3 20·1	27·9 26·6 25·2 23·8 22·5 21·2	29.4 28.0 26.5 25.1 23.7 22.3	31·0 29·4 27·9 26·4 24·9 23·5	32·5 30·9 29·3 27·8 26·2 24·6	34·1 32·4 30·8 29·1 27·5 25·8

* ANTARES.

Lat.	m. 43		m.	m. 45	m. 46	47		n.	m. 49	m. 50	m. 51	m. 52	n 5		m. 54	m. 55	m. 56
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5 6 7 8 9	I 38 I 35 I 33	·6 I ·9 I	43·1 40·3 1 37·6	47.7 44.8 42.0	1 55.6 1 52.4 1 49.4 1 46.5 1 43.7	I 5	1.01	2·I 2 58·8 2 55·7 2	10·7 2 7·1 2 3·7 2 0·4 2 57·3 2	8·6 5·2	2 17·3 2 13·7 2 10·2	2 22 2 18 2 15	·6 2 2 2 ·8 2 2 ·1 2 2	7·9 2 4·0 2 0·2 2	37.6 2 33.4 2 29.3 2 25.4 2 21.7 2	34.7 2	44.2 40.1 36.0
10 11 12 13 14	I 26 I 24 I 22	·3 I ·2 I ·1 I	30·3 I 28·1 I 25·9 I	34.4 32.0 29.8	1 38.2 1 36.1	I 4:	2·7 I 2·2 I 7·8 I	47·1 I 44·4 I 41·9 I	54·3 I 51·5 I 48·7 I 46·I I 43·6 I	55.9 53.1 50.4	2 0·5 1 57·6 1 54·7	2 5 2 2 1 59	·2 2 ·1 2 ·2 2		18·1 2 14·7 2 11·4 2 8·3 2 5·2 2	16.5 5	24.5
15 16 17 18 20	1 16 1 14 1 12	·6 I	20.0 I 18.1 I 16.3 I	23·6 21·6 19·8	I 23.3 I 25.2 I 23.3	I 3 I 2	1.0 I 6.0 I	34·9 I 32·7 I 30·6 I	41·1 38·8 36·5 34·3 30·2	42.8 40.4 38.2	1 46·9 1 44·4 1 42·1	I 51 I 48 I 46	·5 I 5	5.2 I 2.6 I 0.1 I	2·3 59·5 56·8 2 54·2 49·2		8·3 5·4 2·6
22 24 26 28 30	1 3 1 1 0 58		9.8 1 6.8 1 3.9 1 1.2 1 58.6 1	9·8 6·8 4·0	1 12.9 1 9.8 1 6.9	I I	5.0 I 2.8 I	19·3 I 15·9 I 12·7 I	26·3 I 22·6 I 19·1 I 15·8 I 12·6 I	25.9 22.3 18.9	1 29·4 1 25·6 1 22·0	I 32 I 28 I 25	·8 I 3	6·4 I 2·3 I 8·5 I	44.5 I 40.0 I 35.8 I 31.8 I 28.0 I	43.7 1 39.3 1 35.2 1	47.4 42.9 38.6
32 34 36 38 40	0 51 0 49 0 47	·4 0 ·3 0 ·2 0	53.8 0 51.6 0 49.4 0	23.0	o 58·8 o 56·3 o 53·9	0 5 0 5	8·8 I		9.6 I 3.9 I 1.1 I 58.5 I	9·4 6·5 3·6	1 6·2	I 15 I II I 8	·0 I I	7·8 I 4·6 I I·4 I	24·3 I 20·8 I 17·4 I 14·1 I	23.8 I 20.3 I 16.9 I	26·8 23·2 19·7
42 44 46 48 50	0 41 0 39 0 37	·3 0 ·4 0 ·5 0	43·2 0 41·2 0 39·3 0	45.5 43.1 41.1	0 47.2	0 4 0 4 0 4	9·2 0 7·0 0 4·8 0	51·3 0 49·0 0 46·7 0	56.0 0 53.5 0 51.1 0 48.7 0 46.4 0	55.7 53.2 50.7	57.9 55.3 52.7	0 57 0 54		6.90	7.9 I 4.9 I 59.1 I 56.3 O	10·4 I 7·3 I 4·2 I 1·3 I 58·3 I	9·7 6·6 3·5
52 54 56 58 60	0 32 0 30 0 28	·2 0 ·5 0 ·8 0	33·7 0 31·9 0 30·1 0	35°3 33°4 31°5	o 36·9 o 34·9 o 32·9	0 30 0 30 0 34	3·5 0 5·4 0 1·4 0	40·1 0 38·0 0 35·9 0	37.40	43.5 41.2 38.9	45.3 42.9 40.5	0 47 0 44 0 42	·1 0 4 ·5 0 4 ·0 0 4	8·9 0 6·3 0 3·7 0	53.5 0 50.7 0 48.0 0 45.3 0 42.7 0	52.6 0 49.8 0 47.0 0	54.5 51.6 48.7
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10 12 14 16	1·5 1·4 1·4 1·3	3.0 2.9 2.8 2.7	4.2 4.3 4.5	6·0 5·8 5·5 5·3	7·5 7·2 6·9 6·6	9·0 8·6 8·3 8·0	9.3 10.0 10.2	11.0 11.4 11.0	12.8	14·8 14·2 13·6 13·1	16·2 15·5 14·9 14·4	17·6 16·9 16·2 15·6	19.0 18.2 17.5 16.9	20·3 19·5 18·1	20.8	24·8 23·8 23·0 22·2	27·8 26·8 25·9 25·0
18 20 22 26	1·3 1·2 1·3	2.6 2.5 2.4 2.3	3·8 3·7 3·6 3·4	5·1 5·0 4·8 4·5	6·4 6·2 6·0 5·6	7·7 7·4 7·2 6·8	8·9 8·6 8·4 7 · 9	9.0	11.0	12.6 12.2 11.9 11.2	13·9 13·4 13·0 12·3	15·1 14·6 14·2 13·4	16·3 15·3 14·5	17·5 16·4 15·6	18.1	21·5 20·9 20·3 19·2	24·2 23·5 22·9 21·8
30 35 40 50 60	0.0 0.0 1.0 1.0	2·2 2·1 2·0 1·9 1·8	3·2 3·1 2·9 2·8 2·7	4·3 4·1 3·9 3·7 3·6	5.4 5.1 4.9 4.6 4.5	6·5 6·1 5·9 5·5 5·4	7·5 7·1 6·8 6·4 6·3	8·6 8·1 7·8 7·4 7·2	8·8 8·3	10·7 10·2 9·7 9·2 9·0	11.7 10.7 10.1 9.9	12.8 12.2 11.7 11.0 10.8	13·8 13·1 12·6 11·9 11·7	14·9 14·1 13·6 12·9	15.1	18·4 17·5 16·0 16·0	20·9 19·9 19·2 18·3 17·9

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. \qquad ARCTURUS.

Lat.	m. 2	m. 4	m. 6	m. 8	m. 10	m. 12	m. 14	m. 16	m. 18	m. 20	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26
N.							RED	UCT	ONS	•	,					
44 46 48 50 52	0·2 0·2 0·2 0·1 0·1	0.8 0.8 0.7 0.6 0.6	1.9 1.7 1.6 1.4 1.3	3.4 3.1 2.8 2.5 2.3	5.4 4.8 4.3 3.9 3.5	7.7 6.9 6.2 5.6 5 I	9.4 8.4 7.6 6.9	13·7 12·3 11·0 10·0 9·0	17·3 15·5 14·0 12·6 11·4	21·3 19·1 17·3 15·6 14·1	23·5 21·1 19·0 17·2 15·6	25·8 23·2 20·9 18·9 17·1	28·2 25·3 22·8 20·6 18·6	30·6 27·5 24·8 22·4 20·3	33·2 29·8 26·9 24·3 22·0	35.9 32.2 29.1 26.3 23.8
54 56 58 60 62	0.1 0.1 0.1 0.1	0·5 0·4 0·4 0·4 0·3	1·1 0·9 0·8 0·8	2.0 1.8 1.7 1.5 1.4	3·2 2·9 2·6 2·4 2·1	4·6 4·2 3·8 3·4 3·1	6·3 5·7 5·1 4·6 4·2	8·2 7·4 6·7 6·1 5·5	9°4 8°5 7°7 6°9	12·8 11·6 10·5 9·5 8·6	14·1 12·8 11·6 10·5 9·4	15·5 14·0 12·7 11·5 10·4	16·9 15·3 13·9 12·5 11·3	18·4 16·7 15·1 13·7 12·3	19·9 18·1 16·4 14·8	21.6 19.5 17.7 16.0 14.5
\$. 10 12 14 16 18	0·2 0·2 0·2 0·2 0·2	0.9 0.9 0.8 0.8	2·2 2·1 1·9 1·8 1·7	3.9 3.7 3.4 3.2 3.1	6·1 5·7 5·4 5·1 4·8	8·8 8·3 7·8 7·3 6·9	12·0 11·2 10·6 9·9 9·4	15·7 14·7 13·8 13·0 12·3	19·8 18·6 17·4 16·4 15·5	24·4 22·9 21·5 20·3 19·1	26·9 25·2 23·7 22·4 21·1	29·5 27·7 26·0 24·5 23·2	32·3 30·3 28·4 26·8 25·3	35·1 32·9 30·9 29·1	38·0 35·7 33·5 31·6 29·9	41·1 38·5 36·2 34·2 32·3
20 22 24 26 28	0·2 0·2 0·1 0·1	0·7 0·7 0·6 0·6 0·6	1.6 1.5 1.4 1.3	2·9 2·7 2·6 2·5 2·4	4.2 4.3 4.1 3.9 3.7	6·5 6·2 5·6 5·3	8·9 8·4 8·0 7·6 7·2	11.6 10.4 9.9 9.4	14·7 13·9 13·2 12·5 11·9	18·1 17·2 16·3 15·5 14·7	20·0 18·9 18·0 17·0 16·2	21·9 20·8 19·7 18·7 17·8	23.9 22.7 21.5 20.5 19.4	26·1 24·7 23·4 22·3 21·2	28·3 26·8 25·4 24·2 23·0	30·5 29·0 27·5 26·1 24·8
30 34 40 50 60	0.1 0.1 0.1 0.1	0.6 0.5 0.4 0.3 0.2	1.0 0.8 0.9	2·2 2·0 1·7 1·3 1·0	*3*5 3*2 2*7 2*1 1*6	5.0 4.6 3.9 3.0 2.2	6·9 6·2 5·4 4·1 3·1	9.0 8.1 7.0 5.4 4.0	11·3 8·9 6·8 5·1	14·0 12·7 10·9 8·4 6·3	15.4 14.0 9.3 6.9	16·9 15·3 13·2 10·2 7·6	18·5 16·7 14·5 11·2 8·3	20·1 18·2 15·7 12·2 9·0	21·8 19·8 17·1 13·2 9·8	23.6 21.4 18.5 14.3 10.6
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Lat.	m. 27	m. 28	m. 29	m. 30	m. 31	m. 32	m. 33	m. 34	m. 35	m. 36	m. 37	m. 38	m. 39	m. 40	m.	42
N.							REI	DUCI	CIONS	S.						
44 45 46 47 48	38·6 36·6 34·7 33·0 31·3	41.5 39.3 37.3 35.4 33.7	44.5 42.1 40.0 38.0 36.1	47.5 45.0 42.7 40.6 38.6	50.7 48.1 45.6 43.3 41.2	54.0 51.2 48.5 46.1 43.8	57·3 54·3 51·6 49·0 46·6	60.8 57.6 54.7 52.0 49.4	64·3 61·0 57·9 55·0 52·3	68.0 64.5 61.2 58.1 55.3	71.7 68.0 64.6 61.4 58.3	75·5 71·6 68·0 64·6 61·5	79.4 75.4 71.6 68.0 64.7	83·4 79·2 75·2 71·5 68·0	87·5 83·1 78·9 75·0 71·3	91.7 87.1 82.7 78.6 74.8
49 50 51 52 53	29·8 28·3 27·0 25·6 24·4	32.0 30.4 29.0 27.6 26.2	34·3 32·6 31·0 29·6 28·1	36·7 34·9 33·2 31·6 30·1	39·I 37·2 35·4 33·7 32·I	41.7 39.6 37.7 35.9 34.2	44.3 42.1 40.1 38.2 36.3	47.0 44.7 42.5 40.5 38.6	49·7 47·3 45·0 42·9 40·8	52.6 50.0 47.6 45.3 43.2	55.5 52.8 50.3 47.9 45.6	58·5 55·6 53·0 50·4 48·0	61.5 58.6 55.8 53.1 50.6	64·7 61·6 58·6 55·8 53·2	67.9 64.6 61.5 58.6 55.8	71·2 67·7 64·5 61·4 58·5
54 56 58 60 62	23·2 21·1 19·1 17·3 15·6	25.0 22.6 20.5 18.6 16.8	26·8 24·3 22·0 19·9 18·0	28·6 26·0 23·5 21·3 19·2	30·6 27·7 25·1 22·7 20·5	32.6 29.5 26.8 24.2 21.9	34.6 31.4 28.4 25.7 23.2	36·7 33·3 30·2 27·3 24·7	38·9 35·3 32·0 28·9 26·1	41·1 37·3 33·8 30·6 27·6	43.4 39.4 35.7 32.3 29.2	45·8 41·5 37·6 34·1 30·8	48·2 43·7 39·6 35·9 32·4	50·6 45·9 41·7 37·7 34·1	53·2 48·3 43·7 39·6 35·8	55.8 50.6 45.9 41.6 37.5
\$. 14 15 16 17 18	39·1 37·9 36·8 35·8 34·8	42.0 40.7 39.5 38.4 37.4	45.0 43.6 42.4 41.2 40.1	48·1 46·7 45·3 44·0 42·8	51·3 49·8 48·4 47·0 45·7	54·6 53·0 51·5 50·1 48·7	58·0 56·3 54·7 53·2 51·7	61·5 59·8 58·1 56·4 54·9	65·2 63·3 61·5 59·7 58·1	68·9 66·9 65·0 63·2 61·4	72·7 70·6 68·6 66·7 64·8	76·6 74·4 72·3 70·3 68·3	80·6 78·3 76·1 74·0 71·9	84·7 82·3 79·9 77·7 75·6	88·9 86·4 83·9 81·6 79·4	93·2 90·5 88·0 85·6 83·2
20 22 24 26 28	32·9 31·2 29·6 28·2 26·8	35.4 33.6 31.9 30.3 28.8	37·9 36·0 34·1 32·4 30·8	40·6 38·5 36·5 34·7 33·0	43·3 41·1 39·0 37·0 35·2	46·1 43·7 41·5 39·4 37·5	49.0 46.5 44.1 41.9 39.9	52·0 49·3 46·8 44·5 42·3	55.0 52.2 49.6 47.1 44.8	58·2 55·2 52·4 49·8 47·4	61·4 58·2 55·3 52·6 50·0	64·7 61·4 58·3 55·4 52·7	68·1 64·6 61·4 58·4 55·5	71.6 67.9 64.5 61.4 58.4	75·2 71·3 67·8 64·4 61·3	78·9 74·8 71·1 67·6 64·3
30 32 34 36 38	25·5 24·2 23·1 21·9 20·9	27.4 26.0 24.8 23.6 22.5	29·3 27·9 26·6 25·3 24·1	31·4 29·9 28·4 27·1 25·8	33.5 31.9 30.4 28.9 27.5	35.7 34.0 32.3 30.8 29.3	37.9 36.1 34.4 32.7 31.2	40·3 38·3 36·5 34·7 33·1	42.6 40.6 38.7 36.8 35.1	45·I 42·9 40·9 38·9 37·I	47·6 45·3 43·2 41·1 39·2	50·2 47·8 45·5 43·4 41·3	52·8 50·3 47·9 45·7 43·5	55·6 52·9 50·4 48·0 45·7	58·4 55·6 52·9 50·4 48·0	61·2 58·3 55·5 52·9 50·4
40 44 48 52	19·9 18·0 16·2 14·5	21·4 19·4 17·6	23.0 20.8 18.7 16.8	24·6 22·2 20·0 17·9	26·2 23·7 21·4 19·2	27·9 25·3 22·8 20·4	29·7 26·9 24·2 21·7	31·5 28·5 25·7 23·0	33.4 30.2 27.2 24.4	35·3 31·9 28·8 25·8	37·3 33·7 30·4 27·3	39·3 35·6 32·1 28·8	41.4 37.5 33.8 30.3	43.5 39.4 35.5 31.9	45.7 41.4 37.3 33.5	48·0 43·4 39·2 35·1

* ARCTURUS.

Lat	1 m.		m. 44	m. 45	m. 46		7	m. 48	m. 49	50		m. 51	55		n. 53	m. 54	m.	m. 56
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44 45 46 47 48	I 31 I 26 I 22 I 18	0.6 I 0.6 I 0.3 I	21.9	39·5 34·6 30·0 25·6	I 33.	9 I 4 7 I 4 9 I 3 3 I 3	4.0 8.3 2.9 7.9 3.1	1 52·8 1 47·2 1 42·0 1 37·0	I 57.3 I 51.6 I 46.1 I 41.0	2 I 5 I 5 I 4	8·4 2 2·0 2 6·0 2 0·4 1 5·0 1	2 6.7 2 0.5 1 54.7 1 49.1	2 I 2 I 1 5	3.3 1	16·4 2 9·8 2 3·5 2 57·6 2	1.92	26·5 19·3 12·6	24·2 24·3
49 50 51 52 53 54	I 10 I 7 I 4 I I	7.6 I 7.6 I 7.4 I 7.3 I	18.0 I 14.2 I 10.7 I 7.3 I 4.1 I 1.1 I	17·5 13·9 10·4 7·0	I 17. I 13. I 10.	0 I 2 I I 2 5 I I	4.4 0.4 6.6	28.0 23.8 19.8	1 31.6 1 27.2 1 23.1 1 19.2	I 3. I 30 I 20 I 2:	5·3 1 0·8 1 6·5 1 2·4 1	39.0 34.3 29.9 25.7	I 4 I 3 I 3 I 2	2·8 I 4 8·0 I 4 3·4 I 3	46·7 I 41·7 I 36·9 I 32·4 I	56·1 2 50·6 1 45·4 1 40·5 1 35·8 1 31·3 1	39.3 1	58·7 53·2 47·9 42·8
55 56 57 58 59 60	0 53 0 50 0 48 0 45	·00 ·50 ·10 ·70	58·2 I 55·5 0 52·8 0 50 3 0 47·9 0 45·6 0	58·0 55·2 52·6 50·0	0 57° 0 54° 0 52°	0 5 0 5 0 5	4.2	5.8	1 5·3 1 2·2 0 59·2	I I:	1.3 I 1.7 I 1.6 I	14·2 10·7 7·3 4·1	III	7.0 I 2	20·0 I 16·2 I 12·6 I	27.0 I 23.0 I 19.0 I 15.3 I 11.7 I 8.2 I	26·0 I 21·9 I 18·1 I	29·1 24·9 20·9 17·0
S. 14 15 16 17 18	I 34 I 32 I 29	·8 I	42·1 I 39·1 I 36·4 I 33·7 I 31·2 I	43·6 40·7 37·9	I 48. I 45. I 42.	I I 5 I I 4 2 I 4	2·8 1 9·6 1 6 6 1	0·9 57·5 54·2 51·1 48·1	2 2·3 1 58·9 1 55·7	2 3	7·2 2 3·7 2 0·3 2	8·5 5·0	2 I 2 I 2	7·3 2 2 3·5 2 1 9·9 2 1	22·4 2 18·5 2 14·8 2	31·9 2 27·7 2 23·0 2 19·7 2 16·0 2	33.0 2 28.8 2 24.8 2	38·4 34·1 29·9
19 20 21 22 24 26	I 22 I 20 I 18 I 14	·6 I ·4 I ·4 I	28·8 I 26·4 I 24·2 I 22·0 I 17·9 I 14·1 I	30·3 28·0 25·7 21·4	I 34.3 I 31.6 I 29.5 I 25.6	3 I 3 I 3 I 3 I 2	8·3 1 5·8 1 3·3 1	45.2 42.5 39.8 37.3 32.4 27.9	1 46·7 1 44·0 1 41·3 1 36·3	I 5: I 4: I 4: I 4:	1.0 I 8.2 I 5.4 I	55°4 52°4 49°6 44°1	I 5 I 5 I 4	6.8 2 3.8 I 8.2 I	52·3 I	9·0 2 5·7 2 2·5 2	13·7 2 10·3 2 7·0 2 0·7 2	18·5 15·0
28 30 32 34 36 38	1 4 1 1 0 58 0 55	·II ·II ·2 I ·4 0	10·5 I 7·1 I 3·9 I 0·9 I 58·0 I 55·2 0	10·2 6·8 3·7 0·7	1 3°:	3 I I 5 I 5 I	6·4 1 2·8 1	12.3	1 23.0 1 19.1 1 15.3 1 11.8	I 2: I 2: I I: I I:	6·4 1 2·3 1 8·4 1 4·7 1	29·8 25·6 21·5	I 3 I 2 I 2 I 2	3·3 I 3 8·9 I 3 4·7 I 3	36·9 I 32·3 I 28·0 I 23·8 I	45.5 I 40.5 I 35.8 I 31.3 I 27.0 I 22.9 I	39·3 1 34·6 1 30·2 1	48·0 42·9 38·1 33·4
40 42 44 46 48 50	0 47 0 45 0 43 0 41	·8 0 ·5 0 ·2 0 ·0 0	52.6 0 50.1 0 47.6 0 45.3 0 43.0 0 40.7 0	52·4 49·8 47·3 44·9	0 54° 0 52° 0 49° 0 46°	0 5 0 5 0 5 0 4	4·3 0	2.5 59.5 56.6 53.8 51.1 48.4	1 2.0 0 59.0 0 56.1 0 53.2	I I O 5	4·5 I I·4 I 8·4 I 5·4 C	3.9 0.7 57.6	I I O 5	9·8 I : 6·4 I 3·I I	12.4 I 8.9 I 5.5 I 2.2 I	18·9 I 15·2 I 11·5 I 8·0 I 4·5 I 1·2 I	17.91	20·8 16·8 13·0
			TR	UE	BEA	RIN	1G	OR A	ZIM	UTF	1 (OF -	← A	RCT	URU	s.		
Lat.	m. 4	m. 8	m. 12	m.	m. 20	m. 24	1 m.		36	40		m. 44	m. 48	m. 52	m. 56	60	m. 70	m. 80
N.								AZ	IMU'	rhs								
65 55 50 47 45	1.3 1.6 1.9 2.0	2.6 3.3 3.7 4.1 4.4	4.0 4.9 5.6 6.1 6.6	5·3 6·5 7·4 8·1 8·7	6.6 8.1 9.3 10.2 10.9	7·9 9·7 11·1 12·2 13·0	11.	3 12· 9 14· 2 16·	9 14· 7 16· 1 18·	16 18 20	·3	14·5 17·6 20·0 21·9 23·3	15.8 19.2 21.8 23.8 25.3	23.2	18·4 22·3 25·2 27·4 29·1	23·8 26·9 29·2	22.8 27.5 30.9 33.5 35.4	26.0 31.2 34.9 37.6 39.7
8. 6 8 10 12	2·2 2·0 1·9 1·8	4.4 4.1 3.8 3.6	6·5 6·1 5·7 5·4	8·7 8·1 7·6 7·2	10·8 10·1 9·5 8·9	12·9 12·0 11·3	14 13 12	0 15· 1 14· 4 14·	1 15.8 1 15.8	7 19 7 18 3 17	·5 ·4 ·4	22·7 21·3 20·1 19·1	24·5 23·1 21·8 20·7	22.2	28·0 26·4 25·0 23·7	28·0 26·5 25·2	33.5 31.8 30.2 28.8	37·1 35·3 33·6 32·2
14 16 20 25	1·7 1·6 1·5 1·3	3.4 3.0 2.7	5·I 4·8 4·4 4·0	6·8 6·4 5·9 5·4	8·5 8·0 7·4 6·7	9·6 8·8 8·0	10.	2 II· 3 IO·	7 14·3 7 13·3 6 11·9	15 14 13	·8 ·5 ·2	18·1 17·3 15·9 14·5	19·7 18·8 17·3 15·8	21·2 20·2 18·6 17·0	22.6 21.6 20.0 18.3	19.5	27.6 26.4 24.5 22.5	30·8 29·6 27·5 25·4
30 40 50 5 5	I·2 I·1 I·0 I·2	2·5 2·2 2·0 2·0	3.4 3.0 5.0 5.0	3.9 4.4 4.0 3.9	6·2 5·4 5·0 4·9	7·4 6·5 6·0 5·9	7	6 8.	7 9·8 5 9·6	3 IO	8	13·4 11·9 11·0 10·7	14·6 13·0 12·0 11·7	13.0	17·0 15·1 14·0 13·6		18·7 17·4 17·0	23·7 21·3 19·8 19·4

TABLE XV.

REDUCTION TO THE MERIDIAN FOR HOUR-ANGLES FROM UPPER MERIDIAN.

**\times \beta ARGUS.

Lat.	m. 4	m.	m.	m.	m.	m.	m. 24	m. 26	m. 28	m.	m.		m. 34	m. 36	m. 38	m			m. 44
N.			,				F	EDI	JCTI	ONS	• ,	_					,	,	
0 20 10 0	0.2 0.2 0.2	0.7 0.7 0.8	1.6 1.7 1.8	2.8 2.9 3.1	4.3 4.6 4.9	5·6 5·9	6.2 6.6 7.1	7:3 7:8 8:3	8·5 9·6	10.4	ļ II.	8	12·5 13·3 14·2	14.0 14.9 15.9	15.6 16.6 17.7	18.	4 20	3	20·9 22·3 23·7
\$. 10 20 24 28 32	0·2 0·2 0·2 0·2	0.8 0.0 0.0	1.9 2.0 2.1 2.2 2.3	3.4 3.6 3.8 3.9 4.1	5·3 5·7 5·9 6·1 6·4	6·4 6·9 7·1 7·4 7·8	7·6 8·2 8·5 8·8 9·2	8·9 9·6 10·4 10·8	10·3 11·6 12·0 12·5	11.8	15.	6 1 7	15·2 16·4 17·0 17·7 18·5	17.0 18.4 19.1 19.8 20.7	19·0 20·5 21·2 22·1 23·1	22· 23· 24·	7 25· 5 25· 5 27·	9	25·4 27·4 28·4 29·6 30·9
36 38 40 42	0·3 0·3 0·3	1·1 1·1 1·1 1·2	2·4 2·5 2·6 2·7	4·3 4·5 4·6 4·8	6·7 6·9 7·2 7·4	8·1 8·4 8·7 9·0	9.7 10.0 10.3 10.7	11.4 11.7 12.1 12.5	13·2 13·6 14·0 14·5		18.	7 3	19·4 20·0 20·6 21·3	21.8 22.4 23.1 23.9	24·3 25·0 25·7 26·6	27	6 30·	4	32·5 33·4 34·4 35·6
43 44 45 46	0·3 0·3 0·3	1·2 1·3 1·3	2·7 2·8 2·8 2·9	4·8 4·9 5·0 5·1	7·6 7·7 7·9 8·0	9·2 9·3 9·6 9·8	11.9 11.3 11.1	12·8 13·0 13·6	14·8 15·1 15·4 15·7	17:3	19	6	21·7 22·1 22·6 23·1	24·3 24·8 25·3 25·9	27·1 27·6 28·2 28·8	30	5 33	6	36·2 36·9 37·6 38·4
47 48 49 50	0·3 0·3 0·4	I·3 I·4 I·4	3.0 3.1 3.2	5·3 5·4 5·5 5·7	8·2 8·4 8·6 8·9	10.0 10.2 10.5 10.8	11.8 12.1 12.4 12.9	13·9 14·2 14·6 15·0	16·1 16·5 16·4	19:3	21.	4	23·6 24·2 24·8 25·5	26·4 27·1 27·8 28·5	30·9 30·1 30·1	33	3 36	7	39°3 40°2 41°2 42°3
Lat.	m.	m.	m.	m	m.	m.	m.	m. /	m1	m. [m.		m.	m.	ı n		m.	I	m.
'	46	48	50	52	54	56	58_	EDU	62 ICTI	0NS	66		68	70_	7	2	74	1	76
N. 0 16 12 8 4	23·4 24·0 24·6 25·3 25·9	25·5 26·1 26·8 27·5 28·2	27·7 28·4 29·1 29·8 30·6	29·9 30·7 31·4 32·2 33·1	32·2 33·9 34·7 35·7	34·7 35·5 36·4 37·4 38·3	37·2 38·1 39·1 40·1 41·1	1.1	42·4 43·5 44·6 45·7 46·9	45·2 46·3 47·5 48·7 50·0	48.0 49.2 50.5 51.8 53.1	0	51.0 52.2 53.6 54.9 56.3	55·3 56·7 58·2	0 5 I I	7·1 8·5 0·0 1·5 3·1	1.8 3.3 4.9	I	3.5 5.1 6.8 8.5 10.2
S. 2 4 6 8 10	26·3 26·6 27·0 27·4 27·7	28·6 29·0 29·4 29·8 30·2	31.0 31.4 31.8 32.3 32.7	33·5 34·4 34·9 35·4	37·1	38·8 39·9 40·4 41·0	41.6 42.2 42.7 43.3 43.9	44.5 45.1 45.7 46.4 47.0	47.5 48.2 48.8 49.5 50.2	50·6 51·3 52·0 52·7 53·4	53·8 54·5 55·2 56·0 56·8	0 0	57·1 57·8 58·6 59·4 0·2	I 1·3 I 2·1 I 2·9	I	3.9 1 4.8 1 5.6 1 6.5 1 7.4 1	8·3 9·2 10·1	I	11·1 12·0 13·0 14·0 15·0
12 14 16 18 20	28·1 28·6 29·0 29·5 30 0	30.6 31.1 31.6 32.1 32.6	33·2 33·7 34·2 34·8 35·4	35.9 36.4 37.0 37.6 38.2	38·7 39·3 39·9 40·5 41·2	43.5	44.6 45.2 45.9 46.7 47.5	47.7 48.4 49.1 49.9 50.7	50·9 51·6 52·4 53·3 54·1	54·2 55·0 55·8 56·7 57·6	57.6 58.4 59.3 60.2 61.2	I I I	1·1 2·0 2·9 3·9 4·9	I 5.6 I 6.6 I 7.6	I I I	8·4 1 9·4 1 0·4 1 1·5 1	13·2 14·3 15·5	I	16·0 17·2 18·3 19·5 20·8
22 24 26 28 30	30·5 31·1 32·3 33·0	33·2 33·8 34·4 35·1 35·9	36·0 36·6 37·3 38·1 38·9	38·9 39·6 40·4 41·2 42·0	41.9 42.7 43.5 44.3 45.3	45.0 45.9 46.7 47.6 48.6	48·3 49·2 50·1 51·1 52·1	51.6 52.6 53.5 54.6 55.7	55·1 56·1 57·1 58·3 59·4	58·6 59·7 60·8 62·0 63·3	62·3 63·4 64·6 65·9 67·2	I I I	6·0 7·2 8·5 9·8	1 11·2 1 12·5 1 13·9	III	3.9 1 5.2 1 6.6 1 8.1 1 9.8 1	19·4 20·8 22·4	I I I	22·2 23·6 25·2 26·8 28·6
32 34 35 36 37	33·7 34·6 35·0 35·5 35·9	36·7 37·6 38·1 38·6 39·1	39·8 40·7 41·3 41·8 42·4	45.2	47.4 48.0 48.6	49.7 50.9 51.6 52.3 53.0	54·6 55·3 56·0	59.9	62·2 63·0 63·8	64.7 66.2 67.1 67.9 68.8	70·4 71·2 72·1	I I	14·6 15·5 16·5	1 17·1 1 19·0 1 19·9 1 20·9 1 22·0	I 2	3·4 1 4·4 1 5·5 1	28·0 29·1 30·2	I I	35.0
38 39 40 41 42	36·4 37·6 37·6 38·2 38·8	39.7 40.2 40.9 41.5 42.2	43.0 43.6 44.3 45.0 45.8	47.8	50.7 51.5 52.4	53.7 54.5 55.3 56.2 57.2	57.5 58.4 59.3 60.2 61.2	61·5 62·4 63·4 64·4 65·4	65·6 66·5 67·5 68·6 69·8	69·8 70·8 71·9 73·0 74·2	75·2 76·3 77·5	I I I	20.9	1 23·1 1 24·3 1 25·6 1 26·9 1 28·3	I 2 I 3	9 I I 0 4 I 1 8 I	33·9 35·3 36·8	I I	38·9 40·4 41·0
43 44 45 46	39·5 40·3 41·1 41·9	43.0 43.8 44.7 45.6	46·6 47·5 48·4 49·4	50·3 51·3 53·3	55·2	59 ·3 60·4	62·3 63·5 64·7 66·0	66·6 67·8 69·1 70·5	71·0 72·2 73·6 75·1	75·5 76·8 78·3 79·9	83.1 81.9	I	26·4 28·I	1 29·8 1 31·4 1 33·1 1 35·0	I 3	6·5 I	41·8 43·7	I	47·2
47 48 49 50	42.9 43.9 45.0 46.2	46.6 47.7 48.9 50.2	50·5 51·7 52·9 54·3	57.2	60.0	63·0 64·4 66·0 67·7	67·4 69·0 70·7 72·5	75.4	76·8 78·5 80·4 82·5	81·6 83·5 85·5 87·7	88·6 90·7	I	33·8 36·0	1 37.0 1 39.2 1 41.5 1 44.0	I 4	7.1 1	50·3	I	56.0

REDUCTION TO THE MERIDIAN FOR HOUR-ANGLES FROM UPPER MERIDIAN. \times β ARGUS.

Lat.	7 7		m.	m. 78	m. 79	m. 80	m 81			m. 83	m. 84	m. 85	m. 86	m			m. 89	m. 90
N.									DUC						1	,	1	
16 14 12 10 8	I I	3·5 1 4·3 1 5·1 1 6·0 1 6·8 1	6.8	1 7·7 1 8·5	1 10.3 1 11.5	1 10.3 1 11.2 1 13.0 1 13.0	I I	3.0 I 3.9 I	14.8 I 15.7 I 16.6 I	16.6 I 17.5 I 18.5 I	19.4	1 20·3 1 21·3	I 23.	1 1 24 2 1 25 2 1 26	5·I I 2	5.0 I 7.0 I 8.1 I	30.11	32·I 29·9
6 4 2 0 S .	I	8.4 1	10.2	1 12·0	I 13.9	1 14·8 1 15·7 1 16·7 1 17·6	II	7·6 I 8·6 I	18·5 I 19·5 I 20·5 I 21·5 I	21.4 1	23.4	1 25·3 1 26·4	I 27	3 I 2	8·3 I 3 9·3 I 3 0·4 I 3 I·6 I 3	1.4 1	33.4 I	35·5 36·7
2 4 6 8	1 1 1 1	2·0 1 3·0 1 4·0 1	1 13·9 1 14·9 1 15·9	1 15·8 1 16·8 1 17·8	1 17·7 1 18·7	1 18.6 1 19.7 1 20.7 1 21.8 1 22.9	I 2 I 2 I 2	1.6 I 2.7 I 3.8 I	22.6 I 23.6 I 24.7 I 25.9 I 27.1 I	25.6 I 26.7 I 27.9 I	27·7 28·8 30·0	1 29.7 1 30.9 1 32.1	I 31 I 33 I 34	8 I 3 0 I 3 3 I 3	3·9 I 3 5·2 I 3 6·5 I 3	6·1 1 37·3 1 8·6 1	38·2 I 39·5 I 40·8 I	40.4 41.2 43.1
12 14 16 18 20	1 I 1 I 1 I	7·1 1 8·3 1 9·5 1	19·1 20·3 121·6	I 21·2 I 22·4 I 23·7	I 23·2 I 24·5 I 25·8	I 24·I I 25·3 I 26·6 I 27·9 I 29·4	I 2 I 2 I 3	7·4 I 8·7 I 0·I I	28·3 I 29·6 I 30·9 I 32·3 I 33·8 I	31·7 I	33·9 35·3 36·8	1 36·1 1 37·5 1 39·0	I 38 I 39 I 41	3 I 4 8 I 4 3 I 4	0.2 I 7	12·8 I 14·4 I 16·0 I	45.1 1 46.7 1 48.3 1	47·5 49·1 50·7
22 24 26 28 30	I 2 I 2 I 2	3·6 1 25·2 1 26·8 1	1 25·8 1 27·4 1 29·1	1 28·0 1 29·6 1 31·3	1 33.6 1 31.6	1 30·9 1 34·1 1 36·0 1 37·9	I 3 I 3 I 3	4·7 I 6·4 I 8·3 I		43.11 41.11	41.7 43.5 45.5	I 44.I I 46.0 I 48.0	I 46 I 48 I 50	·5 I 4 ·4 I 5 ·5 I 5	3.0 I 0.0 I	53·3 I 55·5 I	53·8 I	56·3 58·4 0·6
32 34 35 36 37 38	I 3 I 3 I 3	3.8 3.8 5.0	1 35 0 1 36·2 1 37·4 1 38·7	I 37.4 I 38.6 I 39.9 I 41.2	I 41.1 I 42.4 I 43.7	1 40.0 1 42.4 1 43.6 1 44.9 7 1 46.2	I 4 I 4 I 4 I 4	4·9 I 6·1 I 7·4 I 8·8 I	47.4 I 48.7 I 50.0 I 51.4 I	49.9 51.2 54.1	52·5 53·8 55·2 56·7	I 55.1 I 56.5 I 57.9 I 59.4	I 57 I 59 2 0 2 2	·7 2 ·1 2 ·6 2 ·2 2	7·7 2 0·4 2 1·8 2 3·3 2 4·9 2 6·6 2			8·5 10·1 11·6
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45 46 47 48 49 50	I 4 I 5 I 5 I 5	9·1	1 51·9 1 54·1 1 56·4 1 59·0	1 54.7 1 56.9 1 59.3 2 1.9 4.7	1 57.5 1 59.8 2 2.2 2 4.9 2 7.7	2 0·4 2 2·7 2 5·2	2 2 2 2 I 2 I	3·2 2 5·6 2 8·2 2 0·9 2 3·9 2		9·1 2 11 6 14·2 17·1 2	2 12·1 2 14·6 2 17·3 2 20·2 2 23·4	2 15·1 2 17·7 2 20·4 2 23·4	2 18 2 20 2 23 2 26 2 29	·I 2 2 ·7 2 2 ·5 2 2 ·6 2 2 ·8 2 3	1·2 2 3·8 2 6·7 2 9·8 2	24·3 2 27·0 2 29·9 2 33·0 2 36·4 2	27·4 30·2 33·1 36·3 39·8	2 30·5 2 33·4 2 36·4 2 39·6 2 43·1
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I 20 20	0 5 0 4	0.4 0.4 0.5 0.5	0.8 0.9 0.9	1·2 1·3 1·4 1·5	1.6 1.7 1.8 2.0	2·0 2·2 2·3 2·5	2·4 2·6 2·8 3·0	2·8 3·0 3·2 3·4	3·7 3·9	3·7 3·9 4·1 4·4	4·1 4·3 4·6 4·9	4.2 4.7 5.1 5.4	4.9 5.1 5.5 5.8	5·2 5·5 5·9	6·0 6·4 6·8 7·2	7.0 7.4 7.9 8.4	7·9 8·4 8·9 9·5	8·8 9·9 8·8
3:33	6 8	0·5 0·6 0·6 0·7	1·1 1·2 1·3 1·3	1.6 1.7 1.9 2.0	2·I 2·3 2·6 2·7	2·7 2·9 3·2 3·4	3·2 3·5 3·8 4·0	3·7 4·0 4·4 4·7	5·1 5·4	4·8 5·2 5·7 6·0	5·3 5·7 6·3 6·7	5·8 6·3 6·9 7·3	6·3 6·8 7·5 7·9	6·8 7·4 8·1 8·6	7·8 8·4 9·3 9·8	9.0 9.8 10.7 11.3	10·2 11·0 12·1 12·7	11·3 12·2 13·4 14·1
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4 5	9	I.1 I.0	2·I	3.0	4.0	5.0	6·0 6·3	7·0 7·3	8.0	8.9	9.8	10.8	11.2	12.0 13.1		15·7 16·4 17·1	18.3	20.1

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

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Lat.	m. [m. 8	m. 12	m. 16	m. 20	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	m. 36	m. 38	m. 40	m. 42	m. 44
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30 35 40	0·2 0·2 0·2 0·1	0·7 0·6 0·6 0·6	1·5 1·4 1·4 1·3	2·7 2·6 2·5 2·4	4·2 4·1 3·9 3·7	6·1 5·8 5·6 5·4	7·1 6·8 6·6 6·3	8·3 7·9 7·6 7·3	9·5 9·1 8·8 8·4	10.8 10.4 10.0 9.6	12·2 11·7 11·3 10·8	13·7 13·1 12·6 12·1	15·2 14·6 14·1 13·5	16·9 16·2 15·6 15·0	18·6 17·8 17·2 16·5	20·4 19·6 18·8 18·1
45 50 55 60	0.I 0.I 0.I 0.I	0·6 0·5 0·5 0·5	1·3 1·2 1·1	2·3 2·2 2·0 I·9	3·6 3·4 3·2 3·0	5·2 4·9 4·6 4·3	6·1 5·8 5·4 5·1	7·0 6·7 6·3 5·9	8·0 7·6 7·2 6·7	9·2 8·7 8·2 7·6	9·8 9·8 8·6	11.6 11.0 10.4 9.7	12·9 12·3 11·6 10·8	14·3 13·6 12·8 11·9	15.7 15.0 14.2 13.2	17·3 16·4 15·5 14·4
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44 46 48 50 52	18·3 17·9 17·6 17·2 16·8	19·1 18·7 18·4 18·0 17·6	19·9 19·6 19·2 18·8	20·8 20·4 20·0 19·6 19·1	21·7 21·2 20·8 20·4 19·9	23.4 22.5 22.1 21.7 21.2 20.8	24·3 23·5 23·0 22·6 22·1 21·6	24·4 23·9 23·4 22·9 22·4	25·3 24·8 24·4 23·8 23·3	26·3 25·8 25·3 24·7 24·2	27·3 26·8 26·2 25·7 25·1	28·3 27·7 27·2 26·6 26·0	29·3 28·7 28·2 27·6 27·0	30·3 29·7 29·2 28·5 27·9	31.4 30.8 30.2 29.5 28.9	32·4 31·8 31·2 30·5 29·9
54 56 58 60	16·4 16·0 15·6 15·1	17·2 16·7 16·3 15·8	17·9 17·4 17·0 16·5	18·7 18·2 17·7 17·2	19·5 19·0 18·4 17·9	20·3 19·7 19·2 18·6	21·1 20·5 20·0 19·4	21·9 21·3 20·8 20·2	22·8 22·2 21·6 20·9	23·6 23·0 22·4 21·7	24·5 23·9 23·2 22·5	25·4 24·8 24·1 23·4	26·3 25·7 24·9 24·2	27·2 26·6 25·8 25·1	28·2 27·5 26·7 25·9	29·2 28·4 27·6 26·8
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36 38 40 42 44	34·7 34·2 33·6 33·0 32·4	35.9 35.3 34.7 34.1 33.5	37.0 36.5 35.9 35.3 34.6	38·2 37·6 37·0 36·4 35·8	39.5 38.8 38.2 37.6 36.9	40.7 40.1 39.4 38.7 38.1	42.0 41.3 40.6 39.9 39.2	43.2 42.6 41.9 41.1 40.4	44.5 43.8 43.1 42.4 41.6	45·8 45·1 44·4 43·6 42·8	47·2 46·4 45·7 44·1	48·5 47·8 47·0 46·2 45·4	49.9 49.1 48.3 47.5 46.6	51·3 50·5 49·6 48·8 47·9	52.7 51.8 51.0 50.1 49.2	54·1 53·3 52·4 51·5 50·6
46 48 50 52 54	31.8 31.2 30.5 29.9	32·9 32·2 31·6 30·9 30·1	34.0 33.3 32.6 31.9 31.1	35·I 34·4 33·7 32·9 32·I	36·2 35·5 34·7 34·0 33·2	37·3 36·6 35·8 35·0 34·2	38·5 37·7 36·9 36·1 35·3	39.6 38.9 38.1 37.2 36.3	40·8 40·0 39·2 38·3 37·4	42.0 41.2 40.3 39.5 38.5	43°3 42°4 41°5 40°6 39°6	44.5 43.6 42.7 41.8 40.8	45·8 44·9 43·9 42·9 41·9	47.0 46.1 45.1 44.1 43.1	48·3 47·4 46·4 45·4 44·3	49.6 48.7 47.6 46.6 45.5
56 57 58 59 60	28·4 28·0 27·6 27·2 26·8	29·4 29·0 28·6 28·1 27·7	29·5 29·1 29·6	31·3 30·9 30·4 29·5	32·3 31·4 31·0 30·5	33·3 32·4 31·9 31·4	34.4 33.9 33.4 32.9 32.4	35.4 34.9 34.4 33.9 33.4	36·5 36·0 35·5 34·9 34·4	37·5 37·0 36·5 36·0 35·4	38·6 38·1 37·6 37·0 36·4	39.7 39.2 38.6 38.1 37.5	40·9 40·3 39·7 39·1 38·5	42.0 41.4 40.8 40.2 39.6	43·I 42·6 42·0 41·4 40·7	44·3 43·7 43·1 42·5 41·8
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24 30	0.4 0.4	0.7 0.7	1.1 1.1	1·4 1·4	1.8 1.8	2·I 2·I	2.6 2.7	3.2 3.6	4·4 4·4	5·2 5·3	6·1 6·2	6·9 7·0	7.8	8.6 8.7	9·4 9·5	10.4
40 50	0.4	0.4	1.3	1.5	1.0 2.0 2.2	2·4 2·6	3·0 3·2	3·7 4·0 4·3	4·6 5·0 5·4	5·6 6·0 6·5	6·5 7·0 7·5 8·0	7·4 8·0 8·6	8·3 9·0 9·6	9·2 10·0	11.0	10.9
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REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM MERIDIAN BELOW THE POLE.

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24 26 28 30 32	60·4 59·6 58·8 58·0 57·1	62.0 61.1 60.3 59.5 58.6	63.6 62.7 61.9 61.0 60.2	65·2 64·3 63·5 62·6 61·7	66.8 66.0 65.1 64.2 63.3	68·5 67·6 66·7 65·8 64·8	70·2 69·3 68·3 67·4 66·4	71.9 70.9 70.0 69.0 68.0	73.6 72.6 71.7 70.7 69.7	75·4 74·4 73·4 72·4 71·3	77·1 76·1 75·1 74·1 73·0	78·9 77·9 76·8 75·8 74·7	80·7 79·6 78·6 77·5 76·4	82·5 81·4 80·4 79·3 78·1	84·4 83·3 82·2 81·0 79·9	86·2 85·1 84·0 82·8 81·7
34 36 38 40 42	56·3 55·4 54·6 53·7 52·8	57·8 56·9 56·0 55·1 54·2	59 3 58·4 57·5 56·5 55·6	60·8 59·9 58·9 58·0 57·0	62·3 61·4 60·4 59·5 58·4	63·9 62·9 61·9 60·9 59·9	65·5 64·5 63·5 62·4 61·4	67·1 66·0 65·0 64·0 62·9	68·7 67·6 66·6 65·5 64·4	70·3 69·2 68·2 67·1 65·9	71·9 70·9 69·8 68·6 67·5	73.6 72.5 71.4 70.2 69.0	75·3 74·2 73·0 71·8 70·6	77.0 75.8 74.7 73.5 72.2	78·7 77·5 76·3 75·1 73·8	80·5 79·3 78·0 76·8 75·5
44 46 48 50 52	51.8 50.9 49.9 48.8 47.7	53·2 50·1 49·0	54.6 53.6 52.5 51.4 50.3	56·0 54·9 53·9 52·7 51·6	57.4 56.3 55.2 54.1 52.9	58·8 57·7 56·6 55·4 54·2	60·3 59·2 58·0 56·8 55·5	61.8 60.6 59.4 58.2 56.9	63·3 62·1 60·8 59·6 58·3	64.8 63.5 62.3 61.0 59.7	66·3 65·0 63·8 62·4 61·1	67·8 66·6 65·2 63·9 62·5	69·4 68·1 66·7 65·4 63·9	70·9 69·6 68·3 66·8 65·4	72·5 71·2 69·8 68·3 66·8	74·I 72·8 7I·3 69·9 68·3
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24 26 28 30 32 34	88·1 87·0 85·8 84·6 83·4	90·0 88·8 87·7 86·5 85·2 84·0	90·7 89·5 88·3 87·1 85·8	92·6 9 91·4 9 90·2 9 88·9 9 87·6 8	5.8 97 4.6 96 3.3 95 2.1 94 0.8 92 9.4 91 8.1 89	98·5 97·2 95·9 94·5 93·2	99.2 97.8 96.5	102·5 101·2 99·8 98·4 97·0	104.6 103.2 101.8 100.3	I 46 I 45 I 43 I 44 I 40	5.0 I 5.6 I 5.2 I 3.8 I 2.3 I	50·1 48·7 47·2 45·8 44·3 42·8	i 52. i 50. i 49. i 47. i 46.	8 I 3 I 3 I 3 I 3 I 3 I 3 I 3 I 3 I 3 I	54·3 I 52·9 I 51·4 I 49·9 I 48·3 I	56·5 55·0 53·5 51·9 50·4 48·8
36 38 40 42 43	81.0 79.7 78.4 77.1 76.5 75.8	82·7 81·5 80·1 78·8 78·1 77·4	83·2 8 81·9 8 80·5 8	85.0 8 83.6 8 82.2 8 81.5 8	8·1 89 6·7 88 5·3 87 3·9 85 3·2 84 2·4 84	·5 90·4 ·1 88·9 ·6 87·4 ·9 86·6	92·2 90·7 89·2 88·4	94·0 92·5 91·0	1	I 37 I 36 I 34 I 33	7.8 I 7.8 I 7.6 I 7.6 I	41·3 39·7 38·1 36·4 35·6 34·8	I 43° I 41° I 38° I 37° I 36°	6 I 4 0 I 4 3 I 4	15·2 I 13·6 I 11·9 I 10·2 I	47·2 45·5 43·8 42·1 41·2
44 45 46 47 48	75·I 74·4 73·6 72·9	76·7 76·0 75·2 74·5	78·3 77·6 76·8 76·1	80·0 8 79·2 8 78·5 8 77·7 7	1·7 83 0·9 82 0·1 81 9·3 81	·4 85·1 ·6 84·3 ·8 83·5 ·0 82·6	86.8 86.0 85.2 84.3	88·6 87·7 86·9 86·0	90·3 89·5 88·6 87·7	I 32 I 31 I 30 I 29	2·1 1 1·2 1 0·3 1	33.0 33.0 31.2	I 33. I 34. I 33.	7 I 8 I 9 I	38·4 I 37·5 I 36·6 I 35·7 I	40·3 39·4 38·4 37·5 36·5
49 50 51 52	72·2 71·4 70·6 69·8	73·7 72·9 72·1 71·3	74·5 73·7 72·9	76·1 7 75·3 7 74·4 7	8·5 80 7·7 79 6·8 78 6·0 77	·3 80·9 ·4 80·0 ·6 79·1	82.6 81.7 80.8	83·3 82·4		I 20 I 20 I 25	3·5 I 7·6 I 5·7 I	30·3 29·3 28·3 27·4	I 30. I 31. I 31.	0 1	33.8 I 32.8 I 31.8 I	35°5 34°5 33°5 32°5
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REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

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26 27	51. 52. 53. 54. 55. 56.	9 5 8 5 7 5 7 5	5·2 6·2 7·1 8·1	57·6 58·6	63.2	62.	5 65·1 6 66·1 7 67·3 8 68·5	71.2	70·3 71·5 74·0	73.0 74.2 75.4 76.8	75° 76° 78° 79°	7 78. 9 79. 3 81. 6 82.	5 1 8 1 1 1 5 1	21·3 22·6 24·0 25·5	1 21·6 1 24·2 1 25·5 1 27·0 1 28·5 1 30·1	I 27 I 28 I 30 I 31	1 1 3 5 1 3 6 1 3	30·0 31·5 33·0	1 30·2 1 33·0 1 34·5 1 36·1 1 37·8 1 39·6
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14 16 18 20	I 23° I 25° I 28° I 30°	6 I 7 I 0 I 5 I	26·3 28·5 30·9 33·4	1 29.0 1 31.3 1 33.7 1 36.4	1 31·8 1 34·2 1 36·7 1 39·4	I 32·4 I 34·7 I 37·1 I 39·7	I 3: I 4: I 4: I 4:	7·5 I 0·1 I 2·7 I 5·5 I	45.7 I	43.4 46.0 48.8 51.9	46·4 49·1 52·0 55·1	I 49.4 I 52.2 I 55.2 I 58.3	I 52 I 55 I 58	·5 I 5 ·3 I 5 ·4 2	5·6 I	1·8 2 5·0 2	2·0 2 5·0 2	5·2 8·3
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36 37 38 39	2 1· 2 5· 2 8· 2 12·	8 2 0 2 4 2 I 2	9.0 12.5 16.3	2 9.6 2 13.0 2 16.6 2 20.5	2 13.6 2 17.0 2 20.7 2 24.7	2 14·3 2 17·6 2 21·1 2 24·9 2 33·4	2 2 2 2 2 2 2 3	1·6 2 5·2 2 9·1 2 3·3 2	29·4 2 33·4 2 37·7 2	29·8 2 33·7 2 37·7 2 42·1 2	2 34·0 2 37·9 2 42·1 2 46·6	2 38·3 2 42·3 2 46·5 2 51·2	2 42 2 46 2 51 2 55	·6 & 4 ·7 2 5 ·1 2 5 ·8 3	6.9 2 1.1 2 5.6 3 0.4 3	51.3 2	55.8 0.1 4.8 9.8	0·3 3 4·7 3 9·5 3 14·6
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24 26 27 28 29 30	I.	9000	1.8 1.9 1.9 2.0 2.0	2·7 2·8 2·9 3·0 3·0 3·1	3·5 3·7 3·8 3·9 4·0 4·2	4·4 4·6 4·8 4·9 5·0 5·2	5·3 5·6 5·7 5·9 6·0 6·2	6·1 6·5 6·6 6·8 7·0 7·2	7.0 7.4 7.6 7.8 8.0 8.2	7*9 8*3 8:5 8*7 9*0 9*2	8·7 9·1 9·4 9·6. 9·9	9.5 10.0 10.3 10.6 10.9 11.2	10·4 10·9 11·2 11·5 11·8	11·2 11·7 12·0 12·4 12·7	14·1 14·5	15·4 15·8 16·2 16·6	18.2	18·3 19·1 19·5 20·0 20·5 21·1
31 32 33 34 35 36	I.	1 2 2 2	2·2 2·3 2·4 2·5 2·6	3·2 3·3 3·5 3·6 3·7 3·9	4·3 4·4 4·6 4·8 4·9 5·2	5.4 5.5 5.7 5.9 6.2 6.4	6·4 6·6 6·9 7·1 7·4 7·7	7·5 7·7 8·0 8·3 8·6 8·9	8·5 8·8 9·1 9·4 9·8 10·1	9.5 9.8 10.2 10.5 10.9	10·5 10·9 11·2 11·6 12·1 12·5	11.5 11.9 12.3 12.7 13.2 13.7	13.8	13·5 13·9 14·4 14·8 15·4 15·9	16.3	18·1 19·3 19·9	19.7 20.2 20.8 21.5 22.2 23.0	21.6 22.2 22.9 23.5 24.3 25.1

TABLE XV.

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

★s • ARGUS AND \$ CRUCIS.

Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	m. 36	m. 38	m. 40	m. 42	m. 44
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50 55 60	0.2 0.2 0.2	0·7 0·6	1·6 1·5 1·4	2·9 2·7 2·5	4·6 4·2 3·8	6·6 6·1 5·5	7·7 7·1 6·5	8·9 8·3 7·5	9·5 8·6	11·7 10·8 9·8	13.5 13.5	14·8 13·7 12·4	16·4 15·2 13·8	18·2 16·9 15·3	20·1 18·6 16·9	22.0 20.4 18.5
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42 44 46 48 50	25.6 25.0 24.4 23.7 23.0	26·8 26·1 25·5 24·8 24·1	28·0 27·3 26·6 25·9 25·1	29·2 28·4 27·7 27·0 26·2	30·4 29·6 28·9 28·1 27·3	31.6 30.8 30.1 29.3 28.4	32·9 32·1 31·3 30·4 29·6	34·2 33·4 32·5 31·6 30·7	35·5 34·7 33·8 32·9 31·9	36·9 36·0 35·0 34·1	38·2 37·3 36·4 35·4 34·4	39.6 38.7 37.7 36.7 35.6	41·1 40·1 39·0 38·0	42.5 41.5 40.4 39.3 38.2	44.0 42.9 41.8 40.7 39.6	45.5 44.4 43.2 42.1 40.9
52 54 56 58 60	22·3 21·6 20·9 20·2 19·4	23·3 22·6 21·9 21·1 20·3	24·4 23·6 22·8 22·0 21·2	25.4 24.6 23.8 23.0 22.1	26·5 25·6 24·8 23·9 23·0	27.6 26.7 25.8 24.9 23.9	28·7 27·8 26·9 25·9 24·9	29·8 28·9 27·9 26·9 25·9	31·0 30·0 29·0 28·0 26·9	32·2 30·1 29·0 27·9	33.4 32.3 31.2 30.1 28.9	34·6 33·5 32·4 31·2 30·0	35·8 34·7 33·5 32·3 31·1	37·I 35·9 34·7 33·5 32·2	38·4 37·2 35·9 34·6 33·3	39·7 38·4 37·1 35·8 34·4
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41 42 43 44 45	46·0 45·5 44·9 44·4 43·8	47·6 47·0 46·4 45·9 45·3	49°1 48°5 48°0 47°4 46°7	50·7 50·1 49·5 48·9 48·2	52·3 51·7 51·1 50·5 49·8	53·9 53·3 52·6 52·0 51·3	55.6 55.0 54.3 53.6 52.9	57·3 56·6 55·9 55·3 54·5	59.0 58.3 57.6 56.9 56.1	60·7 60·1 59·3 58·6 57·8	62·5 61·8 61·0 60·3 59·5	64·3 63·6 62·7 62·0 61·2	66·1 65·4 64·5 63·8 62·9	67·9 67·2 66·3 65·5 64·6	69·8 69·0 68·1 67·3 66·4	71.7 70.9 70.0 69.2 68.2
46 47 48 49 50	43.2 42.1 41.5 40.9	44.7 44.1 43.5 42.9 42.3	46·I 45·5 44·9 44·3 43·7	47.6 47.0 46.4 45.7 45.1	49.2 48.5 47.8 47.2 46.5	50·7 50·0 49·4 48·7 48·0	52·3 51·5 50·9 50·2 49·4	53·8 53·1 52·4 51·7 51·0	55·5 54·7 54·0 53·2 52·5	57·I 56·3 55·6 54·8 54·0	58·8 57·9 57·2 56·4 55·6	59.6 58.8 58.0 57.2	62·1 61·3 60·5 59·6 58·8	63·9 63·0 62·2 61·3 60·4	65·6 64·7 63·9 63·0 62·1	67·4 66·4 65·6 64·7 63·8
51 52 53 54 55	40·3 39·7 39·1 38·4 37·8	41.6 41.0 40.4 39.7 39.1	43.0 42.4 41.7 41.0 40.4	44·4 43·7 43·1 42·4 41·7	45·8 45·1 44·4 43·7 43·0	47·3 46·5 45·8 45·1 44·3	48·7 48·0 47·2 46·5 45·7	50·2 49·4 48·7 47·9 47·1	51.7 50.9 50.1 49.3 48.5	53·2 52·4 51·6 50·8 49·9	54·8 53·9 53·1 52·3 51·4	56·3 55·5 54·6 53·7 52·9	57·9 57·1 56·2 55·3 54·3	59.5 58.6 57.7 56.8 55.9	61·2 60·3 59·3 58·4 57·4	62·8 61·9 60·9 59·9 58·9
56 57 58 59 60	37·1 36·5 35·8 35·1 34·4	38·4 37·7 37·0 36·3 35·6	39.7 39.0 38.2 37.5 36.8	40.9 40.2 39.5 38.7 38.0	42·2 41·5 40·0 39·2	43.6 42.8 42.0 41.2 40.4	44.9 44.1 43.3 42.5 41.7	46·3 45·5 44·6 43·8 42·9	47.7 46.8 46.0 45.1 44.2	49°! 48°2 47°3 46°4 45°5	50·5 49·6 48·7 47·8 46·8	52.0 51.0 50.1 49.1 48.2	53.4 52.5 51.5 50.5 49.5	54·9 53·9 52·9 51·9 50·9	56·4 55·4 54·4 53·4 52·3	57·9 56·9 55·9 54·8 53·7
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34 40 44 48	0·5 0·5 0·5 0·5	1.0 1.0 1.0	1.6 1.6	2·I 2·I 2·I	2·6 2·6 2·6 2·7	3·I 3·I 3·3	3.8 3.9 3.9 4.0	5·1 5·2 5·4	6·4 6·5 6·5	7.6 7.7 7.8 8.0	9·3 9·3	10·1 10·2 10·4 10·6	11·3 11·5 11·7	12·5 12·7 12·9 13·2	13.7 14.0 14.5	14·9 15·2 15·4 15·8
52 56 60	0·5 0·6 0·6	I·I I·I I·2	1·6 1·7 1·8	2·3 2·3 2·2	2·7 2·8 2·9	3·3 3·4 3·5	4·I 4·3 4·4	5.5 5.7 5.9	6·8 7·1 7·3	8·2 8·5 8·8	9·6 9·9 10·2	10·9 11·2 11·7	12·2 12·6 13·1	13·6 14·0 14·6	14·9 15·4 16·0	16·2 16·8 17·5

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM MERIDIAN BELOW THE POLE.

 χ s ϵ ARGUS AND β CRUCIS.

							I	ноп	JR.							
Lat.	m. 16	m.	18	m. 19	m.	m. 21	m.	m. 23	m. 24	m. 25	m. 26	m. 1	m. 28	m. 29	m. 30	m. 31
S.							REI	UC.	ΓΙΟΝ	S.						
34 35 36 37 38 39	79·6 78 7 77·9 77·0 76·2 75·3	81·7 80·8 79·9 79·0 78·2 77·3	83.8 82.9 82.0 81.1 80.2 79.3	85.9 85.0 84.1 83.2 82.3 81.3	88.1 87.2 86.2 85.3 84.3 83.4	90·3 89·3 88·4 87·4 86·4 85·5	91·5 90·5 89·6 88·6	94.7 93.7 92.7 97.7 90.7 89.7	97.0 96.0 95.0 93.9 92.9 91.9	99'3 98'3 97'2 96'2 95'1 94'0	101.6 100.6 99.5 98.4 97.3	102·9 101·8 100·7 99·6	106·4 105·3 104·1 103·0 101·9	108·8 107·6 106·5 105·3 104·2 103·0	111·2 110·0 108·9 107·7 106·5	113.7 112.5 111.3 110.1 208.9
40 41 42 43 44 45	74.5 73.6 72.7 71.8 70.9 70.0	76·4 75·5 74·6 73·7 72·8 71·9	78·4 77·5 76·6 75·6 74·7 73·7	80·4 79·5 78·5 77·6 76·6 75·6	82·4 81·5 80·5 79·5 78·5 77·6 76·6	84.5 83.5 82.5 81.5 80.5 79.5	85.6 84.5 83.5 82.5 81.4	88·7 87·6 86·6 85·5 84·5 83·4	90·8 89·7 88·7 87·6 86·5 85·4	93.0 91.9 90.8 89.7 88.6 87.5	95.1 94.0 92.0 91.8 90.7 89.3	96·2 95·1 93·9 92·8 91·6	99.6 98.4 97.3 96.1 94.9 93.7	101·8 100·6 99·5 98·3 97·0 95·8	104.7 102.9 101.7 100.5 99.2 98.0	100.4 103.9 102.7 101.4 100.1
46 47 48 49 50 51	69·1 68·2 67·3 66·4 65·4 64·4	71.0 70.0 69.1 68.1 67.1 66.1	72.8 71.8 70.9 69.9 68.9 67.9	74.7 73.7 72.7 71.7 70.6 69.6	75·5 74·5 73·5 72·4 71·4	75.3 74.2 73.2	79.3	81·3 80·2 79·1 77·9 76·8	84·3 83·2 82·1 81·0 79·8 78·6	85·2 84·0 82·9 81·7 80·5	87:2 86:0 84:8 83:0 82:2	89·2 88·0 86·8 85·6	92.5 91.3 90.0 88.8 87.5 86.2	94.6 93.3 92.1 90.0 89.5 88.2	96·7 95·4 94·1 92·8 91·5 90·2	97.5 96.2 94.9 93.6 92.2
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Lat.	m.	m. 33	m. 34	35	36	m. 37	38	m	i. I	n.	m.	m. 42	m.	m.	m. 45	m. 46
S.	1			, <u></u>	1		, 55	1	,							
35 I 36 I 37 I 38 I 39 I 40 I	14.9 13.7 12.5 11.2 10.0	118·7 117·4 116·2 114·9 113·6 112·4	121·2 119·9 118·6 117·3 116·1 114·8	123.7 122.4 121.1 119.8 118.5 117.2	125.0 123.7 122.3 121.0 119.6	127.6 126.2 124.9 123.5 122.1	128.8 127.2 126.0 124.0	132 131 130 128 127 2 125	.8 13 .4 13 .0 13 .6 13 .1 12	5.5 1 4.1 1 2.6 1 1.2 1 9.7 1 8.2 1	32.3	2 20·9 2 2 19·4 2 2 17·9 2 2 16·4 2 2 14·9 2 2 13·3 2	25·1 2 23·6 2 22·1 2 20·6 2 19·0 2 17·5 2	26·4 2 24·8 2 23·3 2 21·7 2 20·1 2	29·2 27·6 26·0 24·4 22·8	2 32.0 2 30.4 2 28.8 2 27.1 2 25.5 2 23.8
42 I 43 I 44 I 45 I 46 I	06·2 04·9 03·6 02·3	109.8 108.5 107.2 105.9 104.5 103.2 101.8	112·1 110·8 109·5 108·1 106·8 105·4 104·0	114·5 113·2 111·8 110·4 109·0 107·6 106·2		113.6	120·3 118·3 117·2 116·3	1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2.8 12 3 12 3.3 12 3.3 12 5.8 11	5·3 I 3·7 I 2·2 I 0·7 I 9·1 I 7·6 I	27·7 26·2 24·6 23·1 21·5	2 11·8 2 2 10·2 2 2 8·7 2 2 7·1 2 2 5·5 2 2 3·9 2 2 2·3 2	9.6 2 8.0 2 6.3 2	15·3 2 13·7 2 12·1 2 10·4 2	17·9 16·3 14·6 12·9	2 20·5 2 18·8 2 17·1
	98·3 97·0 95·6 94·2	99·1 97·7 96·2	102.6 101.2 99.8 98.3	104·8 103·3 101·9	107.0	106.	109.	1 110	0.6 II	4.4 I 2.8 T	15.0	2 0·6 2 1 59·0 2 1 57·3 1 1 55·6 1	1·3 2 59·6 2	3.6	2 6.0	2 8·4 2 6·6
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	m. 47	48			0	m. 51	m. 52	m. 53	5 5		m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
36 37 38 39 40 41	2 31·2 29·2 28·2 26·2 24·2 23·2 21·2 18·2 16·2 14·2 12·3 8·	2 2 3 3 4 4 2 2 3 5 9 2 2 3 1 5 9 2 2 2 7 7 0 2 2 2 1 1 2 2 3 4 2 2 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	00 2 3 3 2 3 3 3 2 2 2 3 3 3 2 5 5 2 2 2 2	8.92 2 2 3 5 3 7 2 2 3 3 7 2 2 3 3 3 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	11.7/2 10.00 2 38.3 2 36.5 2 34.7 2 33.0 2 22.25.7 2 22.5.7 2 22.0.1 2 22.0.1 2 21.8.1 2 21.6.2 2	44.6 42.9 4 41.1 39.3 37.5 33.7.5 33.9 32.1 33.2 28.3 26.4 22.6 22.6 22.6 21.8.6	2 45.8 2 44.0 2 42.2 2 40.3 2 38.5 2 36.6 2 34.8 2 32.9 2 27.1 2 25.1 2 23.1	2 50 2 48 2 46 2 45 2 43 2 37 2 37 2 33 2 29 2 27 2 25 2 23	79 2 4 4 4 4 4 4 3 3 3 3 3 3 3 3 3 3 3 3 3	3·5 2 2·7 2 2·8 2 2·9 6·0 2 2·2 2 2·3 2	54.6 52.7 50.8 48.9 47.0 43.0 41.1 39.0 37.0 33.0 33.0 33.0 32.9 30.8 28.7	3 3 3 3	56·7 2 54·7 2 52·7 2 46·6 2 44·5 2 40·3 2 38·2 2 33·8 2	7.63 5.73 3.73 3.73 5.73 5.73 5.75 2.55.66 2.55.66 2.55.66 2.55.66 2.49.43 2.46.91 2.46.91 2.46.91 2.36.42	10.8 8.8 6.7 3.2.7 3.2.7 3.3.0.6 2.58.6 2.58.6 2.56.5 2.50.1 2.48.0 2.41.3 2.41.3 2.30.1	13.9 9.8 11.9 9.8 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. ** BETELGUESE.

Lat.	m. 2	m. 4	m. 6	m. 8	m. 10	m. 12	m. 14	16	m. 18	m. 20	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26
N.]	REDU	JCTI	ONS.							
34 36 38 40 42	0.2 0.2 0.2 0.2 0.2	0.9 0.9 0.8 0.7 0.7	2·1 1·9 1·8 1·6 1·5	3·8 3·5 3·2 2·9 2·7	6.0 5.5 5.0 4.6 4.2	8.6 7.9 7.2 6.6 6.1	ii·7 10·7 9·8 9·0 8·3	15·3 14·0 12·8 11·8 10·8	19·3 17·7 16·2 14·9	23.8 21.8 20.0 18.4 16.9	26·3 24·0 22·0 20·2 18·6	28.8 26.3 24.1 22.2 20.4	31·5 28·8 26·4 24·2 22·3	34·2 31·3 28·7 26·4 24·3	37·1 33·9 31·1 28·6 26·4	40·1 36·7 33·6 30·9 28·5
44 46 48 50	0.I 0.I 0.I 0.I	0.6 0.6 0.5 0.5	1·4 1·3 1·1	2·5 2·3 2·1 2·0	3.9 3.6 3.3 3.0	5·6 5·2 4·8 4·4	7·6 7·1 6·5 6·0	9·2 8·5 7·9	12·6 11·7 10·8 9·9	15·6 14·4 13·3 12·3	17·2 15·9 14·7 13·5	18·9 17·4 16·1 14·9	20·6 19·0 17·6 16·2	22·4 20·7 19·1 17·7	24·3 22·5 20·7 19·2	26·3 24·3 22·4 20·7
52 54 56 60	0.1 0.1 0.1 0.1	0·4 0·4 0·4	0.9 0.9	1·8 1·7 1·5 1·3	2·8 2·6 2·4 2·0	4·1 3·8 3·5 2·9	5·6 5·1 4·7 4·0	7·3 6·7 6·2 5·2	9·2 8·5 7·8 6·6	10·5 9·6 8·1	12·5 10·6 9·0	13.7 11.7 9.9	15.0 13.8 12.8 10.8	13.9 12.1 12.3	17·7 16·3 15·1 12·7	19·1 17·7 16·3 13·8
\$. 20 22 24 26	0·2 0·2 0·2 0·2	0.8 0.9 0.8	2·3 2·2 2·0 I·9	4·2 3·9 3·6 3·4	6·6 6·1 5·7 5·3	9·5 8·8 8·2 7·6	12·9 11·1 10·3	16·9 14·5 13·5	21·3 19·7 18·3 17·1	26·3 24·3 22·6 21·1	29.0 26.8 24.9 23.2	31·8 29·4 27·3 25·5	34·7 32·1 2 9· 9 27·8	37·7 35·0 32·5 30·3	40·9 37·9 35·2 32·8	44.2 41.0 38.1 35.5
28 30 32 35	0.5 0.5 0.5 0.1	0·8 0·8 0·7 0·6	1·7 1·7 1·5 1·4	3·I 2·9 2·5	4·9 4·6 4·3 3·9	7·1 6·6 6·2 5·7	9.7 9.0 8.5 7.7	12.6 11.8 11.1 10.1	16·0 14·9 14·0 12·7	19·7 18·4 17·3 15·7	21·7 20·3 19·1 17·3	23·8 22·3 20·9 19·0	26·0 24·3 22·8 20·8	28·3 26·5 24·8 22·6	30·7 28·7 26·9 24·5	33·2 31·1 29·1
40 45 50 55	0.I 0.I 0.I 0.I	0·5 0·4 0·4 0·3	1·2 1·0 0·9 0·7	1.3 1.6 1.6	3.4 2.9 2.5 2.1	4·8 4·2 3·5 3·0	6·6 5·7 4·8 4·1	8·6 7·4 6·3 5·4	9.4 8.0 6.8	13·5 11·6 9·9 8·4	14·9 12·7 10·9 9·2	10·1 11·0 10·3	12.8	19·4 16·6 14·2 12·1	18·0 15·4 13·1	22·7 19·5 16·7 14·2
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36 37 38 39 40	39·5 37·8 36·2 34·7 33·3	42.5 40.6 38.9 37.3 35.8	45.5 43.6 41.7 40.0 38.4	48.7 46.6 44.6 42.8 41.1	51·9 49·7 47·6 45·7 43·8	55°3 52°9 50°7 48°6 46°7	58·7 56·2 53·9 51·7 49·6	62·3 59·6 57·2 54·8 52·6	65.9 63.1 60.5 58.0 55.7	69.6 66.7 64.0 61.4 58.9	73·5 70·4 67·5 64·7 62·1	77.4 74.2 71.1 68.2 65.5	81·4 78·0 74·8 71·8 68·9	85.6 82.0 78.7 75.5 72.4	89·8 86·1 82·6 79·2 76·0	94·1 90·2 86·5 83·0 79·7
41 42 43 44 45	32.0 30.7 29.5 28.3 27.2	34·4 33·0 31·7 30·5 29·3	36·9 35·4 34·0 32·7 31·4	39.4 37.9 36.4 34.9 33.6	42·I 40·4 38·8 37·3 35·8	44.8 43.0 41.3 39.7 38.2	47·6 45·7 43·9 42·2 40·6	50·5 48·5 46·6 44·8 43·0	53·5 51·4 49·3 47·4 45·6	56·5 54·3 52·2 50·1 48·2	59.7 57.3 55.1 52.9 50.9	62·9 60·4 58·0 55·8 53·6	66·2 63·6 61·1 58·7 56·5	69.6 66.8 64.2 61.7 59.4	73.0 70.2 67.4 64.8 62.3	76·6 73·6 70·7 68·0 65·4
46 47 48 50 52	26·2 25·2 24·2 22·3 20·6	28·1 27·0 26·0 24·0 22·2	30·2 29·0 27·9 25·8 23·8	32·3 31·0 29·8 27·6 25·5	34·4 33·1 31·8 29·4 27·2	36·7 35·3 33·9 31·3 29·0	39·0 37·5 36·0 33·3 30·8	41.4 39.8 38.2 35.4 32.7	43·8 42·1 40·5 37·4 34·6	46·3 44·6 42·8 39·6 36·6	48·9 47·0 45·2 41·8 38·6	51·6 49·6 47·7 44·1 40·7	54·3 52·2 50·2 46·4 42·9	57·1 54·9 52·8 48·8 45·1	59.9 57.6 55.4 51.2 47.4	62·8 60·4 58·1 53·8 49·7
54 56 58 60	19·1 17·6 16·2 14·8	20·5 18·9 17·4 15·9	22·0 20·3 18·6 17·1	23·5 21·7 19·9 18·3	25·1 23·1 21·3 19·5	26·7 24·6 22·7 20·8	28·4 26·2 24·1 22·1	30·2 27·8 25·6 23·5	31·9 29·5 27·1 24·9	33·8 31·2 28·7 26·3	35·7 32·9 30·3 27·8	37·6 34·7 31·9 29·3	39·6 36·5 33·6 30·9	41·7 38·4 35·4 32·5	43.7 40.3 37.1 34.1	45.9 42.3 39.0 35.8
\$. 25 26 27 28 29	39·6 38·3 37·0 35·7 34·6	42.6 41.1 39.7 38.4 37.2	45.6 44.1 42.6 41.2 39.8	48·8 47·1 45·6 44·1 42·6	52·1 50·3 48·6 47·0 45·5	55.4 53.6 51.8 50.1 48.4	58·9 56·9 55·0 53·2 51·5	62·5 60·4 58·3 56·4 54·6	66·1 63·9 61·8 59·7 57·8	69·9 67·5 65·3 63·2 61·1	73·7 71·3 68·9 66·7 64·5	77·7 75·1 72·6 70·3 68·0	81.8 79.0 76.4 73.9 71.6	85·9 83·1 80·3 77·7 75·2	90·2 87·2 84·3 81·6 79·0	94.5 91.4 88.4 85.5 82.8
30 32 34 36 38	33·5 31·4 29·5 27·7 26·0	36·0 33·7 31·7 29·8 28·0	38·6 36·2 34·0 31·9 30·0	41·3 38·7 36·3 34·2 32·1	44.0 41.3 38.8 36.5 34.3	46·9 44·0 41·3 38·8 36·5	49.8 46.8 43.9 41.3 38.8	52·9 49·6 46·6 43·8 41·2	56·0 52·5 49·3 46·4 43·6	59·2 55·5 52·2 49·0 46·I	62·5 58·6 55·1 51·8 48·7	65.8 61.8 58.1 54.6 51.4	69·3 65·0 61·1 57·5 54·1	72·9 68·4 64·3 60·4 56·9	76·5 71·8 67·5 63·5 59·7	80·2 75·3 70·8 66·6 62·6
40 42 44 46 50	24.5 23.1 21.7 20.4 18.0	26·3 24·8 23·3 21·9 19·3	28·3 26·6 25·0 23·5 20·7	30·2 28·4 26·8 25·2 22·2	32·3 30·4 28·6 26·9 23·7	34°4 32°3 30°4 28°6 25°3	36·5 34·4 32·3 30·4 26·8	38·8 36·5 34·3 32·3 28·5	41·1 38·6 36·4 34·2 30·2	43.4 40.9 38.5 36.2 31.9	45.9 43.2 40.6 38.2 33.7	48·3 45·5 42·8 40·3 35·6	50·9 47·9 45·1 42·4 37·4	53·5 50·4 47·4 44·6 39·4	56·2 52·9 49·8 46·8 41·4	59.0 55.5 52.2 49.1 43.4

* BETELGUESE.

Lat.	m. 43	m.	1 m		n. 16	m. 47	m. 48		n. 19	m. 50	m. 51		n. 52	58		m. 54	m. 55	m. 56
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38 39 40 41 42	I 20.	1 30 1 27 2 1 23	9 I 3 9 I 3	5.0 I	43·3 I 39·2 I 35·3 I 31·5 I 27·9 I	43·4 39·3 35·4	I 43 I 39	8 I 5 I	52·2 I 47·7 I 43·5 I	1.5 56.7 52.1 47.7 43.5	6·2 1·2 56·5 51·9	2 1 1 1 5	5·9 0·9 56·2	2 16 2 10 2 5 2 6 1 56	0.6 2 5.5 2 0.6 2 5.0 2	21.0 2 15.4 2 10.1 2 5.1 2 0.3 2	20·3 2 14·8 2 9·6 2 4·6 2	25·2 19·6 14·2 9·0
43 44 45 46 47	I II.	2 I I4 3 I II 3 I 8 3 I 6	·5 I I ·5 I I ·9 I I	1. 1	21·3 I 18·0 I 15·2 I	24·8 21·4 18·4 15·4	I 28 I 24 I 21 I 18	4 I 9 I 7 I 6 I	32·0 I 28·4 I 25·1 I 21·9 I	39.5 I 35.7 I 32.1 I 28.6 I 25.2 I	39.5 35.7 32.1 28.6	I 4 I 3 I 3 I 3	13·4 39·4 35·6 32·0	I 47 I 43 I 39 I 35	7·3 I 3·2 I 3·3 I 5·5 I	55.6 I 51.2 I 47.0 I 43.0 I 39.1 I	55·3 I 50·9 I 46·7 I 42·7 I	59°4 54°9 50°5 46°4
48 49 50 51 52	0 58·0 0 56·3 0 54·3 0 52·3	5 I I 3 O 58 2 O 56 I O 54	·70 5	7.00	6·9 I 4·3 I 1·9 I 59·5 I		I 12 I 10 I 7 I 4	8 I 0 I 3 I 7 I	15·8 1 12·9 1 10·1 1 7·4 1	- 1	22·0 18·9 15·8 12·9	I 2 I 1 I 1	25·2 21·9 18·8 15·8	I 28 I 25 I 21 I 18	3·4 I 5·0 I 1·8 I 3·7 I	35.3 I 31.7 I 28.2 I 24.9 I 21.6 I	35·1 1 31·5 1 28·0 1 24·6	38·5 34·8 31·1 27·7
53 54 55 56 57	0 48· 0 46· 0 44·	0 50 0 48 0 46	30 5 30 5	4.7 0 52.6 0 50.5 0 8.5 0 6.6 0	55.00 52.80 50.70	57·3 55·1 52·9	0 59 0 57 0 55	20	4.8 I 2.3 I 59.8 I 57.4 0 55.1 0	7·4 I 4·8 I 2·3 I 59·8 I 57·4	7·4 4·7 2·2	I I I I		I 12 I 9 I 7	2.7 I	18·5 I 15·4 I 12·5 I 9·6 I 6·8 I	18·2 15·1 12·2	21.0 17.8
23 24 25 26 27	I 39°	I 47	·II 5	55·9 2 51·9 1 18·2 1 14·6 1	52.9 I 49.2 I	1·8 57·7 53·8	2 6 2 2 1 58	·9 2 ·6 2 ·6 2			22.6 17.9	2 2 2 2 2 2	28·1 23·2 18·5	2 33 2 28 2 23	3.6 2 3.6 2	44.9 2 39.2 2 34.0 2 29.0 2 24.2 2	44.9 2 39.5 2 34.4 2	50·7 45·1 39·8
28 29 30 31 32 33	I 26.0 I 24.0 I 21.4 I 18.0	1 30 1 27 1 25 1 22	7 1 3 9 1 3 1 1 2	37.9 I 34.8 I 31.8 I 29.0 I 26.2 I	39.0 I 35.9 I 30.0 I	43·2 40·0 36·9 33·9	I 47 I 44 I 41 I 37	6 I 2 I 0 I	45·11 41·91	0·3 2 56·5 2 52·9 1 49·4 1 46·0 1	57·3 53·7 50·2	1 5	5.7 1.8 58.1 54.5	2 10 2 6 2 2 1 58	0.5 2 0.4 2 2.6 2 3.8 2	3.5 5	20·2 2 15·9 2 11·7 2 7·7 2	25·2 20·7 16·4 12·3
33 34 35 36 37 38	I 11.	1 17 1 15 7 1 13 5 1 10 5 1 8	·6 I 2 ·2 I I ·0 I I ·8 I I ·7 I I	1 I : I :	24.6 I 22.I I 19.6 I 17.3 I	28·3 25·6 23·1 20·6	I 32 I 29 I 26 I 24 I 21	· 6 I · 6 I · 6 I	35.8 I 33.0 I 30.2 I 27.5 I 24.9 I	39.7 I 36.7 I 33.8 I 31.1 I 28.4 I	43.7 40.6 37.6 34.7 31.9	I 4 I 4 I 3	17·7 14·5 11·4 38·3	1 51 1 48 1 45 1 42	.8 I .4 I .2 I	59.5 2 55.9 2 52.5 I 49.1 I 45.9 I 42.8 I	53·1 1 49·8 1	4.5 0.8 57.2 53.7
40 42 44 46 48 50	0 51.	1 0 7 0 57 5 0 53 4 0 50	·3 0 5 ·9 0 5 ·7 0 5	3.6 I	55.30	9·3 5·3 1·4 57·8	I 12 I 8 I 4 I 0	3 I 1 I 0 I 2 I	15.3	23·2 I 18·4 I 13·8 I 9·4 I 5·3 I 1·3 I	21·5 16·7 12·2 7·9	I 2 I 1 I 1	24·7 19·7 15·0	I 27 I 22 I 17 I 13	7.9 I 2.8 I 7.9 I 3.3 I	36.8 I 31.2 I 25.9 I 20.8 I 16.0 I 11.4 I	34.5 I 29.0 I 23.8 I 18.8 I	37.9 32.2 26.8 21.7
			TRU	JE B	EAR	ING	OR	AZI	MUT	H O	F X	BE	TE	LG	UES	E.		
Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 28	32	36	m. 40	m. 44	1 m		m. 52	56	60 m.	70 m.	80
N.			4					ZIN	IUTE	IS.								
30 32 34 36	2.6 2.4 2.2 2.1	5·2 4·8 4·4 4·1	7·7 7·1 6·6 6·2	9.5 8.8 8.2	12.7 11.8 11.0	15·2 14·1 13·1	17.6 16.3 15.2 14.3	20.0 18.5 17.3 16.3	20.7	22.9	24.9		3 2	9:0 27:2 25:7	33.0 30.9 29.1	32.8	39.5 37.3 35.2 33.4	43.7 41.4 39.3 37.4
40 45 50 60	1.8 1.6 1.5 1.2	3·7 3·2 2·9 2·5	5·5 4·9 4·4 3·7	7·3 6·5 5·8 5·0	9·2 8·1 7·3 6·2	9.7		12.9	16.3	16·0 14·5		19 17	3 1	8.7	20.I	23.6		30.8
S. 20 22 24 26	2·2 2·0 1·9 1·8	4·3 4·0 3·8 3·6	6·4 6·0 5·7 5·4	8.6 8.0 7.6 7.2	10·7 10·0 9·5 9·0	10.2	13·9 13·1 12·5	15.8 15.0 14.2	15.9	19·5 18·5 17·6	10.5 50.5 51.4	23 21 20	9 2	4·9 23·6 22·5		28.2	32.2	35·9 34·3 35·9
30 35 45 55	1.0 1.2 1.1	3·3 2·9 2·5 2·2	4·9 4·4 3·8 3·4	6·5 5·9 5·0 4·5	8·1 7·3 6·2 5·6	9·7 8·8 7·5 6·7	11·3 10·2 8·7 7·8	10.0	13.1	16.0 14.2 12.4	15·9 13·6	17 14	3 1	0.6 8.7 6.1 4.5	17.3		24.7	

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. \div CANOPUS.

Lat.	m. 4	l m		m.	m.	m.	m. 22	m. 24	m. 26	m. 28	30		1. 2	m. 34	36	m. 38	m. 40	m.	m. 44
N.		,						REI	DUC.	CION	NS.		_						
34 28 24 20 16	0.3 0.3 0.3 0.3	I.	1 1 2 2 2 3	2·4 2·6 2·7 2·8 2·9	4·2 4·5 4·8 5·0 5·2	6.6 7.1 7.5 7.8 8.2	8·0 8·6 9·0 9·4 9·9		11·1 12·0 12·6 13·2 13·8	12·9 13·9 14·6 15·3 16·0	14.8 16.0 16.0 17.0	0 18 7 19 5 20	·2 ·0	19.0 20.5 21.5 22.5 23.6	21·3 23·0 24·1 25·3 26·5	23·8 25·6 26·8 28·1 29·5	26·3 28·3 29·7 31·1 32·6	29.0 31.2 32.7 34.3 36.0	34·3 35·9 37·7
12 8 4 0	0·3 0·4 0·4	I	4 5 6	3·1 3·2 3·4 3·6	5.5 5.8 6.1 6.4	8·6 9·5 10·0	10·4 10·9 11·5 12·1	12·4 13·6 14·4	14·5 15·2 16·0 16·8	16·8 17·6 18·5 19·5	19:3 20:2 21:3 22:4	2 23 3 24	·0 ·2	24·8 26·0 27·3 28·7	27·7 29·1 30·6 32·2	30·9 32·4 34·0 35·8	34·2 35·9 37·7 39·7	37.7 39.6 41.5 43.7	43.4
S. 4 8 12 14	0·4 0·4 0·5 0·5	1	7 8 9	3·8 4·0 4·3 4·4	7·1 7·6	11.9	12·7 13·5 14·4 14·9	15·2 16·1 17·1 17·7	17.8 18.8 20.1 20.8	20·6 21·8 23·3 24·0	23·0 25·0 26·1 27·0	0 28 7 30	•5	30·3 32·1 34·2 35·4	34·0 36·0 38·3 39·6	37·8 40·1 42·6 44·1	41·9 44·3 47·2 48·8	46·3 48·9 52·0 53·2	53.6
16 18 20 22	0·5 0·5 0·6	2		4·6 4·8 5·0 5·2	8·5 8·8	13.8	15·4 16·0 16·7 17·4	18·3 19·0 19·8 20·7	21·5 22·3 23·2 24·2	24·9 25·9 26·9 28·1	28·6 29·7 30·9 32·2	7 33	·7	36.6 38.0 39.6 41.3	41.0 42.6 44.3 46.2	45.7 47.4 49.3 51.4	50·5 52·4 54·5 56·8	55.6 57.7 60.6 62.6	63.3
24 26 28 30	0·6 0·7 0·7		7	5·4 5·7 6·0 6·4	10.1	15.8	18·2 19·1 20·2 21·4	21·7 22·8 24·0 25·5	25.4 26.7 28.2 29.9	29·4 30·9 32·6 34·5	33.7 35.2 37.3 39.6	4 40	·2 ·4	43·2 45·3 47·8 50·6	48·3 50·7 53·5 56·6	53.7 56.4 59.4 63.0	59.4 62.4 65.7 69.6	65.2 68.6 72.3 76.5	75.2
		m.	m.	m.	m.	m.	m.	m.	m.	m		m.		n. [m.	m.		m.	m.
N.	15	46]	47	48	49	50	51	<u>52</u> REI	J 53 DUC	ION		55 I		6	57	58		59	60_
30 3 28 3 26 3	3·3 3 5·0 3 5·8 3 6·7 3 7·6 3	6·5 7·4 8·3	38·1 39·1 40·0	39·8 40·7 41·7	39°4 41°4 42°4 43°5 44°5	41.0 43.1 44.2 45.3 46.3	44. 46. 47.	9 46· 0 47· 1 48·	6 48· 8 49· 9 50·	4 50 6 51 8 52		52·1 53·4 54·7	0 0 0	54.0	0 53°3 0 56°0 0 57°4 0 58°7 1 0°1	0 57 0 59 1 0	9 0	57·1 59·9 1·4 2·9 4·4	0 59.0 1 2.0 1 3.5 1 5.0 1 6.6
20 3 18 4 16 4	8·5 4 9·4 4 0·3 4 1·3 4 2·2 4	3·I	42 · 9 44·0 45·0	44.8 45.8 46.9	45.6 46.6 47.7 48.9 50.0	47.4 48.6 49.7 50.9 52.1	50· 51· 52·	5 52· 7 53· 9 55·	5 54° 7 55° 0 57°	5 56 8 57 1 59	0.6 0.3	57:3 58:7 60:1 61:5 62:9	I I	59.4 0.8 2.2 3.7 5.2	1 1.5 1 3.0 1 4.5 1 6.0	I 5		5.9 7.4 9.0 10.6 12.3	1 8·1 1 9·7 1 11·4 1 13·0 1 14·8
10 4 8 4 6 4 4 4	3°2 4 4°3 4 5°4 4 6°5 4 7°6 4 8°9 5	6·3 7·4 8·6 9·8	48·3 49·5 50·7 51·9	50.4 51.6 52.8 54.1	51·2 52·4 53·7 55·0 56·4 57·8	53°3 54°6 55°9 57°3 58°7 60°2	56· 58· 59· 61·	8 59. 2 60. 6 61. 1 63.	0 61 4 62 9 64 5 65	3 63 8 65 3 66 9 68	3·6 5·7 3·4	64·4 65·9 67·5 69·2 70·9 72·7	I I I	13.2	1 9·1 1 10·8 1 12·5 1 14·2 1 16·1 1 18·0	1 13 1 15 1 16 1 18	·8 I ·7 I	14.0 15.8 17.6 19.5 21.4 23.5	1 16·5 1 18·3 1 20·2 1 22·2 1 24·2 1 26·3
2 5 4 5 6 5	0·1 5 1·5 5 2·9 5 4·4 5	3·8 5·3 6·8	56·1 57·7 59:3	58·5 60·1 61·8	60·9 62·6 64·4	61.8 63.4 65.1 67.0 69.0	65. 67. 69.	9 68· 8 70· 7 72·	5 71. 4 73. 4 75.	2 73 1 75 2 78	3·8 5·8 3·0	74·6 76·6 78·6 80·9 83·2	I I I		I 20.0 I 22.1 I 24.4 I 26.7 I 29.3	I 25 I 27 I 29	·0 I	25.6 27.9 30.3 32.8 35.5	1 28·5 1 30·9 1 33·3 1 35·9 1 38·7
12 5 14 6 16 6	7.7 6 9.6 6 1.6 6 3.8 6	2·2 4·3 6·6	64·9 67·1 69·4	67·7 69·9 72·4	70·5 72·8 75·4	71·1 73·3 75·8 78·4 81·3	76. 78. 81.	2 79. 8 81. 5 84.	2 82 8 85 7 87	2 85 0 88 9 91	3.1	88·4 91·3 94·5	I I I	31·6 34·6 3 <i>7</i> ·9	I 32.0 I 34.8 I 38.0 I 41.3 I 45.0	I 38 I 41 I 44	·8 I	41·5 44·8	I 41.7 I 44.8 I 48.3 I 52.0 I 56.0
21 7 22 7 23 7	8.7 7 70.2 7 71.6 7 73.2 7	3·2 4·8 6·4	76·4 78·0 79·7	79·6 81·3 83·0	82·9 84·6 86·5	84.5 86.2 88.0 89.0 91.0	89. 91. 93.	6 93· 5 95· 5 97·	1 96 0 98 1 100	6 102	0.2 I 1.5 I	o6∙o o8∙3	I I I	47·5 49·8 52·1	1 49·1 1 51·3 1 53·6 1 56·0 1 58·6	I 55 I 57 2 0	·II	59·0	2 0·5 2 2·9 2 5·4 2 8·1 2 10·9
26 7 27 8 28 8 29 8	6.7 8 8.5 8 9.6 8 9.7 8 5.0 8	2·0 4·1 6·3 8·7	85·5 87·7 90·0 92·5	89.0 91.3 96.3	92.7	96.4 98.8 101.4 104.2	100	8 101· 2 104· 7 106· 4 109· 4 115·	0 107 6 110 4 113 4 116	9 111 6 112 5 112	1·9 I 1·7 I 7·7 I	15.9 18.8 21.9 25.2	2 2 2	0.0 3.0 6.2 9.6	2 1·3 2 4·2 2 7·2 2 10·5 2 14·0 2 17·8	2 II 2 II 2 I4 2 I8	·4 2 ·5 2 ·9 2 ·5 2	12·7 15·9 19·4 23·1	2 13·8 2 17·0 2 20·3 2 23·9 2 27·7 2 31·8

* CANOPUS.

Lat	m. 61	m. 62	m. 63	m. 64	m. 65	m. 66		m.	m.	m. 69	m. 70	m.	m	2 7	n.	m.	m. 75
N.							RE	DUC	TIO	NS.							
34 32 30 28 26 24	61.0 62.5 64.0 65.6 67.2 68.8	63.0 64.5 66.1 67.8 69.4 71.0	65.0 66.6 68.3 70.0 71.6 73.3	67·1 68·8 70·5 72·2 73·9 75·6	74°4 76°2	1 13 1 14 1 16 1 18	·1 1 ·9 1 ·7 1 ·6 1	15·3 1 17·2 1 19·0 1 20·9 1	17.5 I 19.5 I 21.4 I 23.3 I	19·8 21·8 23·8 25·8	20·1 1 22·1 1 24·2 1 26·2 1 28·3 1 30·4	I 24 I 26 I 28 I 30	5 I 2 6 I 2 7 I 3 8 I 3	6.81 9.01 1.11	29·2 I 31·5 I 33·7 I 35·9 I	36·2 I	34·2 36·5 38·8 41·2
22 20 18 16 14	70°4 72°0 73°7 75°5 77°2	72·7 74·4 76·2 77·9 79·8	75.0 76.8 78.6 80.4 82.3	77.4 79.2 81.1 83.0 84.9	81·7 83·6	I 24 I 26 I 28	·2 I ·2 I ·2 I	26·8 I 28·8 I 30·9 I	29.4 I 31.4 I 33.6 I	32·0 34·1 36·3	1 32·5 1 34·6 1 36·8 1 39·1 1 41·4	I 37 I 39 I 41	3 I 4 6 I 4	0·1 I 4 2·4 I 4 4·7 I 4	42·8 I 45·2 I 47·6 I	45.6 I 48.1 I 50.6 I	53.2
12 10 8 6 4	79·1 80·9 82·9 84·9 87·0 89·2	81.6 83.6 85.6 87.6 89.8 92.1	84·3 86·3 88·3 90·5 92·7 95·0	86·9 89·0 91·1 93·3 95·6 98·0	91·7 93·9 96·2 98·6	I 34 I 36 I 39 I 41	·6 I ·8 I ·2 I ·6 I	37·4 I 39·7 I 42·1 I 44·6 I	40·3 1 42·7 1 45·2 1 47·7 1	43°2 45°7 48°2 50°9	1 43.7 1 46.2 1 48.7 1 51.3 1 54.0 1 56.9	I 49 I 51 I 54 I 57	2 I 5 8 I 5 5 I 5	2·3 I	55·3 I 58·I 2 0·9 2 3·9 2	58·5 2 1·3 2 4·2 2	4.5 7.5 10.6
S. 0 2 4 6 8	91·5 93·9 96·4 99·1 102·0	99.5	100.0 102.7 105.6	103·2 105·9 108·9	106·3 109·2	I 49 I 52 I 55	·6 I	52·9 I	56.2	59·6 2·7 6·1	2 6.2	2 6 2 9 2 13	·4 2 ·8 2 I ·4 2 I	9·9 2 3·4 2 7·1 2	13·5 2 17·1 2 20·8 2	17·1 2 20·8 2 24·6 2	28.5
10 12 14 16 17 18	108·3 111·8 115·6 117·7	115.4	115·3 119·1 123·1 125·3	118·9 122·8 127·0 129·2	122.6 126.5 130.8 133.1	2 10 2 14 2 17	·3 2 ·4 2 ·8 2 ·1 2	14.2 2 18.8 2 21.2 2	13.8 18.1 22.8 25.3	2 22·1 2 26·9 2 29·4	2 17.4 2 21.6 2 26.1 2 31.0 2 33.6 2 36.4	2 25 2 30 2 35 2 37	·5 2 2 ·2 2 3 ·2 2 3 ·9 2 4	9·5 2 4·3 2 9·5 2 2·2 2	33.6 2 38.5 2 43.8 2 46.6 2	37.7 2 42.7 2 48.2 2 51.0 2	2 47.0 2 52.6 2 55.5
19 20 21 22 23 24	124.4 126.9 129.5 132.2	128·4 130·9 133·6 136·4	132.4 135.0 137.8 140.7	136.5 139.2 142.0 145.0	140.7 143.4 146.3 149.4	2 24 2 27 2 30 2 33	·92 ·72 ·72 ·82	29·I 2 32·0 2 35·I 2 38·3 2	33.4 36.4 39.5 42.9	37.8 40.9 44.1 47.4	2 39·2 2 42·2 2 45·3 2 48·6 2 52·1 2 55·8	2 46 2 49 2 53 2 56	·7 2 5 ·9 2 5 ·3 2 5 ·8 3	1.2 2 4.5 2 8.0 3 1.6 3	55·8 3 59·2 3 2·7 3 6·5 3	0.2	5.2 8.7 12.4 16.3
25 26 27 28 29 30	141.4 144.8 148.5 152.5	142·5 145·9 149·4 153·2 157·2 161·6	150·4 154·1 157·9 162·1	155.0 158.7 162.7 167.0	159.6 163.5 167.6 171.9	2 44 2 48 2 52 2 57	·4 2 ·3 2	49·1 2 53·2 2 57·4 3 2·0 3	53.9 58.1 2.5 7.2	58.8 3.0 7.5 12.3	2 59·6 3 3·7 3 8·1 3 12·7 3 17·6 3 22·8	3 13 3 17 3 22	·7 3 I ·2 3 I ·9 3 2 ·9 3 2	3·8 3 8·3 3 3·2 3 8·3 3	18·9 3 23·6 3 28·5 3 33·7 3	24·1 28·9 33·9	3 39°4 3 44°8
			TR	UE 1	BEAL	RINC	G 0.	R AZ	ZIMU	TH (OF X	- CA	NOP	US.			
Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 28	m. 32	36	m. 40	m. 44	m. 48	m. 52	60 m.	m. 70	80 m.	90
N.			-					ZIM	UTH	S.						1	i
34 30 20 10 5	0.6 0.6 0.6 0.7 0.7	1·2 1·3 1·4 1·4	1.8 1.9 2.1 2.2	2·4 2·4 2·5 2·7 2·9	3.0 3.1 3.2 3.4 3.6	3.6 3.7 3.8 4.1 4.3	4·2 4·3 4·4 4·8 5·0	4.9 5.0 5.4	5·5 5·7 6·1	6·3 6·8	6·7 6·7 6·9 7·4 7·8	7·3 7·6 8·1 8·5	7·9 7·9 8·2 8·8 9·2	9.0 9.1 0.1 10.1	10·5 10·6 10·9 11·7	13.4	13.2
S. 0 5 10 14	0·8 0·8 0·9	1·5 1·6 1·8	2·3 2·5 2·7 2·9	3·6 3·6 3·6	3·8 4·1 4·5 4·8	4·6 4·9 5·3 5·8	5·3 5·7 6·2 6·7	6.2	7·3	8.8	9.7	9.0 9.7 10.5 11.4	9.7 10.4 11.4 12.3	11·2 12·0 14·0	12·9 13·8 15·0	14·6 15·6 16·9 18·1	16·3 17·4 18·7 20·1
16 18 20 22	1.0 1.1 1.1 1.2	2·0 2·1 2·2 2·4	3·0 3·2 3·4 3·6	4·1 4·3 4·5 4·7	5·1 5·3 5·6 5·9	6·1 6·4 6·7 7·1	7·0 7·4 7·8 8·2	8·4 8·9	9.4	10.4	12.0		12·8 13·4 14·1 14·8	14·6 15·3 16·0	16.8 17.5 18.4 19.3	18·9 19·7 20·6 21·6	20·8 21·7 22·7 23·8
24 26 28 30	1·3 1·4 1·5 1·6	2·5 2·7 2·9 3·I	3·8 4·0 4·4 4·7	5.0 5.4 5.8 6.3	6·3 6·7 7·2 7·8	7.5 8.0 8.6 9.3	9·3 10·8	10.6	11.9	13.1	15.3	14.6 15.5 16.6 17.8	15·7 16·7 17·8 19·2	17.8 18.9 20.2 21.7			

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

* CANOPUS.

Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	m. 36	m. 38	m. 40	m. 42	m. 44
S.							RED	UCT:	IONS							
38 40 42 44	0.2 0.2 0.2 0.2	0.9 0.9 0.9	2·2 2·2 2·1 2·1	4.0 3.9 3.8 3.7	6·3 6·1 5·9 5·7	9.0 8.8 8.5 8.3	10.0 10.3 10.0 9.6	12·3 11·6 11·3	14·1 13·7 13·3 12·9	16.0 15.5 15.2 14.7	18·1 17·5 17·1 16·6	20·2 19·7 19·2 18·6	22·5 21·9 21·3 20·7	25.0 24.3 23.7 23.0	27·5 26·8 26·1 25·3	30·2 29·4 28·6 27·7
46 48 50 52	0°2 0°2 0°2 0°2	0.9 0.8 0.8	2.0 2.0 1.9 1.8	3.2 3.3 3.3 3.3	5.6 5.4 5.2 5.1	8·0 7·8 7·5 7·3	9°4 9°2 8°9 8°6	10.8 10.9	12.6 12.2 11.8 11.4	14·3 13·4 13·4	16·1 15·6 15·1 14·6	18·1 17·5 17·0 16·4	20·1 19·5 18·9 18·3	22·3 21·6 21·0 20·2	24.6 23.8 23.1 22.3	27·0 26·1 25·3 24·5
54 56 58 60	0·2 0·2 0·2 0·2	0.8 0.7 0.7	1.7 1.6 1.5	3·1 2·9 2·8	4·9 4·5 4·3	7.0 6.8 6.5 6.2	8·2 7·9 7·6 7·3	9.5 9.2 8.8 8.5	10·1 10·1 9·7	12.2 12.0 11.2 11.0	14·1 13·5 13·0 12·4	15·8 15·2 14·6 14·0	16·3 15·5	19·5 18·7 18·0 17·2	21·5 20·6 19·9 19·0	23·6 22·7 21·8 20·8
Lat.	m. 45	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	m. 54	1 m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
S.							RED	UCT								
38 40 42 44 46	31.6 30.7 29.9 29.0 28.2	33.0 32.1 31.3 30.0	34·4 33·5 32·6 31·7	35.9 35.0 34.0 33.0	37.4 36.4 35.4 34.4	39.0 37.9 36.9 35.8 34.8	40·5 39·4 38·4 37·3 36·2	42·I 41·0 39·9 38·7	43·8 42·6 41·4 40·2	45.4 44.2 43.0 41.8	47·1 45·8 44·6 43·3	48.8 47.5 46.2 44.9	50.6 49.2 47.9 46.5	52·4 51·0 49·6 48·1	54·2 52·7 51·3 49·8	56.0 54.5 53.0 51.5
48 50 52	27·3 26·4 25·5	29.4 28.6 27.6 26.7	30.7 29.8 28.8 27.8	30·0 30·0	33.4 32.3 31.3 30.3	33.7 32.6 31.5	35·0 33·9 32·8	37.6 36.4 35.3 34.1	39·1 37·8 36·6 35·4	39·3 38·0 36·7	42·1 40·7 39·4 38·1	43.6 42.2 40.9 39.5	45·2 43·7 42·3 40·9	46·7 45·3 43·8 42·3	48.4 46.9 45.3 43.8	50.0 48.5 46.9 45.3
54 56 58 60	24.6 23.7 22.7 21.8	25·7 24·7 23·7 22·7	26·9 25·8 24·8 23·7	28·0 26·9 25·9 24·7	29·2 28·1 26·9 25·8	30·4 29·2 28·0 26·8	31.6 30.4 29.2 27.9	30·3 30·3 30·3	34·1 32·8 31·5 30·1	35.4 34.1 32.7 31.3	36·7 35·3 33·9 32·5	38·1 36·6 35·2 33·6	39.4 37.9 36.4 34.8	39·3 37·7 36·1	42·2 40·6 39·0 37·3	43.7 42.0 40.3 38.6
							1	HOU	R.							
Lat.	m. 0	m. 1	m. 2	m. 3	m. 4	m. 5	6 m.	m.	m. 8	m. 9	10 m.	m. 11	12 m.	13	14 m.	15 m.
S.							RED	UCTI	ONS	•			*-			
38 40 42 44 45	56·0 54·5 53·0 51·5 50·8	57.9 56.3 54.8 53.2 52.5	59.8 58.2 56.6 55.0 54.2	61.7 60.1 58.4 56.8 55.9	63.7 62.0 60.3 58.6 57.7	65.7 63.9 62.2 60.4 59.5	67·7 65·9 64·1 62·3 61·4	69.8 67.9 66.0 64.2 63.2	71.8 69.9 68.0 66.1 65.1	73.9 72.0 70.0 68.0 67.0	76·1 74·1 72·0 70·0 69·0	78·3 76·2 74·1 72·0 70·9	80.5 78.3 76.2 74.0 72.9	82·7 80·5 78·3 76·1 75·0	85.0 82.7 80.4 78.2 77.0	87·3 85·0 82·6 80·3 79·1
46 47 48 49 50	50.0 49.2 48.5 47.7 46.9	51·7 50·9 50·1 49·3 48·5	53.4 52.6 51.7 50.9 50.1	55·1 54·3 53·4 52·5 51·7	56.8 56.0 55.1 54.2 53.3	58·6 57·7 56·8 55·9 55·0	60·4 59·5 58·6 54·6 56·7	62·3 60·4 59·4 58·4	64·I 63·2 62·2 61·2 60·2	66·0 65·0 64·0 63·0 61·9	67·9 66·9 65·9 64·8 63·7	69·9 68·8 67·7 66·7 65·6	71·8 70·7 69·6 68·5 67·4	73·8 72·7 71·6 70·4 69·3	75·9 74·7 73·5 72·4 71·2	77.9 76.7 75.5 74.3 73.1
51 52 53 54 55	46·I 45·3 44·5 43·7 42·9	47.6 46.8 46.0 45.1 44.3	49.2 48.4 47.5 46.6 45.8	50·8 49·9 49·0 48·1 47·2	52.4 51.5 50.6 49.7 48.7	54·I 53·I 52·2 51·2 50·3	55.7 54.8 53.8 52.8 51.8	57.4 56.4 55.4 54.4 53.4	59·2 58·1 57·1 56·1 55·0	59.8 58.8 57.7 56.6	62·7 61·6 60·5 59·4 58·3	64.4 63.3 62.2 61.1 59.9	66·3 65·1 64·0 62·8 61·6	68·1 66·9 65·7 64·5 63·3	70.0 68.8 67.5 66.3 65.1	71.9 70.6 69.4 68.1 66.8
56 57 58 59 60	42.0 41.2 40.3 39.5 38.6	43.4 42.6 41.7 40.8 39.9	44.9 44.0 43.1 42.1 41.2	46·3 45·4 44·5 43·5 42·5	47.8 46.8 45.9 44.9 43.9	49.3 48.3 47.3 46.3 45.3	50·8 49·8 48·8 47·7 46·7	52.4 51.3 50.3 49.2 48.1	53.9 52.9 51.8 50.7 49.5	55.5 54.4 53.3 52.2 51.0	57·1 56·0 54·8 53·7 52·5	58·8 57·6 56·4 55·2 54·0	50.4 59.2 58.0 56.8 55.5	62·1 60·9 59·6 58·3 57·0	63·8 62·5 61·2 59·9 58·6	65·5 64·2 62·9 61·6 60·2
Tet				0	HOU:	R.				1		I	ноц	JR.		
Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 30	1 m.	m. 50	m. 00	10 m.	20 m.	m.	m. 40	m. 50	m. 60
S.								IMUT								
38 42 46 50	0.6 0.6 0.6 0.6	0 I·2 I·2 I·2 I·2	1.8 1.8 1.9	2.4 2.4 2.5 2.5	3.1 3.1 3.1 3.0	3.6 3.7 3.7 3.7	4.5 4.6 4.6 4.7	6·1 6·1 6·1	7.6 7.6 7.7 7.8	9.0 9.1 9.3	10.5 10.6 10.7 10.8	12.0 12.1 12.2	13.4 13.5 13.7	14·9 15·0 15·1 15·4	16·3 16·4 16·6 16·9	17·7 17·9 18·1 18·4
54 58 60	0·6 0·6 0·7	I·3 I·3	1.0 1.0	2·5 2·6 2·6	3·2 3·3	3·8 3·9 4·0	4·7 4·9 4·9	6·3 6·5 6·6	7·9 8·1 8·2	9·5 9·7 9·8	11.2	12·6 12·9 13·1	14·1 14·5 14·7	15·7 16·1 16·4	17·3 17·7 18·0	18.8

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM MERIDIAN BELOW THE POLE.

* CANOPUS.

	1					*	ı HO	UR.							
Lat.	m. 16	m. 17	m. 18	m. 19	m. 20	m. 21	m. 22	m. 23	m. 24	m.	m. 26	m. 27	m. 28	m. 29	m. 30
S.	[10 .		10	10	20		EDU								_
39 40 41 42 43 44	88.4 87.2 86.0 84.8 83.6 82.4	90.7 89.5 88.3 87.0 85.8 84.6	93.0 91.8 90.5 89.3 88.0 86.8	95.4 94.1 92.9 91.6 90.3 89.0	97.8 96.5 95.2 93.9 92.6 91.2	98·9 97·6 96·2 94·9 93·5	102·7 101·4 100·0 98·6 97·2 95·8	105·2 103·8 102·4 101·0 99·6 98·1	107.8 106.3 104.9 103.4 102.0 100.5	, 110·3 108·8 107·3 105·9 104·4 102·9	112.9 111.4 109.9 108.3 106.8	115·5 114·0 112·4 110·8 109·3 107·7	118·1 116·6 115·0 113·4 111·8		123·5 121·9 120·2 118·5 116·9
45 46 47 48 49 50	81·2 80·0 78·8 77·5 76·3 75·0	83·3 82·1 80·8 79·6 78·3 77·0	85.5 84.2 82.9 81.6 80.3 79.0	87·7 86·4 85·1 83·7 82·4 81·0	89.9 88.6 87.2 85.8 84.5 83.1	92°1 90°8 89°4 88°0 86°6 85°2	94.4 93.0 91.6 90.1 88.7 87.3	96·7 95·3 93·8 92·3 90·9 89·4	99.0 97.5 96.1 94.6 93.0 91.5	99.9 98.3 96.8 95.3 93.7	103.8 102.2 100.6 99.1 97.5 95.9	106·2 104·6 103·0 101·4 99·8 98·1	100.4	111.0 109.4 107.7 106.0 104.4 102.7	113.5 111.8 110.1 108.4 106.7 105.0
51 52 53 54 55 56	73.8 72.5 71.2 69.9 68.6 67.3	75.7 74.4 73.1 71.8 70.4 69.1	77.7 76.3 75.0 73.6 72.2 70.8	79.7 78.3 76.9 75.5 74.1 72.7	81.7 80.3 78.9 77.4 76.0 74.5	83·7 82·3 80·8 79·4 77·9 76·4	85.8 84.3 82.8 81.3 79.8 78.2	87.9 86.4 84.8 83.3 81.7 80.1	90.0 88.4 86.9 85.3 83.7 82.1	92.1 90.6 88.9 87.3 85.7 84.0	94°3 92°7 91°0 89°4 87°7 86°0	96·5 94·8 93·2 91·5 89·7 88·0	98·7 97·0 95·3 93·6 91·8 90·0	99°2 97°4 95°7 93°9 92°1	103·2 101·4 99·6 97·8 96·0 94·1
7.4							1 НС	UR.							
Lat.	m. 31	m. 32	m. 33	m. 34	m. 35	m. 36	m. 37	m. 38	m. 39	m. 40	m. 41	m. 42	1 m. 43	m. 44	m. 45
s.	_				1	R	EDU	CTIO	VS.						
38 39 40 41 42	127·9 126·2 124·5 122·9 121·2	130·7 129·0 127·3 125·5 123·8	133.5 131.8 130.0 128.3 126.5	136·4 134·6 132·8 131·0 129·2	139·3 137·4 135·6 133·8 131·9	140·3 138·4	145·1 143·2 141·3 139·4 137·5	148·1 146·1 144·2 140·3	151.0 149.1 147.1 145.1 143.1	154·I 152·I 150·0 148·0 146·0	150.0	160·2 158·1 156·0 153·9 151·8	163·3 161·2 159·0 156·9 154·7	166·4 164·3 162·1 159·9 157·7	169.6 167.4 165.2 162.9 160.7
43 44 45 46 47	119·5 117·7 116·0 114·3 112·6	116.8	124.7 122.9 121.1 119.3 117.5	127·4 125·6 123·7 121·9 120·0	124.2	132·8 130·9 129·0 127·1 125·1	135.5 133.6 131.7 129.7	130.3	141·1 139·1 135·0 135·0	139·8 135·7	144.7 142.6 140.5 138.3	149.7 147.5 143.2 141.1	152.6 150.4 148.2 146.0 143.8	155.5 153.3 151.1 148.8 146.6	158·5 156·2 151·7 149·4
48 49 50 51 52	110.8 109.1 105.5 103.7	113.2 111.4 109.6 107.8	115.7 112.0 110.1 108.2	118·2 116·3 114·4 112·5	114.9	123·2 121·2 117·3 115·3	125.7 121.7 119.7 117.6	128·3 126·3 122·1 120·1	130.9 128.8 126.7 124.6 122.5	133.6 131.4 127.1 125.0	129.7	138·9 136·7 134·5 132·2 129·9	141.6 139.3 137.1 134.8 132.5	144.3 142.0 139.7 137.4 135.0	147·1 144·7 142·4 140·0 137·6
53 54 55 56	96.5 98.1 98.1	104·1 100·3 98·3	106·3 104·4 100·5	108·6 106·6 104·6 102·6	110·9 108·9 106·8 104·8	111.5	113.9 111.3 109.2	117·9 113·6 111·4	120·3 118·2 113·7	122·8 120·5 118·3 116·0	125·2 122·9 120·6 118·3	127·7 123·0 120·6	130·1 127·8 125·4 123·0	132·7 130·3 127·8 125·4	135.2 130.3 127.8
Lat.	m. 1	m	m 1	m 1		***	ı HO					-			
	48	m. 47	m. 48	m. 49	m. 50	51	52	m. 53	m. 54	m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
S.			١ ,		,	R] .	EDUC	TION	NS.				ı		
38 39 40 41 42	172.8 170.5 168.3 166.0 163.7	173.7 171.4 166.8	176·9 174·6 172·2	175.4	181·0 178·6 176·1	179.3	182.5	100.3	101.0	104.01	108.2	201.0	213·3 210·5 207·8 205·0 202·2	211.2	211.8
43 44 45 46 47	161.5 159.2 156.9 154.5 152.2	162·1 159·8 157·4 155·0	157.9	168·2 165·7 163·3 160·8	171·2 168·7 166·2 163·7	176.8 174.3 171.8 169.2 166.7	177·4 174·8 172·2 169·7	180·5 177·9 175·3 172·6	183.7 181.0 178.4 175.7	186·9 184·2 181·4 178·7	184.6 181.8	193·3 190·5 187·7 184·9	196·6 193·7 190·9	202·7 199·8 197·0 194·1 191·1	200·2 197·3
48 49 50 51 52	142.7 140.2	150·2 147·8 145·3 142·8	150·5 148·0 145·5	155.8 153.3 150.7 148.2	158·7 156·1 153·5 150·9	153.6	164·4 161·7 159·0 156·3	167·3 164·6 161·8 159·1	170°2 167°5 164°7 161°9	170·4 167·5 164·7	167.5	176·3 170·4	182.2	179.2	191·3 182·2 182·2 179·1
53 54 55 56	132.7	137.8	137.7	142.9	145.5	150·9 148·1 145·4 142·6	150.8	153.2	156.2	158.9	161.6	164.4	170·2 167·1 164·0 160·9	173·1 17c•0 166·8 163·6	160.6

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

* CANOPUS.

							2 HC	URS.							-
Lat.	m. 1	m. 2	m. 3	m. 4	m. 5	m. 6	m. 7	m. 8	m. 9	m. 10	m. 11	m. 12	13 m.	m. 14	m. 15
S.						. RI	EDUC	TION	IS.						
36 37 38 39	229·8 226·9 224·0 221·1 218·2	233·5 230·6 227·7 224·7 221·8	237·3 234·3 231·3 228·3 225·4	241.0 238.0 235.0 232.0 229.0	241·8 238·7 235·7	245.6	252·6 249·4 246·2 243·1 239·9	256·5 253·3 250·0 246·8 243·6	260·4 257·1 253·9 250·6 247·4		268·3 265·0 261·6 258·3 254·9	272·3 268·9 265·5 262·1 258·7	276·3 272·9 269·5 266·0 262·5	280·4 276·9 273·4 269·9 266·4	284·5 280·9 277·4 273·9 270·3
41 42 43 44 45	215·3 212·4 209·5 206·5 203·5	218·8 215·8 212·9 209·9 206·8	222·3 219·3 216·3	225.9 222.8 219.8 216.7 213.5	229·5 226·4 223·2 220·1	1	236·7 233·5 230·3 227·0 223·8	240·4 237·1 233·9 230·6 227·3	244·I 240·8 237·4 234·I 230·8	247·8 244·4 241·1	251·5 248·1	255·3 251·8 248·4 244·9 241·4	259°I 255°6 252°I 248°5 245°0	262·9 259·3 255·8 252·2 248·6	266·7 263·1 259·5 255·9 252·2
46 47 48 49 50	200·5 197·5 194·5 191·4 188·3	203·8 200·7 197·7 194·5 191·4	207·1 204·0 200·8 197·7 194·5	210·4 207·3 204·1 200·9 197·6	213·8 210·5 207·3	217·1 213·9 210·6 207·3	220·5 217·2 213·9 210·5 207·1	223·9 220·6 217·2 213·8 210·3	227·4 224·0 220·5 217·1 213·6	230·8 227·4 223·9 220·4 216·8	234·3 230·8 227·3 223·7 220·1	237·8 234·3 230·7 227·1 223·4	241.4 237.8 234.1 230.5 226.8	245.0 241.3 237.6 233.9 230.1	248·5 244·8 241·1 237·3 233·5
51 52 53 54 55 56	185.2 182.0 178.9 175.6 172.4 169.1	188·2 185·0 181·7 178·5 175·2 171·8	191·3 188·0 184·7 181·4 178·0 174·6	194.3 191.0 187.7 184.3 180.9	190.7 187.2 183.8	200·5 197·1 193·7 190·2 186·7 183·1	196·7 193·2 189·6	206·9 203·3 199·8 196·2 192·6 188·9	210·0 206·5 202·9 199·2 195·5 191·8		209.1	219.7 216.0 212.2 208.4 204.6 200.7	223.0 219.2 215.4 211.5 207.6 203.7	226·3 222·5 218·6 214·7 210·7 206·7	229.6 225.8 221.8 217.8 213.8 200.7
			, ,								3				
Lat.	m.	m. 1	m.	m.	m.	m.	2 HO	URS.	m.	m.	m.	m.	m.	ı m.	m.
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
S.		1	1		1	RI	EDUC	TION	IS.				ſ	,	
36 37 38 39 40	288.6 285.0 281.4 277.8 274.2	292·7 289·1 285·5 281·8 278·2	296·9 293·2 289·5 285·8 282·1	301·1 297·4 293·6 289·9 286·1	301·5 297·7	305·7	306·1	318·1 314·2 310·3 306·3 302·4	322·4 318·5 314·5 310·5 306·5	322.8	331·2 327·1 323·0 318·9 314·8	331.4		340·2 336·0	348·9 344·7 340·4 336·1 331·7
41 42 43 44 45	270.6 266.9 263.3 259.6 255.9	274·5 270·8 267·1 263·3 259·6	278·4 274·7 270·9 267·1 263·3	282·3 278·6 274·7 270·9 267·0	286·3 282·5 278·6 274·7 270·8		294·3 290·4 286·4 282·4 278·4	298·4 294·4 290·4 286·3 282·2	302·4 298·4 294·3 290·2 286·1	306·5 302·4 298·3 294·2 290·0	310·7 306·5 302·3 298·1 293·9	314·8 310·6 306·4 302·1 297·8	319.0 314.7 310.4 306.1 301.8	323·2 318·9 314·5 310·2 305·8	327.4 323.0 318.6 314.2 309.8
46 47 48 49 50	252·2 248·4 244·6 240·8 236·9	255.8 252.0 248.1 244.2 240.3	259·5 255·6 251·7 247·7 243·8	263·1 259·2 255·3 251·3 247·2	262·9 258·9	270·6 266·6 262·5 258·4 254·2	274·3 270·3 266·1 262·0 257·8	278·1 274·0 269·8 265·6 261·3	281·9 277·7 273·5 269·2 264·9	285.8 281.5 277.2 272.9 268.5	289.6 285.3 281.0 276.6 272.2	293·5 289·1 284·7 280·3 275·8	297.4 293.0 288.5 284.0 279.5	301·3 296·9 292·3 287·8 283·2	305·3 300·8 296·2 291·6 286·9
51 52 53 54 55 56	233.0 229.0 225.1 221.0 216.9 212.8	236·4 232·4 228·3 224·2 220·1 215·0	239·8 235·7 231·6 227·4 223·2 219·0	243·2 239·1 234·9 230·7 226·4 222·1	242.4 238.2 234.0 229.6	250·I 245·8 24I·6 237·2 232·8		257.0 252.7 248.3 243.9 239.4	260.6 256.2 251.7 247.2 242.7	246.0	267·7 263·2 258·6 254·0 249·3	271·3 266·7 262·1 257·4 252·7	274·9 270·3 265·6 260·8 256·0	278·6 273·9 269·1 264·3 259·4	282·2 277·5 272·7 267·8 262·9
	212 0					228·4		234.8		241.3			251.2	254.5	257.9
			11(0)	- 56	23.2 4 11	IG O		URS.		* *	CANC	7502			
Lat.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.
S.	2	4	6	8	10	12	AZIM	16 1 UTHS	18 S	20	22	24	26	28	30
36 38 40 42	18·0 18·0 18·0	18·3 18·3 18·3	18·5 18·6 18·7	18.8 18.9 19.0	19·1 19·2 19·2	19·3 19·4 19·4 19·5	19.6 19.6 19.7 19.8	19·9 19·9 20·0 20·1	20·1 20·2 20·3 20·4	20·4 20·5 20·5 20·6	20·7 20·7 20·8 20·9	20·9 21·0 21·1 21·2	21·2 21·3 21·4 21·5	21·5 21·5 21·6 21·8	21·7 21·8 21·9 22·0
44 46 48 50 52	18·2 18·3 18·5 18·6	18.5 18.6 18.8 19.0	18·8 18·9 19·1 19·5	19·1 19·2 19·4 19·5	19.4 19.5 19.6 19.8	19·6 19·8 19·9 20·1	19·9 20·1 20·2 20·4	20·2 20·4 20·5 20·7	20·5 20·6 20·8 21·0	20·8 20·9 21·1 21·3	21·1 21·2 21·4 21·6	21·3 21·5 21·7 21·9	21.6 21.8 22.0 22.2	21·9 22·1 22·3 22·5	22·2 22·3 22·5 22·8
54 56	19.3 10.1	19.4	19.7	20.0	20·3 20·6	20·3 20·6 20·9	20·7 20·9 21·2	2I·0 2I·2 2I·5	21·3 21·5 21·8	21·6 21·8 22·1	21·8 22·1 22·4	22·1 22·4 22·7	22·4 22·7 23·0	23·3 23·0 23·7	23·6 23·6

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

* CANOPUS.

							2 HO	URS.							
Lat.	m. 31	m. 32	m. 33	m.4 34	m. 35	m. 36	m.	m. 38	m. 39	m. 40	m. 41	m. 42	m. 43	m. 44	m. 45
S.	-					RI	EDUC	TION	S.						
36 37 38 39 40	353.4 349.1 344.8 340.4 336.0	358.0 353.6 349.2 344.8 340.4	362·5 358·1 353·7 349·2 344·7	362·6 358·1 353·6	371·7 367·2 362·6 358·1 353·5	362·5	381.0 376.4 371.7 367.1 362.4	385·7 381·0 376·3 371·6 366·8	390·4 385·7 380·9 376·1 371·3	390.4		404·7 399·8 394·9 389·9 385·0	409·5 404·6 399·6 394·6 389·6	414.4 409.4 404.3 399.3 394.2	419·2 414·2 409·1 404·0 398·8
41 42 43 44 45	331.6 327.2 322.8 318.3 313.8	335.9 331.4 326.9 322.4 317.8	331·1 326·5	344·5 339·9 335·3 330·7 326·0	348·9 344·2 339·6 334·9 330·1	343·8	357.6 352.9 348.1 343.3 338.5	362·1 357·3 352·4 347·6 342·7	366·5 361·6 356·8 351·8 346·9	351.1 351.1 351.1 351.1	365·5 360·5	380·0 375·0 369·9 364·8 359·7	384.5 379.4 374.3 369.2 364.0	389·I 384·0 378·8 373·6 368·3	393.7 388.5 383.3 378.0 372.7
46 47 48 49 50	309·2 304·7 300·0 295·4 290·7	313·2 308·6 303·9 299·2 294·4	307.8	311·8 306·9		314.7	313.6	337·7 332·7 327·7 322·6 317·5	341.9 336.8 331.7 326.6 321.4	346·1 341·0 335·8 330·6 325·4	345.1	354.5 344.0 338.7 333.3	342·8 337·3	363.0 357.7 352.3 346.9 341.4	367·3 361·9 356·5 351·0 345·4
51 52 53 54 55 56	285.9 281.1 276.2 271.3 266.3 261.2	289.6 284.7 279.8 274.8 269.7 264.6	278.3	292·I 287·0 281·9	285·5 280·2	304·7 299·5 294·4 289·1 283·8 278·4	308·5 303·3 298·0 292·7 287·3 281·9	312·3 307·1 301·8 296·4 290·9 285·4	316·2 310·9 305·5 300·1 294·5 289·0	320·I 314·7 309·3 303·7 298·2 292·5	318·5 313·0 307·5 301·8	327.9 322.4 316.8 311.2 305.5 299.7		318.7	339.8 334.1 328.3 322.5 316.6 310.6
							110	HDC							-
Lat.	m.	m.	m.	m.	m.	m.	2 HO	URS.	m.	m.	m.	m.	m.	m.	m.
 S.	46	47	48	49	50	51	52 EDUC	53	54	55	56	57	58	59	60
36 37 38 39 40 42 43 44 45 47 48 49 55 55 55 55 56	419.0 413.9 408.7 403.5 398.3 393.0 387.8 382.4 377.1 371.7 366.2 360.7 355.1	353.6 347.8 342.0 336.1 330.2 324.1	428.8 423.5 412.9 407.6 402.2 396.8 391.4 385.9 380.4 369.2 363.5 357.7 351.9 346.0 340.1 334.0 327.9	439.0 433.7 428.4 423.0 417.7 412.3 406.8 401.4 395.9 390.3 384.8 379.1 373.4 361.8 350.0 350.0 344.0 337.9 331.7 325.4	438.6 433.2 427.9 422.4 417.0 411.5 406.0 400.4 394.8 389.2 383.5	443.6 438.1 432.7 427.2 416.2 410.6 405.0 399.3 387.8 387.8 387.8 376.1 370.2 364.2 358.1 351.9 345.7 339.4	398·1 392·2 386·4 380·4 374·4 368·3 362·2 356·0 349·6	453.6 448.0 442.5 436.9 431.2 425.6 419.9 414.2 408.4 402.5 336.7 384.7 378.6 372.5 366.3 353.6 353.6 353.6 353.6	458.6 453.0 447.4 441.7 436.1 424.6 418.8 412.9 407.0 401.1 335.1 335.9 376.7 370.4 364.0 357.6 357.6	463.6 452.3 446.6 440.9 435.1 429.3 423.4 417.5 411.6 405.6 399.5 393.4 387.1 380.9 374.5 361.6 355.0	451.5 445.7 439.9 434.0 428.1 422.1 416.1 410.0 403.9 397.7 391.4 385.1 378.7 372.2	473.8 468.1 462.3 456.5 450.5 444.7 438.8 432.8 426.8 420.7 414.5 402.1 395.7 389.3 382.9 376.3 369.6 362.9	366.9	484·I 478·2 472·3 466·4 454·4 448·3 442·2 436·I 429·9 423·6 417·3 410·9 404·4 397·9 391·3 384·6 377·8	, 495·2 489·3 483·4 477·4 477·4 465·4 459·3 453·2 447·0 440·8 434·5 421·8 415·4 408·8 402·2 395·5 388·7 381·9 367·8
			TRU	E BE	CARI	NG O	R AZ	IMU.	гн о	F X	CAN	OPUS).		
Lat.		1	1					URS.							
	m. 32	34	36	38 m	m. 40	m. 42	m. 44	m. 46	m. 48	m. 50	m. 52	m. 54	56	58	60 80
s.		ı			1		AZIM								
36 38 40 42 44	22·1 22·2 22·3 22·4	22·3 22·3 22·5 22·6 22·7	22·5 22·6 22·7 22·8 23·0	22.8 22.8 23.0 23.1 23.3	23·0 23·1 23·2 23·4 23·5	23·3 23·4 23·5 23·7 23·8	23.5 23.7 23.8 23.9 24.1	23·9 23·9 24·1 24·2 24·3	24·1 24·2 24·3 24·5 24·6	24·4 24·4 24·6 24·7 24·9	24.6 24.7 24.8 25.0 25.2	24·9 24·9 25·1 25·3 25·4	25·1 25·2 25·3 25·5 25·7	25·4 25·4 25·6 25·8 26·0	25.6 25.7 25.9 26.0 26.3
46 48 50 52 54	22.6 22.8 23.1 23.3 23.6	22·9 23·1 23·3 23·6 23·9	23·2 23·4 23·6 23·9 24·2	23·5 23·7 23·9 24·2 24·5	23·7 24·0 24·2 24·5 24·8	24·0 24·2 24·5 24·8 25·1	24·3 24·5 24·8 25·1 25·4	24.6 24.8 25.1 25.4 25.7	24·8 25·1 25·4 25·7 26·0	25·1 25·4 25·6 25·9 26·3	25·4 25·6 25·9 26·2 26·6	25·7 25·9 26·2 26·5 26·9	25·9 26·2 26·5 26·8 27·2	26·2 26·5 26·8 27·1 27·5	26·5 26·7 27·1 27·4 27·8
56	23.9	24.2	24.5	24.9	25.5	25.5	25.8	26.1	26.4	26.7	27.0	27.3	27.6	27.9	28.2

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. ** CAPELLA.

Lat.	m.	m. 8	m. 12	m. 16	m.	m. 22	m. 24		m. 28	m. 30	3				m.	m.	m.
N.							REI	OUCT	ION	S.							
0 20 18 16 14 12	0.8 0.8 0.7 0.7 0.6	3·1 2·9 2·8 2·7 2·5	7.0 6.7 6.3 6.0 5.8	12·5 11·9 11·3 10·7 10·2	19·5 18·4 17·5 16·7 15·9	23·5 22·3 21·1 20·1 19·2	26·5 25·1 23·9	31·0 3 29·4 3 28·1 3	7·9 5·9 4·1 2·5 1·0	43.4 41.1 39.0 37.2 35.6	49 46 44 42 40	.7 52. .4 50. .3 47.	6 58·6 0 56·6 7 53·4	9 65·4 0 62·2 4 59·4	72.4 68.8 65.7	79.6 75.7 72.3	87·2 82·9 79·2
10 8 6 4 0	0.6 0.6 0.6 0.5 0.5	2·4 2·3 2·3 2·2 2·0	5·5 5·3 5·1 4·9 4·6	9·8 9·4 9·0 8·7 8·1	15·2 14·6 14·1 13·6 12·6	18·4 17·7 17·0 16·4 15·3	21·0 20·2 19·5	24·7 2 23·7 2 22·9 2	29.7 28.6 27.5 26.5 24.7	34·1 32·8 31·5 30·4 28·4	38 37 35 34 32	2 42 8 40 6 39	0 47° 4 45° 0 43°	52·3 3 50·4 7 48·6	57.9 55.8 53.8	63.8 61.4 59.2	69·9 67·3 64·9
8. 4 8 12 16 20	0·5 0·4 0·4 0·4	1·9 1·8 1·7 1·6 1·5	4.3 4.0 3.8 3.6 3.4	7·6 7·1 6·7 6·3 6·0	11·8 10·5 9·9	14·3 13·5 12·7 12·0 11·3	16·0 15·1 14·2	18·8 2 17·7 2 16·7 1	23·2 21·8 20·5 19·4 18·3	26·6 25·0 23·6 22·2 21·0	30 28 26 25 23	·4 32 ·8 30 ·3 28	1 35° 2 33° 6 32°	9 40.0 9 37.2 0 35.0	9 44.3 7 41.8 5 39.5	48·8 46·0 43·5	53.5 50.5 47.7
24 28 32 36 40	0.4 0.3 0.3 0.3	1·4 1·4 1·3 1·2	3·2 3·0 2·8 2·7 2·5	5·7 5·3 5·0 4·8 4·5	8·8 8·3 7·9 7·4 7·0	10·7 10·1 9·5 9·0 8·5	12.0 11.4 10.7	14·1 1 13·3 1 12·5 1	7·3 6·4 15·4 14·5	19·9 18·8 17·7 16·7 15·7	22 21 20 19	·4 24 ·2 22 ·0 21	·I 27· ·8 25· ·4 24·	0 30° 5 28° 0 26°	33.3 4 31.5 8 29.6	36.7 34.7 32.7	40°3 38°0 35°8
								1					1	1		(m	
Lat.	45	m. 46	m. 47	48	m. 49	50	51 m.	52	58	3 {	n. 54	55	m. 56	m. 57	58	59	60 60
N.			,	,		,	REI	DUCT	'IOI	IS.		1		1		1	,
20 19 18 17 16	96.0 93.5 91.1 88.8 86.7 84.7		99·I	108·8 105·9 103·2 100·7 98·3 96·0	110.3	1111.7	1110.0	120.5	128 125 122 119	3 13 0 12 0 12 1 12	3·0 9·6 6·5 3·5	134·3 131·0 128·0	146·3 142·6 139·0 135·7 132·5 129·5	147·5 143·8 140·4 137·1	148·7 145·1 141·8	153·6 150·0 146·5	166·9 162·7 158·7 154·9 151·3 147·9
14 13 12 11 10 9	82·7 80·9 79·2 77·6 76·0 74·5	86·4 84·5 82·7 81·0 79·3 77·8	90·1 88·1 86·2 84·5 82·8 81·1	93·9 91·8 89·9 88·0 86·2 84·6	97.7 95.6 93.6 91.6 89.8 88.0	99.4 97.3 95.3 93.4 91.6	103.3	109.7 107.3 105.1 102.9 100.9 98.9	106	4 II 0 II 8 II	5·5 3·1 0·8 8·6	119.7 117.2 114.8	126.6 123.9 121.3 118.9 116.5 114.3	128·3 125·6 123·0 120·6	129·9 127·3 124·7	137·1 134·3 131·5 129·0	144.7 141.6 138.7 135.9 133.2 130.7
8 7 6 4 2 0	73·1 71·7 70·4 67·9 65·6 63·4	76·3 74·8 73·5 70·9 68·5 66·2	79·6 78·1 76·6 73·9 71·4 69·1	82·9 81·4 79·9 77·1 74·5 72·0	86·4 84·7 83·2 80·3 77·5 75·0	89.8 88.2 86.6 83.5 80.7	91.7	95.2 93.5 90.2 87.2	98° 97° 93°	5 9	2.5	108·3 106·2 104·3 100·7 97·3 94·2	110·1 108·1 104·3 100·8	113.0 108.0 104.4	117.9	121·8 119·7 115·5 111·7	128·3 125·9 123·6 119·4 115·4 111·7
\$. 2 4 6 8 10	61·4 59·5 57·7 56·0 54·3	64·1 62·1 60·2 58·5 56·8	66.9 64.8 62.9 61.0 59.2	69·7 67·6 65·5 63·6 61·8	72·6 70·4 68·3 66·2 64·3	75.6 73.3 71.0 68.0 67.0	76.2	79·1 76·8 7 74·5	79 77	2 8 7 8 4 8	8·0 5·3 2·7 0·3 8·0	91·2 88·4 85·7 83·2 80·8	94.5 91.6 88.8 86.2 83.8	97·8 94·8 92·0 89·3 86·7	101·2 98·1 95·2 92·4 89·8	104·7 101·5 98·5 95·6 92·9	108·2 104·9 101·8 98·8 96·0
12 14 16 18 20	52·8 51·3 49·9 48·5 47·2	55·1 53·6 52·1 50·7 49·3	57.5 55.9 54.4 52.9 51.4	58·3 56·7 55·1 53·6	62·5 60·7 59·1 57·4 55·8	65.1 63.2 61.5 59.8 58.1	65.63.63.63.63.63.63.63.63.63.63.63.63.63.	68·3 66·4 64·6	71 69 67	0 7 0 7 1 6	5·8 3·6 1·6 9·6 7·7	78·6 76·4 74·2 72·2 70·2	81·4 79·1 76·9 74·8 72·8	84·3 81·9 79·7 77·5 75·4	87·2 84·8 82·5 80·2 78·0	90·2 87·7 85·3 83·0 80·7	93·3 90·7 88·2 85·8 83·4
22 24 26 28 30	45.9 44.6 43.4 42.2 41.0	47.9 46.6 45.3 44.0 42.8	50.0 48.6 47.3 46.0 44.7	52·1 50·7 49·3 47·9 46·6	54.3 52.8 51.4 49.9 48.5	56·5 55·6 53·5 52·6 50·5	57° 55° 54°	59.5 57.8 56.2	61 60 58	7 6 0 6 4 6	5.9 4.1 2.3 0.6 8.9	68·3 66·4 64·6 62·8 61·0	70·8 68·9 67·0 65·1 63·3	73°3 71°3 69°4 67°4 65°5	75.9 73.8 71.8 69.8 67.8	78·5 76·3 74·3 72·2 70·2	81·1 78·9 76·8 74·6 72·6
32 34 36 38 40	39·8 38·6 37·5 36·4 35·3	41.6 40.3 39.2 38.0 36.8	43'4 42'1 40'9 39'7 38'5	45.2 43.9 42.6 41.4 40.1	47°1 45°8 44°4 43°1 41°8	46.	6 49° 2 48° 9 46°	51.5 50.6 7 48.5	53 51 50	5 5 9 5 4 5	7·2 5·5 3·9 2·3 0·7	59°3 57°6 55°9 54°2 52°6	61·5 59·7 57·9 56·2 54·5	63.7 61.8 60.0 58.2 56.5	65.9 64.0 62.1 60.3 58.5	68·2 66·2 64·3 62·4 60·5	70·5 68·5 66·5 64·5 62·5

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

Lat.	m. 61	m. 62	63		m.	m. 65	m. 66	67		n.	m. 69	m. 70	m.	m		n.	m. 74
N.	-01	0.5					REI	DUC'	TION	IS.					,		
20 19 18 17	2 43.7	2 53° 2 48° 2 44°	1 2 5 5 9 2 5 9 2 5 9	0.0 2	8.6 3.8 59.4 55.1 51.1 2	9°3 4°7 0°4	3 14·9 3 10·3	9 3 20 2 3 15 7 3 11	[*I 3]	26·2 3 21·2 3 16·6 3	31·9 26·9 22·1 17·6	3 23·0	3 43 3 38 3 33 3 28	3 3 44 3 3 39 6 3 34	9.63 1.53 1.53 1.53	39.8	50·6 45·5
15 14 13 12	2 29.4	2 34	1 2 3 8 2 3	8·9 2 5·5 2	40.3 2	48·7 45·2	2 50° 2 50°	7 2 58 1 2 55 6 2 51	5°1 3	3·9 3 0·1 3 56·5 3	9·1 5·2 1·5	3 18·6 3 14·4 3 10·4 3 6·6 2·9	3 11. 3 12.	7 3 25 6 3 20 7 3 10	5·1 3 : 5·9 3 :	30·6 3 26·3 3	36·1 31·7 27·5
10 9 8 7 6	2 14.9	2 19	222	3.6 2	30.9 28.1 25.3 22.7 20.1 2	32.6	2 37	2 2 41	8.82	46.5 2	54.5 51.3 48.1 45.1 42.2	2 56.1	3 I·	03 5	5.93	14·5 3 10·9 3 7·4 3 4·1 3 0·9 3	15.9 12.4 8.9
5 4 3 2 0	1 59·3	2 7· 2 5·	2 2 I I 2 0 2	1.3 2	TO:0 2	17.1	2 21.	7 2 28	3.0 2 5.5 2	32·3 2 29·8 2 27·3 2	39.4 36.7 34.1 31.6 26.7	2 41·1 2 38·4 2 35·0	2 45	0 2 50 9 2 4: 2 2 4:	0.2 2 7.4 2 4.6 2	54·8 2 51·9 2 49·1 2	59·4 56·4 53·6
\$. 2 4 6 8 10	1 45.1	I 51. I 48. I 45.	9 I 5 6 I 5 4 I 4	5·5 I 2·0 I 8·8 I	2·8 2 59·1 2 55·5 1 52·2 1 49·0 1	2·7 59·1 55·7	2 6· 2 2· 1 59·	5 2 10 7 2 0 2 2 :	0·2 2 6·4 2 2·8 2	14.1 2	22:2 18:0 13:9 10:0 6:4	2 21.0	2 25.	9 2 2 6 2 2 5 2 2	9·9 2 5·5 2 I·3 2	34·0 2 29·5 2 25·2 2	33.2 38.1
12 14 16 18 20	I 33.7 I 3I.1 I 28.6	I 36.	8 I 3	9·9 I 7·1 I	40.2 I	46·2 43·3	1 49. 1 46. 1 43.	4 I 5:	2·7 I 9·6 I	56·11 52·91 40·81	59.4 56.2 53.0 50.0	I 59.5 I 56.3	2 6. 3 1 59. 1 56.	3 2 9 2 6 2 3 I 5	9·8 2 6·3 2 2·9 2 9·6 2	9.8 6.3 2.9	9.8
22 24 26 28 30	1 23.8 1 21.6 1 19.3 1 17.1 1 15.0	I 24. I 21. I 19.	2 I 2 9 I 2 7 I 2	6·9 I 4·6 I 2·2 I	29.7 I 27.2 I 24.8 I	32·5 30·0 27·5	I 35. I 30.	3 I 3 7 I 3 2 I 3	8·2 I 5·5 I 2·9 I	41·11 38·31 35·61	44°1 41°2 38°4	I 44.1	I 50.	1 1 5 1 1 5 2 1 4	7·11 7·11	23.1 1	59°5 56°2 53°0
32 34 36 38 40		1 11. 1 11.	1	3.3 I 1.1 I		20·3 17·9 15·6	I 22. I 20.	8 I 25 3 I 25 0 I 20	5·3 I 2·8 I 0·3 I	27·8 I 25·2 I 22·7 I	30·4 27·7 25·1	I 30.3	1 35° 1 32°	6 I 3 8 I 3 I I 3	8·3 I 5·5 I 2·6 I	38·1 1 35·2 1	43.8
			TR	UE	BEA	RIN	GOR	AZ	IMU	TH (OF +	- CA	PELI	LA:			
Lat.	m. 4	m. 8	m. 12	16 m.	20 m.	m. 24	28	m. 32	36	1 m.	1 m.	m. 48	m. 52	m. 60	70	80	m. 90
N.						,	A	ZIMI	UTH	S.	1						
20 19 18 17 16	1.6 1.5 1.5 1.5	3·2 3·1 3·0 2·9 2·8	4.8 4.6 4.4 4.3 4.2	6·3 6·1 5·9 5·7 5·6	7·9 7·6 7·4 7·1 6·9	9.4 9.1 8.8 8.5 8.3	10·9 10·6 10·2 9·9 9·6	12.0	13·5 13·6	14.4	15.2	18·1 17·5 17·0 16·5 16·0	18.8	21.4 20.7 20.2		27·0 26·3 25·6	28.1
14 12 10 8 4	1·3 1·2 1·1 1·0 1·0	2·6 2·5 2·4 2·3 2·1 1·9	3.9 3.7 3.6 3.4 3.1 2.9	5·2 5·0 4·7 4·5 4·2 3·9	6.5 6.2 5.9 5.6 5.2 4.8	7.8 7.4 7.1 6.7 6.2 5.8	9·1 8·6 8·2 7·8 7·2 6·7	10·3 9·8 9·4 8·9 8·2 7·7	9.2	11.1	13·3 12·2 11·2	15·2 14·5 13·8 13·2 12·2 11·4	14.2	16·9	19·5 18·7 17·3	21.8 21.0 19.5	24·I 23·2 21·6
S. 5 10 20 30 40	0.9 0.8 0.8 0.7 0.7	1·8 1·7 1·5 1·4	2·7 2·5 2·3 2·2 2·1	3.6 3.4 3.0 2.9 2.8	4·2 3·8 3·6	5:4 5:0 4:6 4:3 4:2	6·2 5·9 5·3 5·0 4·9	7·1 6·7 6·1 5·6	6.8	8·3	9·1 8·3 7·8	9·1 8·5	11.4 10.7 9.8 9.2 9.0	13·1 12·3 11·3 10·6 10·4	15·1 14·3 13·1 12·4 12·1	16·2 14·8 14·1	18·1 16·6 15·8

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	m. 36	38	m. 40	m. 42	m. 44
N.							RED	UCTI	ONS							
\$46 48 50 52 54	0·3 0·2 0·2 0·2 0·2	0.0 0.0 0.0	2·3 2·2 2·1 2·0 1·9	4·1 3·9 3·8 3·6 3·5	6·3 6·1 5·9 5·7 5·4	9·1 8·8 8·5 8·2 7·8	10.7 10.3 10.0 9.6 9.2	12·4 12·0 11·5 11·1 10·6	14·2 13·7 13·2 12·7 12·2	16·2 15·6 15·1 14·5 13·9	18·3 17·7 17·0 16·4 15·7	20·5 19·8 19·1 18·4 17·6	22.8 22.1 21.2 20.5 19.6	25·3 24·5 23·5 22·7 21·7	27·9 27·0 25·9 25·0 23·9	30·6 29·6 28·4 27·4 26·2
56 58 60 62 64	0·2 0·2 0·2 0·2	0·8 0·8 0·8 0·7 0·7	1.9 1.8 1.7 1.6 1.5	3·3 3·2 3·0 2·9 2·7	5·2 5·0 4·7 4·5 4·2	7·5 7·2 6·8 6·5 6·1	8·8 8·4 8·0 7·6 7·2	9.7 9.3 8.8 8.8	11.7 11.2 10.7 10.1 9.5	13·3 12·7 12·2 11·5 10·9	15·1 14·4 13·7 13·0 12·3	16·9 16·1 15·4 14·6 13·7	18·8 17·9 17·1 16·2 15·3	20·9 19·8 19·0 17·9 17·0	23.0 21.9 20.9 19.8 18.7	25·2 24·0 23·0 21·7 20·5
Lat.	m. 45	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	m. 54	m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
N.							RED									
\$6 48 50 52 54 56 58 59 60	32·0 30·8 29·7 28·6 27·5 26·3 25·1 24·5 23·9	33.4 32.2 31.1 29.9 28.7 27.5 26.2 25.6 25.0 24.3	34.9 33.6 32.4 31.2 29.9 28.7 27.4 26.7 26.1	36·4 35·1 33·8 32·5 31·2 29·9 28·6 27·9 27·2 26·5	37·9 36·5 35·2 33·9 32·5 31·2 30·0 29·0 28·3 27·6	39.4 38.1 36.7 35.3 33.9 32.4 31.0 30.2 29.5 28.8	41.0 39.6 38.1 36.7 35.2 33.7 32.2 31.5 30.7 29.9	42.6 41.2 39.6 38.1 36.6 35.1 33.5 32.7 31.9 31.1	44·3 42·7 41·2 39·6 38·0 36·4 34·8 34·0 33·1 32·3	46.0 44.4 42.7 41.1 39.5 37.8 36.1 35.3 34.4 33.5	47.7 46.0 44.3 42.7 41.0 39.2 37.5 36.6 35.7 34.8	49.4 47.7 46.0 44.2 42.5 40.7 38.8 37.9 37.0 36.0	51·2 49·4 47·6 45·8 44·0 42·1 40·2 39·3 38·3 37·3	53.0 51.1 49.3 47.4 45.5 43.6 41.6 40.7 39.7 38.7	54.8 52.9 51.0 49.0 47.1 45.1 42.1 41.1 40.0	56.7 54.7 52.7 50.7 48.7 46.7 44.6 43.5 42.5 41.4
62 63 64	22·1 22·1	23·7 23·0 22·4	24·8 24·1 23·4	25·8 25·1 24·4	26·9 26·2 25·4	28·0 27·2 26·5	29·I 28·3 27·5	30·3 29·4 28·6	31·5 30·6 29·7	32·7 31·8 30·9	33.9 32.0	35.1 34.1 33.5	36·4 35·4 34·4	37·7 36·6 35·6	39·0 37·9 36·8	39·2 38·1
								TTOT								
Lat.	m. 0	m.	m. 2	m. 3	m.	m. 5	m. 6	HOU m. 7	m. 8	m. 9	m. 10	m.	m. 12	m. 13	m. 14	m. 15
N.	1		~				RED						1 12			-10
46 47 48 49 50	56·7 55·7 54·7 53·7 52·7	58.6 57.5 56.5 55.5 54.5	60·5 59·4 58·4 57·3 56·3	62·4 61·3 60·3 59·2 58·1	64·4 63·3 62·2 61·0 59·9	66·4 65·3 64·1 63·0 61·8	68·5 67·3 66·1 64·9 63·7	70.6 69.3 68.1 66.9 65.6	72·7 71·4 70·2 68·9 67·6	74·8 73·5 72·2 70·9 69·6	77.0 75.6 74.3 73.0 71.6	79·2 77·8 76·5 75·0 73·7	81·4 80·0 78·6 77·1 75·7	83.7 82.2 80.8 79.3 77.8	86.0 84.5 83.0 81.5 80.0	88·3 86·7 85·2 83·7 82·2
51 52 53 54 55	51.7 50.7 49.7 48.7 47.7 46.7	53.4 52.4 51.4 50.3 49.3 48.2	55.2 54.1 53.1 52.0 50.9	57.0 55.9 54.8 53.7 52.5	58·8 57·7 56·5 55·4 54·2	59.5 58.3 57.1 55.9	62.5 61.3 60.1 58.9 57.6	64·4 63·2 61·9 60·6 59·4 58·1	66·3 65·1 63·8 62·5 61·2 59·8	68·3 67·0 65·7 64·3 63·0	70·3 68·9 67·6 66·2 64·8	72·3 70·9 69·5 68·0 66·6	74·3 72·9 71·4 69·9 68·5	76·4 74·9 73·4 71·9 70·4 68·9	78·4 77·0 75·4 73·8 72·3	80.6 79.0 77.5 75.8 74.3
56 57 58 59 60	45.6 44.6 43.5 42.5	47·1 46·1 45·0 43·9 42·8	49·8 48·7 47·6 46·4 45·3	51.4 50.3 49.1 47.9 46.8	53.0 51.9 50.7 49.5 48.3	54.7 53.5 52.3 51.0 49.8 48.5	55.1 53.9 52.6 51.3	56·8 55·5 54·2 52·9	58·5 57·2 55·8 54·5	60·2 58·8 57·5 56·1	63.4 62.0 60.6 59.1 57.7	63.8 62.3 60.8 59.3	65.6 64.0 62.5 61.0	67·4 65·8 64·3 62·7	69·2 67·6 66·1 64·4 62·8	71·1 69·4 67·8 66·2
62 63 64	41.4 40.3 39.5 38.1	41.6 40.5 39.4	44.2 43.0 41.8 40.6	44.4 43.5 42.0	45·8 44·6 43·3	47·3 46·0	50.0 48.7 47.4 46.0	51.5 50.2 48.8 47.4	53·1 51·7 50·3 48·8	54·6 53·2 51·8 50·3	54·8 53·3 51·8	56·3 54·8 53·3	57·9 56·3 54·8	59·5 57·9 56·3	59·5 57·8	62·8 61·1 59·4
Lat.		l m			HOU	-	1		1				ноц			
	m. 4	m. 8	12 12	16	m. 20	m. 24	30	m. 40	m. 50	m. 00	m. 10	m. 20	30	m. 40	m. 50	m. 60
N.	0.4			2.8	۰	٥	1 .	IMUT	1			00		17.1	18.8	
46 50 54 56	0·7 0·7 0·7	1·4 1·4 1·4	2·I 2·I 2·I	2·8 2·8 2·8	3.5 3.5 3.6	4·2 4·2 4·3	5·2 5·3 5·3	6·9 7·0 7·1	8.7 8.7 8.8 8.9	10.4 10.6 10.6	12·1 12·2 12·4	13.8 13.9 14.2 14.2	15.5 15.6 15.8 15.9	17·5 17·6	19·4 19·4	20·5 20·6 20·9 21·1
58 60 62 64	0.7 0.7 0.7 0.7	1.4 1.2 1.2	2·I •2·2 2·2 2·2	2·9 2·9 3·0	3.6 3.7 3.7	4·3 4·4 4·4	5·4 5·4 5·5 5·6	7·2 7·3 7·4	8·9 9·0 9·1 9·2	10·7 10·8 11·0 11·1	12·5 12·6 12·8 12·9	14·3 14·4 14·6 14·8	16·0 16·2 16·4 16·6	17.8 18.0 18.2 18.5	19·6 19·8 20·0 20·3	21·3 21·5 21·8 22·2

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM MERIDIAN BELOW THE POLE.

	!						r I	HOUF	2.						
Lat.	m. 16	m. 17	m. 18	m. 19	m. 20	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26	m. 27	m. 28	m. 29	m. 30
N.							RED	UCTI	ONS.						
45 46 47 48 49 50	92·2 90·6 89·0 87·5 85·9 84·3	94.6 93.0 91.4 89.8 88.1 86.5	97.0 95.4 93.7 92.1 90.4 88.8	99.5 97.8 96.1 94.4 92.7 91.0	102.0 100.3 98.6 96.8 95.1 93.3	104.6 102.8 101.0 99.2 97.5 95.7	107·1 105·3 103·5 101·7 99·9 98·0	109.7 107.9 106.0 104.2 102.3 100.4	112·4 110·5 108·6 106·7 104·7 102·8	115.0 113.1 111.1 109.2 107.2 105.3	117·7 113·7 113·7 111·7 109·7 107·7	120·5 118·4 116·4 114·3 112·3 110·2	123·2 121·1 119·0 116·9 114·8 112·7	126·0 123·9 121·7 119·6 117·4 115·3	128·8 126·6 124·5 122·3 120·1 117·9
51 52 53 54 55 56	82·7 81·1 79·5 77·9 76·3 74·6	84·9 83·2 81·6 79·9 78·3 76·6	87·1 85·4 83·7 82·0 80·3 78·6	89·3 87·6 85·9 84·1 82·4 80·6	91.6 89.8 88.0 86.3 84.5 82.6	93·9 92·1 90·2 88·4 86·6 84·7	96·2 94·3 92·5 90·6 88·7 86·8	98·5 96·6 94·7 92·8 90·9 88·9	98·9 97·0 95·0 93·0 91·0	103·3 101·3 99·3 97·3 95·2 93·2	105·7 103·7 101·6 99·6 97:5 95·4	108·2 106·1 104·0 101·9 99·7 97·6	110.6 108.5 106.4 104.2 102.0 99.8	113·1 110·9 106·6 104·3 102·1	115.7 113.4 111.2 108.9 106.7 104.4
57 58 59 60 61 62	73.0 71.3 69.6 67.9 66.2 64.5	74.9 73.2 71.5 69.7 68.0 66.2	76·8 75·1 73·3 71·5 69·7 67·9	78·8 77·0 75·2 73·4 71·5 69·6	80·8 79·0 77·1 75·2 73·3 71·4	82·8 80·9 79·0 77·1 75·2 73·2	84·9 82·9 81·0 79·0 77·0 75·0	86·9 84·9 82·9 80·9 78·9 76·8	89.0 87.0 84.9 82.9 80.8 78.7	91·1 89·1 87·0 84·8 82·7 80·5	93·3 91·1 89·0 86·8 84·6 82·4	95.4 93.3 91.1 88.9 86.6 84.3	97·6 95·4 93·2 90·9 88·6 86·3	99·8 97·6 95·3 92·9 90·6 88·2	99.8 97.4 95.0 92.6 90.2
1:1			· · · · · ·				1	HOU	R.						
Lat.	m. 31	m. 32	m. 33	m. 34	m. 35	m. 36	m. 37	m. 38	m. 39	m. 40	m. 41	m. 42	m. 43	m. 44	m. 45
N.							RED	UCTI	ONS.						
44 45 46 47 48	133.9 131.6 129.4 127.2 125.0	136·8 134·5 132·3 130·0 127·7	139.7 137.4 135.1 132.8 130.5	142·7 140·4 138·0 135·6 133·2	145·7 143·3 140·9 138·5 136·1	148·8 146·3 143·8 141·4 138·9	151.8 149.3 146.8 144.3 141.8	154·9 152·4 149·8 147·2 144·7	158·1 155·5 152·8 150·2 147·6	155·9 153·2 150·6	164.4 161.7 159.0 156.3 153.5	167·6 164·9 162·1 159·3 156·5	170·9 168·1 165·3 162·4 159·6	174.2 171.3 168.4 165.5 162.7	177·5 174·6 171·6 168·7 165·7
49 50 51 52 53	122.7 120.5 118.2 115.9 113.6	125.4 123.1 120.8 118.5 116.1	128·1 125·8 123·4 121·0 118·6	130·9 128·5 126·1 123·6 121·2	133.6 131.2 128.7 126.2 123.7	128.9	139.2 136.7 134.1 131.5 129.0	142·1 139·5 136·9 134·2 131·6	145.0 142.3 139.6 137.0 134.3	147·9 145·2 142·4 139·7 137·0	150·8 148·0 145·3 142·5 139·7	153·8 150·9 148·1 145·3 142·4	156·7 153·9 151·0 148·1 145·2	159.8 156.8 153.9 150.9 148.0	162.8 159.8 156.8 153.8 150.8
55 56 57 58	109·0 106·7 104·3 102·0	111.4 109.0 106.6 104.2	113·8 111·4 108·9 106·4	116·3 111·3 108·7	118·7 116·2 113·6 111·0	113.4 116.0 115.0	123·7 121·1 118·4 115·7	126·3 123·5 120·8 118·1	128·8 126·1 123·3 120·5	131·4 128·6 125·8 122·9	134.0 131.1 128.2 125.3	136·6 133·7 130·8 127·8	130.3 132.3 130.3	142.0 138.9 135.9 132.8	144.7 141.6 138.5 135.3
59 60 61 62	99·6 97·1 94·7 92·2	99·3 96·8 94·2	103·9 101·4 98·9 96·3	106·2 101·0 98·3	108·4 103·1 100·4	108·0 105·3 102·5	113.0 110.2 107.5 104.6	115·3 112·5 106·8	117.6 114.8 111.9 109.0	117·1 114·1 111·2	122·4 116·4 113·4	124·8 121·8 118·7 115·6	127·2 124·1 121·0 117·8	129·7 126·5 123·3 120·1	132 2 128·9 125·7 122·4
Lat.								HOU							
	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	m. 54	55	m. 56	m. 57	m. 58	m. 59	m. 60
N.		١.	١.	١.	١.			UCTI	1			1 .	١.	t .	
44 45 46 47 48	180·8 177·8 174·9 171·9 168·9	181.2	184.5	187·9 184·7 181·6	191·3 188·1 184·9	198.0 194.7 191.4 188.2 184.9	198·2 194·8 191·5	198.3	205.2	208.7	208·7 205·2	215·9 212·3 208·7	212.3	223.2	226·9 223·1 219·3
49 50 51 52 53		156.5	162.6	168.8 165.6 162.3	171·9 168·6 165·3	178·3 171·6 168·3	181·5 178·1 174·7 171·3	174.3	184·4 180·9 177·3	1	190.8	201·4 197·7 194·1 190·4 186·6	204·8 201·1 197·3 193·6 189·8	196·8 193·0	
54 55 56 57 58	141·1 137·9	153.4 150.2 147.0 143.7 140.5	149·7 146·4 143·1	155·8 152·4 149·1 145·7	155·2 151·8 148·4	161·5 154·5 151·0	157.3	160·1 156·4	170·2 166·5 162·9 159·2	169·4 165·7 162·0	172·3 168·6 164·7	182·9 179·1 175·3 171·4 167·5	178·2 170·4	185·2 181·2 177·2 173·2	180.3
59 60 61 62	134·7 131·4 128·1 124·7	130.2	139·7 136·3 132·9 129·4	138.8		143·9 140·3	142.8	149.1	151·7 147·9	154.3	157·0 153·0		166·4 162·4 158·3 154·1	160.0	167.8

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

							2 HO	URS.							
Lat.	m.	m. 2	m. 3	m. 4	m. 5	m. 6	m. 7	m. 8	m. 9	m. 10	m. 11	12	m. 13	m. 14	m. 15
N.						RI	EDUC	TION	S.		. ,				
44 45 46	234·4 230·6 226·7	238·2 234·3 230·4	242·I 238·I 234·I	245°9 241°9 237°9		253·7 249·6 245·4	253.5		261.3	269·7 265·3 260·9	273·7 269·3 264·8	277·8 273·3 268·8	281·9 277·4 272·8	286·1 281·4 276·8	290·3 285·5 280·8
47 48 49		226.5	230.2	233.8	237.5	241·3 237·1	245.0	248·8 244·5 240·2	252·6 248·3	256·5 252·1 247·6		264·2 259·7 255·1	268·2 263·5 258·9	272·1 267·4 262·7	276·1 271·3 266·6
50 51 52 53	207·3 203·4 199·4	214.7	218.1	221·6 217·5 213·4	225·2 22I·0		232·3	235.9		243·I 238·6 234·I	246.8	250·5 245·9 241·2 236·5	254.2 249.5 244.8 240.0	258·0 253·2 248·4	261·7 256·9 252·0 247·1
54 55 56	195.4 191.3 187.3	198·6 194·5 190·3 186·1	201·8 197·6 193·4	205·0 200·8 196·5	208·3 204·0	211·6 207·2 202·8	214·9 210·4	218·2 213·7 209·2	221.6	224·9 220·3 215·6	228·3 223·6 218·9	231·8 227·0 222·2 217·3	235.2	238·7 233·8 228·8 223·8	242·2 237·2 232·2 227·1
57 58 59	179.0 174.8	181·9 177·7	184.9	187·8 183·4	190.8	189.3	196.9	199.9	203.0	201.3	209.3	212.4	215·6 210·5	213·6	222·0 216·8
60 61 62 63 64	170.6 166.3 162.0 157.6 153.1	173.4 169.0 164.6 160.1	171·8 167·3 162·7	174.2 170.0	177·3	170.6	182·9 178·2 173·3	185·8	188·6 183·7 178·7	196.4 191.5 186.5 181.5	194·4 189·4 184·2	197.3 192.2 187.0 181.7	205.4 200.3 195.1 189.8 184.4	208·5 203·3 198·0 192·6 187·2	211.5 206.2 200.9 195.4 189.9
	-55	-30						OURS			,,,				
Lat.	m. 16	m. 17	m. 18	m. 19	m. 20	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26	m. 27	m. 28	m. 29	m. 30
N.						<u> </u>	EDUC							,	
° 44 45	294·5 289·7	298.7	302·9 298·0	307·2 302·2	311·5 306·5	315·9 310·8	320·2 315·0	324·6 319·4			337·9 332·5	342·4 336·9	347·0 341·4	351·5 345·9	356·1 350·4
46 47 48	284·9 280·1 275·3	289.0 284.1 279.2	283·2 283·2	297·3 292·3 287·2	301·4 296·4 291·3	305·6 300·5 295·3	309·9 304·7 299·4	303.2	307.7	-	316.0 331.6	325·9 320·3	335·8 330·2 324·5	328.8	344.7 338.9 333.1
49 50 51 52	270·4 265·5 260·6 255·7	274·3 269·4 264·4 259·4	273·2 268·2 263·1	282·2 277·I 272·0 266·8		284·9 279·7 274·4	294·2 288·9 283·6 278·2 272·8	298·2 292·9 287·5 282·0	302·3 296·9 291·4 285·9 280·3	295·3 289·8	310·5 304·9 299·3 293·7 288·0	303.3	318·8 313·1 307·4 301·6	323.0 317.2 311.4 305.5	327·3 321·4 315·5 309·5
53 54 55 56	250·7 245·7 240·7 235·5	254·3 249·3 244·1 239·0	242.4	245.8	249.3	269·1 263·7 258·3 252·8	267·3 261·9 256·3	276·6 271·0 265·5 259·9	274·7 269·1 263·4	267.0	282·2 276·5 270·6	291.8 286.0 280.2 274.2	295.7 289.8 283.9 277.9	299·6 293·7 287·6 281·6	303·6 297·5 291·4 285·3
57 58 59	219.9 230.4 230.4	228.2	231.7	229.6	238·4 232·8	236.1	250·7 245·1 239·4	254·2 248·5 242·7	251·9 246·0		264.7 258.7 252.7	268·3 262·2 256·1		275·4 269·2 263·0	279·I 272·8 266·4
60 61 62 63	214.6 209.2 203.8 198.3	212·3 206·8 201·1	215.3	218·4 212·7 207·0	227·2 221·5 215·7 209·9 204·0	224.6 218.8 212.8	227·7 221·8 215·8			237.2	234.2	237.3	246·9 240·5 234·0	250·2 243·7 237·1	253.5 246.9 240.2 233.5
64	192.7	195.5	TRU	1	<u> </u>	1		<u> </u>		<u> </u>				230 4	~33 3
	1							OURS							
Lat.	m. 2	m. 4	m. 6	m. 8	10 m.	1 m.	m. 14	m. 16	m. 18	m. 20	m. 22	m. 24	m. 26	28	30
N.							AZIM	UTHS				1	1 -	La	1
44 46 48 50	20.7 20.8 20.9 21.0	21·1 21·1 21·2 21·3	21·4 21·4 21·5 21·6	21·7 21·8 21·9 22·0	22·0 22·1 22·2 22·3	22·4 22·4 22·5 22·6	22·7 22·8 23·0	23·0 23·1 23·2 23·3	23·3 23·4 23·5 23·6	23.6 23.7 23.8 23.9	23.9 24.0 24.1 24.3	24·2 24·3 24·5 24·6	24.6 24.7 24.8 24.9	24·8 25·0 25·1 25·3	25·2 25·3 25·4 25·6
52 54 56 58	21·1 21·3 21·4 21·7	21.4 21.6 21.8	21.8 21.9 22.4	22·I 22·3 22·5 22·7	22·4 22·6 22·8 23·1	22·8 23·0 23·2 23·4	23·1 23·3 23·5 23·7	23.4 23.6 23.9 24.1	23·8 24·0 24·4	24·1 24·3 24·5 24·8	24·4 24·6 24·9 25·1	24·8 25·0 25·2 25·5	25·1 25·3 25·6 25·8	25.4 25.7 25.9 26.2	25·8 26·0 26·2 26·5
60 62 64	21·9 22·2 22·5	22·8 22·8	22.6	23·0 23·2 23·6	23·3 23·6 23·9	23·7 24·0 24·3	24·0 24·3 24·7	24·4 24·7 25·0	24.7 25.0 25.4	25·1 25·4 25·8	25.4 25.8 26.1	25·8 26·1 26·5	26·1 26·5 26·8	26·5 26·8 27·2	26·8 27·2 27·6

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

						2	2 HO	URS.							
Lat.	m. 31	m. 32	m. 33	m. 34	m. 35	m. 36	37	m. 38	m. 39	m. 40	m. 41	m. 42	m. 43	m. 44	m. 45
N.						RI	EDUC	TION	īS.			1	,		
44 45 46 47 48	360·7 354·9 349·1 343·3 337·4	365·3 359·5 353·6 347·7 341·8	370·0 364·1 358·1 352·1 346·1	374·7 368·7 362·7 356·6 350·5	379.4 373.3 367.2 361.1 354.9	378·0	388·9 382·7 376·5 370·2 363·9	393·7 387·4 381·1 374·7 368·4	398·5 392·2 385·8 379·3 372·9	396.9	408·2 401·7 395·2 388·6 382·0	413·1 406·6 399·9 393·3 386·6	418·1 411·4 404·7 398·0 391·2	423.0 416.3 409.5 402.7 395.9	428.0 421.2 414.3 407.5 400.5
49 50 51 52 53	331·5 325·6 319·6 313·6 307·5	335·8 329·8 323·7 317·6 311·5	340·1 334·0 327·9 315·5	344.4 338.2 332.0 325.8 319.5	348.8 342.5 336.2 329.9 323.5		357·5 351·1 344·7 338·2 331·7	361.9 355.5 349.0 342.4 335.8		370·9 364·3 357·6 350·9 344·1	368·7 361·9 355·1	379.9 373.1 366.3 359.4 352.5	384·4 377·6 370·7 363·7 356·7	389.0 382.1 368.1 361.0	393.6 386.6 379.5 372.4 365.3
54 55 56 57 58	301·4 295·2 289·0 282·7 276·3	305·3 299·0 292·7 286·4 279·9	309·2 302·9 296·5 290·0 283·5	313·1 306·7 300·3 293·7 287·1	317·1 310·6 304·1 297·5 290·8	301·2 294·5	325·1 318·5 311·8 305·0 298·1	329·2 322·4 315·6 308·8 301·8	333.2 326.4 319.5 312.6 305.6		341.4 327.4 320.3 313.1	345.5 338.5 331.4 324.2 316.9	349.7 342.5 335.3 328.1 320.7	353.8 346.6 339.3 332.0 324.5	358.0 350.7 343.4 335.9 328.4
59 60 61 62 63 64	269·9 263·4 256·8 250·1 243·4 236·5	273.4 266.8 260.1 253.4 246.5 239.6	276·9 270·2 263·5 256·7 249·7 242·7	280·5 273·7 266·9 259·9 252·9 245·8		280·7 273·7	291·2 284·2 277·1 269·9 262·6 255·2	294.8 287.7 280.6 273.3 265.9 258.4	298·5 291·3 284·0 276·7 269·2 261·6	302·1 294·9 287·5 280·1 272·5 264·8	291.0 283.5 275.8	309·5 302·1 294·6 286·9 279·2 271·3	313·3 305·7 298·1 290·4 282·5 274·6		320·8 313·1 305·3 297·3 289·3 281·2
							77.0	TIDO			<u>'</u>				_
Lat.	m.	m.	m.	m.	m.	m.	m.	URS m.	m.	m.	m.	m.	m.	m.	m.
N.	46	47	48	49	50	51 RI	DUC EDUC	TION	54 S	55	56	57	58	59	60
445 447 48 49 55 55 55 55 57 57 57 57 57 57 57 57 57	419·2 412·2 405·2 398·2 391·1 376·8 369·6 362·3 354·9 347·4 339·9 347·4 339·9 324·6 316·8 308·9	431.0 424.1 417.0 410.0 402.9 395.7 388.5 381.2 373.9 366.5 359.0 351.5 343.9 328.4 320.5 312.5		433.9 426.7 419.5 412.2 404.9 397.5 390.1 382.6 375.0 367.4 359.7 344.0 336.1 328.0 319.8	446·I 438·8 431·6 424·3 416·9 409·5 304·6 387·0 379·3 371·6 363·8 355·9 348·3 339·9 331·8 339·9 331·8 333·8 333·8 333·8 333·8 333·8 333·8 333·8 333·8 333·8	399·I 39I·4 383·7 375·9 368·0 360·0 352·0 343·8 335·5 327·2	395.8 388.0 380.1 372.2 364.1 356.0 347.7 339.4 330.9	446·3 438·8 431·2 423·6 415·9 408·1 400·3 392·4 376·4 376·4 376·4 368·2 360·0 351·6 343·2 334·7	458.9 451.3 443.7 436.0 428.3 420.5 412.7 404.8 396.8 388.7 380.6 372.3 364.0 355.6 347.1 338.4	471.6 464.0 456.3 448.6 440.9 433.1 425.2 417.3 409.3 401.2 393.0 393.6 36.5 368.1 359.6 350.9	445.7 437.8 429.9 421.9 413.8 405.6 397.4 389.1 380.7 372.2 363.6 354.8	481.9 474.2 466.4 458.5 450.6 442.6 434.6 426.5 418.3 410.1 401.8 393.4 384.9 376.3 367.6 358.7 349.8	495.0 487.2 479.3 471.4 463.5 455.5 447.4 439.3 431.2 422.9 414.6 406.2 337.7 389.1 380.4 371.6 362.7 353.7	500·3 492·4 484·5 476·5 468·5 460·4 452·3 444·1 435·8 427·5 419·1 410·6 402·0 393·3 384·5 375·6 366·6 357·5	505-6 497-7 489-7 481-6 473-5 465-4 455-2 448-9 440-5 432-1 423-6 415-0 388-7 379-6 388-7 379-6 361-4
62 63 64	300·9 292·8 284·5	304·4 296·2 287·9	307.9	311.2	315.1	318·7	322.4	326.0	329.7	333.4	337·I	340·8 331·6	344·5 335·2 325·8	348·3 338·9 329·4	352·I 342·6
			TRUE	BE.	ARIN	IG O				F X	CAI	PELL	A		
Lat.	m.	m.	m.	m.	m.	m.	2 HO	DURS m.	m.	m.	m.	1 m.	ı m.	. m	
	32	34	36	38	40	42	44	46	48	50	52	54	56	58	m. 60
N.			١.	۱ .			AZIM	UTH							.
44 46 48 50 52	25.5 25.6 25.7 25.9 26.1	25·9 25·9 26·1 26·2 26·4	26·2 26·2 26·4 26·6 26·8	26.5 26.6 26.7 26.9 27.1	26.8 26.9 27.0 27.2 27.4	27·1 27·2 27·3 27·5	27·4 27·5 27·7 27·8 28·1	27.7 27.8 28.0 28.2 28.4	28.0 28.1 28.3 28.5	28·3 28·4 28·6 28·8	28.6 28.7 28.9 29.1	28·9 29·1 29·2 29·4	29·2 29·4 29·5 29·8 30·0	29·5 29·7 29·9 30·1 30·3	29.8 30.0 30.2 30.4 30.7
54 56 58 60 62	26·3 26·6 26·9 27·2 27·5	26·7 26·9 27·2 27·5 27·9	27·0 27·3 27·6 27·9 28·3	27·3 27·6 27·9 28·2 28·6	27.7 27.9 28.2 28.6 29.0	28·0 28·3 28·6 28·9 29·3	28·3 28·6 28·9 29·3 29·7	28.6 28.9 29.3 29.6 30.0	29·0 29·3 29·6 30·0 30·4	29·3 29·6 29·9 30·3 30·7	29.6 29.9 30.3 30.7 31.1	30.0 30.3 30.0	30·3 30·6 31·0 31·4	30.6 31.0 31.3 31.7	31·0 31·7 32·1
64	28.0	28.3	28.6	29.0	29.4	29.8	30.1	30.4	30.4	31.5	31.6	31.2	32.3	32.2	32·5 33· I

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

* α CENTAURI.

Lat.	m.	m. 8	m. 12	m. 16	m.	m.	1 m			m. 28	m. 30	m. 32	34	36	m. 38	m. 40	m. 42	m. 44
N.							F	RED	UCI	'IOI	NS.							
24 20 16	0·2 0·3	1.0 1.0 0.0	2·1 2·2 2·3	3.8 3.9 4.1	5·9 6·1 6·4	7.4	₹ 8.	8 10	·4 I	í·6 2·0 2·5	13·3 13·8 14·3	15·1 15·7 16·3	17.7	19·1 19·8 20·6	22·9 22·1 21·3	23.6 24.5 25.4	26·0 27·0 28·0	28·5 29·6 30·7
12 8 4	0.3 0.3 0.3	1.1 1.1	2·4 2·5 2·6	4.4 4.4 4.6	6.6 6.8 7.1	8.3	9.	9 11	·6 I	2·9 3·4 3·9	14·8 15·4 16·0	16·9 17·5 18·2	19.8	21.3 23.0 51.3	23·8 24·7 25·6	26·3 27·3 28·4	31.5 30.1 30.0	34.3 33.0 31.0
S. 0 4 8 12	0.3 0.3 0.3	1.3 1.3 1.2	2·7 2·8 2·9 3·0	4.7 4.9 5.2 5.4	7·4 7·7 8·0 8·4	9.3	11.	1 13 6 13	.0 I	4·5 5·1 5·7 6·4	16·6 17·3 18·0 18·9	18·9 19·7 20·5	22.2	23·9 24·9 25·9 27·1	26·6 27·7 28·9 30·2	29·5 30·7 32·0 33·4	32·5 33·8 35·2 36·8	35.6 37.1 38.7 40.4
16 20 22 24	0.4 0.4 0.4 0.4	1.4 1.5 1.6	3·4 3·4 3·6	5.6 6.0 6.1 6.3	9·9 9·6 9·6	11.6	2 13·	4 I5 8 I6	·7 I	7·3 8·2 8·7 9·3	19·8 20·9 21·5 22·1	22·5 23·7 24·4 25·2	27.6	28·4 30·0 30·9 31·8	31·7 33·4 34·4 35·4	35·I 37·0 38·0 39·2	38·6 40·7 41·9 43·2	42·4 44·7 46·0 47·4
26 28 30 32	0·4 0·4 0·4 0·5	1.6 1.7 1.8 1.8	3.7 3.8 3.9 4.1	6·5 6·8 7·0 7·3	10·2 10·5 10·9	13.	3 15· 3 16·	2 17 8 18 4 19	·8 2	9·9 0·6 1·4 2·3	22·9 23·7 24·6 25·6	26·0 26·9 27·9	30·4	1 .	36·6 37·8 39·2 40·8	40·5 41·9 43·4 45·2	44·6 46·1 47·8 49·7	48·9 50·5 52·4 54·5
34 36 38 40	0·5 0·5 0·6	1.9 2.0 2.1 2.3	4.3 4.2 4.8 5.1	7.6 8.0 8.5 9.0	11·9 12·5 13·2	16.0	18.	0 21 0 22	·I 2	3·3 4·4 5·7 7·3	26·7 28·0 29·5 31·3	30·3 31·8 35·6	35·9	42.3	42.6 44.6 47.0 49.8	47·1 49·4 52·0 55·1	51.9 54.3 57.2 60.6	
Lat.	m. 45	m. 46	m.	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	54			m. 56	m. 57	58 58		m. 59	m. 60
N.	1.1	. 1	. (. 1	. 1	I	RED	UC]	CIO	NS.		. 1		1.	1.	1	
24 20 16 12	29·8 31·0 32·1 33·3	31·2 32·3 33·5 34·8	32·5 33·8 35·0 36·3	33·9 35·2 36·5 37·9	35·3 36·7 38·0 39·5		38·3 39·7 41·2 42·7	39·8 41·3 42·8 44·4	41.3 42.9 44.5 46.1	44.	5 46	0.2 0 0.2 0	46·1 47·9 49·6 51·4	0 47.8 0 49.6 0 51.4 0 53.3	0 51	3 0	53·1	0 52·9 0 54·9 0 56·9 0 59·0
8 4 2 0	34.5 35.8 36.5 37.2	36·1 37·4 38·2 38·9	37·7 39·1 39·8 40·6	39·3 40·8 41·5 42·3	40·9 42·5 43·3 44·1	45.0	44°3 46°0 46°8 47°8	46·0 47·8 48·7 49·6	47.8 49.6 50.6 51.5	51.	5 53 5 54	4 0 4 0	56.4	o 55·3 o 58·4 o 59·5			2.2	I 1.2 I 3.5 I 4.7 I 5.9
8. 2 4 6 8 10	38·0 38·8 39·6 40·4 41·3 42·3	39.7 40.5 41.3 42.2 43.1 44.1	41.4 42.2 43.1 44.1 45.0 46.0	43·2 44·1 45·0 45·9 46·9 48·0	45.0 45.9 46.9 47.9 48.9 50.0	46.8 47.8 48.8 49.8 50.9 52.0	51.8	50.6 51.6 52.7 53.8 55.0 56.2	52.6 53.6 54.7 55.9 57.1 58.4	55. 56. 58.	6 57 8 58 0 60 3 61		1.0	1 0·7 1 1·9 1 3·2 1 4·5 1 6·0 1 7·4	I 4 I 5 I 6 I 8		6·3 7·7 9·1	1 7·2 1 8·5 1 9·9 1 11·4 1 13·0 1 14·6
14 16 18 20 22 24	43.2 44.3 45.5 46.7 48.1 49.5	45.2 46.3 47.5 48.8 50.2 51.7	47.1 48.3 49.5 50.9 52.3 53.9	49.1 50.3 51.6 53.0 54.5 56.2	51·2 52·4 53·8 55·2 56·8 58·5	53·3 54·6 56·0 57·5 59·1 60·9	58·2 59·8 61·5	57.6 59.0 60.5 62.1 63.9 65.8	59.8 61.2 62.8 64.5 66.3 68.3	63. 65. 66. 68.	5 65 2 67 9 69 8 71).4 I		1 9.0 1 10.7 1 12.5 1 14.4 1 16.5 1 18.8	I 15 I 17 I 19	·I I ·O I ·I I	15·6 17·6 19·6 21·8	1 16·3 1 18·2 1 20·2 1 22·3 1 24·6 1 27·1
25 26 27 28 29 30	50·3 51·1 51·9 52·8 53·8 54·8	56·1	56.6 57.5 58.6 59.7		61·4 62·5 63·6 64·7	65.0 66.1 67.3	65·3 66·4 67·5 68·7 70·0	69.0 70.2 71.4 72.7	72·8 74·1 75·5	73° 74° 75° 76° 78°	75 75 75 75 75 75 75 75 75 75 75	5·8 I 7·0 I 3·3 I 9·7 I	21·1 22·5 24·0	I 20.0 I 21.3 I 22.6 I 23.9 I 25.4 I 27.0	I 24 I 25 I 26 I 28 I 30	·1 1 ·4 1 ·9 1 ·4 1	26·9 28·3 29·8 31·4	1 28·4 1 29·8 1 31·3 1 32·8 1 34·4 1 36·1
31 32 33 34 35	55.8 57.0 58.1 59.4 60.8	63.4	62.0 63.3 64.7 66.2	63.4 64.6 66.0 67.4 68.9	66.0 67.3 68.7 70.2 71.8	68.6 70.0 71.4 73.0 74.6	72·7 74·2 75·9 77·6	74·1 75·6 77·1 78·8 80·6	81.8	81 83 84 86	3 82 0 86 8 82 7 86	1.3 I	33.0	1 28.6 1 30.4 1 32.1 1 34.2 1 36.3	I 33 I 35 I 37 I 39	·5 I ·4 I ·6 I	36·6 38·6 40·7 42·9	1 37·9 1 39·8 1 41·8 1 44·0 1 46·3
36 37 38 39 40	62·2 63·8 65·5 67·3 69·3	68.3	67·7 69·4 71·3 73·2 75·4	70.6 72.3 74.2 76.3 78.5	73·5 75·3 77·3 79·4 81·7	76·4 78·3 80·4 82·6 84·9	79.4 81.4 83.5 85.8 88.3	82·5 84·5 86·7 89·0 91·6	90.0	90	9 9	1·2 I 5·6 I 9·2 I	35°2 37°5 40°0 42°7 45°7	1 38·5 1 40·9 1 45·5 1 46·3 1 49·5	I 44 I 47 I 49	'4 I	47·8 50·6 53·5	1 48·8 1 51·4 1 54·2 1 57·3 2 0·5

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

× α CENTAURI.

Lat.	m. 61	m. 62	6 m		m. 64	m. 65	m. 66	67		n.	m. 69	m. 70	m.	7		m. 73	m 74
N.			,				RE	DUC						,	,	,	
0 22 20 18 16 14 12	0 55.7 0 56.7 0 57.8 0 58.8 0 59.9 1 1.0	0 58. 0 59. 1 0. 1 1.	61	9.4 I 0.5 I 1.6 I 2.7 I 3.8 I 5.0 I	1.2 1 2.4 1 3.5 1 4.7 1 5.9 1 7.1 1		1 6· 1 7· 1 8·	3 I 8 5 I 9	0.8 I	10.4 I 11.6 I 12.9 I 14.3 I	11.1 12.4 13.7 15.1 16.4 17.8	I 14: I 15: I 18:	5 I I6 9 I I8 2 I I9 5 I 20	·6 I I ·0 I 2 ·4 I 2	8·8 I 0·2 I 1·7 I	21.0 I 22.4 I 23.9 I 25.4 I	23·2 24·7 26·2 27·8
10 8 6 4 2	1 2·1 1 3·2 1 4·4 1 5·6 1 6·8 1 8·1	I 5. I 6. I 7. I 9.	3 I 5 I 7 I 0 I I	9.91		11.7 13.0 14.3 15.8	1 13· 1 16· 1 18·	9 I I 6 I I 6 I I 2 C	5·1 1 7·5 1 8·9 1	18·4 1 19·8 1 21·3 1 22·8 1	23.7	I 23° I 24° I 26° I 27°	1 25 1 26 1 1 28 7 1 30	·3 I 2 ·9 I 2 ·5 I 3 ·2 I 3	7·7 I 9·3 I 1·0 I 2·7 I	30·2 I 31·8 I 33·5 I 35·3 I	32.6 34.3 36.0 37.8
S. 2 4 6 8 10 12	1 10·8 1 12·3 1 13·8 1 15·4	I 13. I 14. I 16. I 17.	6 I I 6 I I 2 I I 8 I 2	5.5 I 7.0 I 8.6 I	16·3 I 17·9 I 19·4 I 21·1 I 22·9 I 24·7 I	20°3 21°9 23°6 25°4	I 22. I 24. I 26. I 28.	7 I 25 4 I 26 2 I 28 0 I 30	5.9 I 8.8 I 0.7 I	27·7 I 29·5 I 31·4 I 33·4 I	30·3 32·1 36·1	I 32.	35 37 37 39 31 41	·5 I 3 ·4 I 4 ·5 I 4 ·6 I 4	8·2 I 0·2 I 2·3 I 4·4 I	40.9 I 42.9 I 45.1 I 47.3 I	43.6 45.7 47.9 50.2
14 16 18 20 22 24	I 20.8 I 22.8 I 25.0 I 27.4	I 23. I 25. I 27. I 30.	4 I 2 5 I 2 8 I 3	6·1 1 8·2 1 0·5 1	26·7 I 28·8 I 31·0 I 33·4 I 36·0 I 38·8 I	31·5 33·8 36·3 38·0	1 34. 1 36.	3 I 33 6 I 39 2 I 42	7·1 1 2·1 1 4·0 1	40.0 I 42.5 I 45.1 I 48.0 I	42.9 45.4 48.2 51.1	I 48.	8 I 48 4 I 5 I 2 I 5 4 3 I 5 7	·8 1 5 ·5 1 5 ·4 1 5 ·5 2	1.8 I 4.5 I		57.9 0.8 4.0 7.3
25 26 27 28 29 30	I 34.3 I 37.5	I 37. I 38. I 40.	3 I 4 9 I 4 6 I 4	0°4 I 2°I I 3°8 I	40·3 I 41·9 I 43·5 I 45·2 I 47·0 I 48·9 I	46·7 48·4 50·3	I 49. I 51. I 53.	9 I 5: 7 I 5: 6 I 5:	3·1 1 5·0 1 7·0 2	56.4 1	59·8 1·7 3·8	2 3° 2 5° 2 7°	2 2 4 1 2 6 2 2 8 3 2 10	·6 2 1 ·6 2 1 ·8 2 1	0·0 2 2·2 2 4·4 2	9.5 2 11.5 2 13.5 2 15.7 2 18.0 2 20.4 2	17·1 19·3 21·7
31 32 33 34 35	I 43·I I 45·2 I 47·4 I 49·7	I 46. I 48. I 50. I 53.	4 I 4 5 I 5 8 I 5 2 I 5	9.7 I 1.9 I 4.3 I 6.8 2	51.0 1 53.1 1 55.4 1 57.8 2 0.4 2	56·5 58·9 I·3 4·0	2 0· 2 2· 2 5· 2 7·	0 2 4 2 0 2 7 2 1	1.4 2	9.6 2 12.3 2 15.2 2	10·7 13·3 16·1 19·0	2 14°. 2 17° 2 19° 2 22°	4 2 18 1 2 20 9 2 23 9 2 26	·1 2 2 ·8 2 2 ·7 2 2 ·8 2 3	1.9 2 4.7 2 7.6 2 0.7 2	25.7 2 28.5 2 31.5 2 34.7 2	29.5 32.4 35.5 38.8
36 37 38 39 40		2 4.	6 2 6 2 8 2	2·3 2 5·4 2 8·7 2	3°1 2 6°0 2 9°2 2 12°6 2 16°2 2	9·8 13·1 16·5	2 13· 2 17· 2 20·	7 2 I' 0 2 20 5 2 2	7·5 2 0·9 2 4·6 2	21·5 2 24·9 2 28·7 2		2 29° 2 33° 2 37°	4 2 33 1 2 37 0 2 41	·5 2 3 ·3 2 4 ·3 2 4	7·6 2 1·5 2 5·6 2	41.8 2 45.7 2 49.9 2	50·0 54·3
_			RU		EARI			AZI			F X					1	1
Lat.	m. 4	m.	m. 12	m. 16	20 m.	m. 24	m. 28	m. 32	m. 36	40 40	m. 44	m. 48	52	m. 60	m. 70	80	90
N. 0 25 20 10 0	0.5 0.5 0.5 0.5 0.6	I.0 I.0 I.0	1.5 1.5 1.6	2·0 2·1 2·1 2·3	2·5 2·5 2·6 2·8	3.0 3.0 3.1 3.4	3.5 3.5 3.6 3.9	3.9 4.0 4.2 4.5	0. 4.4 4.5 4.7 5.1	S. 4.9 5.0 5.2 5.6	5°4 5°5 5°7 6°2	5·9 6·0 6·2 6·7	6·4 6·4 6·7 7·3	7·3 7·4 7·7 8·3	8·5 8·6 9·0 9·7	9.7 9.8 10.2 11.0	10·9 11·4 12·2
S. 10 15 20 22 24	0·7 0·7 0·8 0·8 0·8	1·3 1·4 1·5 1·6 1·7	1.9 2.1 2.3 2.4 2.5	2·5 2·8 3·0 3·2 3·3	3·2 3·4 3·8 3·9 4·1	3.8 4.1 4.5 4.7 4.9	4°4 4°8 5°3 5°5 5°7	5·1 5·5 6·0 6·3 6·6	5·7 6·2 6·7 7·0 7·3	6·3 6·8 7·5 7·8 8·1	6·9 7·5 8·2 8·5 8·9	7.5 8.1 8.9 9.3 9.7	8·1 8·8 9·6 10·0 10·5	9.3 10.1 11.0 11.2	10·8 11·7 12·7 13·2 13·8	12·2 13·1 14·3 14·9 15·5	13.6 14.6 15.9 16.5 17.2
26 28 30 32 34	1.0 1.0 0.0	1·7 1·8 1·9 2·1 2·2	2.6 2.7 2.9 3.1 3.3	3·5 3·7 3·9 4·1 4·4	4·8 5·1	5·2 5·5 5·8 6·2 6·6	6·0 6·4 6·7 7·1 7·6	6·9 7·2 7·7 8·1 8·7	7.7 8.1 8.6 9.1 9.7	8·5 9·0 9·5 10·1 10·7	10.4	11.3	11.0 11.5 12.2 12.9 13.7	12·5 13·2 13·9 14·7 15·6	14.4 15.1 15.9 16.8 17.9	16·2 17·0 17·9 18·9 20·0	17.9 18.8 19.7 20.8 22.0
36 38 39 40	1·3 1·3 1·4	2·4 2·6 2·7 2·8	3.6 3.8 4.0 4.2	4.7 5.1 5.3 5.6	6.7	7.0 7.6 8.0 8.3	8·2 8·9 9·2 9·7	9°3 10°1 10°5 11°0	10·4 11·3 11·7 12·3		14.2	14.7	14.7 15.8 16.5 17.2	16·7 18·0 18·7 19·4	19·1 20·5 21·2 22·1	21·3 22·8 23·6 24·5	23·3 24·9 25·8 26·7

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

★ α² CENTAURI.

Lat.	m.	m. 8	m. 12	m. 16	m. 20	m. 24	m. 26	m. 28	30 m.	m. 32	m. 34	m. 36	m. 38	m. 40	m. 42	m. 44
S.							RED	UCTI	ONS.							
30 35 40 45	0·2 0·2 0·2 0·2	0.9 0.9 0.8 0.8	2.0 1.9 1.8 1.7	3.6 3.4 3.2 3.1	5.6 5.4 5.0 4.8	8·1 7·7 7·2 6·9	9.4 9.0 8.5 8.0	10.4 9.9 9.3	12.6 11.9 10.6	14·3 13·6 12·8 12·1	16·1 15·3 14·5 13·7	18·1 17·2 16·2 15·3	20·1 19·1 18·1 17·1	22·3 21·2 20·1 18·9	24·6 23·3 22·I 20·9	27.0 25.6 24.3 22.9
50 55 60	0.5 0.1	0·7 0·6	1.9 1.2	2·8 2·6 2·4	4.4 4.1 3.2	6·4 5·9 5·4	7·5 6·9 6·3	8·7 8·0 7·3	10.0 9.2 8.4	9.6 10.2 9.6	12·8 11·9 10·8	14.3 13.3	16·0 14·8 13·5	17·7 16·4 14·9	19·5 18·1 16·5	21.4 19.9 18.1
Lat.	m. 45	m. 46	m. 47	m.	m. 49	m. 50	m. 51	m. 52	in. 53	m. 54	m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
S.	10 1						RED									
30 32 34 36 38	28·2 27·6 27·1 26·5 26·0	29.5 28.9 28.3 27.7 27.1	30·8 30·1 29·5 28·9 28·3	32·1 31·4 30·8 30·2 29·5	33.4 32.8 32.1 31.4 30.8	34·8 34·1 33·4 32·7 32·0	36·2 35·5 34·8 34·0 33·3	37·6 36·9 36·1 35·4 34·6	39·I 38·3 37·5 36·7	40.6 39.8 39.0 38.1 37.3	42·1 41·2 40·4 39·6 38·7	43.6 42.7 41.0 40.1	45.2 44.3 43.4 42.5 41.6	46.8 45.8 44.9 44.0 43.1	48·4 47·4 46·5 45·5 44·5	50.0 49.0 48.0 47.0 46.1
40 42 44 46 48	25.4 24.8 24.2 23.6 23.0	26·5 25·9 25·3 24·7 24·0	27·7 27·1 26·4 25·7 25·1	28·9 28·2 27·5 26·9 26·1	30·I 29·4 28·7 28·0 27·2	31·3 30·6 29·9 29·1 28·4	32.6 31.8 31.1 30.3 29.5	33·8 33·1 32·3 31·5 30·7	35·2 34·4 33·5 32·7 31·9	36·5 35·7 34·8 34·0 33·I	37.9 37.0 36.1 35.2 34.3	39·2 38·4 37·4 36·5 35·6	40·6 39·7 38·8 37·8 36·8	42·I 41·I 40·2 39·2 38·I	43.5 42.6 41.6 40.5 39.5	45.0 44.0 41.0 40.8
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48 49 50 51 52	40·8 40·3 39·7 39·1 38·6	42·2 41·6 41·0 40·5 39·9	43.6 43.0 42.4 41.8 41.2	45.0 44.4 43.8 43.1 42.5	46·4 45·8 45·2 44·5 43·9	47.9 47.2 46.6 45.9 45.2	49.4 48.7 48.0 47.3 46.6	50.9 50.2 49.5 48.8 48.0	52.4 51.7 51.0 50.2 49.5	53.9 53.2 52.5 51.7 50.9	55.5 54.7 54.0 53.2 52.4	57·1 56·3 55·5 54·7 53·9	58·7 57·9 57·1 56·3 55·4	60·3 59·5 58·7 57·8 57·0	62.0 61.1 60.3 59.4 58.5	63.6 62.8 61.9 61.0 60.1
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58 59 60	34·9 34·3 33·6	36·1 35·4 34·7	37·3 36·6 35·9	38·5 37·8 37·0	39·7 39·0 38·2	41.0 40.2 39.4	42·2 41·4 40·6	43.5 42.7 41.9	44.8 44.0 43.1	46·1 45·3 44·4	47.5 46.6 4 5 .7	48·8 47·9 47·0	50·2 49·3 48·3	51·6 50·7 49·7	23.0 23.0	54.5 53.4 52.4
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REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM MERIDIAN BELOW THE POLE.

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41 42 43 44 45	71·2 70·3 69·5 68·7 67·8	73.0 72.2 71.4 70.5 69.6	74.9 74.1 73.2 72.3 71.4	76·8 76·0 75·1 74·2 73·3	78·8 77·9 77·0 76·1 75·1	80·8 79·8 78·9 78·0 77·0	82.8 81.8 80.8 79.9 78.9	84.8 83.8 82.8 81.8 80.8	86.8 85.8 84.8 83.8 82.8	88·9 87·8 86·8 85·8 84·7	91.0 89.9 88.9 87.8 86.9	92.0 90.9 89.8 88.7	95.2 94.1 93.0 91.9 90.8	97.4 96.2 95.1 94.0 92.8	99.5 98.4 97.2 96.1 94.9	101.7 100.6 99.4 98.2 97.0
46 47 48 49 50	67.0 66.1 65.3 64.4 63.5	68·8 67·9 67·0 66·1 65·2	70·5 69·6 68·7 67·8 66·9	72·3 71·4 70·5 69·5 68·6	74·2 72·3 71·3 70·3	76·0 75·1 74·1 72·1	77.9 76.9 75.9 74.9 73.8	79·8 78·8 77·8 76·7 75·6	81·7 80·7 79·6 78·6 77·5	83.7 82.6 81.5 80.4 79.3	83.4 82.3 81.2	86.5 85.4 84.2 83.1	89.6 88.5 87.3 86.2 85.0	91.7 90.5 89.3 88.1 86.9	93.7 92.5 91.3 90.1 88.9	95.8 94.6 93.3 92.1 90.8
51 52 53 54	62·6 61·7 60·7 59·8	64·2 63·3 62·3 61·4	65·9 64·9 64·0 63·0	67·6 66·6 65·6 64·6	69·3 68·3 67·3 66·2	71·1 70·0 69·0 67·9	72·8 71·7 70·7 69·6	74·6 73·5 72·4 71·3	76·4 75·3 74·1 73·0	78·2 77·0 75·9 74·7	78·9	80.7	83.8 82.5 81.3 80.0	85.7 84.4 83.1 81.9	87.6 86.3 85.0 83.7	89·5 88·2 86·9 85·6
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REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

★ α CRUCIS.

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REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

★ α CRUCIS.

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1	N.				,				EDU	CTIC	NS.							
1 1 1	8 16 14	52·6 53·5 54·4 55·3 56·3	54.4 55.3 56.2 57.1 58.1	56·1 57·0 58·0 59·0 60·0	57.9 58.9 59.9 60.9 61.9	59.7 60.7 61.7 62.8 63.8	I I I	1.6 1 2.6 1 3.6 1 4.7 1 5.8 1	6.7 1	6·4 7·5 8·6	1 7·2 1 8·3	I 10.3 I 11.5 I 12.7	I II	3·5 I I	4·3 I 5·6 I 6·9 I	16·4 1 17·7 1 19·0 1	18·5 19·8 21·1	1 20·6 1 21·9 1 23·3
	0 8 6 4 2	57°2 58°2 59°2 60°2 61°2	59°1 60°1 62°2 63°2	61.0 62.0 63.1 64.2 65.3	62·9 64·0 65·1 66·2 67·3	64·9 66·0 67·1 68·2 69·4	I I I I	0.3 I	8·9 I 10·1 I 11·3 I 12·5 I 13·7 I	12·2 13·4 14·6	1 15.5	1 16·4 1 17·7 1 19·0	I 18	3.6 I 2 3.9 I 2 I.3 I 2	0·8 I 2·I I 3·5 I	23.0 I 24.4 I 25.8 I	25·3 26·7 28·2	1 29.0
	0 2 4 6 8	62·3 63·4 64·6 65·8 67·0	64·3 65·5 66·7 67·9 69·2	66·4 67·6 68·8 70·1 71·4	68·5 69·7 71·0 72·3 73·7	71.9 73.2 74.6	I I I I	4·1 5·5 1	15.0 I 16.3 I 17.7 I 19.2 I 20.7 I	18·6 20·0 21·5	I 20·9 I 22·4 I 23·9	I 23·2 I 24·7 I 26·3	I 2 I 2 I 2	5·6 I 2 7·I I 2 8·7 I 3	28.0 I 29.6 I	30.4 I 32.0 I 33.7 I	32·8 34·5 36·3	1 35·3 1 37·0 1 38·8
I	0 2 4 6 8	68·4 69·8 71·2 72·8 74·4	70·6 72·0 73·5 75·1 76·8	72·8 74·3 75·9 77·5 79·3	75·1 76·7 78·3 80·0 81·8	77.5 79.0 80.7 82.5 84.3	I 2 I 2 I 2	1·5 I 3·2 I 5·0 I	22·2 I 23·9 I 25·7 I 27·5 I 29·5 I	26·4 28·2 30·1	1 28·9 1 30·8 1 32·7	I 31.4 I 33.3 I 35.4	I 3	4·0 I 3 6·0 I 3 8·0 I 4	36·7 I 38·7 I 10·8 I	39.3 I 41.4 I 43.5 I	42.0 44.1 46.3	1 44·7 1 46·9 1 49·1
2 2 2	3 4 5	76·2 78·1 79·1 80·2 81·3	78·7 80·6 81·7 82·8 83·9	81·2 83·2 84·3 85·4 86·5	83.7 85.8 86.9 88.1 89.3	86·3 88·5 89·6 90·8 92·0	I 3 I 3 I 3	1·1 I 2·3 I 3·5 I	31.6 I 33.9 I 36.3 I 37.6 I	36·6 37·9 39·1	I 40·7 I 42·0	I 43.5 I 44.9	I 4	5·1 1 4 6·4 1 4 7·8 1 5	8.0 I 9.4 I 50.8 I	51.0 I 52.4 I 53.8 I	54.0 55.4 56.9	57.0 58.4 0.0
2 2 2	6 7 8 9 0	82·4 83·6 84·8 86·1 87·5	85·1 86·3 87·6 88·9 90·3	87·7 89·0 90·3 91·7 93·2	90·5 91·8 93·2 94·6 96·1	96·0	I 3: I 3: I 4:	7·5 I 8·9 I 0·4 I	39.0 I 40.4 I 41.9 I 43.4 I 45.0 I	43·3 44·8 46·4	46·3 47·9 49·5	I 49.3 I 50.9 I 52.6	I 54	2·4 I 5 4·0 I 5 5·7 I 5	5.4 I 7.I 2		3·5 5·4	2 4·9 2 6·8 2 8·7
3 3 3 3	3	89·0 90·5 92·1 93·8	91·8 93·4 95·0 96·8		101.1	102·4 104·2	I 4	5·4 I 7·3 I	46.8 I 48.6 I 50.5 I 52.5 I	53.7	54·9 56·9	2 0.3 1 2 0.3	2 2	1·4 2 3·5 2		10.3 2	13.8	2 12·7 2 14·9 2 17·3 2 19·7
3 3 3 3	6 7	99.6	100.6	109.8	107.0	112.2	I 53	3·6 I	54.6 I 56.9 2 59.3 2 1.9 2	2.7	3.7	2 7·I	2 IC 2 IC	3·1 2 I 3·6 2 I 3·3 2 I 5·2 2 I	6.9 2	17·8 2 20·6 2	21.4	2 25.1
3: 4: 4: 4:	0	100.3	112.8	113.4	114·2 116·9 119·9	123.2	2 2	1·0 2		14.2		2 22·I 2 18·7	2 20	2.5 2 2	6.3 2	30.5 5	34·1	38.0° 2 41.8
L	at.	m. 4	m. 8	m. 12	m. 16	m.	m. 24	m. 28		36	m.	m.	m.	m.	m.	m.	m.	m.
N	<u>-</u> '	-1		_ A&	10	20 1	~1	. 40	AZIN			1 22	48	52	60	70	80	90
2 2 1	5 0 0	0.5 0.5 0.5 0.5	1.0 1.0 0.0	1·4 1·4 1·4 1·6	1.8 1.9 1.9	2·3 2·3 2·4 2·6	2.8 2.8 2.9 3.1	3.4 3.4 3.4	3.7	4.3	4.6	5.1	5.5 5.5 5.7 6.1	6.0	6.8 6.9 7.1 7.6		9.0 9.1 9.4 10.0	10.2
1 1 2 2 2	5 0 4 8 0	0.6 0.6 0.7 0.7 0.8 0.8	1·2 1·2 1·4 1·5 1·6 1·7	1.7 1.9 2.0 2.2 2.4 2.5	2·3 2·5 2·7 2·9 3·2 3·4	2·9 3·1 3·4 3·7 4·0 4·2	3.5 3.7 4.0 4.4 4.8 5.1	4.0 4.3 4.7 5.1 5.6 5.9	3 4.9 5.4 5.8 6 6.4	5·5 6·0 6·5 7·2	6·1 6·7 7·2 7·9	6·3 6·7 7·3 7·9 8·7 9·2	6·8 7·3 8·6 8·6 9·5 9·9	7·9 8·6 9·3	10.2	10·5 11·4 12·3 13·4	11.9 13.9	13·2 14·3 15·4 16·7
3 3 3 4	2 4 6 8 0	0·9 1·0 1·1 1·2 1·3	1.8 1.9 2.0 2.2 2.4 2.6	2·7 2·9 3·1 3·3 3·6 3·9	3.6 3.8 4.1 4.4 4.7 5.2	4.5 4.8 5.1 5.5 5.9 6.4	5·4 5·7 6·1 6·5 7·1 7·7	6·2 6·6 7·1 7·6 8·2 9·6	7·1 7·6 8·1 8·7 9·4	8·0 8·5 9·0 9·7	8·8 9·4 10·0 10·7 11·6	9·7 10·3	10·5 11·1 11·9 12·7	11·3 12·0 12·8 13·7	12·9 13·7 14·6 15·6 16·7	14.8 15.7 16.7 17.8 19.1	16·7 17·6 18·7 19·9 21·3	18·4 19·4 20·5 21·8 23·3

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

★ a CRUCIS.

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Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	36	m. 38	m. 40	m. 42	m. 44
S.							RED	UCTI	ONS	•						
30	0.2	oʻ8	1.0	3.3	5.3	7:5	8:8	10.2	11.8	13.4	15.1	16·8	18.9	20.9	23.0	25·1
35 40	0·2	0·8	1.8	3.0	5·0 4·7	7·2 6·8	8•4 8•o	9.7	11.2	12.7	14.4	16.1	17.9	19.9	21.9	24.0
45	0.5	0.2	1.6	2.9	4.2	6.4	7.6	9 . 3	10.0	11.4	12.9	14.5	16.1	17.9	19.7	21.6
50 55	0.3	0.7	1.4	2·7 2·5	4·2 3·9	6·0 5·6	7·1	8·2 7·6	9°4 8·8	10.0	12.1	13.6	15·2 14·1	16·8 15·6	18·5 17·2	20·4 18·9
60	0.1	0.6	1.3	2.3	3.6	2.1	6.1	7.0	8.0	9.2	10.4	11.6	13.0	14.3	15.7	17.4
Lat.	m. 45	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	m. 54	m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
S.							RED	UCT	ONS							
28	26·8	28.1	29.3	30.5	31.8	33.1	34.4	35.8	37.2	38∙6	40.0	41.5	43.0	44.5	46·0	47.6
32 36	25·9 24·9	27·0 26·0	28.2	29.4	30.6	31.0	33.5	34.2	35.8	37·2 35·8	38·6	40·0 38·5	39.9	42.9	44.4 42.7	45.9
40	23.9	25.0	26.1	27.2	29.4	30·7 29·5	30.6	31.9	34.2	34.3	35.6	36.9	38.3	39.6	41.0	42.4
44 48	22.9	23.9	24.9	26·0 24·8	27.1	28·2 26·8	29.3	30.5	31.7	32.9	34·I	35.3	36·6·	37·9	39·2	40·5 38·6
52	20.6	21.5	22.5	23.5	24.4	25.4	26.5	27.5	28.6	29.7	30.8	31.9	33.0	34.2	35.4	36.6
54 56	20.0	20.3	21.8	22.8	23.7	24.7	25.7	25.9	27.7	28.8	29·9 28·9	30.0	31.1	33.5	34.4	35.5
58 60	18·7 18·2	19·6 18·9	20.5	21.3	22.2	23·I	24.1	25.0	26·0 25·1	27·0 26·0	28·0 27·0	29.0	30.0	30.0	31.0	33.3
							т	ЮН	JR.							
Lat.	m. 0	m. 1	m.	m.	m.	m. 5	m. 6	m. 7	m. 8	m. 9	m. 10	m. 11	m. 12	m. 13	m. 14	m. 15
S.							RED			•						
28	47.6	49.2	50.8	52.4	54.1	55.8	57.5	59.3	6 i ·o	62.8	64.6	66·5	68.4	70.3	72.2	74.1
30	46.7	48.3	49.9	51.5	53·1	54.8	56.5	58.2	59·9 58·8	61.7	63.5	65·3 64·1	67.2	69·0 67·7	70·9 69·6	72.8
34	45°9 45°0	47·4 46·5	49.0 48.1	50·5 49·6	52·2	53·8 52·8	55·5 54·4	57·I	57.7	59.4	61.2	62.9	64.7	66.5	68.3	70.2
36 38	44.2	45.6	47·1 46·2	48.7	50·2 49·2	50.7	53.4	55.0	56·6 55·5	58·3	60·0 58·8	60.5	63.4	65.2	67·0 65·7	68.8
40 42	42.4	43.8	45.2	46.7	48.2	49·7 48·6	51.2	52.8	54.4	56·o	57·6 56·4	59·2 58·0	60·9 59·6	62.6	64.3	66·I 64· 6
44	40.5	42·9 41·9	44.3	45.7	47·I	47.5	50·I 49·0	50.2	53.2	54·7 53·5	55·I	56.7	58.3	59.9	61.5	63.2
46 48	39·6 38·6	39·9	42.2	43·6 42·6	45·0	46.4	47.9	49°3	50·8 49·5	52·3	53·8 52·5	55.4 54.0	56·9 55·5	58·5	60·I 58·6	60.2
49 50	38·I 37·6	39.4	40.7	42.0	43'4	44.7	46.1	47.5	48.9	50.4	51.8	53.3	54.8	56.3	57·9 57·1	59·5 58·7
51	37·I	38.3	39·6	40.9	42.8	44·I	45·5 44·9	46·9 46·2	48·3 47·6	49.7	50.4	51.9	54·I	55·6 54·8	56.3	57.9
52	36·6	37·8 37·3	39.1	40·3	4I·6	42.9	44.2	45.6	46.3	48.3	49·8 49·0	50.4	52.6	54.1	55·6 54·8	57·1
54 55	35·5 35·5	36.7 36.2	37.9	39·2 38·6	40.4	41.7	43.0	44.3	45.6	46.9	48·3 47·6	49.7	51·I	52.5	54.0	55·4 54·6
56	34.4	35.6	37·3	37.9	39.8	40.4	42.3	43.6	44.9	45.5	46.8	48.2	49.5	50.9	53·I	53.7
57 58	33.3	35·0 34·4	36·1	37·3 36·7	38·5 37·9	39·7	40·9 40·2	42.2	43.4	44.0	46·0 45·3	47.4	48.7	49.2	51·4 50·6	52.8
59 60	32·7 32·1	33.8	34·9 34·2	36·0 35·4	37·2 36·5	38·3 37·6	30.5	40.7	41.0	43.2	44·4 43·6	45.7	47.0	48.3	49.6	21.0
				o 1	HOU	R.				1		I	HOU	R.		
Lat.	m. 4	m. 8	m. 12	m.	m. 20	m. 24	m. 30	m. 40	m. 50	m. 00	m. 10	m.	m. 30	1 m.	m.	m. 60
S.								IMUT								
30	0.2	0.9	° 1.4	ı.8	2.3	2.8	3.5	4.6	5.7	6.9	8°0	9·1	0 10.2	11.3	12.3	13.4
36 40	0.2	0.0	1.4	1.0	2.3	2.8	3.2	4.7	5.8	6·9	8·0 8·2	9.2	10.3	11.4	12.5	13.8
44	0.2	1.0	1.5	1.9	2.4	2.0	3.2 3.2	4·7 4·8	5·9 6·0	7.0	8.3	9.2 6.3	10.2	11.0	13.0	14.1
48 52	0·5 0·5	I.0 I.0	1.2	2.0	2·5 2·5	3.0	3·7 3·8	4.9 2.1	6·3	7·3 7·5	8·6 8·8	9°7	11.0	12.1	13.3	14.5
56 60	0°5	I.I I.I	1.5	2·I 2·2	2.6	3.1	3.9	5.2	6.5	7.8	9.1	10.4	11.7	13.0	14.3	15.6
~~	~ 3	- 1	1 - 0		2.7	3.5	4.1	5.2	0.0	8.2	9.5	10.0	12.2	13.6	14.9	16.3

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM MERIDIAN BELOW THE POLE.

* a CRUCIS.

								ı I	UOL	R.							
Lat	m. 16	m.	18	m.	m. 20	m. 21	m. 22					m. 26	m. 27	m. 28	m. 29	m. 30	m. 31
S.	•						R	EDU	CTI	ONS.							
28 30 32 34 36	74.5 73.2 71.8	75.1	79·9 78·5 77·1 75·6 74·2	82.0 80.5 79.0 77.6 76.1	84.0 82.5 81.0 79.5 78.0	86·1 84·6 83·1 81·5 79·9	88. 86. 85. 83. 81.	7 88 1 87 5 85	·8 90 ·2 89 ·5 87	9 93 3 91 6 89	4	97.0 95.3 93.5 91.8 90.0	99.2 97.5 95.7 93.9 92.1	99.7 97.9 96.1 94.2	103.8 101.9 100.1 98.2 96.4	106·1 104·2 102·3 100·4 98·5	108·4 106·5 104·6 102·7
38 40 42 44 46	69.0 67.6 66.2 64.7	70·9 69·4 67·9 66·4	72·7 71·2 69·7 68·1	74.6 73.0 71.5 69.9 68.3	76·5 74·9 73·3 71·7 70·0	78·4 76·8 75·1 73·4 71·7	80· 78· 77· 75· 73·	6 80 0 78 3 77	6 82 8 80 1 79	5 84 7 82 0 80	5 7 8	88·3 86·4 84·6 82·7 80·8	90·3 88·5 86·6 84·7 82·7	92.4 90.5 88.6 86.6 84.6	94.5 92.5 90.6 88.6 86.5	96·6 94·6 92·6 90·5 88·4	98·7 96·7 94·6 92·6 90·4
48 50 52 54 56	58·4 56·7	61.6 60.0 58.2	61.5	66.6 64.9 63.1 61.3 59.4	68·3 66·5 64·7 62·8 60·9	70.0 68.2 66.3 64.4 62.4	69. 68. 66. 64.	9 71 o 69 o 67	6 73 6 71 6 69	3 75 3 73 3 70	0	78·8 76·8 74·7 72·6 70·3	80·7 78·6 76·5 74·3 72·0	82·5 80·4 78·2 76·0 73·6	84·4 82·2 80·0 77·7 75·3	86·3 84·1 81·8 79·4 77·0	88·2 86·0 83·6 81·2 78·7
								- T	TOTTI								
Lat.	m.	m.	m.	m.	m.	m		m.	IOUI	m.	1	m.	m.	m.	m.	m.	m.
s.	32	33	34	35	36	37		38 EDI	GTIC) 40)NS.	1	41	42	43	44	45	46
30 32 34 36	110·8 108·8 106·9 104·9	113·2 111·2 109·2 107·2 105·1	115.6 113.6 111.5 109.5	111.8 111.8 111.8	116	1118	8 1 7 1 5 1		128·1 125·8 123·5 121·3 119·0	130.6	7 1	133·2 130·9 128·5 126·1	2 15.6 2 13.2 2 11.6 2 8.6 2 6.2	2 13.6 2 11.2	2 18·6 2 16·1 2 13·6	2 18·7 2 16·2	2 23.9 2 21.4 2 18.7
38 40 42 44 46 48	98·8 96·7 94·6 92·4	103.0 101.0 98.8 96.6 94.4	105·3 103·1 100·9 98·7 96·4	107·5 105·3 103·1 100·8 98·5	100.	109 107 105 102	7 1	14·3 12·0 109·6 107·2	116.6 114.3 111.8 109.4 106.8	119.0 116.5 114.1 111.6	I	16·4 13·8	2 3.7 2 1.5 1 58.6 1 56.6 1 53.2	2 3.6 2 1.0 1 58.3 1 55.6	2 5.9 2 3.3 2 0.6 1 57.8	2 8·3 2 5·6 2 2·9 2 0·1	2 5·2 2 5·2
50 52 54 56	90°1 87°8 85°5 83°0 80°4	92·1 89·7 87·3 84·8 82·2	94·1 91·7 89·2 86·6 84·0	93.6 91.1 88.5 85.7	98· 95· 93· 90· 87·	97° 94° 92°	9	99.6 96.9 94.1 91.2	93·1 96·0 96·0 96·0	106·4 103·6 100·8 97·9 94·9	1	08·5 05·7 02·9 99·9 96·8		1 49·9 1 46·9 1 43·9	I 52.0 I 49.0 I 45.9	I 54.2	I 56·3 I 53·2 I 49·9
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Lat.	m. 47	m. 48	49			m. 51	m 5		m. 53	m. 54		m. 55	m. 56	m. 57	58 58	m. 59	m. 60
S.									CTIC								:
28 30 32 34 36	2 26 2 24 2 21	6 2 29 0 2 26 3 2 24	0.3 2 3 5.7 2 2 1.0 2 2	2·1 2 3	37.6 2 34.8 2 32.0 2 29.3 2 26.4 2		2 4 2 3 2 3	3·2 2 0·4 2 7·5 2 4·6 2	46·1 43·2 40·3 37·4 34·4	46·1 43·1 40·1	2	45.9	2 54.9 2 51.8 2 48.8 2 45.2 2 42.6	2 48.5	2 57·7 2 54·5 2 51·4	3 0.7 2 57.5 2 54.2	3 3.7 3 0.4 2 57.1
38 40 41 42 43	2 13	8 2 14 4 2 14	5.7 2 I 1.3 2 I 2.8 2 I	6·7 2 1	20·7 2 19·2 2	23·2 21·7 20·2 18·7	2 2 2 2 2 2 2 2	5·8 2 4·3 2 2·7 2 1·2 2	26·8 2 25·2 2 23·7 2	29·4 27·8 26·2	2 2 2	33.6 32.0 30.4 28.7	2 36·2 2 34·6 2 32·9 2 31·3	2 38·9 2 37·2 2 35·5 2 33·9	2 41.6 2 39.9 2 38.2 2 36.5	2 42·6 2 40·8 2 39·1	2 47.0 2 45.3 2 43.5 2 41.7
44 45 46 47 48	2 6 2 4 2 3 2 1	1 2 8 6 2 6 1 2 5 6 2 3	3·42 I 5·92 5·42 3·92	9·3 2 1 7·7 2 1 6·1 2	13·2 2 11·6 2 10·0 2 8·4 2	15·6 14·0 12·4 10·8	2 I 2 I 2 I 2 I	8·0 2 6·4 2 4·8 2 3·1 2	20·4 2 18·8 2 17·1 2 15·5 2	22·9 21·2 19·6 17·8	2 2 2	25·4 23·7 22·0 20·2	2 27·9 2 26·2 2 24·4 2 22·7	2 30·4 2 28·7 2 26·9 2 25·1	2 33.0 2 31.2 2 29.4 2 27.6	2 37·3 2 35·5 2 33·7 2 31·9 2 30·0	2 38·1 2 36·3 2 34·4 2 32·5
49 50 51 52	I 58- I 56- I 55-	5 2 0 9 I 59 3 I 57	0.7 2 0.1 2 7.5 1 5	- 1	6.8 2 5.2 2 3.5 2 1.8 2	5°7 4°0	2 2	9·7 2 8·0 2 6·2 2	10.3	14·3 10·7	2 2	14·9 13·0	2 17·2 2 15·3	2 17·6	2 23·8 2 21·9 2 19·9	2 28·I 2 26·2 2 24·3 2 22·3	2 28·7 2 26·7 2 24·7
53 54 55 56	I 52	O I 54	5.8 I 5 1.1 I 5 2.4 I 5 0.6 I 5	7·9 2 6·2 I 4·4 I 2·6 I	0·1 2 58·3 2 56·5 1		2	4.4 2 2.6 2 0.8 2 8.9 2	6.6 2 4.8 2 2.9 2 1.0 2	7·0	2		2 11.4	2 13.7	2 16·0 2 13·9	2 20·3 2 16·1 2 14·0	2 20·5 2 18·4

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

* α CYGNI.

Lat	1 m.	8 m.	12 12		20					n.	m. 30	32	1 m. 34	36	m. 38	m. 40	42	m. 44
N.							R	EDU	CTI	ONS	S.							
20 18 16 14 12	0.8 0.8 0.7 0.7 0.7	3.3	6.6	11.	4 19 7 18 1 17	3 23 2 22 3 21	3 27 1 26 0 24	7 32	4 37 7 35 2 35	7·6 4 5·6 4 3·9 3	45.6 43.0 40.8 38.8 37.0	51.8 48.9 46.4 44.1 42.1	58·3 55·1 52·2 49·7 47·5	65·2 61·6 58·5 55·6 53·1	72·5 68·5 65·0 61·9 59·1	80·1 75·8 71·9 68·5 65·4	83·3 79·1 75·3	86.6
10 8 6 4 0	0.6 0.6 0.6 0.6	2.1	5.3	2 9. 3 9.	7 15 3 14 0 14	·2 18 ·6 17 ·0 17	3 21 6 21 0 20	8 25 0 24 2 23	6 26	9·6 3 3·5 3 7·4 3	35·4 34·0 32·7 31·5 29·3	40.3 38.6 37.1 35.8 33.3	45°4 43°6 41°9 40°3 37°6	50·9 48·8 46·9 45·2 42·1	56.6 54.3 52.2 50.3 46.8	62.6 60.1 57.8 55.6 51.8	66·2 63·6	72·5 69·7 67·2
S. 4 8 12 16 20	0·5 0·5 0·4 0·4	2.0 1.8 1.0 1.0	3 4·1 7 3·9 5 3·2	7 6·	3 II 9 IO 5 IO	·4 13 ·8 13	8 16 0 15 3 14	5 19 5 18 6 17	3 2 2 2 1 I	2.4 2	27·4 25·7 24·2 22·8 21·5	31·1 29·2 27·5 25·9 24·5	31.1 33.0	39.4 37.0 34.8 32.8 31.0	43.8 41.1 38.7 36.5 34.5	48·5 45·6 42·9 40·5 38·2	50·2 47·3 44·6	55.0 51.8 48.9
24 28 32 36 40	0.4 0.3 0.3 0.3	I.7	3 3 3 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	5· 5· 7 4·	5 8 1 8 8 7	·6 9	9 13	0 15 3 14 6 13 9 12	6 I	5·7 1 5·8 1	20·3 19·2 18·1 17·0 16·0	23·1 21·8 20·6 19·4 18·2	23.2	29·2 27·6 26·0 24·5 23·0	32·6 30·7 29·0 27·3 25·6	36·1 34·0 32·1 30·2 28·4	37·5 35·4 33·3	38·8 36·5
Lat.	m. 45	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	54		n.	m. 56	m. 57	58		m. 59	m. 60
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20 19 18 17 16	, 97.9 95.3 92.8 90.5	99.5	106·5 103·7 101·0	108.0	115·5 112·4 109·5	120·1 116·9 113·9	124·7	129·5 126·1 122·8	134·3 130·8 127·4	139	2 14 5 14 1 13	4·2 2 0·4 2 6·9 2	33·3 29·2 25·3 21·7	2 34·3 2 30·3 2 26·6	2 39 2 35 2 31	3.9 2 9.5 2 5.4 2 1.5 2 7.9 2	44·8 40·6 36·6	
15 14 13 12 11	88·3 86·2 84·3 82·4 80·6	92·2 90·0 87·9 86·0 84·2		97·8 95·6 93·5 91·5	99.5		105.5 102.6	117.0 114.3 111.7 109.3	113.4 113.4	120	9 12 2 12 6 12	7·4 2 4·5 2 1·8 2	9.0 6.2	2 10.6	2 21 2 18 2 15	1·4 2 1·1 2 3·0 2 5·0 2	25·9 22·6 19·6	2 34·I 2 30·6 2 27·3 2 24·2 2 21·2
10 9 8 7 6	78·9 77·3 75·8 74·3	82·4 80·7 79·1 77·6 76·1	85·9 84·2 82·5 80·9	89.6 87.8 86.0 84.4 82.7	93·3 91·4 89·6 87·8 86·2	97.0 95.1 93.2 91.4 89.6	98.8		104.4	108	3 II 2 II	4·5 I	58·6 56·3 54·0	2 2·7 2 0·3 1 58·0	2 4	0.5 2 5.9 2 1.5 2 2.1 2	8·7 6·2	2 18·3 2 15·6 2 13·0 2 10·4 2 8·0
4 2 0 S.	70·2 67·7 65·4	73·3 70·7 68·3	76·5 73·8 71·3	79·7 76·9 74·3	83·0 80·1 77·4	86·4 83·4 80·6	86.7 83.8	93.3	96.9	97	5 10	4·2 I 0·6 I	47·9 44·2		I 55	5.6 I 1.6 I	59·5 55·4 51·5	2 3·5 1 59·2
2 4 6 8 10	63·3 61·3 59·4 57·6 55·8	66·1 64·0 62·0 60·1 58·3	69·0 66·8 64·7 62·7 60·9	71·9 69·6 67·5 65·4 63·5	74.9 72.5 70.3 68.1 66.1	77·9 75·5 73·1 70·9 68·8	81.0 78.5 76.0 73.7 71.6	79.0 76.6	87.4 84.6 82.6 79.6 77.2	87. 85. 82. 80.	8 9 1 8 6 8 1 8	1·1 1 8·3 1 5·6 1	34·3 31·4 28·7	I 3/·7 I 34·7	I 41 I 38 I 35	0.0 I 0.0 I	44.5 41.3 38.3	41.6
12 14 16 18 20	54·2 52·6 51·1 49·7 48·3	56·6 55·0 53·4 51·9 50·4	57°4 55°7 54°2	58·1 56·5 54·9	64·2 62·3 60·5 58·8 57·2	59·5	69·5 67·5 63·7 61·9	68·1 66·2 64·3	70°7	75° 73° 71°	5 7 4 7 3 7 3 7	8·3 I 6·1 I 4·0 I 1·9 I	21·2 18·9 16·7 14·5	1 26·5 1 24·1 1 21·7 1 19·4 1 17·2	I 27 I 24 I 22 I I9	7.0 I 1.5 I 2.2 I 3.9 I	30·0 27·5 25·0 22·6	33.0 30.4 27.9 25.4
22 24 26 28 30	46·9 45·6 44·3 43·0 41·8	49.0 47.6 46.3 45.0 43.7	49.7 48.3 46.9 45.6	53·3 51·8 50·4 48·9 47·5	55.6 54.0 52.5 51.0 49.5	56·2 54·6	58·5 56·8 55·2 53·6	59·1 57·4	59·6	65. 63. 61. 60.	5 6 6 6 9 6 1 6	7·9 I 6·0 I 4·2 I 2·3 I	10·4 8·4 6·5 4·6	1 12.9 1 10.9 1 6.9	I 15 I 13 I 11 I 9	3 1 3 1 3 1	18·1 15·9 13·7 11·6	14.1
32 34 36 38 40	40.6 39.4 38.2 37.1 35.9	42.4 41.2 39.9 38.7 37.5	41·7 40·4	46·2 44·8 43·5 42·1 40·8	48·1 46·7 45·3 43·9 42·5	47·I	52·1 50·6 49·0 47·6 46·1	51.0	51.3	56· 55· 53·	6 5 0 5 3 5	0·5 I 8·7 I 7·0 0 5·3 0	59·I 59·I	1 3·1	I 5	7.3 I 6.3 I 6.4 I 6.5 I	9·6 7·5 5·5 3·5 1·6	1 9·8 1 7·8 1 5·7

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

★ a CYGNI.

Lat.	m. 61	62 62	n		m. 64	m. 65	m. 66	67		m. 68	m. 69	m. 70	m.			m. 73	m. 74
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20 19 18 17 16	2 46.9	3 I · 2 56 · 2 52 ·	13 53 12 5	6·6 3 1·9 3 7·4 3	17·4 3 12·2 3 7·4 3 2·8 3 58·5 3	8.3	3 13.	1 3 35 7 3 29 6 3 24 8 3 19	1.3 3	30.1 3	35·9 30·8	3 41.0	3 47	8 3 5	59.74 53.94 18.33	12·3 4 6·0 4 0·0 4 54·3 4 48·9 3	18·8 12·3 6·1 0·3 54·8
15 14 13 12 11	2 35.5 2 32.1 2 28.9 2 25.8	2 40 2 36 2 33 2 30	4 2 4 9 2 4 6 2 3 4 2 3	5·4 2 1·8 2 8·4 2 5·1 2	54.4 2 50.5 2 46.8 2 43.3 2 39.9 2	55.6 51.8 48.2 44.7	3 0° 2 56° 2 53° 2 49°	8 3 6 9 3 2 2 2 58 6 2 54	5·1 3 2·1 3 3·2 3 4·6 2		16·8 12·6 8·6 4·7	3 22·2 3 17·9 3 13·8 3 9·9	3 23 3 19 3 15	7 3 3 3 3 2 1 3 2	33·3 3 28·8 3 24·5 3 20·4 3	43.8 39.0 34.3 329.9 25.7 3	44.7 39.9 35.4 31.1
10 9 8 7 6	2 20.0 2 17.3 2 14.7 2 12.2	2 24 2 21 2 19 2 16	5 2 2 7 2 2 0 2 2 4 2 2	9.0 2 6.1 2 3.4 2 0.8 2	36·7 2 33·6 2 30·7 2 27·8 2 25·1 2	38·3 35·2 32·3 29·5	2 34	0 2 47 9 2 44 9 2 41 0 2 38	7·8 2 1·6 2 1·5 2 3·6 2	52·6 2 49·3 2 46·2 2 43·2 2	57·5 54·2 50·9 47·8	3 2·5 2 59·1 2 55·7 2 52·6	3 7 3 4 3 0 2 57	·5 3 1 ·6 3 ·3 3	2.6 3 9.0 3 5.5 3 2.2 3	21.6 3 17.8 3 14.1 3 10.5 3 7.1 3	23.0 19.2 15.5 12.0
5 4 3 2 0	2 9.8 2 7.5 2 5.3 2 3.1 1 59.0	2 11	6 2 I 3 2 I 1 2 I	5·8 2 3·4 2 1·1 2	22·5 2 20·0 2 17·5 2 15·2 2 10·7 2	24·3 21·8 19·3	2 26.	6 2 33 0 2 30 5 2 27	3.0 2 0.4 2 7.8 2	37·4 2 34·7 2 32·1 2	42.0 39.2 36.5	2 43.7	2 51 2 48 2 45	·I 2 5	55·8 3 52·8 2 19·9 2	3.8 0.6 3 57.5 3 54.5 48.9 2	2·2 59·2
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12 14 16 18 20	I 36·I I 33·4 I 30·8 I 28·2	I 39 I 36 I 33 I 31	2 I 4 4 I 3 7 I 3	2.4 I 9.5 I 6.8 I 4.0 I	48·7 I 45·6 I 42·7 I 39·8 I 37·0 I	48.9 45.9 42.9 40.0	I 49. I 46. I 43.	2 I 5: I I 5: O I 49 I I 40	5·6 1 2·4 1 9·2 1 5·2 1	55·7 I 52·5 I 49·3 I	2·5 59·1 55·7 52·5	2 6·6 2 2·5 1 59·1 1 55·8	2 9 5 2 5 1 2 2 8 I 59	·6 2 : ·9 2 ·4 2 ·1 2	13·2 2 9·5 2 5·9 2 2·4 2	20·8 2 16·8 2 13·0 2 9·3 2 5·7 2	20·5 16·6 12·8 9·1
22 24 26 28 30	1 23.4 1 21.0 1 18.8 1 16.5	1 26 1 23 1 21 1 19	7 I 2 7 I 2 3 I 2	8.9 I 6.4 I 4.0 I 1.6 I	34·3 I 31·7 I 29·1 I 26·6 I 24·2 I	34.6 31.9 29.3 26.8	I 37. I 34. I 34.	5 I 46 7 I 33 I I 34 5 I 33	0.4 I 7.6 I 4.8 I 2.2 I	40·5 I 37·7 I 34·9 I	46·4 43·4 40·5 37·7	I 46.4 I 43.4 I 40.5	1 52 1 49 1 46 5 1 43	·6 I ·4 I ·4 I	55·7 I 52·5 I 49·3 I 46·3 I	55.6 I 52.4 I 49.2 I	2·I 58·7 55·4 52·2
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				RUE				OR .	AZIN	IUTI	I OI	* *	αСУ	'GN	I.		
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20 19 18 17	1.7 1.6 1.6 1.5	3.3 3.5 3.3	5.0 4.8 4.7 4.5	6·7 6·4 6·2 6·0	8·3 8·0 7·7 7·5	9.9 9.5 9.2 8.9	11.5 11.1 10.7 10.4	13.0 12.6 12.2 11.8	14.6 14.1 13.6 13.2	16·1 15·5 15·0 14·6	17·5 17·0 16·4 15·9	17.8	20·4 19·7 19·1 18·5	23.0 22.3 21.6 21.0	26·1 25·3 24·6 23·9	29.0 28.1 27.4 26.7	31.2 30.4 30.4 30.4
16 14 12 10 8	1·5 1·4 1·3 1·2	2·9 2·7 2·6 2·5	4.4 4.1 3.9 3.7	5·8 5·5 5·2 4·9	7·2 6·8 6·5 6·1	8·6 8·2 7·7 7·3	9.5 9.0 8.5	11·4 10·8 10·2 9·7	10.9	12.0	13.3	16·7 15·8 15·0 14·3	16·2 15·4	18·4 17·6	30.3 31.1	23.6	28·4 27·1 26·0 24·9
6 4 0	1·1 1·1 1·2	2·3 2·2 2·3	3·5 3·4 3·2 3·0	4.2 4.3 4.0	5·9 5·6 5·4 5·0	7·0 6·7 6·4 6·0	8·1 7·8 7·5 6·9	9·3 8·9 8·5 7·9	10.4 10.0 9.6 8.9		11.6	13.1	14·7 14·1 13·6 12·7	16·8 16·2 15·6 14·5	18.6		23.9 23.1 20.9
5 10 15	0.9 0.8	1·9 1·6	2·8 2·6 2·4	3·7 3·5 3·3	4·6 4·3 4·1	5·5 5·2 4·9	6·4 6·0 5·7	7·3 6·9 6·5	8·2 7·7 7·3	8·5 8·1	8.9	9.7	10.2	13·5 12·7 12·0	13.9	16.6	19·6 18·5 17·6
20 30 40	0·8 0·7 0·7	1.4 1.4	2·1 2·2 2·3	3·I 2·9 2·8	3.6 3.5	4·7 4·4 4·3	5·4 5·1 5·0	6·2 5·8 5·7	7.0 6.6 6.4	7.3		9·3 8·7 8·5	9·4 9·2	10.0 10.0	12.6		16·1 15·7

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

 \bigstar α CYGNI.

Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 26	m. 28	m. 30	m. 32	34	36	m. 38	m. 40	m. 42	m. 44
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46 50 54 58	0·3 0·2 0·2	1.0 0.9 0.8	2·3 2·2 2·0 1·8	4·I 3·8 3·5 3·5	6·4 6·0 5·5 5·0	9:3 8:6 7:9 7:2	10·9 10·1 9·3 8·5	12.6 11.7 10.8 9.9	14·5 13·4 12·4 11·3	16·4 15·3 14·1 12·9	18.6 17.2 15.9 14.5	20·8 19·3 17·8 16·3	23·2 21·5 19·9 18·1	25·7 23·9 22·0 20·1	28·3 26·3 24·3 22·2	31·1 28·8 26·6 24·3
60 62 64	0·2 0·2 0·2	0·8 0·7 0·7	1.7 1.6 1.5	3·I 2·9 2·7	4·8 4·5 4·3	6·9 6·5 6·2	8·1 7·7 7·3	9·4 8·9 8·4	10·8 10·2 9·7	12·2 11·6 11·0	13·8 13·1 12·4	15·5 14·7 13·9	17·2 16·4 15·5	19·1 18·2 17·1	21·1 20·0 18·9	23·I 21·9 20·7
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Lat.	m. 45	m. 46	m. 47	m. 48	49	m. 50	51	52	53	54	55	56	57	58	59	60
N.						1	RED	UCT	IONS			1	ı	ı	ı	t
46 48 50 52 54	32·5 31·3 30·2 29·0 27·8	33.9 32.7 31.5 30.3	35.4 34.2 32.9 31.6 30.4	36·9 35·6 34·3 33·0 31·7	38·5 37·1 35·7 34·4 33·0	40·1 38·6 37·2 35·8 34·3	41·7 40·2 38·7 37·2 35·7	43·3 41·8 40·2 38·7 37·1	45.0 43.4 41.8 40.2 38.6	46·7 45·1 43·4 41·7 40·0	48·4 46·7 45·0 43·3 41·5	50·2 48·4 46·7 44·9 43·0	52.0 50.2 48.3 46.5 44.6	53.8 51.9 50.0 48.1 46.2	55.7 53.7 51.8 49.8 47.8	57.6 55.6 53.5 51.5 49.4
55 56 57 58 59	27·2 26·6 26·0 25·4 24·8	28·5 27·8 27·2 26·6 25·9	29.7 29.1 28.4 27.7 27.1	31.0 30.3 29.6 28.9 28.2	32·3 31·6 30·9 30·2 29·4	33.6 32.9 32.1 31.4 30.6	35.0 34.2 33.4 32.7 31.9	36·3 35·5 34·7 33·9 33·1	37.7 36.9 36.1 35.3 34.4	39·2 38·3 37·5 36·6 35·7	40.6 39.7 38.8 38.0 37.0	42·I 41·2 40·3 39·4 38·4	43.6 42.7 41.7 40.8 39.8	45.2 44.2 43.2 42.2 41.2	46·7 45·7 44·7 43·6 42·6	48·3 47·3 46·2 45·1 44·1
60 61 62 63 64	24.2 23.6 23.0 22.3 21.7	25·3 24·6 24·0 23·3 22·7	26·4 25·7 25·1 24·3 23·7	27·5 26·8 26·1 25·4 24·7	28·7 28·0 27·2 26·5 25·7	29·9 29·1 28·3 27·6 26·8	31·1 30·3 29·5 28·7 27·8	32·3 31·5 30·6 29·8 28·9	33.6 32.7 31.8 30.9 30.1	34·8 33·9 33·0 32·1 31·2	36·1 35·2 34·3 33·3 32·4	37·5 36·5 35·5 34·5 33·6	38·8 37·8 36·8 35·8 34·8	40·2 39·1 38·1 37·0 36·0	41.6 40.5 39.4 38.3 37.2	43.0 41.9 40.8 39.6 38.5
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	m. 0	m. 1	m. 2	m. 3	m. 4	m. 5	6 6	7 m.	8 8	m. 9	m. 10	11 m.	12	13	m. 14	15
N.							RED	UCT	IONS	.						
46 47 48 49 50	57.6 56.6 55.6 54.5 53.5	59.5 58.5 57.4 56.4 55.3	61·5 60·4 59·3 58·2 57·1	63·5 62·3 61·2 60·1 59·0	65.5 64.3 63.2 62.0 60.8	67.5 66.3 65.1 63.9 62.8	69.6 68.4 67.2 65.9 64.7	71·7 70·4 69·2 67·9 66·7	73.9 72.6 71.3 69.9 68.6	76·0 74·7 73·4 72·0 70·7	78·2 76·9 75·5 74·1 72·7	80·5 79·1 77·6 76·2 74·8	82·7 81·3 79·8 78·4 76·9	85.0 83.5 82.0 80.5 79.0	87·4 85·8 84·3 82·7 81·2	89.7 88.1 86.6 85.0 83.4
51 52 53 54 55	52·5 51·5 50·4 49·4 48·3	54·2 53·2 52·1 51·0 49·9	56.0 54.9 53.8 52.7 51.6	57·8 56·7 55·6 54·4 53·3	59.7 58.5 57.3 56.2 55.0	61·5 60·3 59·1 57·9 56·7	63·5 62·2 61·0 59·7 58·4	65.4 64.1 62.8 61.5 60.2	67·3 66·0 64·7 63·3 62·0	69·3 68·0 66·6 65·2 63·8	71·3 69·9 68·5 67·1 65·7	73.4 71.9 70.5 69.0 67.6	75.4 73.9 72.5 71.0 69.5	77.5 76.0 74.5 72.9 71.4	79.6 78.1 76.5 74.9 73.3	81.8 80.2 78.6 77.0 75.3
56 57 58 59 60	47°3 46°2 45°1 44°1 43°0	48·9 47·8 46·7 45·5 44·4	50·5 49·3 48·2 47·0 45·9	52·1 50·9 49·8 48·6 47·4	53·8 52·5 51·3 50·1 48·9	55.4 54.2 52.9 51.7 50.4	57·1 55·9 54·6 53·3 51·9	58·9 57·6 56·2 54·9 53·5	50.6 59.3 57.9 56.5 55.1	62·4 61·0 59·6 58·2 56·8	64·3 62·8 61·4 59·9 58·4	66·1 64·6 63·1 61·6 60•1	67·9 66·4 64·9 63·3 61·8	69·8 68·3 66·7 65·1 63·5	71.8 70.1 68.5 66.9 65.2	73·7 72·0 70·4 68·7 67·0
61 62 63 64	41.9 40.8 39.6 38.5	43°3 42°1 41°0 39°8	44.7 43.5 42.3 41.1	46·1 44·9 43·7 42·4	47·6 46·4 45·1 43·8	49·1 47·8 46·5 45·1	50·6 49·3 47·9 46·5	52·2 50·8 49·4 47·9	53.7 52.3 50.8 49.4	55·3 53·8 52·3 50·8	56·9 55·4 53·8 52·3	58·5 57·0 55·4 53·8	50·2 58·6 57·0 55·3	61·9 60·2 58·5 56·9	63.6 61.9 60.2 58.4	65·3 63·5 61·8 60·0
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46 50 54 56	0.7 0.7 0.7 0.7	1.4 1.4 1.4	° 2°1 2°1 2°2 2°2	2·8 2·8 2·9 2·9	3.5 3.6 3.6 3.6	4.3 4.3 4.3	5°3 5°3 5°4 5°4	7·1 7·1 7·2 7·2	8.8 8.9 8.9 9.0	10.6 10.6 10.7 10.8	12·3 12·4 12·5 12·6	14·0 14·1 14·2 14·3	15.7 15.8 16.0 16.1	17·4 17·5 17·7 17·9	19·5 19·5 19·6	20.8 21.0 21.2 21.4
58 60 62 64	0·7 0·7 0·7 0·8	1.2 1.2 1.2	2·2 2·2 2·3	2·9 2·9 3·0	3.6 3.7 3.7 3.8	4.4 4.4 4.4 4.5	5.4 5.5 5.5 5.6	7:3 7:3 7:3 7:5	9·1 9·2 9·3	10·9 11·0 11·1 11·2	12·7 12·8 12·9 13·1	14·5 14·6 14·7 14·9	16·2 16·4 16·6 16·8	18·0 18·2 18·4 18·7	19·8 20·0 20·2 20·5	21.6 21.8 22.1 22.4

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM MERIDIAN BELOW THE POLE.

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46 47 48 49 50	92.0 90.4 88.8 87.2 85.6	94·5 92·8 91·1 89·5 87·8	96·9 95·2 93·5 91·8	99.4 97.6 95.9 94.1	101.9 100.1 98.3 96.5 94.7	, 104·4 102·6 100·8 98·9 97·1	107.0 105.1 103.2 101.4 99.5	105.	7 110 8 108 8 106	3.3 I	14·9 12·9 10·9 10·8	117·6 115·5 113·5 111·4 109·3	114.0	120.9	123.6		131·5 129·2 126·9 124·6 122·2
51 52 53 54 55	83.9 82.3 80.6 79.0 77.3	86·1 84·4 82·7 81·0 79·3	88·4 86·6 84·9 83·1 81·4	90·6 88·8 87·1	92·9 91·1 89·3 87·4 85·6	95·2 93·4 91·5 89·6 87·7	97·6 95·7 93·7 91·8 89·9	99° 98° 96° 94° 92°	0 100 0 98 1 96	3.3 I	04·8 02·7 00·7 98·6 96·5	107·2 105·1 103·0 100·9 98·8	107.6	112·2 110·0 107·8 105·6 103·4		117·3 115·0 112·7 110·4 108·1	119·9 117·6 115·2 112·9 110·5
56 57 58 59 60	75·6 73·9 72·2 70·5 68·7	77.6 75.9 74.1 72.3 70.5	79·6 77·8 76·0 74·2 72·4	81.6 79.8 78.0 76.1 74.2	83·7 81·8 80·0 78·0 76·1	85·8 83·9 81·9 80·0 78·0	87.9 86.0 84.0 82.0 79.9	90° 88° 86° 84° 81°	o 90 o 88 o 86 9 83	0·2 3·1 5·0	94.4 92.3 90.2 88.0 85.8	96·6 94·5 92·3 90·1 87·9	98·9 96·7 94·4 92·2 89·9	98·9 96·6 94·3 92·0	103.4 101.1 98.8 96.4 94.0	105·7 103·4 101·0 98·6 96·2	108·1 105·7 103·2 100·8 98·3
61 62 63 64	67.0 65.2 63.4 61.6	68·7 66·9 65·1 63·2	70·5 68·7 66·8 64·9		74·2 72·2 70·2 68·2	76·0 74·0 72·0 69·9	77·9 75·8 73·7 71·6	79° 75° 73°	7 79 77		83·7 81·4 79·2 76·9	85·6 83·4 81·1 78·7		89.6 87.2 84.8 82.4	91.6 89.2 86.8 84.3	93.7 91.2 88.7 86.2	95·8 93·2 90·7 88·1
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46 47 48 49 50	134·3 132·0 129·6 127·3 124·9	134· 132· 130· 127·	8 137 4 135 0 132 6 130	7.7 IZ 5.3 IZ 2.8 IZ 0.3 IZ	38·1 14 35·6 13 33·1 13	3.6 14 11.0 14 18.4 14 15.9 13	3.9 1. 8.7 1. 6.0 1	19.5 1 16.9 1 14.2 1 11.5 1	52·5 49·8 47·1 44·4	155.6 152.8 150.1 147.3	5 158 8 155 1 153 3 150	·7 2 4 ·9 2 3 ·0 2 3 ·2 2 3	30·9 2 30·2 2	42·0 2 39·1 2 36·1 2	39·I 2 36·I 2	51·3 48·3 45·2 42·2 39·1	2 57·6 2 54·5
52 53 54 55 56	120·1 117·7 115·3 112·9	117	3 122 3 117	2·9 I:	28·0 13 25·5 12 22·9 12	30·7 13 28·1 13 25·5 12 22·8 12	8·1 1 5·4 1	33·4 1 30·7 1 27·9 1	136·1 133·3 130·5	136.0 136.0	9 141 0 138 1 135 3 132	·6 2 : ·7 2 : ·8 2 : ·8 2	18.5 2	27·2 2 24·2 2 21·1 2		32·9 29·8 26·6	
57 58 59 60	108·0 105·5 103·0 100·4	107	8 110 2 10 6 10	7.5 1	12·4 I: 09·7 I: 07·0 I	14·8 11 12·0 11 09·3 11	19·9 1: 17·1 1 14·3 1 11·5 1	19.5	116.1	121.	4 126 5 123 5 120	*9 2 *9 2 *8 2		15.0 2 11.9 2 8.8 2 5.6 2 2.4 2	17.6 2 14.4 2 11.2 2 8.0 2 4.8 2	17.0 13.8 10.5	2 19.6
62 63 64	95°3 92°7 90°0	94	7 9	5.7	98.7 10	03.7 10	5·8 I	05.0	10·2 107·1	109	4 114 3 111	·6 I	56·9 I 53·7 I 50·4 I	55.9 1		0.4	
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52 53 54 55 56 57	2 3 2 3 2 3 2 2 3	8.7 2 35.4 2 32.2 2 28.9 2	38·3 35·0 31·6	2 44° 2 41° 2 37° 2 34°	6 2 47. 2 2 44. 8 2 40. 4 2 37.	0 2 54 6 2 50 I 2 47 7 2 43	0 2 6 2 1 2 6 2	3.6 2 50.1 2 16.5 2	0.3 56.7 53.1 49.4 45.8	3 3 2 59 2 56 2 52 2 48	3.4 3 5.8 3 5.1 2 2.4 2 3.7 2	6·6 2·9 59·2 55·4 51·6	3 9.8	3 13.0 3 9.2 3 5.3 3 1.5	3 16·3 3 12·4 3 8·5 3 4·5	3 19·6 3 15·6 3 11·6 3 7·6 3 3·6	3 22·9 3 18·9 3 14·8 3 10·7 3 6·6
58 59 60 61 62	2 1 2 1 2 1	22·2 2 (8·8 2 (5·4 2	24·8 21·4 17·9 14·4	2 27· 2 24· 2 20· 2 16·	5 2 30 0 2 26 5 2 23 9 2 19	2 2 32 6 2 29 0 2 25 4 2 21	9 2 3 2 6 2 9 2	35.6 2 31.9 2 28.2 2 24.4 2	38·4 34·6 30·8 27·0	2 41 2 32 2 33 2 29	1·1 2 7·3 2 3·5 2 9·6 2	43.9 40.1 36.1	2 46·8 2 2 42·8 2 2 38·8 2 2 34·8	2 49.6 2 2 45.6 2 2 41.5 2 2 37.4	2 52·5 2 48·4 2 44·2 2 40·1	2 55.4 2 51.2 2 47.0 2 42.8	2 58·3 2 54·0 2 49·8
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REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

 \star a URSÆ MAJORIS (DUBHE).

Lat.	m. 4	m. 8	m. 12	16	20				n. 6	m. 28	m. 30	m. 32	m. 34	36	38		m. 10	m. 42	m. 44
N.]	RED	UC	TIO	NS.								
42 40 38 36 34	0·5 0·5 0·4 0·4	2·1 2·0 1·9 1·8 1·7	4.7 4.4 4.2 4.0 3.8	8·4 7·9 7·5 7·1 6·8	11.	3 14. 7 14. 1 13.	9 17 1 16 5 16	·7 20 ·8 19 ·0 18	0·8 0·7 3·8	25.5 24.0 22.8 21.8 20.9	29·2 27·6 26·2 25·0 23·9	33.3 31.3 29.2 28.2	33.5	39°37°35°	39. 39.	9 4 7 4 9 4	1·4 8·6 6·2 4·1 2·3	56.6 53.5 50.8 48.5 46.6	58·6 55·7 53·2
32 30 28 26 24	0.4 0.4 0.4 0.4 0.3	1.6 1.5 1.5	3·7 3·6 3·4 3·3 3·2	6·6 6·3 6·1 5·9 5·8	6. 6.	6 11: 6 11: 7 10:	0 14 6 13 2 13	·2 I6	7·3 5·7 5·1 5·6	20·1 19·3 18·7 18·1 17·6	23.0 22.2 21.5 20.8 20.2	26·: 25·: 24·: 23·: 23·:	2 28· 4 27· 7 26· 0 25·	31° 30° 7 29° 9 29°	35° 34° 33° 32°	5 3 3 3 3 3	0·7 9·3 8·0 6·8 5·8	44.8 43.2 41.8 40.6 39.4	47.4 45.9 44.5 43.2
20 16 12 8 4	0.3 0.3 0.3 0.3	1.4 1.3 1.2 1.1 1.1	3·I 2·9 2·8 2·7 2·6 2·5	5.5 5.2 5.0 4.8 4.6 4.4		9 9 9 4 9 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	8 11 4 11 0 10	·7 I3 ·2 I3 ·7 I3 ·3 I3	1.4 3.7 3.1 2.6 2.1 1.6	16·7 15·9 15·2 14·6 14·0 13·5	19·1 18·2 17·4 16·7 16·1 15·5	20.	7 23 4 8 22 4 9 21 9	4 26° 4 25° 5 24° 5 23°	2 29· 2 27· 2 26· 2 25·	2 3 9 3 8 2 8 2	3·9 2·3 0·9 9·7 8·5 7·5	37.4 35.6 34.1 32.7 31.4 30.3	39.0 37.4 35.8 34.5
8 12 16 20 24	0·3 0·2 0·2 0·2 0·2	0.9 0.0 1.0 1.0 1.0	2·4 2·3 2·2 2·1 2·1 2·0	4·2 4·1 4·0 3·8 3·7 3·6	6· 6· 6· 5·	4 7· 2 7· 0 7· 8 7·	7 9 5 8 2 8 0 8	·9 10 ·6 10	0.8 0.5 0.1 0.8	13·0 12·6 12·1 11·7 11·3 10·9	14·9 14·4 13·9 13·5 13·0	17. 16. 15. 14. 14.	18· 3 17· 3 17· 8 16·	5 20° 9 20° 3 19° 7 18°	8 23· 0 22· 4 21· 7 20·	1 2 3 2 6 2 9 2	6·5 5·6 4·7 3·9 3·1 2·3	29·2 28·2 27·3 26·4 25·5 24·6	29·9 28·9 27·9
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N. 42 41 40 39 38	64·7 62·9 61·2 59·6 58·2	67·6 65·6 63·9 62·3 60·7	70·4 68·4 66·6 64·9 63·3	73.4 71.3 69.4 67.6 66.0	76·4 74·2 72·2 70·4 68·7	79.4 77.2 75.1 73.2 71.5	82·5 80·2 78·1 76·1 74·3	85·7 83·3 81·1 79·0 77·2	88. 86. 84. 82. 80.	4 89 1 87 0 85	6 92·8 2 90·2 0 88·3	I	36·1 33·6 31·2	1 42. 1 39. 1 36. 1 34. 1 32.	4 I 4 8 I 4 4 I 3	2·8	1 4 1 4 1 4 1 4 1 3	6·2 3·4 0·9	52.7 1 49.7 1 46.8 1 44.2 1 41.8
37 36 35 34 33	56·8 55·6 54·4 53·3 52·3	59°3 58°0 56°8 55°7 54°6	61·9 60·5 59·3 58·1 57·0	64·5 63·1 61·8 60·5 59·4	67·1 65·7 64·3 63·0 61·8	69·9 68·3 66·9 65·6 64·3		75.4 73.8 72.2 70.8 69.5	78· 76· 75· 73· 72·	6 79. 0 77. 5 76. 1 74.	82·3 8 80·6 2 79·6 8 77·5		25·2 23·5 21·8 20·3	1 20° 1 28° 1 26° 1 24° 1 23°	2 I 3 I 2 7 I 2 I I 2	7·6 6·0	I 3: I 3: I 3:	4·3 2·4 0·6 8·9	39.5 37.4 35.4 33.6 31.8
32 31 30 29 28	51·3 50·4 49·5 48·7 47·9	53.6 52.6 51.7 50.9 50.1	55.9 54.9 54.0 53.1 52.2	58·3 57·2 56·3 55·3 54·4	58·6 57·6 56·7	63·1 62·0 60·0 59·0	64·5 63·4 62·3 61·3	68·2 67·0 65·8 64·8 63·7	69° 68° 67° 66°	5 72· 4 70· 2 69· 2 68·	74.8 7 73.3 7 72.3 6 71.	3 I 3 I 2 I	17·4 16·1 14·9 13·7	1 21° 1 20° 1 18° 1 17° 1 16°	2 I 2 8 I 2 5 I 2 1 I I	0·2 9·0	I 2: I 2: I 2: I 2:	5·7 4·3 2·9 1·6	1 30·2 1 28·6 1 27·1 1 25·7 1 24·4
27 26 24 22 20	47.2 46.5 45.2 44.0 42.8	49.3 48.5 47.2 45.9 44.7	51.4 50.7 49.2 47.9 46.7	53.6 52.8 51.3 49.9 48.7	55.8 55.0 53.4 52.0 50.7	58·1 57·2 55·6 54·1 52·8	59·5 57·8 56·3 54·9	62.8 61.8 60.1 58.5 57.0	65° 64° 60° 59°	2 66· 4 64· 7 63· 2 61·	6 69 67 65 63 63 63 63 63 63 63 63 63 63 63 63 63	1 I 3 I 7 I	9·5 7·7 6·0	1 15. 1 14. 1 10. 1 8.	0 1 1	6·6 4·5 2·5 0·7	I 20 I I I I I I	9·2 7·0 5·0 3·1	1 23·1 1 21·9 1 19·6 1 17·5 1 15·6
18 16 14 12 10	38.3	41.7 40.8 40.0	43·5 42·6 41·7	47.5 46.4 45.4 44.4 43.5	46·2 45·3	48·1	52·3 51·1 50·1 49·0	52.0 51.0	55. 54. 52.	4 58· 2 57· 0 56· 9 54·	6 60° 3 59° 58° 9 56°	7 I 4 I I I 9 O	2·9 1·5 0·2 59·0	I 2. I 2.	2 I 7 I 4 I I I	7·4 5·9 4·6 3·2	I I	9·7 8·2 6·8 5·4	1 13·8 1 12·1 1 10·5 1 9·0 1 7·6
8 6 4 2 0	37·5 36·8 36·1 35·4 34·7	37.7	40·I	42.6 41.8 41.0 40.2 39.5	44.4 43.5 42.7 41.9 41.2	45·3 44·5 43·6	48·1 47·1 46·2 45·4 44·6	49.9 49.0 48.1 47.2 46.3	49.	9 52· 9 51· 0 50·	8 54. 8 53. 8 52.	7 0 7 0 7 0	57·8 56·7 55·7 54·6 53·6	o 58· o 57· o 56·	7 I 6 0 5 6 0 5	9·7 8·6	I	2·9 1·7 0·6	1 6·3 1 5·0 1 3·8 1 2·6 1 1·5
5. 2 6 10 14 18 22	32·9 31·8 30·8	33.3	35.9 34.7 33.5 32.4	37·5 36·2	39.0 37.7 36.4 35.2	40·6 39·3 37·9 36·7	42·3 40·8 39·5 38·1	43.9 42.4 41.0 39.6	45° 44° 42° 41°	6 47. 1 45. 6 44. 2 42.	7 47° 2 45° 7 44°	1 0 4 0 8 0	52.7 50.9 49.2 47.5 45.9 44.4	0 52° 0 50° 0 49° 0 47°	7 0 5 9 0 5 2 0 5 6 0 4	4·6 2·7 1·0 9·2	0 5 0 5 0 5 0 5	6·4 4·5 2·7 0·9	1 0.4 0 58.4 0 56.4 0 54.5 0 52.7 0 50.9

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

★ α URSÆ MAJORIS (DUBHE).

Lat.	61 m.	m. 62	63	m. 64	m. 65	m. 66		n.	m. 68	m. 69	m. 70	m. 71	m		m. 73	m.	m. 75
N.							R		CTI	ONS.			,	,			
42 41 40 39 38	113·2 110·3 105·1	116·7 113·8 111·0 108·4	120·4 117·3 114·5 111·8	124.0 120.9 118.0 115.2	127·7 124·5 121·5 118·7	2 II 2 8 2 5 2 2	·5 2 ·2 2 ·1 2 ·2 2	15.3 2	19·2 15·7	2 26·9 2 23·1 2 19·5 2 16·2 2 13·1	2 27·0 2 23·3 2 20·0	2 31	0 2 3	5.0 2 1.2 2 7.6 2	39·1 2 35·2 2 31·5 2	43.2 2	47.4 43.3 39.5
37 36 35 34 33	98·5 96·6 94·8	103·8 101·7 99·7 97·9	100.0	106.0 104.1	113·7 111·4 109·3 107·2	I 57 I 54 I 52 I 50	·1 2 ·7 1 ·5 1	53·7 I	4.0 1.5 59.2 57.0	2 5.0 2 2.6 2 0.3	2 11·1 2 8·5 2 6·0 2 3·7	2 14· 2 12· 2 9·	7 2 1 0 2 1 5 2 1 2 2 1	8·3 2 5·6 2 3·0 2 0·6 2	22·0 2 19·2 2 16·6 2 14·1 2	28·8 2 25·7 2 22·9 2 20·2 2 17·7 2	29·5 26·6 23·9 21·3
32 31 30 29 28	93°1 91°5 90°0 88°5 87°1	96·1 94·4 92·9 91·4 90·0	99°1 97°4 95°8 94°3 92°8	98·8 97·2 95·7	103·5 101·8 100·2 98·6	I 46 I 44 I 43 I 41	·6 I .	49·8 1 48·0 1 46·3 1 44·6 1	53.0 51.1 49.4 47.7	58·2 56·2 54·3 52·5 50·8	1 59·5 1 57·5 1 55·7 1 53·9	2 2· 2 0· 1 58· 1 57·	8 2 6 8 2 2 9 2 2 1 2 6	5·2 2 4·1 2 2·2 2 0·3 2	9.6 2 7.5 2 5.5 2 3.6 2	6.9 2	16·5 14·3 12·2 10·2
27 26 25 24 23	85.8 84.6 83.4 82.2 81.1	88.6 87.3 86.1 84.9 83.7	91·4 90·1 88·8 87·6 86·4	94·3 92·9 91·6 90·3 89·1	91.9 93.1	1 38 1 37 1 35 1 34	·6 I ·9 I ·6 I	41.6 I 40.2 I 38.8 I 37.5 I	44.2 1 43.1 1 40.3 1	49·1 47·6 46·1 44·6 43·2	1 50·6 1 49·1 1 47·6 1 46·2	1 53. 1 50. 1 50.	6 I 5	5·8 2 5·2 I 3·7 I 2·2 I	55.2 1	5.0 2 3.2 2 1.5 2 59.9 2 58.3 2	6·5 4·7 3·0 1·4
22 20 18 16 14	80·1 78·1 76·2 74·5 72·8 71·3	82·7 80·6 78·7 76·9 75·2 73·6	85·3 83·2 81·2 79·4 77·6 76·0	88.0 85.8 83.8 81.8 80.1 78.4	86·3 84·4 82·5	1 31 1 29 1 26 1 25	.1 I .0 I	33·8 I 31·6 I 29·6 I 27·6 I	36.6 34.3 32.2 30.2	41.9 39.4 37.1 34.9 32.8	1 42·2 1 39·8 1 37·6 1 35·5	I 45. I 42. I 40. I 38.	1 1 4 4 5 6 1 4 5 3 1 4 5 2 1 4 6	8.01 5.51 3.11	51.0 I 48.4 I 45.9 I 43.7 I		57.0 54.2 51.7 49.3
10 8 6 4 2 0	69·9 68·5 67·2 65·9 64·7 63·6	72·1 70·7 69·4 68·1 66·8 65·6	74.5 73.0 71.6 70.3 69.0 67.7	76·8 75·3 73·9 72·5 71·2 69·9	79·2 77·6 76·1 74·7 73·4 72·1	1 20 1 18 1 17 1 15	·0 I ·5 I ·6 I	22·4 I 20·8 I 19·3 I 17·9 I	24.8	29·1 27·3 25·7 24·1 22·5 21·1	1 29·8 1 28·1 1 26·5 1 24·9	I 32. I 30. I 28. I 27.	4 I 3 6 I 3 9 I 3 3 I 2	4·9 I 3·1 I 1·4 I 9·8 I	37·5 I 35·7 I 33·9 I 32·2 I	38·3 I	42.9 40.9 39.1 37.3
8. 2 4 6 8 10	62·4 61·3 60·3 59·3 58·3	64·5 63·4 62·3 61·2 60·2	66·5 65·4 64·3 63·2 62·1	68·7 67·5 66·3 65·2 64·1	70·8 69·6 68·4 67·2 66·1	I II I IO I 9	·7 I ·5 I	13·9 1 12·6 1 11·4 1	16·1 14·8 13·5	19.7 18.3 17.0 15.6	1 20·5 1 19·2 1 17·8	I 22. I 21. I 20.	8 I 2	5'I I 3'7 I 2'3 I	27·5 I 26·0 I 24·6 I	29.9 1	32·3 30·7
12 14 16 18 20	57·3 56·3 55·4 54·4 53·5	59°2 58°2 57°2 56°2 55°3	61·1 60·0 59·0 57·1	63.0 61.9 59.9 58.9	65.0 63.9 62.8 61.8 60.7	I 5 I 4 I 3	8 I 7 I 7 I 6 I	9.0 I 7.8 I 6.7 I 5.6 I 4.5 I	9.9		1 14.0	1 16. 1 14. 1 13.	1 1 18 8 1 16 6 1 15	8·2 I 5·9 I 5·6 I	20·4 I 19·1 I 17·7 I	24.0 I 22.6 I 21.2 I 19.9 I 18.5 I	24·8 23·4 22·0
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Lat.	4.	m. 8	12	m. 16	m. 20	m. 24	m. 28	32	36	40	m. 44	m. 48	m. 52	60	70	80	m. 90
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36 34 32 30	1·0 0·9	2·1 2·0 1·9 1·8	3·2 3·0 2·8 2·6	3·9 3·7 3·5	5·2 4·9 4·6 4·4	6·3 5·9 5·5 5·2	7·3 6·8 6·4 6·1	8·3 7·8 7·3 6·9	9·3 8·7 8·2	9.7 9.1	12·1 11·3 10·6 10·0 9·4	13·1 12·2 11·5 10·8 10·2	14·1 13·2 12·4 11·6 11·0	16·1 15·0 14·1 13·3 12·6	17·2 16·2 15·3	19.2	
28 26 24 22	0·8 0·8 0·8	1·7 1·6 1·5 1·4	2·5 2·4 2·3 2·2	3·3 3·1 3·0 2·9	3.9 3.8 3.6	4·9 4·7 4·5 4·3	5·8 5·5 5·2 5·0	6.6	7.4	8·2 7·8 7·4	8·5 8·1 7·8	9·7 9·3 8·9 8·5	10.0	11.4	13·8 13·2 12·6	16·3 15·5 14·8 14·2 13·7	
20 16 10 0	0·7 0·6 0·6 0·5	I·4 I·3 I·2 I·1	2·I I·9 I·6	2·8 2·6 2·4 2·1	3·5 3·2 2·9 2·6	4·I 3·9 3·5 3·5	4·8 4·1 3·7	5·5 5·1 4·7 4·2	5·8 5·3	6·9 6·4 5·9	7·5 7·0 6·4 5·7	8·2 7·6 7·0 6·3	8·8 8·2 7·5 6·8	9.4 8.7 7.8	10.9	13·2 11·4 10·2	14·6 13·7 12·6
8. 10 20 24	0·5 0·5 0·5	0.0 0.0	1·5 1·4 1·4	1.0 1.0	2·4 2·4 2·3	2·9 2·8 2·8	3·4 3·3 3·3	3·9 3·7 3·7	4.4	4·9 4·7	5·4 5·2 5·1	5·8 5·6 5·6	6·0 6·1	7·3 7·0 7·0	8·4 8·1	9.6	10·3 10·3

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

★ a URSÆ MAJORIS (DUBHE).

Lat.	m. 0	1 m.	m. 8	m. 12	16	m. 20	m. 24	m. 28	m. 30	32	m. 34	36	m. 38	m. 40	m. 42	m. 44
N.						_	RED	UCT	IONS							
30	ó	0.2	0.8	1.9	3.4	5.3	7:6	10.3	11.9	13.5	15.3	17.1	19.0	21.1	23.2	25.5
35 40	0	0.5	0.8	1.2	3·2	5.0 4.8	7·2 6·9	9.8	10.8	12.3	14.5	15.2	18.1	20.1	22.1	24·3 23·I
45	0	0.2	0.7	1.6	2.9	4.5	6.5	8.8	10.2	11.5	13.0	14.6	16.3	18.0	19.9	21.8
50 55	0	0.3	0.7	1.4	2.7	3.9	6·1 5·7	8.3	9·5 8·8	10.1	12.3	13.8	15.3	16.9	18.7	20.2
60 64	0	0.1	0.6	1.3	2.3	3.6	5·2 4·8	7·1 6·5	8.1	9°2 8°5	10.4	11.7	13.0	14.4	15.9	17.4
04	0	0.1	0.2	1.3	2.1	3.3	4.0	0.3	7.5	0.2	9.6	10.8	12.0	13.3	14.7	16.1
Lat.	m. 45	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	m. 54	m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
N.	10 1	10		1 20	- 10		RED					, 00		. 00	00	1 00
28	27.2	28.4	29.6	30.9	32.2	33.2	34.9	36.2	37.6	39.1	40.5	42.0	43.5	45.0	46.6	48.2
32 36	26·2 25·2	27·3 26·3	28·5 27·4	29.8	31.0	32.3	33.6	34·9 33·6	36·3 34·9	37.6	39·0 37·5	40·5 38·9	41.9	43.4	44.9	46.4
40	24·I	25.2	26.3	27.4	28.6	29.8	31.0	32.2	33'4	34.7	36.0	37.3	38.7	40.0	43.5	42.8
44	23.1	24.1	25.2	26.2	27·3 26·7	28·5 27·8	29.6	30.8	32.0	33.2	34.4	35.7	37·0	38.3	39.6	41.0
46 48	22.0	23.0	24.0	25·6 25·0	26.0	27·I	28.2	30.1	30.2	32.4	33·6 32·8	34.0	35.2	37°4 36°4	38.7	39.0
50 52	20.8	22.3	23.3	24.3	25.3	26.4	27.5	28.5	29.6	30.8	31.0	33.1	34.3	35.5	36.7	38.0
54	20.2	21.1	22.0	23.0	23.9	24.9	25.9	26.9	28.0	29.0	30.1	31.2	32.4	33.2	34.7	35.8
56 58	19.6	20.4	20.6	22.2	23.2	24.1	25.1	25.2	27.1	28.1	29.2	30.3	30.3	32.5	33.6	34.7
60	18.2	19.0	19.9	20.7	21.6	22.5	23.4	24.3	25.3	26.2	27.2	28.2	29.2	30.2	31.3	32.3
62 64	16.8	18·3	18.3	10.1	20·7 19·9	20.7	21.2	23.3	24.3	25·2	26·I 25·0	25.9	26.9	29.0	30·0 28·8	31.1
				'							1					
Lat.								HOU							,	
	m. 0	m. 1	m. 2	m. 3	m. 4	1 m. 5	6 m.	m.	m. 8	9.	10 10	m. 11	12 m.	13	m. 14	15
N.				,			RED	UCT	IONS							
28	48.2	49.8	51.4	53.1	54.8	56.5	58.2	60.0	61·8	63.6	65.4	67.3	69.2	71.1	73.1	75.0
30 32	47·3	48·9 48·0	50·5 49·5	51.5	53·8 52·8	55°5	57·2	58·9 57·8	59.5	62·5	64·3	66·1	68·0	69.8	71.7	73.7
34	45.5	47·I 46·I	48.6	50.2	51·8 50·8	53.4	55.0	56.7	58.4	60.1	61·9 60·7	63·6 62·4	65.4	67.2	69·1	71.0
36 38	44.6		47·7	49.2	49.8	52.4	54.0	55.6	57·3	59·0 57·8	59.4	61.1	64.2	65.9	66.4	69.6
40				47.2	48.7	50.3	51.8	53.3	54.9	56.6	58.2	59.9	61.2		1 00 4	
	42.8	45.2	45.7	4/20										63.2	65.0	66.8
42 44				46·8 45·1	47·6 46·6	49·I 48·0	50.7 49.5	52·2 51·0	53·8 52·5	55.3 54.1	56·9 55·7	58·6 57·3	60·2 58·9	61.9 60.5	65.0 63.6 62.2	66·8 65·3 63·8
44 46	42·8 41·9 41·0 40·0	44'3 43'3 42'3 41'3	45.7 44.7 43.7 42.7	46·8 45·1 44·1	47.6 46.6 45.5	49·1 48·0 46·9	49·5 48·3	51·0 49·8	53·8 52·5 51·3	55·3 54·1 52·8	56·9 55·7 54·4	58·6 57·3 55·9	60·2 58·9 57·5	60.2 61.9	63·6 62·2 60·7	65·3 63·8 62·3
44	41.0 41.0	44'3 43'3 42'3	45.7 44.7 43.7	46·8 45·1	47·6 46·6	49·I 48·0	49.5	51.0	53·8 52·5	55.3 54.1 52.8 51.5 50.2	56·9 55·7	58·6 57·3	60·2 58·9	60.2	63·6 62·2	65·3 63·8 62·3 60·8
44 46 48 50 52	42.8 41.9 41.0 40.0 39.0 38.0 36.9	44.3 43.3 42.3 41.3 40.3 39.2 38.2	45.7 44.7 43.7 42.7 41.6 40.5 39.4	46·8 45·1 44·1 43·0 41·9 40·7	47.6 46.6 45.5 44.4 43.2 42.2	49·I 48·0 46·9 45·7 44·5 43·3	49.5 48.3 47.1 45.9 44.7	51.0 49.8 48.6 47.3 46.0	53.8 52.5 51.3 50.0 48.7 47.4	55.3 54.1 52.8 51.5 50.2 48.8	56·9 55·7 54·4 53·0 51·6 50·2	58.6 57.3 55.9 54.5 53.1 51.6	60·2 58·9 57·5 56·1 54·6 53·1	61.9 60.5 59.1 57.6 56.1 54.6	63.6 62.2 60.7 59.2 57.7 56.1	65·3 63·8 62·3 60·8 59·2 57·6
44 46 48 50	42.8 41.9 41.0 40.0 39.0 38.0	44'3 43'3 42'3 41'3 40'3 39'2	45.7 44.7 43.7 42.7 41.6 40.5	46·8 45·1 44·1 43·0 41·9	47.6 46.6 45.5 44.4 43.2	49·1 48·0 46·9 45·7 44·5	49.5 48.3 47.1 45.9	51.0 49.8 48.6 47.3	53.8 52.5 51.3 50.0 48.7	55.3 54.1 52.8 51.5 50.2	56·9 55·7 54·4 53·0 51·6	58.6 57.3 55.9 54.5 53.1	60·2 58·9 57·5 56·1 54·6	61.9 60.5 59.1 57.6 56.1	63.6 62.2 60.7 59.2 57.7	65·3 63·8 62·3 60·8 59·2
44 46 48 50 52 54 56 58	42.8 41.9 41.0 40.0 39.0 38.0 36.9 35.8 34.7 33.6	44·3 43·3 42·3 41·3 40·3 39·2 38·2 37·1 35·9 34·7	45.7 44.7 43.7 42.7 41.6 40.5 39.4 38.3 37.1 35.8	46.8 45.1 44.1 43.0 41.9 40.7 39.5 38.3 37.0	47.6 46.6 45.5 44.4 43.2 42.2 40.8 39.5 38.2	49·1 48·0 46·9 45·7 44·5 43·3 42·0 40·7 39·4	49.5 48.3 47.1 45.9 44.7 43.3 42.0 40.6	51.0 49.8 48.6 47.3 46.0 44.7 43.3 41.8	53.8 52.5 51.3 50.0 48.7 47.4 46.0 44.6 43.1	55·3 54·1 52·8 51·5 50·2 48·8 47·4 45·9 44·3	56·9 55·7 54·4 53·0 51·6 50·2 48·7 47·2 45·6	58.6 57.3 55.9 54.5 53.1 51.6 50.1 48.6 46.9	50.2 58.9 57.5 56.1 54.6 53.1 51.5 49.9 48.3	61.9 60.5 59.1 57.6 56.1 54.6 53.0 51.3 49.6	63.6 62.2 60.7 59.2 57.7 56.1 54.4 52.7 51.0	65·3 63·8 62·3 60·8 59·2 57·6 55·9 54·2
44 46 48 50 52 54 56 58 60 62	42.8 41.9 41.0 40.0 39.0 38.0 36.9 35.8 34.7 33.6 32.3 31.1	44.3 43.3 42.3 41.3 40.3 39.2 38.2 37.1 35.9 34.7 33.4 32.1	45.7 44.7 43.7 42.7 41.6 40.5 39.4 38.3 37.1 35.8 34.5 33.2	46.8 45.1 44.1 43.0 41.9 40.7 39.5 38.3 37.0 35.7 34.3	47.6 46.6 45.5 44.4 43.2 42.2 40.8 39.5 36.8 35.3	49.1 48.0 46.9 45.7 44.5 43.3 42.0 40.7 39.4 37.9 36.5	49.5 48.3 47.1 45.9 44.7 43.3 42.0 40.6 39.1 37.6	51.0 49.8 48.6 47.3 46.0 44.7 43.3 41.8 40.3 38.7	53.8 52.5 51.3 50.0 48.7 47.4 46.0 44.6 43.1 41.5 30.0	55:3 54:1 52:8 51:5 50:2 48:8 47:4 45:9 44:3 42:7 41:1	56·9 55·7 54·4 53·0 51·6 50·2 48·7 47·2 45·6 44·0 42·3	58.6 57.3 55.9 54.5 53.1 51.6 50.1 48.6 46.9 45.2 43.5	50.2 58.9 57.5 56.1 54.6 53.1 51.5 49.9 48.3 46.5 44.7	61.9 60.5 59.1 57.6 56.1 54.6 53.0 51.3 49.6 47.8 45.9	63.6 62.2 60.7 59.2 57.7 56.1 54.4 52.7 51.0 49.1 47.2	65·3 63·8 62·3 60·8 59·2 57·6 55·9 54·2 52·4 50·5 48·5
44 46 48 50 52 54 56 58 60	42.8 41.9 41.0 40.0 39.0 38.0 36.9 35.8 34.7 33.6 32.3	44·3 43·3 42·3 41·3 40·3 39·2 38·2 37·1 35·9 34·7 33·4	45.7 44.7 43.7 42.7 41.6 40.5 39.4 38.3 37.1 35.8 34.5	46.8 45.1 44.1 43.0 41.9 40.7 39.5 38.3 37.0 35.7 34.3	47.6 46.6 45.5 44.4 43.2 42.2 40.8 39.5 36.8 35.3	49·I 48·0 46·9 45·7 44·5 43·3 42·0 40·7 39·4 37·9	49.5 48.3 47.1 45.9 44.7 43.3 42.0 40.6 39.1 37.6	51.0 49.8 48.6 47.3 46.0 44.7 43.3 41.8 40.3	53.8 52.5 51.3 50.0 48.7 47.4 46.0 44.6 43.1 41.5	55·3 54·1 52·8 51·5 50·2 48·8 47·4 45·9 44·3 42·7	56.9 55.7 54.4 53.0 51.6 50.2 48.7 47.2 45.6 44.0	58.6 57.3 55.9 54.5 53.1 51.6 50.1 48.6 46.9 45.2	50.2 58.9 57.5 56.1 54.6 53.1 51.5 49.9 48.3 46.5	61.9 60.5 59.1 57.6 56.1 54.6 53.0 51.3 49.6 47.8	63.6 62.2 60.7 59.2 57.7 56.1 54.4 52.7 51.0 49.1	65·3 63·8 62·3 60·8 59·2 57·6 55·9 54·2 52·4 50·5
44 46 48 50 52 54 56 60 62 64	42.8 41.9 41.0 40.0 39.0 38.0 36.9 35.8 34.7 33.6 32.3 31.1	44.3 43.3 42.3 41.3 40.3 39.2 38.2 37.1 35.9 34.7 33.4 32.1	45.7 44.7 43.7 42.7 41.6 40.5 39.4 38.3 37.1 35.8 34.5 33.2	46.8 45.1 44.1 43.0 41.9 40.7 39.5 38.3 37.0 35.7 34.3 32.8	47.6 46.6 45.5 44.4 43.2 42.2 40.8 39.5 36.8 35.3	49·I 48·0 46·9 45·7 44·5 43·3 42·0 40·7 39·4 37·9 36·5 34·9	49.5 48.3 47.1 45.9 44.7 43.3 42.0 40.6 39.1 37.6	51.0 49.8 48.6 47.3 46.0 44.7 43.3 41.8 40.3 38.7	53.8 52.5 51.3 50.0 48.7 47.4 46.0 44.6 43.1 41.5 30.0	55:3 54:1 52:8 51:5 50:2 48:8 47:4 45:9 44:3 42:7 41:1	56·9 55·7 54·4 53·0 51·6 50·2 48·7 47·2 45·6 44·0 42·3	58.6 57.3 55.9 54.5 53.1 51.6 50.1 48.6 46.9 45.2 43.5 41.6	50.2 58.9 57.5 56.1 54.6 53.1 51.5 49.9 48.3 46.5 44.7	61·9 60·5 59·1 57·6 56·1 54·6 53·0 51·3 49·6 47·8 45·9 44·0	63.6 62.2 60.7 59.2 57.7 56.1 54.4 52.7 51.0 49.1 47.2	65·3 63·8 62·3 60·8 59·2 57·6 55·9 54·2 52·4 50·5 48·5
44 46 48 50 52 54 56 58 60 62	42.8 41.9 41.0 40.0 39.0 38.0 36.9 35.8 34.7 33.6 32.3 31.1	44.3 43.3 42.3 41.3 40.3 39.2 37.1 35.9 34.7 33.4 32.1 30.7	45.7 44.7 43.7 42.7 41.6 40.5 39.4 38.3 37.8 35.8 34.5 31.8	46.8 45.1 44.1 43.0 41.9 40.7 39.5 38.3 37.0 35.7 34.3 32.8	47.6 46.6 45.5 44.4 43.2 42.2 40.8 39.5 38.2 36.8 35.3 33.8 HOUJ	49.1 48.0 46.9 45.7 44.5 43.3 42.0 40.7 39.4 37.9 36.5 34.9 R.	49.5 48.3 47.1 45.9 44.7 43.3 42.0 40.6 39.1 37.6 36.0	51·0 49·8 48·6 47·3 46·0 44·7 43·3 41·8 40·3 38·7 37·1	53.8 52.5 51.3 50.0 48.7 47.4 46.0 44.6 43.1 41.5 338.2 m.	55·3 54·1 52·8 51·5 50·2 48·8 47·4 45·9 44·3 42·7 41·1 39·3	56·9 55·7 54·4 53·0 51·6 50·2 48·7 47·2 45·6 44·0 42·3 40·4	58.6 57.3 55.9 54.5 53.1 51.6 50.1 48.6 46.9 45.2 43.5 41.6	60·2 58·9 57·5 56·1 54·6 53·1 51·5 49·9 48·3 46·5 44·7 42·8	61.9 60.5 59.1 57.6 56.1 54.6 53.0 51.3 49.6 47.8 45.9 44.0	63.6 62.2 60.7 59.2 57.7 56.1 54.4 52.7 51.0 49.1 47.2 45.2	65·3 63·8 62·3 60·8 59·2 57·6 55·9 54·2 52·4 50·5 48·5 46·4
44 46 48 50 52 54 56 60 62 64	42.8 41.9 41.0 40.0 39.0 38.0 36.9 35.8 34.7 33.6 32.3 31.1 29.8	44.3 43.3 42.3 41.3 40.3 39.2 38.2 37.1 35.9 34.7 33.4 32.1 30.7	45.7 44.7 43.7 42.7 41.6 40.5 39.4 38.3 37.1 35.8 34.5 33.2 31.8	46.8 45.1 44.1 43.0 41.9 40.7 39.5 38.3 37.0 35.7 34.3 32.8	47.6 46.6 45.5 44.4 43.2 42.2 40.8 39.5 38.2 36.8 35.3 33.8	49.1 48.0 46.9 45.7 44.5 43.3 42.0 40.7 39.4 37.9 36.5 34.9	49.5 48.3 47.1 45.9 44.7 43.3 42.0 40.6 39.1 37.6 36.0	51·0 49·8 48·6 47·3 46·0 44·7 43·3 41·8 40·3 38·7 37·1	53.8 52.5 51.3 50.0 48.7 47.4 46.0 44.0 44.0 43.1 41.5 39.9 38.2	55:3 54:1 52:8 51:5 50:2 48:8 47:4 45:9 44:3 42:7 41:1 39:3	56·9 55·7 54·4 53·0 51·6 50·2 48·7 47·2 45·6 44·0 42·3 40·4	58.6 57.3 55.9 54.5 53.1 51.6 50.1 48.6 46.9 45.2 43.5 41.6	60·2 58·9 57·5 56·1 54·6 53·1 51·5 49·9 48·3 46·5 44·7 42·8	61·9 60·5 59·1 57·6 56·1 54·6 53·0 51·3 49·6 47·8 45·9 44·0	63.6 62.2 60.7 59.2 57.7 56.1 54.4 52.7 51.0 49.1 47.2 45.2	65·3 63·8 62·3 60·8 59·2 57·6 55·9 54·2 52·4 50·5 48·5 46·4
44 46 48 50 52 54 56 60 62 64 Lat.	42.8 41.9 41.0 40.0 39.0 38.0 36.9 35.8 34.7 32.3 31.1 29.8	44.3 43.3 41.3 40.3 39.2 38.2 37.1 35.9 34.7 33.7 32.1 30.7	45.7 44.7 43.7 42.7 41.6 40.5 39.4 38.3 37.1 35.8 34.5 33.2 31.8	46.8 45.1 44.1 43.0 41.9 40.7 39.5 38.3 37.0 35.7 34.3 32.8	47.6 46.6 45.5 44.4 43.2 40.8 39.5 38.2 36.8 35.3 33.8 HOU	49·1 48·0 46·9 45·7 44·5 43·3 42·0 40·7 39·4 37·9 36·5 34·9	49.5 48.3 47.1 45.9 44.7 43.3 42.0 40.6 39.1 37.6 36.0	51.0 49.8 48.6 47.3 46.0 44.7 43.3 41.8 40.3 38.7 37.1	53.8 52.5 51.3 50.0 48.7 47.4 46.0 44.6 43.1 41.5 39.9 38.2 THS.	55·3 54·1 52·8 51·5 50·2 48·8 47·4 45·9 44·3 42·7 41·1 39·3	56·9 55·7 54·4 53·0 50·2 48·7 47·2 45·6 44·0 42·3 40·4	58.6 57.3 55.9 54.5 53.1 51.6 50.1 48.6 46.9 45.2 43.5 41.6	60·2 58·9 57·5 56·1 54·6 53·1 51·5 49·9 48·3 46·3 44·7 42·8 HOU	61.9 60.5 59.1 57.6 56.1 54.6 53.0 51.3 49.6 47.8 45.9 44.0	63.6 62.2 60.7 59.2 57.7 56.1 54.4 52.7 51.0 49.1 47.2 45.2	65·3 63·8 62·3 60·8 59·2 57·6 55·9 54·2 52·4 50·5 48·5 46·4
44 46 48 50 52 54 56 60 62 64 N.	42.8 41.9 41.0 39.0 38.0 36.0 35.8 34.7 33.6 32.3 31.1 29.8	44.3 43.3 42.3 40.3 39.2 38.2 37.1 35.9 34.7 33.4 32.1 30.7	45.7 44.7 44.7 42.7 41.6 40.5 39.4 38.3 37.1 35.8 34.5 33.2 31.8	46.8 45.1 44.1 43.0 41.9 40.7 39.5 38.3 37.0 35.7 34.3 32.8	47.6 46.6 45.6 44.4 43.2 42.2 40.8 39.5 38.2 36.8 35.3 33.8 HOUJ	49.1 48.0 46.9 45.7 44.5 43.3 42.0 40.7 39.4 36.5 34.9 R. m. 30	49.5 48.3 47.1 45.9 44.7 43.3 42.0 40.6 39.1 37.6 36.0 m. 40 AZ	1.0 49·8 48·6 47·3 46·0 44·7 43·3 41·8 40·3 38·7 37·1 m. 40 11MUT	53.8 52.5 51.3 50.0 48.7 47.4 46.0 43.1 41.5 39.9 38.2 THS.	55.3 54.1 52.8 51.5 50.2 48.8 47.4 45.9 44.3 42.7 41.1 39.3	56·9 55·7 54·4 53·6 50·2 48·7 47·2 45·6 44·0 42·3 40·4	58.6 57.3 55.9 54.5 53.1 53.1 48.6 46.9 45.2 43.5 41.6	60·2 58·9 57·5 56·1 54·6 53·1 51·5 49·9 48·3 46·5 44·7 42·8 HOU m. 30	61.9 60.5 59.5 57.6 56.1 54.6 53.0 51.3 49.6 47.8 45.9 44.0 R.	63.6 62.2 60.7 59.2 57.7 56.1 54.4 52.7 51.0 49.1 47.2 45.2	65·3 63·8 62·3 60·8 59·2 57·6 55·9 54·2 52·4 50·5 48·5 46·4
44 46 48 50 52 54 56 60 62 64 Lat.	42.8 41.9 41.0 39.0 38.0 36.9 35.8 34.7 33.6 32.3 31.1 29.8	44.3 43.3 42.3 41.3 40.3 39.2 38.2 37.1 35.9 34.7 33.4 32.1 30.7	45.7 44.7 43.7 41.6 40.5 39.4 38.3 37.1 35.8 34.5 33.2 31.8	46.8 45.1 44.1 43.0 41.9 40.7 39.5 38.3 37.0 35.7 34.3 32.8	47.6 46.6 45.5 44.4 43.2 40.8 39.5 38.2 36.8 35.3 33.8 HOUL	49.1 48.0 46.9 44.5 44.5 43.3 42.0 40.7 39.4 37.9 36.5 34.9 R.	49.5 48.3 47.1 45.9 44.7 43.3 42.0 40.6 39.1 37.6 36.0 M. 40 40.0 40.0 40.0 37.6 36.0	51.0 49.8 48.6 47.3 46.0 44.7 43.3 41.8 40.3 38.7 37.1 m. 40	53.8 52.5 51.3 50.0 48.7 47.4 46.0 44.6 43.1 41.5 39.9 38.2 THS.	55·3 54·1 52·8 51·5 50·2 48·8 47·4 45·9 44·3 42·7 41·1 39·3	56·9 55·7 54·4 53·6 50·2 48·7 47·2 45·6 44·0 42·3 40·4	58.6 57.3 55.9 54.5 53.1 51.6 50.1 48.6 46.9 45.2 43.5 41.6	60·2 58·9 57·5 56·16 53·1 51·5 49·9 48·3 46·5 44·7 42·8 HOU	61.9 60.5 59.1 57.6 56.1 54.6 53.0 51.3 49.6 47.9 44.0 R.	63.6 62.2 60.7 59.2 57.7 56.1 54.4 52.7 51.0 49.1 47.2 45.2	65·3 63·8 62·3 60·8 59·2 57·6 55·9 54·2 52·4 50·4 48·5 46·4
444 466 48 50 52 54 56 62 64 N. \$30 40 50 54 58	42.8 41.9 40.0 39.0 36.9 35.8 34.7 33.6 32.3 32.3 31.1 29.8	44.3 43.3 41.3 40.3 38.2 38.2 37.1 35.9 34.7 32.1 30.7	45.7 44.7 42.7 41.6 40.5 38.3 37.1 35.8 34.5 31.8 m. 12	46.8 45.1 44.1 43.0 41.9 40.7 33.3 37.0 35.7 34.3 32.8 0 1.9 1.9 2.0 2.1 2.2	47.6 46.6 45.6 45.6 44.4 43.2 42.2 40.8 39.5 38.2 36.8 35.3 33.8 HOU. m. 20	49.1 48.0 46.9 45.7 44.5 43.3 42.0 39.4 40.7 39.4 37.9 36.5 34.9 R. m. 2.8 2.8 2.9 3.0 3.1 3.2	49.5 48.3 47.1 45.9 44.7 43.3 42.0 40.6 39.1 37.6 36.0 m. 40 AZ 3.5 3.6 3.8 3.9 4.0	10 49.8 48.6 47.3 46.0 44.7 43.3 41.8 40.3 38.7 37.1 1MU7 4.6 4.6 4.6 4.6 4.6 4.6 5.0 5.2 5.3	53.8 52.5 51.3 50.0 48.7 47.4 46.0 44.6 43.1 41.5 38.2 m. 50 THS. \$\circ\$8 5.8 5.9 6.5 6.7	55:3 54:1 52:8 51:5 50:2 48:8 47:4 45:9 42:7 41:1 39:3 00 6:9 7:1 7:5 7:7 8:0	56·9 55·7 54·4 53·0 50·2 48·7 47·2 45·6 44·0 42·3 40·4 m. 10	58.6 57.3 55.9 54.5 55.1 51.6 50.1 48.6 46.9 45.2 43.5 41.6 1 20	60·2 58·9 57·5 56·1 54·6 53·1 51·5 49·9 46·5 44·7 42·8 HOU m. 30	61.9 60.5 59.5 59.6 56.1 54.6 53.0 49.6 47.8 45.9 44.0 R. m. 40	63.6 62.2 60.7 59.2 57.7 56.1 54.4 52.7 51.0 49.1 47.2 45.2 m. 50	65:3 63:8 60:8 60:8 55:9 57:6 55:9 55:4 50:5 48:5 46:4 m. 60
44 46 48 50 52 54 56 60 62 64 N. 30 40 50	42.8 41.9 40.0 39.0 36.9 35.8 34.7 33.6 32.3 31.1 29.8	44.3 43.3 42.3 41.3 40.3 39.2 38.2 38.1 35.9 34.7 33.4 32.1 30.7	45.7 44.7 42.7 41.6 40.5 38.3 37.1 35.8 33.2 31.8 12	46.8 45.1 44.1 43.0 41.9 40.7 39.5 38.3 37.0 35.7 34.3 32.8	47.6 46.6 45.6 45.6 44.4 43.2 42.2 42.2 40.8 39.5 38.2 36.8 35.3 33.8 HOU 20	49.1 48.0 46.9 45.7 44.5 43.3 42.0 30.4 37.9 36.5 34.9 R. m. 30 82.8 2.9 3.0 3.1	49.5 48.3 47.1 45.9 44.7 43.3 42.0 40.6 39.1 37.6 36.0 M. 40 40.0 40.0 40.0 30.0 40.0 40.0 40.0 40	1.0 49.8 48.6 47.3 46.0 44.7 43.3 41.8 40.3 38.7 37.1 1.8 40.0 4.6 4.8 5.0 5.2	53.8 52.5 51.3 50.0 48.7 47.4 44.6 43.1 41.5 39.9 38.2 THS.	55·3 54·18 51·5 50·2 48·8 47·4 45·9 44·3 42·7 41·1 39·3 m. 00	56·9 55·7 54·4 53·0 50·2 48·7 47·2 45·6 44·0 42·3 40·4 m. 10	58.6 57.3 55.9 54.5 53.1 51.6 50.1 48.6 46.9 45.2 43.5 41.6	60·2 58·9 57·5 56·1 54·6 53·1 51·5 49·9 48·3 46·5 44·7 42·8 HOU m. 30	61.9 60.5 59.1 57.6 56.1 54.6 53.0 49.6 47.8 45.9 44.0 R. m. 40	63.6 62.2 60.7 59.2 57.7 56.1 54.4 52.7 51.0 49.1 47.2 45.2 m. 50	65:3 63:8 62:3 60:8 59:2 57:6 55:9 55:9 46:4 50:5 46:4 60

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM MERIDIAN BELOW THE POLE.

 \star α URSÆ MAJORIS (DUBHE).

	1						I	HOU	JR.				1			
Lat.	m. 16	17	18	m. 19	20	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26	m. 27	28 m.	m. 29	30	31
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30 32 34 36 38	75.8 74.4 73.0 71.5 70.1	77.8 76.3 74.9 73.4 71.9	79.8 78.3 76.8 75.3 73.8	81.8 80.3 78.8 77.2 75.7	83·9 82·3 80·8 79·2 77·6	86.0 84.4 82.8 81.2 79.5	88·1 86·5 84·8 83·2 81·5	90·2 88·6 86·9 85·2 83·5	92·4 90·7 89·0 87·2 85·5	94.6 92.8 91.1 89.3 87.5	96·8 95·0 93·2 91·4 89·6	97·2 95·4 93·5	101·3 99·4 97·6 95·7 93·8	99.8	104.0	104.3
40 42 44 46 48	68·6 67·2 65·6 64·1 62·5	70°4 68°9 67°4 65°8 64°2	72·3 70·7 69·1 67·5 65·8	74·1 72·5 70·9 69·2 67·5	76·0 74·4 72·7 71·0 69·2	77·9 76·2 74·5 72·7 71·0	79·8 78·1 76·3 74·5 72·7	81.8 80.0 78.2 76.4 74.5	83.7 81.9 80.1 78.2 76.3	85.7 83.9 82.0 80.1 78.1	87·7 85·8 83·9 81·9 79·9	85.8 83.8 81.8	91.8 89.8 87.8 85.8 83.6	93.9 91.9 89.8 87.7 85.5	96·0 93·9 91·8 89·7 87·5	98·1 96·0 93·9 91·7 89·4
50 52 54 56 58	60·9 59·2 57·5 55·7 53·8	62·5 60·8 59·0 57·2 55·2	64·I 62·4 60·5 58·6 56·7	65.8 64.0 62.1 60.1 58.1	67·4 65·6 63·7 61·7 59·6	69·1 67·2 65·2 63·2 61·1	70·8 68·9 66·9 64·8 62·6	72·5 70·6 68·5 66·4 64·1	74°3 72°3 70°1 68°0 65°7	76·1 74·0 71·8 69·6 67·2	77.8 75.7 73.5 71.2 68.8	77·5 75·2 72·9	81·5 79·2 76·9 74·5 72·0	83·3 81·0 78·7 76·2 73·7	85·2 82·9 80·4 77·9 75·3	87·1 84·7 82·2 79·7 77·0
Lat.	m. 32	m. 33	m. 34	m.	m. 36	m. 37	m. 38	m. 39	1 m.	41		m. 42	m. 43	m. 44	m. 45	m. 46
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32 34 36	108·6 106·5 104·5 102·4	110·9 108·8 106·7 104·6	113·3 111·2 106·8	117.8 115.7 113.5 111.3 109.1	120·3 118·1 115·9 113·6 111·4	2 2.8 2 0.5 1 58.3 1 56.0 1 53.7	2 3.0 2 0.7 1 58.4 1 56.0	2 5.5 2 3.1 2 0.8 1 58.2	2 8 2 5 3 2 3 4 2 0	6 2 8 2 2 5 7 2 3	·5 2 ·1 2 ·6 2 ·1 2	10.6 8.1 5.5 2	15.7 2 13.1 2 10.6 2 8.0 2	18·3 2 15·7 2 13·1 2 10·5 2	12.9	2 23.6 2 20.9 2 18.2 2 15.4
40 42 44 46 48	98·1 95·9 93·7 91·4	98·0 95·7 93·3	102·4 100·1 97·7 95·3	99·8 97·4	106·7 104·3 101·9 99·4	1 51·3 1 48·9 1 46·5 1 44·0 1 41·5	1 51·2 1 48·7 1 46·2 1 43·6	I 53.4 I 50.9 I 48.3 I 45.7	1 55 1 53 1 50 7 1 47	7 I 58 I 55 5 I 52 8 I 49	·4 I ·7 I ·9 I	3.0 2 0.3 2 57.7 I 54.9 I 52.1 I	24.3 I	5.0 2 2.3 2 59.4 2 56.5 1	4.6 1.7 58.7	2 9·8 2 6·9 2 4·0 2 1·0
49 50 51 52 53	90·2 89·0 87·8 86·6 85·3	92·1 90·9 89·7 88·4 87·2 85·9	94·1 92·9 91·6 90·3 89·0	96·1 94·8 93·6 92·2 90·9 89·6	96·8 95·5 94·2 92·8	1 40·2 1 38·8 1 37·5 1 36·1 1 34·8	1 40·9 1 39·5 1 36·7	I 42.9 I 41.5 I 40.1 I 38.7	1 45 1 43 1 42 7 I 40	0 I 47 6 I 45 1 I 44 7 I 42	·1 1 .6 1 .2 1 .7 1	49.2 I	51·3 I 49·8 I 48·3 I 46·7 I	53.5 I 51.9 I 50.4 I 48.8 I	55.7 54.1 52.5 50.9	57·8 56·2 54·6 53·0
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40 42 43 44 45	2 10· 2 10·	3 2 I4 8 2 I3 3 2 II	1·7 2 I 3·2 2 I 1·7 2 I 0·2 2 I	4·1 2 1	9.7 2 18.1 2 16.6 2 15.0 2	22·2 2 20·6 2 19·0 2 17·4 2	24·7 23·1 21·5 19·9	2 27·3 2 25·7 2 24·0 2 22·4	2 29° 2 28° 2 26° 2 24°	9 2 32 2 2 30 6 2 29 9 2 27	5 2 ·8 2 ·1 2 ·4 2	31.7 2	37·7 2 36·0 2 34·3 2 32·5 2	40·4 2 38·6 2 36·9 2 35·1 2	43·1 41·3 39·5 37·7	2 45·8 2 44·0 2 42·1 2 40·3
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REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN, ** FOMALHAUT.

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50 46 42	11.9 13.5 14.8 16.1 16.8	12·8 14·5 15·9 17·3 18·1	13·7 15·5 17·0 18·6 19·4	14.6 16.6 18.2 19.9 20.7	15.6 17.7 19.4 21.2 22.1		17.7 20.1 22.0 24.0 25.1	18.8 21.3 23.4 25.4 26.6	19.9 22.6 24.8 27.0 28.2	21·1 23·9 26·2 28·6 29·8	25·2 27·7 30·2	0 0	23.5 26.6 29.2 31.8 33.2	00000	24.7 28.0 30.7 33.5 35.0	00000	26.0 29.5 32.3 35.2 36.8	0 0	27.3 31.0 33.9 37.0 38.6	0	28·7 32·5 35·6 38·8 40·5
36 34 32	17·5 18·2 19·0 19·8 20·6	18·8 19·6 20·4 21·3 22·1	20·2 21·0 21·9 22·8 23·7	21·6 22·5 23·4 24·4 25·4	23·1 24·0 25·0 26·0 27·1	24.6 25.6 26.6 27.7 28.9	26·1 27·2 28·3 29·5 30·7	27·7 28·9 30·1 31·3 32·6	29.4 30.6 31.9 33.2 34.5	31·1 32·4 33·7 35·1 36·5	34·2 35·6 37·0 38·5	0 0	34·6 36·0 37·5 39·1 40·6	0 0 0 0	36·4 38·0 39·5 41·1 42·8	0 0 0 0	38·3 39·9 41·6 43·2 45·0	0	40·3 41·9 43·7 45·4 47·3	00000	42.2 44.0 45.8 47.7 49.6
26 24 22	21·4 22·3 23·2 24·2 25·2	23.0 24.0 25.0 26.0 27.1	24.7 25.7 26.8 27.9 29.1	26·4 27·5 28·6 29·8 31·1	28·2 29·4 30·6 31·8 33·2	30·1 31·3 32·6 33·9 35·4	32.0 33.3 34.6 36.1 37.6	33·9 35·3 36·7 38·3 39·9	35.9 37.4 38.9 40.5 42.2	38·0 39·5 41·2 42·9 44·7	41.8	0 0	42·3 44·0 45·8 47·7 49·7		44.5 46.4 48.3 50.3 52.4	0 0 0 0	46.8 48.7 50.7 52.8 55.0	0	49·2 51·2 53·3 55·5 57·8	0 0 0 1	51.6 53.7 55.9 58.2 0.6
16 14 12	26·3 27·4 28·7 30·0 30·7	28·3 29·5 30·8 32·2 33·0	30°3 31°6 33°0 34°6 35°4	32·4 33·8 35·3 37·0 37·8	34·6 36·1 37·7 39·4 40·4	36·9 38·5 40·2 42·0 43·0	39·2 40·9 42·7 44·7 45·7	41·6 43·4 45·3 47·4 48·5	44.0 45.9 48.0 50.2 51.3	46.6 48.6 50.7 53.1 54.3	53.6 56.0 57.3	0 0 0 1	51·8 54·1 56·5 59·0 0·4	0 0 1 1	54·6 56·9 59·4 2·2 3·6	0 1 1 1	57.4 59.9 2.5 5.3 6.8	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	0·3 2·9 5·6 8·6 10·2	I I I I	3·2 5·9 8·8 11·9 13·6
9 8 7	32.9	33·8 34·6 35·4 36·3 37·2	38·0 38·9	40.6	43.3	46·1	47·9 49·0 50·3	52·0 53·3 54·6	55°I	59.7	58.6 60.0 61.5 63.0 64.6	I	3°3 4°8 6°4 8°0	I		I I	8·4 10·0 11·7 13·4 15·3	I	13.2 12.3 12.1 13.0	I	15·3 17·1 18·9 20·8 22·8
4 3 2	37·5 38·5	39·2 40·3 41·4		44.9 46.1 47.4		51.0 52.4 53.9	52·8 54·2 55·7 57·2 58·9		59.4 60.9 62.5 64.3 66.1	66.1	68·0	I		I I	13.4 15.4 17.4 19.5 21.6	I I I	23.5	I I I		I	25.0 27.2 29.5 31.9 34.5
I		43·8 45·1 46·6		51.7		58·7	64.3	66.2	70.0	74.0	78·1 80·5	1	19·9 22·3 24·8	I	26.6	I	33·7	I	35·4 38·3	I	43.0
4	44.7 46.2 47.8	48·1 49·7 51·4	51·5 53·2 55·0	55·1 56·9 58·8	58·7 60·7 62·8	64.6	66·4 68·6 70·9	72.7	76.9	81.3	83.0 85.7 88.6	I	33·3 33·3	I	32·0 35·0 38·1	I	36·6 39·7 43·1	1	41.4 44.6 48.1	ī	46·2 49·6 53·3

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. ** FOMALHAUT.

Lat.	m. 43	m.			m. 46	m. 47	m. 48	п	n. 1	m. 50	m. 51	m. 52	53		n.	m. 55	m. 56
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54 52 50 48 46	0 34°2 0 35°2	0 34	1.00 1.60 1.30	33.8 35.5 37.3 0 39.1 0 40.9	37·10 38·90 40·80	38·7 40·7 42·6	0 40 0 42 0 44	40	44·20 46·30	48.20	43.3 45.6 47.8 50.1	0 45° 0 47° 0 49° 0 52° 0 54°	10 49 70 51 10 54	·60	53·6 o	50.4 53.0 55.6 58.2 0.9	54.9 57.6 0.3
38	0 40%	0 44	2.6 0 1.4 0 5.3 0	48.40	46.6 0 48.6 0 50.6 0	48.6 50.7 52.8	0 50 0 52 0 55	70 80 10	52·8 0 55·1 0 57·4 0	55.0 0	57·2 59·6 2·1	I 2.0	4 I I	1.2 I 1.3 I 1.0 I		3.6 I 6.4 I 9.2 I 12.2 I 15.1 I	8·8 11·8 14·8
30	0 49.9	0 54 0 54 0 56	2·3 0 1·4 0 5·6 0	56·9 o	57.10	59.6 2.0 4.2	I 4	6 I	10.1	10.11	10·1 12·9 15·8	I 10.0 I 12.0 I 15.0 I 18.0 I 22.0	8 I 15 8 I 18 8 I 21	6 I I 7 I I	18·5 I 21·6 I 24·9 I	21·4 I 24·7 I 28·1 I	24·3 27·7 31·2
24 23 22 21 20	0 58.6 0 59.8 1 1.0 1 2.2 1 3.5	I 2 I 3 I 5	:31 :61 3:81 5:51		11.1 I	11·3 12·7 14·2	I 14 I 15 I 17	3 I 8 I 4 I	17·4 I 19·0 I 20·6 I	23.9 I	23·8 25·5 27·2	I 25°: I 27°: I 28°: I 30°: I 32°:	0 I 30 8 I 32 6 I 34	0.4 I 2.2 I 1.1 I	33·8 I 35·6 I 37·6 I	37·2 I 39·2 I 41·2 I	40·7 42·7 44·8
19 18 17 16 15	I 4.0 I 7.6 I 9.1 I 10.6	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.8 I 2.3 I	10·9 I 12·4 I 14·0 I 15·5 I 17·2 I	15.7 I 17.2 I 18.9 I	20·6 22·3	I 22 I 24 I 25	3 I 0 I 8 I	25·7 I 27·5 I 29·4 I	33.0 I 33.0 I	32·7 34·7 36·7	I 34° I 36° I 38° I 40° I 42°	3 I 40 4 I 44 4 I 44	0.0 I 7	43·8 I 45·9 I 48·2 I	47.6 I 49.8 I 52.1 I	51.4 53.8 56.2
II	I 13.7	1 17 1 18	.11: .61:	24·3 I	24.2 I 26.1 I 28.0 I	27·8 29·8 31·8	I 31 I 33 I 35	5 I 6 I 7 I	35·3 I 37·4 I 39·6 I	39.2 I 41.4 I 43.7 I	43°1 45°4 47°8	I 44° I 47° I 49° I 51° I 54°	1 1 51 5 1 53 9 1 56	1.5 I 3.6 I	55·3 I	59·5 2 2·2 2 4·9 2	3·8 6·5
7 6	I 24.7	1 28	6 I 8 I	28·3 I 30·4 I 32·6 I 34·8 I 37·2 I	30.0 I	40.8	I 45 I 47	61	19.3 I	48.5 I 51.1 I 53.7 I 56.5 2 59.4 2	58.2	1 57° 1 59° 2 2° 2 5° 2 8°	8 2 7	7.4 2	9.12	10·7 2 13·7 2 16·9 2 20·2 2 23·7 2	18·5 21·8
3 2 1	1 31·3 1 33·7 1 36·2 1 38·9 1 41·7	I 40 I 43	·61	42·4 I 45·I I 48·0 I	46.9 I 49.7 I 52.8 I	51·4 54·4 57·6	1 56 1 59 2 2	2 2 2 5 2	57.8 2 0.8 2 4.1 2 7.5 2 11.0 2	9.0 2	10·6 14·1 17·7		6 2 20 2 2 24 0 2 28	0.7 2 3 1.4 2 3 3.3 2 3	25·9 2 29·7 2 33·8 2	39.3 2	36·5 40·6 44·9
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60 50 40 30	0.0 0.0	1.7 1.8 1.8 2.0	2.6 2.6 2.8 3.0	3.5 3.5 3.7 4.0	4·3 4·4 4·6 5·0	5·2 5·3 5·5 6·0	6·1 6·4 7·0	6.9 7.3 8.0	8.2	8.6 8.8 9.2 9.9	10.1	10.4 10.2 11.0	11·4 .11·9	12·1 12·2 12·8 13·8	13.0 13.1 13.7 14.7	15.3	17·2 17·4 18·1 19·4
20 15 10 8	1·1 1·2 1·3 1·4	2·3 2·4 2·7 2·8	3·4 3·7 4·0 4·2	4·5 4·9 5·4 5·6	5·6 6·1 6·7 7·0	6·7 7·3 8·0 8·4	7·9 8·5 9·3 9·7	9.0 10.6 11.1	11.0	11·2 12·0 13·2 13·7	13.2	13·3 14·4 15·7 16·4	16.9	15.4 16.6 18.1 18.9	17.7		21.6 23.1 25.0 25.9
6 4 2 0 S.	1·5 1·6 1·6 1·7	3·3 3·5	4.4 4.6 4.9 5.2	5·9 6·2 6·5 6·9	7·3 7·7 8·1 8·6	8·7 9·2 9·7 10·2	10·2 10·7 11·2 11·3	12·8 12·8	13.6	14·4 15·1 15·8 16·7	15·7 16·5 17·3 18·3		19.2		20·9 21·9 24·1	26.2	29.2
2 4 6	1·8 2·0 2·1	3·7 3·9 4·2	5·5 5·9 6·3	7·3 7·8 8·4	9·1 9·7 10·5	10·9 11·6 12·5	12·6 13·5 14·5	14·4 15·3 16·4	18.3	20.2		20·9 22·2 23·7	23.9		28.6	28·9 30·5 32·3	
8 9 10	2·3 2·4 2·5	4·6 4·8 5·0	6·9 7·2 7·5	0.0 9.2 9.1	11·3 11·3 12·4	13·5 14·1 14·7	15·7 16·3 17·1	17·7 18·5 19·3	20.6	22.6					31.6	34°3 35°4 36°6	37·7 38·9 40·1

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. \times α ${\rm PAVONIS}.$

Lat.	1 m.	m. 8	12				m.	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	36	m. 38	m. 40	42	m. 44
N.			,					RE	DUC	TIOI	NS.					,		
28 24 20 16	0·3 0·3 0·3	1.1	2.	4 4.	2 6	6·6	7·6 8·0 8·3 8·7	9·5 9·9 10·3	10·7 11·1 11·6 12·1	12·4 12·9 13·5 14·0	14·2 14·8 15·5 16·1	16.2	19.8	21.3	22·8 23·7 24·8 25·8	25·2 26·3 27·4 28·6	27·8 29·0 30·2 31·5	33.1
12 8 4 0	0.3 0.3 0.3	1:2 1:3 1:2	2 2.	8 5.	2 8	7·8	9·4 9·8	10·7 11·2 11·7 12·2	12·6 13·1 13·7 14·3	14·6 15·2 15·9 16·6	16·8 17·5 18·2 19·1	19.0	22.4	26.2	26·9 28·0 29·2 30·5	29·8 31·0 32·4 33·8		37·5 39·1
\$. 4 8 12 16	0·4 0·4 0·4	1.0	3.	4 6 6	3 9	0.3 I	1.3	12·8 13·4 14·2 15·0	15.0 15.8 16.6 17.6	17·4 18·3 19·3 20·4	20·0 21·0 22·1 23·4	22·2 23·3 25·2 26·6	26.9	30.1	32·0 33·6 35·3 37·4	35·4 37·2 39·1 41·4	43.1	44·9 47·3
18 20 22 24	0·4 0·4 0·5 0·5	1.8	3 4.	0 7 I 7	4 1	1·1 1	3·4 3·9	15·5 16·0 16·5 17·2	18·1 18·7 19·4 20·1	21·0 21·7 22·5 23·3	24·1 24·9 25·8 26·7	27·2 28·3 29·3	33.0	35.8	38·6 39·8 41·2 42·7	42·7 44·1 45·6 47·2	50.2	53.2
26 28 30 32 34	0·5 0·5 0·6 0·6	2.1	4° 2 4° 3 5°	7 8. 9 8. 1 9.	3 I: 7 I: 1 I:	2·9 1 4·3 1	5·7 6·4 7·2	17·8 18·6 19·5 20·5 21·6	20.9 21.8 22.8 24.0 25.4	24·2 25·3 26·5 27·8 29·4	27·8 29·0 30·3 31·9 33·7	31.6 32.5 34.4 36.5 38.5	37·1 4 38·8 2 40·8	43·5 45·7	44.3 46.2 48.3 50.8 53.6	49°1 51°1 53°5 56°1 59°2	56·3 58·8	61.7 64.5 67.6
Lat.	m. 45	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	53	54			m. 56	m. 57	m. 58		m. 5 9	m. 60
N.								RE	DUC	TIOI	NS.							
28 26 24 22 20	31.9 32.6 33.2 33.9 34.7	33·3 34·0 34·7 35·5 36·2	34·8 35·5 36·3 37·0 37·8	36·3 37·0 37·8 38·6 39·4	37·8 38·6 39·4 40·2 41·1	40°2 41°0	42·7 43·6	43°4 44°3 45°3	45° 46° 47°	46. 1 47. 0 48.	8 48 8 49 8 50	·6 0 ·6 0	49·3 50·3 51·4 52·5 53·6	0 51.0 0 52.1 0 53.2 0 54.3 0 55.5	0 54 0 55	·0 0 ·1 0	55·8 57·0 58·2	0 56·5 0 57·7 0 58·9 1 0·2 1 1·4
18 16 14 12 10	35.4 36.1 36.8 37.6 38.4	37.0 37.7 38.5 39.3 40.1	38·6 39·4 40·2 41·0 41·9	40·2 41·1 41·9 42·8 43·7	41·9 42·8 43·7 44·6 45·5	43.6 44.5 45.4 46.4 47.3	45°4 46°3 47°3 48°2 49°2	48·1 49·1	50·6 51·6 52·1	51.	9 53 0 54 0 56	·8 0 ·9 0	55·8 56·9 58·1	o 56.6 o 57.8 o 59.0 i o.2 i i.4	0 59 I I I 2		3·1 4·4	I 2.7 I 4.0 I 5.3 I 6.6 I 8.0
8 6 4 2 0	39·2 40·0 40·9 41·8 42·7	41.0 41.8 42.7 43.7 44.6	42·8 43·7 44·6 45·6 46·6	44.6 45.5 46.5 47.5 48.6	46·4 47·4 48·4 49·5 50·6	48·3 49·4 50·4 51·5 52·7	52·4 53·6	53.4 54.5 55.7	55°. 56°. 57°.	57 5 58 8 60	5 59 7 60 0 62	·6 I	1·8 3·1 4·5	I 2.7 I 4.0 I 5.4 I 6.8 I 8.3	I 6	·1 1	8.5	1 9.4 1 10.9 1 12.4 1 13.9 1 15.6
\$. 2 4 6 8 10	43.7 44.7 45.8 46.9 48.1	45.7 46.7 47.8 49.0 50.3	47.6 48.8 49.9 51.2 52.5	49.7 50.8 52.0 53.3 54.7	51·8 53·0 54·2 55·6 57·0	53.9 55.1 56.4 57.8 59.3	56.0 57.3 58.7 60.1 61.7	59.6 61.0	61.	64. 65. 67.	2 66 7 68 3 69	6 I 1 I 8 I	9.0	1 9·8 1 11·4 1 13·1 1 14·9 1 16·8	I 13 I 15 I 17	·9 I ·7 I ·5 I	16·5 18·3 20·2	1 17·3 1 19·0 1 20·9 1 22·9 1 25·0
12 14 16 18 20	49.4 50.8 52.3 53.9 55.6	51.6 53.0 54.6 56.3 58.1	55.4	57·7 59·4 61·2	58·5 60·1 61·8 63·7 65·8	62·6 64·4 66·3	63·3 65·0 66·9 68·9 71·1	69.5 71.6	70.	2 72· 2 74· 4 77·	8 75 9 77 1 80	·5 I	18.2	1 18·8 1 21·0 1 23·3 1 25·8 1 28·5	I 23	2 I 8 I	26·7 29·1 31·8	1 27·2 1 29·6 1 32·1 1 34·8 1 37·8
22 24 25 26 27 28	57.5 59.6 60.7 61.9 63.1 64.5	60·0 62·2 63·4 64·6 65·9 67·3	64·9 66·1 67·4	65·3 67·6 68·9 70·2 71·7 73·2	68·0 70·4 71·7 73·1 74·6 76·2	76·1	73·5 76·2 77·6 79·1 80 7 82·3	80.6 82.1 83.8	82· 83· 85· 87·	85. 7 86. 88. 90.	2 88 8 89 4 91 2 93	·3 I ·9 I ·6 I		1 31.4 1 34.7 1 36.4 1 38.3 1 40.2 1 42.2	I 39 I 41 I 43	·9 I ·7 I ·6 I	41·2 43·1 45·1 47·1	1 41·1 1 44·6 1 46·5 1 48·5 1 50·7 1 52·9
29 30 31 32 33 34	65.9 67.4 69.0 70.7 72.5 74.5	68·8 70·3 72·0 73·8 75·7 77·7	71·7 73·3 75·1 76·9 78·9 81·0	74.7 76.4 78.2 80.1 82.2 84.4	77·8 79·6 81·4 83·4 85·6 87·9	84·7 86·8 89·0	86·0 88·0 90·2	91.4 93.6 96.0	94.	96. 3 98. 1 100. 5 103.	1 99 3 101 7 104 2 107	6 I 9 I 0 I	43·1 45·5 48·0 50·7	1 44·4 1 46·7 1 49·2 1 51·8 1 54·6 1 57·6	I 52 I 55 I 58	·4 I ·9 I ·6 I	56·7 59·4 2·4	1 55·3 1 57·8 2 0·5 2 3·4 2 6·4 2 9·7

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

* α PAVONIS.

Lat.	m. 61	m. 62	63		m. 84	m. 65	m. 66	m.		m.	m. 69	m. 70	m.	m		m. 73	m. 74
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26 24 22 20 18	0 59.7 I 0.9 I 2.2 I 3.5 I 4.8	I 4.2 I 5.5	I 4 I 6 I 7	6 I 9 I 7 I	5.6 7.0 8.4 9.8 11.2	9·1 10·5 12·0	I II·2 I I2·2 I I4·2	2 I I3 7 I I4 2 I I6	3·4 I 4·9 I 6·4 I	15·6 1 17·1 1 18·7 1	17.8	i 18·4 i 20·0 i 21·7 i 23·4 i 25·1	I 22 I 24 I 25	3 I 2 0 I 2 7 I 2	4·6 I 6·4 I	28·8 1 30·6 1	29.3
16 14 12 10 8 6 4	I 10.3 I 11.7 I 13.2 I 14.8	1 11.1	1 11 1 13 5 1 14 1 16 5 1 18	·9 I ·4 I ·9 I ·4 I ·7 I	14.2 I 15.7 I 17.3 I 18.9 I 20.5 I 22.2 I	16·5 18·1 19·7 21·3 23·0 24·8	I 22.1 I 23.8 I 25.6 I 27.4	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1·2 I 2·9 I 4·6 I 6·3 I 8·1 I	23.6 I 25.3 I 27.1 I 28.9 I 30.7 I 32.7 I	26·1 27·8 29·6 31·5 33·4 35·4	I 32.2 I 34.I I 38.I	I 31 I 32 I 34 I 36 I 38 I 40	1 1 3 9 1 3 8 1 3 8 1 3 8 1 4	3.6 I 5.5 I 7.5 I 9.5 I 1.6 I 3.7 I	40·2 1 42·2 1 44·4 1 46·5 1	38·8 40·8 42·9 45·0 47·2 49·4
S. 0 2 4 6 8 10	1 18·1 1 19·8 1 21·6 1 23·6 1 25·6 1 27·8	I 22.4 I 24.3 I 28.4	I 25 I 27 I 29 I 31	·I I ·O I ·I I ·2 I	27·7 I 29·7 I 31·9 I 34·1 I	30·5 32·5 34·7 37·0	I 33.2 I 35.3 I 39.9	I 36 I 38 I 40	0.0 I 0.2 I 0.5 I	38·9 I 41·1 I 43·5 I 46·0 I	41.7 44.0 46.5 49.0	I 44.6 I 47.0 I 49.5 I 52.2	I 47 I 50 I 52 I 55	6 I 5 6 I 5	0.6 I 3.1 I 5.7 I	56.2	56·7 59·3 2 2·1 2 5·0
12 14 16 17 18	I 30·I I 32·5 I 35·I I 36·5 I 38·0 I 39·5	I 35.5 I 38.2 I 39.6 I 41.1	I 38 I 41 I 42 I 44	·5 I ·3 I ·8 I	41.6 I 44.5 I 46.0 I 47.6 I	44.8 47.7 49.3 50.9	I 47.9 I 51.0 I 52.6 I 54.2	1 51 5 1 54 5 1 55	1·1 1 1·3 1 5·9 1 7·6 2	57.6 2	57·7 1·0 2·8 4·6	2 4.4	2 4 2 7 2 9 2 II	·5 2 ·9 2 I ·8 2 I ·7 2 I	1·5 2 3·3 2 5·3 2	11.4	2 20.6
21 22 23	I 41.0 I 42.7 I 44.4 I 46.2 I 48.0	I 46.0 I 47.7 I 49.6	I 49 I 51 I 53	3 1	52·7 I 54·6 I 56·5 2	56.2	1 59.7 2 1.6 2 3.7 2 5.9	2 3 2 2 2 2 2 2 2 2	9.6 2	8·9 2 11·1 2	10·4 12·6 14·8 17·1	2 14·1 2 16·3 2 18·6 2 21·6	2 I7 2 20 2 22	·9 2 2	1.6 2 3.9 2 6.3 2	25.4	2 34.2
26 27 28	1 50.0 1 52.1 1 54.3 1 56.6 1 59.0	1 55.7 1 57.9 2 0.3	1 59° 2 1° 2 4° 2 6°	3 2 6 2 1 2 7 2	0.7 2 3.0 2 5.4 2 7.9 2 10.5 2	14.2	2 10·5 2 13·6 2 15·7 2 18·5	2 10	4·3 2 6·9 2	18.2 2	19·6 22·2 24·9 27·7 30·8	2 26.1	2 30	·2 2 3 ·0 2 3 ·0 2 4	4·3 2 7·2 2 0·3 2	38·4 41·4 44·5	2 39.7 2 42.6 2 45.6 2 48.9 2 52.3
32	2 1.6 2 4.4 2 7.3 2 10.5 2 13.9	2 8·3 2 11·4 2 14·6	2 12· 2 15· 2 18·	3 2 3	13·4 2 16·4 2 19·6 2 23·0 2 26·6 2	20·5 23·8 27·3	2 21·5 2 24·6 2 28·6 2 31·6 2 35·4	2 28	8·8 2 2·3 2 5·0 2	36·6 2	37.4 41.0	2 41·8 2 45·3 2 40·4	2 46 5 2 50 1 2 54	0 2 5	60·6 2	55·2 59·1 3·4	3 3.8
Lat.	m.	m.	m.	m. 16	m. 20	m. 24	m. 28	m. 32	m. 36	1 m.	m.	m. 48	m. 52	m. 60	m.	m.	m.
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30 20 10 5	0.5 0.6 0.6 0.6 0.6	1·1 1·1 1·2 1·2 1·3	1.6 1.7 1.8 1.8 1.9	2·2 2·2 2·4 2·5 2·6	2.7 2.8 2.9 3.1 3.2	3·3 3·4 3·5 3·7 3·9	3.8 3.9 4.1 4.3 4.5	4·4 4·5 4·7 4·9 5·2	4·9 5·0 5·3 5·5 5·8	5·9	6.4	7·0 7·3	7·1 7·2 7·6 7·9 8·3	8·1 8·3 8·7 9·1 9·5	9·4 9·6 10·1 10·5 11·0		12.0 12.3 12.9 13.3 13.9
5 10 14 18	0·7 0·7 0·8 0·9	1.4 1.5 1.6 1.7	2·1 2·2 2·4 2·6	2·8 3·0 3·2 3·4	3.4 3.7 4.0 4.3	4·1 4·4 4·8 5·2	4·8 5·2 5·5 6·0	5.5 5.9 6.3 6.8	6·2 6·6 7·1 7·7	7.3	8·i	8·8 9·4	8·8 9·5 10·1 10·9	10·1 10·9 11·6 12·5	11·7 12·5 13·4 14·4	14.2	14·7 15·7 16·7 18·0
20 22 24 26	1.1 0.0 0.0	1·8 1·9 2·0 2·1	2·7 2·8 3·0 3·2	3.6 3.8 4.0 4.3	4.5 4.7 5.0 5.2	5·4 5·6 5·9 6·3	6·3 6·6 6·9 7·3	7·1 7·5 7·9 8·3	8·0 8·4 8·8 9·3	9.3	10.2	11.6	11.4 11.9 12.5 13.2	13.0 13.6 14.3 15.0	15.0 15.7 16.4 17.2	16·9 17·6 18·4 19·3	18·7 19·4 20·3 21·2
28 30 32 34	I·I I·2 I·4	2·2 2·4 2·6 2·8	3.4 3.6 3.9 4.2	4.5 4.8 5.1 5.6	5·6 5·9 6·4 6·9	6·7 7·1 7·6 8·2	7.7 8.3 8.9 9.5	8·8 9·4 10·1 10·9	9.9 10.2 11.3 12.2	12.2	12.7	13.8	14.0 14.9 15.8 17.1	15·9 16·8 18·0	18·3 19·3 20·5 21·9	20·4 21·6 22·9 24·3	22·4 23·7 25·1 26·4

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

* α PAVONIS.

Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	m. 36	m. 38	m. 40	m. 42	m; 44
S.						F	EDU	CTI	ONS.							
38 42 46	0·2 0·2 0·2	0.9 0.9 0.8	2.0 1.9 1.8	3.6 3.4 3.3	5.6 5.4 5.1	8:1 7:7 7:3	9.5 9.1 8.6	11.0 10.5 9.9	12·7 12·0 11·4	14·4 13·7 13·0	16·3 15·5 14·7	18·2 17·3 16·4	20·3 19·3 18·3	22·5 21·4 20·3	24.8 23.6 22.4	27·2 25·9 24·5
50 54 58 60	0·2 0·2 0·2 0·2	0·8 0·7 0·7 0·6	1·7 1·6 1·5 1·4	3·I 2·9 2·7 2·6	4·8 4·5 4·2 4·0	6·9 6·5 6·0 5·8	8·1 7·6 7·0 6·8	9·4 8·8 8·2 7·8	10·8 10·1 9·4 9·9	12·2 11·5 10·6 10·2	13·8 12·9 12·0 11·5	15·5 14·5 13·5	17·2 16·2 15·0 14·4	19·1 17·9 16·6 16·0	21·1 19·7 18·3 17·6	23·1 21·7 20·1 19·3
Lat.	m. 45	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	m. 54	m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
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38 42 46 48 50	28·4 27·1 25·7 24·9 24·2	29·7 28·3 26·8 26·1 25·3	31.0 29.5 28.0 27.2 26.4	32·4 30·8 29·2 28·4 27·5	33·7 32·1 30·4 29·6 28·7	35·1 33·4 31·7 30·8 29·9	36·5 34·7 32·9 32·0 31·1	37.9 36.1 34.2 33.3 32.3	39.4 37.5 35.6 34.6 33.5	40.9 38.9 36.9 35.9 34.8	42·4 40·4 38·3 37·2 36·1	44.0 41.9 39.7 38.6 37.4	45.6 43.4 41.1 40.0 38.8	47·2 44·9 42·6 41·4 40·2	48.8 46.5 44.0 42.8 41.5	50.5 48.0 45.5 44.3 42.9
52 54 56 58 60	23.4 22.7 21.9 21.1 20.2	24·5 23·7 22·9 22·0 21·1	25·6 24·7 23·9 23·0 22·0	26·7 25·8 24·9 23·9 23·0	27·8 26·9 25·9 25·0 23·9	28·9 28·0 27·0 26·0 24·9	30·I 29·I 28·I 27·0 25·9	31·3 30·3 29·2 28·1 27·0	32·5 31·4 30·3 29·2 28·0	33.7 32.6 31.5 30.3 29.0	35.0 33.8 32.7 31.4 30.2	36·3 35·1 33·8 32·6 31·3	37·6 36·3 35·1 33·8 32·4	38·9 37·6 36·3 35·0 33·5	40·2 38·9 37·6 36·2 34·7	41.6 40.3 38.8 37.4 35.9
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Lat.	m.															
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S. 36		1	1		5 ś ·8		62.5	64.4		68.2	1.4.		1.4.	1.1.	-d.	اددا
30 38 40 42 44	51.7 50.5 49.3 48.0 46.8	53.4 52.2 50.9 49.6 48.4	55·2 53·9 52·6 51·3 50·0	56·9 55·6 54·3 52·9 51·6	50.0 57.4 56.0 54.6 53.2	59.2 57.8 56.3 54.9	59.5 58.1 56.6	62·8 61·3 59·8 58·3	66·3 64·7 63·2 61·6 60·0	66.6 65.0 63.4 61.8	70·2 68·6 66·9 65·3 63·6	72·2 70·5 68·8 67·1 65·4	74·2 72·5 70·8 69·0 67·2	76·3 74·5 72·7 70·9 69·1	78·4 76·6 74·7 72·9 71·0	80·5 78·6 76·8 74·8 72·9
45 46 47 48 49	46·2 45·5 44·9 44·3 43·6	47.7 47.1 46.4 45.7 45.1	49·3 48·6 47·9 47·2 46·5	50·9 50·2 49·5 48·8 48·1	52·5 51·8 51·1 50·3 49·6	54·1 53·4 52·6 51·9 51·1	55.8 55.0 54.3 53.5 52.7	57·5 56·7 55·9 55·1 54·3	59·2 58·4 57·6 56·8 55·9	61.0 60.1 59.3 58.4 67.6	62·7 61·9 61·0 60·1 59·3	64·5 63·6 62·8 61·9 61·0	66·4 65·4 64·5 63·6 62·7	68·2 67·2 66·3 65·4 64·4	70·1 69·1 68·1 67·2 66·2	72.0 71.0 70.0 69.0 68.0
50 51 52 53 54	42·9 42·3 41·6 40·9 40·3	44·4 43·7 43·0 42·3 41·6	45·8 45·1 44·4 43·7 43·0	47·3 46·6 45·9 45·1 44·4	48·8 48·1 47·3 46·6 45·8	50·4 49·6 48·8 48·0 47·2	51.9 51.1 50.3 49.5 48.7	53·5 52·7 51·9 51·0 50·1	55·1 54·3 53·4 52·5 51·6	56·7 55·8 55·0 54·1 53·2	58·4 57·5 56·6 55·6 54·7	60·0 59·1 58·2 57·2 56·3	61.7 60.8 59.8 58.8 57.9	63·5 62·5 61·5 60·5 59·5	65·2 64·2 63·2 62·1 61·1	67.0 65.9 64.9 63.8 62.8
55 56 57 58 59 60	39·5 38·8 38·1 37·4 36·6 35·9	40.9 40.1 39.4 38.6 37.9 37.1	42·2 41·5 40·7 39·9 39·1 38·3	43.6 42.8 42.0 41.2 40.4 39.5	45.0 44.2 43.4 42.5 41.7 40.8	46·4 45·6 44·7 43·8 43·0 42·1	47.8 47.0 46.1 45.2 44.3 43.4	49°3 48°4 47°5 46°6 45°7 44°7	50·7 49·8 48·9 48·0 47·0 46·0	52·2 51·3 50·4 49·4 48·4 47·4	53.8 52.8 51.8 50.8 49.8 48.8	55°3 54°3 53°3 52°3 51°2 50°2	56·8 55·8 54·8 53·8 52·7 51·6	58·4 57·4 56·3 55·2 54·2 53·0	60·0 59·0 57·9 56·8 55·6 54·5	61.7 60.6 59.4 58.3 57.2 56.0
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Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 30	m. 40	m. 50	m. 00	10	m. 20	m. 30	m. 40	m. 50	60
S.							AZI	MUT	HS.						,	
36 40 44	0.5 0.5 0.6	1.1 1.1 1.1	1.6 1.6 1.7	2·2 2·2 2·2	2·7 2·7 2·8	3·3 3·3 3·3	4·I 4·I 4·I	5·4 5·5 5·5	6.8 6.8 6.9	8·1 8·2 8·3	9·4 9·5 9·6	10.8 10.8 11.0	12·1 12·2 12·3	13·4 13·5 13·7	14.6 14.8 15.0	16·3 16·1 16·3
48 52 56 60	0.6 0.6 0.6	1.1 1.1 1.2	1.7 1.8 1.8	2·3 2·4 2·4	2·8 2·8 3·0 3·1	3·4 3·5 3·7	4·6 4·3 4·4 4·6	5.6 5.8 5.9 6.1	7.0 7.2 7.4 7.6	8·4 8·6 8·8 9·1	9·8 10·0 10·7	11·2 11·4 11·8 12·2	12·6 12·9 13·2 13·7	13·9 14·3 14·7 15·2	15·3 15·7 16·1 16·7	16·6 17·0 17·6 18·2

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REDUCTION TO THE MERIDIAN TABLE NEAR THE MERIDIAN BELOW THE POLE. * a PAVONIS.

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Lat.	m.	m.	m. 18	m. 19	m.	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26	m.	m. 28	m. 29	m. 30	m. 31
S.	16	17	18	15	20 1	21 ,			CTIC					, 20		- 01
36 37 38 39 40	82.7 81.8 80.8 79.8 78.9	84·9 83·9 82·9 81·9 80·9	87·1 86·1 85·1 84·1 83·0	89·3 88·3 87·2 86·2 85·2	91.6 90.5 89.4 88.4 87.3	93·8 92·8 91·7 90·6 89·5	96·2 95·0 93·9 92·8 91·7	98·5 97·4 96·2 95·1 93·9	100·9 99·7 98·5 97·3 96·2	103·2 102·1 100·9 99·7 98·5	105·7 104·4 103·2 102·0 100·8	108·1 106·9 105·6 104·4 103·1	110·6 109·3 108·0 106·7 105·5	113·1 111·8 110·5 109·2 107·8	115.6 114.3 112.9 111.6 110.3	118·2 116·8 115·4 114·1 112·7
41 42 43 44 45	77·9 76·9 75·9 74·9 73·9	79.9 78.9 77.9 76.9 75.9	82.0 81.0 79.9 78.9 77.8	84·1 83·0 82·0 80·9 79·8	86·2 85·1 84·0 83·0 81·9	88.4 87.3 86.1 85.0 83.9	90·6 89·4 88·3 87·1 86·0	92·8 91·6 90·4 89·2 88·1	95.0 93.8 92.6 91.4 90.2	97·2 96·0 94·8 93·6 92·3	99·5 98·3 97·0 95·8 94·5	101·8 100·5 99·3 98·0 96·7	104·2 102·9 101·5 100·2 98·9	106·5 105·2 103·8 102·5 101·1	108·9 107·5 106·2 104·8 103·4	111·3 109·9 108·5 107·1 105·7
46 47 48 49 50	72.9 71.9 70.9 69.8 68.8	74·8 73·8 72·7 71·7 70·6 69·5	76.8 75.7 74.6 73.5 72.4 71.3	78·7 77·6 76·5 75·4 74·3 73·1	80·7 79·6 78·5 77·3 76·2	82.8 81.6 80.4 79.3 78.1 76.9	84.8 83.6 82.4 81.2 80.0 78.8	86·9 85·6 84·4 83·2 82·0 80·7	88·9 87·7 86·5 85·2 83·9 82·6	91·1 89·8 88·5 87·2 85·9 84·6	93.2 91.9 90.6 89.3 87.9 86.6	95.4 94.0 92.7 91.3 90.0 88.6	97.5 96.2 94.8 93.4 92.0	99.8 98.4 97.0 95.6 94.1	102.0 100.6 99.1 97.7 96.2 94.8	104.2 102.8 101.3 99.9 98.4 96.9
51 52 53 54	66·7 65·6 64·5	68·4 67·3 66·2	70·2 69·0 67·9	72·0 70·8 69·6	73·8 72·6 71·4	75·7 74·4 73·2	77·5 76·3 75·0	79·4 78·1 76·8	81·3 80·0 78·7	83·3 81·9 80·5	85·2 83·8 82·4	87·2 85·8 84·3	89·2 87·7 86·3	91·2 89·7 88·2	93.3	95·3 93·8 92·2
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	32	33	34	35	36	37	38	3 3		41	42	4:		44	45	46
8. 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54	109.4 108.0 106.5 105.0	121·9·1 120·5 119·1 117·6 116·2 114·7 113·3 111·8 110·3 108·8 107·3 105·8 104·3 102·7	124:5123:121:6123:121:612:7117:21117:2117:2117:2117:2117:	5 127. 1 125. 5 124. 1 122. 7 121. 2 119. 7 118. 2 115. 1 115. 1 115. 1 107. 3 105. 7 103.	6 131:22 2129:8 7 128:2 2126:8 7 125:3 2 123:7 7 122:2 2120:6 6 119:1 1 117:5 5 115:9 7 111:0 7 111:0 7 111:0 1 109:2 1 109:2	3 132 3 131 3 129 3 127 7 126 2 124 5 123 1 121 9 118 3 116 7 109 1 108 1 109 1 108 1 109 1 108 1 109	0 136 132 132 132 132 132 132 132 132	5.8 13 5.2 13 3.6 13 2.1 13 3.5 5 13 3.9 13 7.3 12 4.0 12 7.4 12 7.4 11 5.7 11 3.9 11 3.6 11 3.6 11 3.6 11 3.6 11 3.6 11 3.6 11	9.5 142 9.5 142 6.3 139 4.7 137 1.3 135 1.5 134 8.2 139 1.6 5 129 1.9 127 3.2 125 1.9 127 1.0 128 1.0 128 1	13 145: 17 143: 14 140: 18 136: 14 136: 14 136: 14 136: 14 136: 14 129: 16 128: 17 129: 16 128: 17 129: 18	5 2 268 2 244 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	9·I 2 7·4 2 2 3 3·9 2 2 2 2 0·4 2 2 2 2 0·4 2 2 2 2 2 2 2 3·9 2 2 2 2 2 2 2 3·6 8 6·8 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	33.8 2 33.8 2 32.0 2 328.5 2 26.7 2 24.9 2 319.5 2 17.6 2 15.8 2 117.6	36·7 34·9 33·1 33·1 33·3 29·5 27·7 25·8 24·0 22·1 22·1 22·2 18·4 16·4 21·5 10·6 2 6·6 2 4·5	2 39.6 2 37.8 2 36.0 2 34.2 2 32.3 2 30.2 2 28.6 2 26.7 2 24.8 2 26.7 2 24.8 2 21.0 2 19.0 2 17.1 2 13.1 2 13.1 2 11.0 2 9.0 2 4.8
Lat.	m.	[m.	r	n. ₁	m.	m.	m		HOUI	m. (m. 1	m.	m.	m.	m.	m.
<u> </u>	47	48	1 4	19	50	51	55 		JCTIC	54 ONS.	55	56	57	58	59	60
S. 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54	2 40· 2 38· 2 37· 2 35· 2 33· 2 29· 2 27· 2 25· 2 21· 2 17· 2 15· 2 13· 2 11· 2 9·	8 2 4 4 2 2 3 3 3 4 2 2 3 3 3 4 4 5 5 5 5 6 6 6 6 6 6 6 6 6 6 5 5 4 3 3 2 1 1 3 3 3 3	3.7 2.2 2.9 3.7 2.2 2.2 2.2 2.2 2.3 2.3 2.3 2.3	46.77 44.88 42.99 39.00 33.00 33.00 33.00 33.00 29.00 26.99 24.88 22.77 20.66 18.53 14.11	2 49.8 2 47.8 2 45.8 2 43.8 2 41.8 2 37.8 2 37.8 2 37.8 2 37.5 2 27.5 2 27.5 2 27.5 2 28.8 2 16.5	2 50· 2 48· 2 46· 2 44· 2 40· 2 38· 2 36· 2 32· 2 28· 2 25· 2 21· 2 10·	888888888888888888888888888888888888888	67.9 67.9 63.8 63.8 63.8 63.8 64.9 64.9 64.9 65.9 66.9	1.0 3 59°0 3 56°9 3 55.48 2 55.8 2 50°7 2 48°5 2 46°4 2 42°1 2 39°9 2 33°7 2 35°5 2 33°3 2 28°7 2 26°3 2 24°0 2	4-21 3 3 5 5 · 8 2 2 2 2 3 3 5 · 9 2 2 2 2 3 5 · 9 2 2 2 2 6 · 5 2 2 2 6 · 5 2 2 2 6 · 5 2 2 2 6 · 5 2 2 2 6 · 5 2 2 2 6 · 5 2 2 2 6 · 5 2 2 2 6 · 5 2 2 2 6 · 5 2 2 2 6 · 5 2 6 · 5	5.2 3.1 1.0 58.8 56.6 54.5 50.0 47.8 45.6 43.3 41.0 38.7 36.3 33.9 52.9	3 6.3	3 11·6 3 9·4 3 7·2 5 ·0 5 ·0 5 ·0 5 ·0 5 ·0 5 ·0 5 ·0 5 ·0	3 14.9 3 12.6 3 10.4 3 8.1 3 5.8 3 1.2 2 56.5 2 54.2 2 49.4 4 46.9 2 44.4 2 41.9 2 36.8	3 18-13 3 13-5-8 3 13-5-8 3 13-2 3 6-6 3 4-3 3 1-9 2 59-5 2 57-7 2 52-2 2 49-7 2 47-2 2 44-7 2 39-5	3 19.1 3 16.7 3 14.4 3 12.1 3 9.7 3 7.3 3 4.9 3 2.5 5 7.6 2 55.1 2 2 55.1 2 44.8 2 42.2

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

4 ~ PERSEI (MIRFAK).

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26 24 22 20 18	0	7 2 2 6 2	9 6 7 6 6 5	·4 I	2·1 18 1·4 17 0·8 16 0·3 16 9·8 15	·8 21· ·9 20· ·1 19·	6 25· 4 24· 4 23·	6 30.0 3 28.5 1 27.1	34·8 33·0 31·4	39·9 37·8 36·0	45'3 42'9 40'9	54.0 51.0 48.4 46.1 44.0	60·3 57·1 54·1 51·6 49·3	67·2 63·5 60·2 57·3 54·8	74°3 70°2 66°6 63°4 60°6	69.8	89.4 84.5 80.2 76.5 73.1
16 14 12 10 8 4	0	6 2 5 2 5 2	3 5 2 2 4 2 1 4 2 0 4	·1 ·9 ·7 ·5	9°4 14 9°0 14 8°7 13 8°4 13 8°1 12 7°6 11	·I 17· ·6 16· ·I 15· ·6 15·	1 20° 4 19° 8 18° 3 18°	3 23.8 5 22.9 8 22.0 2 21.3	27.5 26.5 25.6 24.7	31.6 30.4 29.3 28.3	35.9 34.6 33.3 32.2	42·2 40·5 39·0 37·6 36·3 34·0	47·2 45·3 43·6 42·1 40·7 38·1	52·5 50·5 48·6 46·9 45·3 42·4	58·1 55·8 53·8 51·9 50·1 47·0	59·2 57·1 55·2	62.6
\$. 0 4 8 12 16	0	4 I 4 I	·7 3 ·6 3 ·5 3	·8 ·6 ·4	6.0 9		7 15° 0 14° 4 13°	1 17·7 3 16·8 6 15·9	20·5 19·4 18·4	23.6	26·8 25·4 24·I	32·0 30·2 28·6 27·2 25·8	35·9 33·9 32·1 30·4 28·9	39.9 37.7 35.7 33.9 32.2	44.2 41.8 39.6 37.6 35.7	46.0	50·5 47·8 45·4
20 24 28 32 36	0°	3 1	·3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	·8 ·6	5·2 8 4·9 7 4·6 7	·5 10· ·1 9· ·7 9· ·3 8· ·9 8·	8 10. 3 11.	6 13.6 0 12.9 5 12.3	15.8	18·1 17·2 16·3	20·6 19·6 18·6	24·5 23·3 22·1 21·0 19·9	27·5 26·1 24·8 23·5 22·3	30·6 29·1 27·6 26·2 24·8	33.9 32.2 30.6 29.0 27.5	35.5 33.7 31.9	37·0
Lat.	m. 45	1 m.	m.	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	m. 54	m. 55	m. 56	m.		n.	m. 59	m. 60
N.								EDU		ONS.							
26 25 24 23 22	93'3 90'7 88'3 86'0 83'8 81'8	92.1		100.0	104.1	, 114·4 111·2 108·3 105·5 102·9 100·4	112.5 109.6 106.9	119.9 116.8 113.8	121·1 118·1 115·2	125.6 122.4 119.4	130·1 126·8 123·7	2 14·6 2 11·3 2 8·1	2 13· 2 15· 2 12·	3 2 2 8 2 2 5 2 I	7.0 2 0.4 2 7.0 2	28·7 25·0 21·6	
	79·9 78·1 76·4 74·8 73·3 70·4	79·8 78·1 76·5	87.0 85.0 83.2 81.4 79.8 76.7	90.6 88.6 86.7 84.9 83.1 79.9	92·2 90·3 88·4 86·6	98·1 96·6 93·9 90·1 96·6	99.7		107·5 105·2 103·0 100·9	111.4 109.1 106.8 104.7	115·5 113·0 110·7 108·5		1 58· 1 56·	7 2 1 2 6 2 3 2	8·0 2 5·3 2 2·7 2	9.5 6.8	2 19·6 2 16·6 2 13·7 2 11·0 2 8·4 2 3·6
12 10 8 6 4 2	59·3	68·3	73.9 71.3 68.9 66.7 64.6 62.7	77.0 74.3 71.8 69.5 67.4 65.4	77.4 74.8 72.4 70.2	83.4 80.5 77.9 75.4 73.0 70.9	86·7 83·7 80·9 78·4 75·9 73·7	90·1 87·0 84·1 81·4 78·9 76·6	93.5 90.3 87.3 84.5 81.9 79.5	97.0 93.7 90.6 87.7 85.0 82.5	93.9 90.9 88.1	I 44.2 I 40.6 I 37.3 I 34.2 I 31.3 I 28.6	I 44.	1 1 4 7 1 4 5 1 4 5 1 3	7.7 I 4.2 I 7.8 I	51.4 47.7 44.3 41.1	55·1 51·3 47·8
	54.3		60·9 59·2 57·5 56·0 54·5	60.0 58.4	64.2 62.5 60.8		71.6 69.5 67.6 65.8 64.1	74.4 72.3 70.3 68.4 66.6	77.2 75.0 73.0 71.0 69.2	80·1 77·9 75·7 73·7 71·8	78·5 76·4	1 26·1 1 23·6 1 21·4 1 19·2 1 17·1	I 26. I 24.	6 I 2 3 I 2 0 I 2	9·6 I 7·2 I 4·9 I	32·7 30·2 27·8	35·8 33·2 30·8
12 14 16	48·7 47·5 46·2 45·1 43·9	49·6 48·3 47·1	53·1 51·7 50·4 49·1 47·9	55'4 53'9 52'6 51'2 50'0	56·2 54·8 53·4	60.0 58.5 57.0 55.6 54.2	62•4 60·8 59·3 57·8 56·4	64·9 63·2 61·6 60·1 58·6	67·4 65·7 64·0 62·4 60·8	69·9 68·1 66·4 64·7 63·1	70.7		I 13.	8 I I	8·5 I 6·5 I 4·6 I	19·1 1 17·2 1	23.9
22 24 26	40·7	43.6	46·7 45·5 44·4 43·3 42·2	48·7 47·5 46·3 45·1 44·0	49.5 48.2 47.0	52·8 51·5 50·2 48·9 47·7	54.9 53.6 52.2 50.9 49.6	57·1 55·7 54·3 52·9 51·6	59·3 57·8 56·4 54·9 53·6	61.5 60.0 58.5 57.0 55.6		I 4.5	1 2. 1 2.	8 I I I 5 I		9.7	1 15·9 1 14·0 1 12·1 1 10·3 1 8·5
	36·7	39.4 38.3 37.3 36.3	41·1 40·0 38·9 37·9	40.6	43.5	46·5 45·2 44·0 42·8	48·3 47·1 45·8 44·6	50·2 48·9 47·6 46·3	52·2 50·8 49·5 48·1	54·2 52·7 51·3 49·9	54.7 53.2	o 58·2 o 56·7 o 55·2 o 53·7	0 58.	7 1 0		4.6 2.9 1.2 59.6	3.3

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

									EI (M		AK).						
Lat.	m. 61	62 m		m. 63	64	m. 65	6		67 ·	68	m. 69	70		m. 71	m. 72	m. 73	m. 74
N.								REI	OUCT:	IONS	•						
26 25 24 23 22	2 38.	5 2 43	1.5 2	48.5 2	2.9 3 58.1 3 53.6 2 49.4 2 45.4 2	54.4	3 3 2 5	3.83 8.83 4.03 9.53 5.33	19.4 3 14.2 3 9.3 3 4.7 3 0.4 3	19.63 14.73 10.03	30.6 25.2 20.1 15.3 10.8	3 30	5.63 5.73	36·5 3 31·1 3 26·1 3	48.0 3 42.2 3 36.7 3 31.6 3 26.7 3	48·0 42·4 37·1	3 53·8 3 48·1 3 42·7
21 20 19 18 17	2 24.	2 25	.72	33.3 2	41.6 2 38.0 2 34.6 2 31.4 2 28.4 2	42·8 39·3 36·0	2 4 2 4	7·6 2 4·0 2	48.8 2	53.7 2 50.1 2	58·6 54·0	3 3	7·5 3 3·5 3 9·8 3	12.63	22·1 3 17·8 3 13·6 3 9·7 3 6·0 3	23.0 18.8 14.8	3 24.0
16 15 14 13 12	2 10·0 2 7·1 2 5·:	2 I4 5 2 II 3 2 9	.72	18·4 2 15·8 2 13·4 2	25.5 2 22.7 2 20.0 2 17.5 2 15.1 2	27·0 24·3 21·7	2 3 2 2 2 2	1·4 2 8·6 2 5·9 2	38·9 2 35·9 2 33·0 2 30·2 2 27·6 2	40·4 2 37·4 2 34·6 2	45.0 41.0	2 49 2 40 2 43	0.6 2 5.5 2 3.5 2	51·1 2 48·0 2	55.73 52.62	0·5 57·2	8·6 3 5·2 3 1·9
11 10 8 6 4 2	I 51.4	2 2 1 58 1 55 1 51	0 I 5 I	6.6 2 2.4 2 58.6 2 55.0 I		14·5 10·1 6·1 2·3	2 I 2 I 2 2	8·5 2 4·0 2	25·1 2 22·6 2 18·0 2 13·7 2 9·7 2 5·9 2	26·8 2 22·1 2	31.0 26.1 21.6 17.4	2 35 2 30 2 25 2 21	5·3 2 0·3 2 5·6 2	39·6 2 34·5 2 29·7 2 25·2 2	38.72	48·4 43·0 38·0 33·3	2 52·9 2 47·4 2 42·2 2 37·4
S. 0 2 4 6 8	I 39.0 I 36.3 I 33.8	I 42 I 39 I 36	·2 I ·5 I ·8 I	45·5 I 42·6 I 39·9 I	51.9 48.8 45.9 43.1 40.4	52·I 49·I 46·2	I 5 I 5 I 4	5.6 I 2.5 I 9.5 I	55.8 I 52.8 I	56·1 I	6·1 2·7 59·5	2 6	0.7 2			20·8 17·0 13·4	2 24.6
14 16	I 26.7 I 24.5 I 22.4	I 29 I 27 I 25	·5 I ·3 I ·1 I	32·4 I 30·1 I 27·8 I	37.8 I 35.3 I 32.9 I 30.6 I 28.4 I	38·3 35·8 33·4	I 4 I 3 I 3	1·3 I 8·8 I 6·3 I	47.0 I 44.3 I 41.7 I 39.2 I 36.7 I	47.4 I 44.7 I 42.1 I	50·6 47·8 45·1	I 53 I 50 I 48	.7 I .9 I	54.0 I 51.2 I			2 6·9 2 3·7 2 0·7
22 24 26	I 16.4 I 14.5 I 12.6	I 18 I 17 I 15	0 I	21·5 I 19·4 I 17·4 I	26·2 I 24·0 I 21·9 I 19·9 I	26·7 24·5 22·4	I 2 I 2 I 2	9·3 I 7·1 I 4·9 I	32.0 I 20.7 I	34.8 I 32.4 I 30.1 I	37·5 35·1 32·7	I 40 I 37 I 35	1 1 1 1 1 1 1	43·2 I 40·6 I 38·1 I	46.1	49.0 1 46.3 1 43.7	52·0 49·2 46·5
32 34	1 9.0 1 7.2 1 5.4 1 3.6	I 9	4 I 6 I 7 I	7·8 1 7·8 1	15.9 I 13.9 I 11.9 I 10.0 I	16·2 14·2 12·2	III	8·6 I 6·5 I 4·4 I	18·8 16·7	23.4 I 19.0 I	25·8 23·5 21·3	1 28 1 26 1 23	.6 I	30·8 I 28·4 I 26·0 I	30.01	35.9	38·5 36·0
Lat.	m.	m.	TR	Įm.	m.	m.	OI m.	M.	ZIMU'	m.)F → m.	m.	m.	SEI.	m.	ı m.	
N.	4	8	12	16	20	24	28	32 37 T N	1UTH	S 40	44	48	52	60	70	80	90
26 25 24 23 22	1.6 1.6 1.5 1.4 1.4	3·2 3·1 3·0 2·9 2·8	4.8 4.7 4.5 4.3 4.2	6·4 6·2 6·0 5·8 5·6	8.0 7.7 7.4 7.2 6.9	9.6 9.2 8.9 8.6 8.3	11.1	12.0	5 14·1 2 13·6 7 13·1 3 12·7	15·6 15·0	16.4	18·4 17·7 17·1 16·6 16·1	18.4	20.8	24·5 23·7 23·0	27.1	28.0
20 18 16 14	1.3 1.5 1.1	2·6 2·5 2·3 2·2	3.9 3.5 3.3	5·2 4·9 4·7 4·4	6·5 6·1 5·8 5·5	7·8 7·4 7·0 6·6	9°1 8°6 8°1 7°7	9.2	7 10·9 2 10·4 9·9		14.0 13.2 12.5 11.9	13·0 13·6 13·0	15.4	17.6	20·1 19·2 18·3	21.2	
12 10 8 4 0	0.0 0.0 1.0 1.0	2·1 2·0 2·0 1·8 1·7	3.0 2.9 2.7 2.6	4.2 4.1 3.9 3.6 3.4	5·3 5·1 4·9 4·5 4·2	6·3 6·1 5·8 5·4 5·1	7.4 7.1 6.8 6.3	8.6	9·0 7 8·7 2 8·1	9.6	11.4 10.9 10.5 9.8 9.2		12.4	14.7 14.1 13.2	16.3	18.3	21.8 21.0 20.3 19.1 18.1
8. 10 20 30 36	0·8 0·7 0·7 0·7	1·3 1·3 1·3	2·3 2·1 2·0		3·8 3·5 3·3 3·3	4.2 4.1 3.9	5·2 4·8 4·6	5 5	5 6.2	7·5 6·9 6·6 6·5	8·2 7·5 7·2 7·1	8·9 8·2 7·9 7·8	8.6	9.8	12·8 11·9 11·4 11·3	13.2	16·2 15·1 14·5 14·4

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

★ α PERSEI (MIRFAK).

Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	m. 36	m. 38	m. 40	m. 42	m. 44
N.							RED	UCT	ONS							
6 42 46 50	0.2 0.2 0.2	0.0 1.0	2·3 2·1 2·0	4.0 3.8 3.6	6·3 5·9 5·5	9.1 8.6 8.0	10·7 10·0 9·4	12.4 11.6 10.9	14·2 13·3 12·4	16·1 15·2 14·2	18·2 17·1 16·0	20·4 19·2 17·8	22.8 21.4 20.0	25·2 23·7 22·2	27·8 26·1 24·4	30·5 28·6 26·7
54 58 62 64	0·2 0·2 0·2 0·2	0·8 0·8 0·7 0·6	1·8 1·7 1·5	3·3 3·0 2·7 2·6	5·1 4·7 4·3 4·1	7·4 6·8 6·2 5·8	8·7 8·0 7·3 6·9	9°3 8°4 8°0	11·6 10·7 9·6 9·1	13.2 12.1 11.0	14·9 13·7 12·4 11·7	16·7 15·3 13·9	18·6 17·1 15·5 14·6	20·6 18·9 17·1 16·2	22.6 20.8 18.9	24·8 22·8 20·7 19·6
04	0.2	0.0	1-5	2.0	4.1				9.		<u> </u>					190
Lat.	m. 45	m. 46	m.	m. 48	m. 49	m. 50	51	52	53	m. 54	55 55	56	m. 57	58 58	m. 59	60 60
N.				,	1		RED	UCT:	IONS			ı	1	ı	ŧ	1
42 44 46 48	31·9 30·9 29·9 28·9	33·3 32·3 31·3 30·2	34·7 33·7 32·6 31·6	36·2 35·1 34·0 32·9	37.8 36.6 35.5 34.3	39·3 38·1 36·9 35·7	40·9 39·6 38·4 37·1	42·5 41·2 39·9 38·6	44.2 42.8 41.5 40.1	45.8 44.4 43.0 41.6	47.5 46.1 44.6 43.2	49.2 47.8 46.2 44.7	51.0 49.5 47.9 46.4	52.8 51.2 49.6 48.0	54.7 53.0 51.4 49.7	56·5 54·8 53·1 51·3
50 52 54 56	27·9 26·9 25·9 24·9	29·2 28·2 27·1 26·0	30·5 29·4 28·3 27·2	31·8 30·7 29·5 28·3	33·1 31·9 30·7 29·5	34·5 33·3 32·0 30·7	35.9 34.6 33.3 32.0	37·3 36·0 34·6 33·2	38·7 37·3 35·9 34·5	40·2 38·8 37·3 35·8	41.7 40.2 38.7 37.1	43·2 41·7 40·1 38·5	44.8 43.2 41.6 39.9	46.4 44.7 43.0 41.3	48.0 46.2 44.5 42.7	49.6 47.8 46.0 44.2
58 60 62 64	23·8 22·8 21·6 20·5	24.9 23.8 22.6 21.4	26·0 24·8 23·6 22·4	27·1 25·9 24·6 23·3	28·2 27·0 25·7 24·3	29.4 28.1 26.7 25.3	30.6 29.2 27.8 26.3	31·8 30·4 28·9 27·4	33.0 31.6 30.0 28.4	34·3 32·8 31·1 29·5	35·6 34·0 32·3 30·6	36·9 35·2 33·5 31·7	38·2 36·5 34·7 32·9	39·6 37·8 35·9 34·0	41.0 39.1 37.2 35.2	42·3 40·4 38·4 36·4
				-				ЮН	TP.				-		L	
Lat.	m.															
\	0	1	2	3	4_	5	RED BED	TICT	IONS	9	10	11	12	13	14	15
N.		.	.,			1	1		١,	١,	. ć o		0.1		85.7	06-
42 43 44 45	56·5 55·7 54·8 53·9	58·4 57·5 56·6 55·7	59.4 58.5 57.6	62·3 61·3 60·4 59·4	64·3 63·3 62·3 61·3	66·3 65·3 64·3 63·3	68·3 67·3 66·3 65·2	69·3 68·3 67·2	72·5 71·4 70·3 69·2	74·6 73·5 72·4 71·2	76·8 75·6 74·5 73·3	79.0 77.8 76.6 75.4	81·2 80·0 78·8 77·5	83.5 82.2 80.9 79.7	84·4 83·2 81·8	88.0 86.7 85.4 84.1
46 47 48 49	53·1 52·2 51·3 50·5	54.0 53.1 52.2	56·7 55·7 54·8 53·9	58·5 57·5 56·6 55·6	59.4 58.4 57.4	62·3 61·2 60·2 59·2	64·2 63·1 62·1 61·0	66·1 65·0 64·0 62·9	68·1 67·0 65·9 64·8	69·0 67·8 66·7	72·1 71·0 69·8 68·6	74·2 73·0 71·8 70·6	76·3 75·0 73·8 72·5	78·4 77·1 75·8 74·6	80·5 79·2 77·9 76·6	82.7 81.4 80.0 78.7
50 51 52 53	49·6 48·7 47·8 46·9	51·3 50·3 49·4 48·5	52·9 52·0 51·1 50·1	54.7 53.7 52.7 51.7	56·4 55·4 54·4 53·4	58·2 57·1 56·1 55·0	58·9 57·8 56·7	61·8 60·7 59·6 58·5	63·6 62·5 61·4 60·2	65·5 64·4 63·2 62·0	67·4 66·2 65·0 63·8	69·3 68·1 66·9 65·6	71·3 70·0 68·7 67·5	73·3 72·0 70·7 69·3	75°3 73°9 72°6 71°2	77·3 75·9 74·6 73·2
54 55 56 57	46.0 45.1 44.2 43.3	47.6 46.6 45.7 44.7	49.1 48.2 47.2 46.2	50·7 49·7 48·7 47·7	52·3 51·3 50·3 49·2	54·0 52·9 51·8 50·7	55.7 54.6 53.4 52.3	57·4 56·2 55·1 53·9	59·1 57·9 56·7 55·5	59·6 58·4 57·2	62.6 61.3 60.1 58.8	64·4 63·1 61·8 60·5	66·2 64·9 63·5 62·2	68·0 66·7 65·3 63·9	69·9 68·5 67·1 65·7	71.8 70.3 68.9 67.5
58 59 60 61	42·3 41·4 40·4 39·4	43.7 42.8 41.8 40.8	45·2 44·2 43·1 42·1	46·6 45·6 44·5 43·5	48·1 47·1 46·0 44·9	49.6 48.5 47.4 46.3	51·2 50·0 48·9 47·7	52.7 51.5 50.4 49.1	54·3 53·1 50·6	55.9 54.7 53.4 52.1	57·5 56·2 54·9 53·6	59·2 57·8 56·5 55·1	60·9 59·5 58·1 56·7	62·6 61·1 59·7 58·3	64.3 62.8 61.4 59.9	66.0 64.5 63.0 61.5
62 63 64	38·4 37·4 36·4	39·7 38·7 37·6	41.0 40.0 38.9	42.4 41.3 40.1	43.7 42.6 41.4	45°I 43°9 42°7	46·5 45·3 44·0	47·9 46·6 45·4	49·3 48·0 46·7	50·8 49·5 48·1	52·3 50·9 49·5	53·8 52·4 50·9	55·3 53·9 52·4	56·8 55·4 53·9	58·4 56·9 55·3	60·0 58·4 56·9
				ο .	HOU	R.						I	ЮН	JR.		
La	m. 4	m. 8	m. 12	16 m.	m. 20	m. 24	30	m. 40	m. 50	m. 00	m. 10	m. 20	30	m. 40	m. 50	m. 60
N.					(IMU'	rhs.	1		1		1	1	
42 46 50 54	0.6 0.7 0.7 0.7	1.3 1.3 1.3	2.0 2.0 2.0	2.6 2.6 2.6 2.7	3·3 3·3 3·3	3.9 4.0 4.0	4·9 4·9 4·9 5·0	6.5 6.5 6.6 6.7	8·1 8·1 8·2 8·3	9·7 9·8 10·0	11.3 11.4 11.9	12.8 12.9 13.1	14·4 14·5 14·7	15·9 16·1 16·5	17.5 17.6 17.8 18.2	19.0 19.2 19.4 19.8
58 60 62 64	0·7 0·7 0·7 0·7	1·4 1·4 1·4	2·0 2·1 2·1 2·1	2·7 2·8 2·8 2·8	3·4 3·4 3·5 3·5	4·I 4·I 4·2 4·2	5·1 5·2 5·3	6·8 6·9 7·0 7·1	8·5 8·6 8·7 8·8	10·2 10·3 10·4 10·6	11·9 12·0 12·4	13·6 13·7 14·1	15·2 15·4 15·6 15·9	16·9 17·1 17·4 17·7	18·6 18·8 19·1 19·4	20·2 20·5 20·8 21·2

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM MERIDIAN BELOW THE POLE.

χ α PERSEI (MIRFAK).

							т Н	OUR.							
Lat.	m. 16	m. 17	m. 18	m. 19	m. 20	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26	m. 27	m. 28	m. 29	m. 30
N.						R	EDU		NS.						
42 43 44 45 46	90·3 89·0 87·6 86·2 84·9	92·7 91·3 89·9 88·5 87·1	95·I 93·7 92·2 90·8 89·3	97·5 96·1 94·6 93·1 91·6	98·5 97·0 95·5 94·0	102·5 100·9 99·4 97·9 96·3	105.0 103.4 101.8 100.3 98.7	107·5 105·9 104·3 102·7 101·1	110·1 108·5 106·8 105·2 103·5		111.9 110.2	118·0 116·3 114·5 112·7 110·9	115·3	119.8	126·2 124·3 122·5 120·6 118·6
47 48 49 50 51	83·5 82·1 80·7 79·3 77·9	85.7 84.3 82.8 81.4 80.0	87.9 86.4 85.0 83.5 82.0	90°2 88°7 87°2 85°7 84°1	92·4 90·9 89·4 87·8 86·3	94.7 93.2 91.6 90.0 88.4	97·1 95·5 93·9 92·2 90·6	99.4 97.8 96.1 94.5 92.8	101·8 100·1 98·5 96·7 95·0	104·2 102·5 100·8 99·0 97·3	106·7 104·9 103·2 101·4 99·6	109·2 107·3 103·7 101·9	104.5	106.6 106.6	116·7 114·8 112·9 110·9 109·0
52 53 54 55 56	76·5 75·1 73·6 72·2 70·7	78·5 77·0 75·6 74·1 72·6	80·5 79·0 77·5 76·0 74·4	82·6 81·1 79·5 77·9 76·3	84·7 83·1 81·5 79·9 78·3	86.8 85.2 83.6 81.9 80.2	88·9 87·3 85·6 83·9 82·2	91·1 89·4 87·7 86·0 84·2	93°3 91°6 89°8 88°0 86°2	95.5 93.7 91.9 90.1 88.3	97·8 95·9 94·1 92·2 90·4	98·2 96·3 94·4 92·5	102·3 100·4 98·5 96·6 94·6	104.6 102.7 100.7 98.7 96.7	98.9 101.0
57 58 59 60	69·2 67·7 66·2 64·7	69·5 67·9 66·4	72·9 71·3 69·7 68·1	74.7 73.1 71.5 69.8	76·6 75·0 73·3 71·6	78·6 76·9 75·1 73·4	80·5 78·8 77·0 75·2	82·5 80·7 78·9 77·0	84·4 82·6 80·8 78·9	86·4 84·6 82·7 80·8	88·5 86·6 84·6 82·7	90·5 88·6 86·6 84·6	92.6 90.6 88.6 86.5	94.7 92.7 90.6 88.5	96·8 94·7 92·6 90·5
Lat.	m. 31	m. 32	m. 33	m. 34	m. 35	m. 36	m. 37	m. 38	m. 39	m. 40	m. 41	m. 42	m. 43	m. 44	m. 45
N.				,		R	EDU	CTIO	NS.				1		
42 43 44 45 46	129.0 127.1 125.2 123.2 121.3	131.8 129.9 127.9 125.9 123.9	132·7 130·6 128·6	137.6 135.5 133.4 131.4 129.3	136.3	141·2 139·1 136·9	139.8	149·3 147·1 144·9 142·6 140·4	152·4 150·1 147·8 145·5 143·2	155.4 153.1 150.8 148.4 146.1	158·5 156·1 153·8 151·4 149·0		157.4	167·9 165·4 162·9 160·4 157·9	168·5 166·0 163·4 160·9
47 48 49 50 51	119·3 115·4 113·4 111·4	121·9 119·9 115·9 113·8	124.6 122.5 120.4 118.4 116.3	127·2 125·1 123·0 120·9 118·8	129·9 127·8 125·6 123·5 121·3	128.2	135'4 133'1 130'9 128'6 126'4	138·1 135·9 133·6 131·3 129·0	139.3	143.8 141.4 139.0 136.6 134.2	146.6 144.2 141.8 139.3 136.9	149.5 147.0 144.6 142.1 139.6		155°3 152°8 150°2 147°6 145°0	158·3 155·7 153·1 150·4 147·8
52 53 54 55 56	109·3 107·3 103·2 101·1	111.7 109.7 107.6 105.4 103.3	114.2 112.0 109.9 107.7 105.5	116.6 114.4 112.2 110.0 107.8	114.6	121.6 119.3 117.0 114.7 112.4	124·1 121·8 119·5 117·1 114·7	126·6 124·3 121·9 119·5 117·1	129·2 126·8 124·4 121·9 119·5	126.9	134.4 131.9 129.4 126.9 124.3	137·1 134·5 131·9 129·4 126·7	139.7 137.1 134.5 131.9 129.2	142·4 139·8 137·1 134·4 131·7	145·1 142·4 139·7 137·0 134·2
57 58 59 60	99.0 96.8 94.7 92.5	99.0 96.7 94.5	103·3 101·1 98·8 96·5	105·5 101·0 98·6	107·8 103·1 100·7	107.7	112·3 109·9 105·0	112.2		114.1	121·7 119·1 116·4 113·7	124·1 121·4 118·7 115·9		128·9 126·2 123·3 120·5	131.4 128.6 125.7 122.8
Lat.	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	m. 54	m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
N.				ł		R	EDU(CTIO	NS.					1	
42 43 44 45 46		167.0	178·1 175·5 172·8 170·0	181·4 178·7 175·9 173·2	187·5 184·7 181·9 179·1 176·3	188.0 185.2 182.3 179.5	191·3 188·5 185·6 182·7	194.7 191.8 188.8 185.9	198·1 192·1 198·1	198·5 195·5	205.0 201.9 198.8 195.7	208·5 202·2 203·3	208.8 205.6 202.4	215.2 203.0 202.8	212·5 212·5
47 48 49 50 51	156·0 153·3 150·6	161.6 158.9 156.2 153.4	159.0 156.2	167·6 164·8 162·0 159·1	1	173·7 170·8 167·9 164·9	167.9	176·9 173·9 170·8	183·1 180·0 176·9	i	189·4 186·3 183·1 179·9	192.7 189.4 186.2 182.9	199·2 195·9 192·6 189·3 186·0	199·2 193·9 193·2	202·5 199·1 195·7 192·3
52 53 54 55 56	145·1 142·4 139·6 136·7	145.0 142.2 139.3	150.6 147.7 144.8 141.9	153.4 150.4 147.5 144.5	156·1 153·2 150·2 147·1	159.0 155.9 152.9 149.8	158·7 155·6 152·4	161·5 158·3 155·1	167 5 164·3 161·1 157·9	170·4 167·2 163·9 160·6	173·4 170·1 166·7 163·4	169.6 166.2	175.9 172.5 169.0	182·3 178·8 175·3 171·8	188·8 185·3 181·8 178·3 174·7
57 58 59 60	131.0	133.2	138·9 135·9 139·8	138.4	144·1 141·0 137·8 134·6	140.3	146.1	145.3	151.2	150.4	156·5	159.2	158.3	164·6	163.6

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. \leftarrow POLLUX.

Lat	m.	m		n.	m.	m. 10	m. 12	m. 14	16			m. 20	m.	ī	m. 22	m 28		m. 24	1 m.		m. 26
N.									DUC					-					1		
53 54 55 56	0.5 0.5 0.1	0.	6 1	·4 ·3	2.6 2.5 2.3 2.2	4.1 3.9 3.7 3.5	5.9 5.6 5.3 5.0	8.1 7.6 7.2 6.8	9.	9 12	8	16·5 15·5 14·6 13·8	18·1 17·1 16·1	1	19·9 18·7 17·7 16·6	21° 20° 19°	5 2	3·6 2·3 1·0 9·8	25.6 24.2 22.8 21.5	3	27·7 26·1 24·6 23·2
57 58 59 60	0.1	1 0·	5 1	1.0 1.0	2·1 2·0 1·9 1·7	3·3 3·1 2·9 2·7	4·7 4·4 4·2 3·9	6·4 6·0 5·7 5·4	8· 7· 7· 7·	9 9	9	13·0 12·3 11·6 10·9	14.3	3	15·7 14·8 14·0 13·2	17 16 15	3 1	8·7 7·6 6·6 5·7	20·3 19·3 18·6 17·6	1	21·9 20·7 19·5 18·4
8. 0 2 4 6 8	0.2	2 0	9 2 2 8 1	2.2	3.9 3.7 3.5 3.3 3.3	6·1 5·7 5·4 5·1 4·8	8·8 8·3 7·8 7·4 7·0	11.9 10.0 10.0 9.5	13.	6 18 8 17 0 16	·6 ·5 ·4 ·5 ·6	24·2 22·7 21·5 20·3 19·2	26·2 25·1 23·6 22·2 21·2	5	29·3 27·5 25·9 24·5 23·3	32 30 28 26 25	·0 3	4·8 2·7 0·8 9·2 7·7	37°3 35°4 31°4 30°4	4	40.7 38.3 36.1 34.2 32.4
10 12 15 20 25	0.2	5 0. 5 0.	7 1 1 6 1	1.7	3.0 2.8 2.6 2.4 2.1	4.6 4.4 4.1 3.7 3.3	6·6 6·3 5·9 5·3 4·7	9.0 8.6 8.0 7.1 6.4	10.	2 14 4 13 3 11	·8 ·1 ·8 ·6	18·3 17·4 16·2 14·5 13·0	16.0	2	22·1 21·1 19·6 17·5 15·7	24 23 21 19	·0 2	6·3 5·0 3·3 0·9	28· 27· 25· 22· 20·	3 6	30·8 29·3 27·3 24·5 22·0
30 35 40 45 50 55	0.1	0.	4 1 4 0 4 0 3 0	0.8 0.7	1·9 1·7 1·6 1·4 1·2	3.0 2.7 2.4 2.2 1.9	4·3 3·8 3·4 3·1 2·7 2·4	5·8 5·2 4·7 4·2 3·7 3·3	6· 6· 5· 4·	5 6	·5 ·6 ·7 ·9 ·1	11.7 10.6 9.5 8.5 7.6 6.6	9.	7 5 4 3	14·2 12·8 11·5 10·3 9·1 8·0	15 14 12 11 10 8	·6	6.9 5.2 3.7 2.2 0.9 9.6	14.	5 8 3 8	19·8 17·8 16·0 14·4 12·8 11·2
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Lat.	m. 27	m. 28	m. 29	30 m.	m. 31	m. 32	m. 33	m. 34	m. 35	m. 36	37		m. 38	ĺ	m. 39		m. 40		m. 41		m. 42
N.								REI	OUC'	TIO	NS.										
53 54 55 56	29.9 28.1 26.5 25.0	32·1 30·2 28·5 26·9	34·4 32·4 30·6 28·8	36·8 34·7 32·7 30·8	34·9	41.8 39.4 37.1 35.0	39·5	47·1 44·4 41·9 39·5	47.0	52·7 49·7 46·8 44·2	55° 52° 49° 46°	4 0	58·6 55·2 52·1 49·2	0			4·8 1·1 57·6 54·4	I I O	8·0 4·1 0·5 57·1	I I O	7·2 3·4 59·9
57 58 59 60	23·6 22·3 21·0 19·8	25.4 23.9 22.6 21.3	27·2 25·7 24·2 22·9	29·1 27·5 25·9 24·5	31.0 29.3 27.7 26.1	33·1 31·2 29·5 27·8	35·1 33·2 31·3 29·6	37·3 35·2 33·4		41.7 39.4 37.2 35.1	44° 41° 39° 37°	6 o 3 o	46·4 43·8 41·4 39·1	0	48·9 46·1 43·6 41·1	0	51.4 48.5 45.8 43.2	0	53·9 50·9 48·1 45·4		56·5 53·4 50·4 47·6
S. 0 1 2 3 4	43.9 42.5 41.3 40.1 38.9	47·1 45·7 44·3 43·0 41·8	50·5 49·0 47·5 46·1 44·8	52.4 50.8	55°9 54°2 52°6	61·3 59·5 57·7 56·0 54·5	63·2	69·1 67·0 65·0 63·2 61·4	73·1 70·9 68·8 66·9 65·0	77:3 74:9 72:7 70:7 68:7		1 1 7 1 6 1		I I	30·3 27·6 25·1 22·7 20·4	I I	34·9 32·1 29·4 26·9 24·5	I	39·6 36·6 33·8 31•2 28·6	I I	44°3 41°2 38°3 35°6 32°9
5 6 8 10 12	37.9 36.8 34.9 33.2 31.6	40.7 39.6 37.6 35.7 34.0	38·3	46·6 45·4 43·1 40·9 39·0	43.7	53.0 51.6 48.9 46.5 44.3	52·0 49·5	59.7 58.1 55.2 52.5 50.0		61·7 58·7	65.	7 I 2 I 0 I	14·3 12·3 8·7 5·3 2·3	I I	18·2 16·1 12·3 8·8 5·5	I	22·2 20·0 16·0 12·3 8·9	I	26·3 24·0 19·8 15·9 12·3	I I I I	30.4 28.1 23.6 19.6 15.8
14 16 18 20 22	27·5 26·4	32.4 31.0 29.6 28.3 27.1	33.5	35.2 34.0 32.2	37·9 36·3 34·7	38·6 37·0	42·9 41·1 39·3	41.7	50·5 48·2 46·1 44·2 42·3	51.0 48.8	21.	5 O 3 O	59.4 56.8 54.3 52.0 49.8	0	2·6 59·8 57·2 54·7 52·4	0	5·8 2·8 0·1 57·6 55·1	I I	9·0 6·0 3·1 0·4 57·9		12·4 9·2 6·2 3·4 0·7
24 26 28 30 32	21.3 22.3	22.9	27·9 26·8 25·7 24·6 23·6	29.8 28.6 27.4 26.3 25.3	31·9 30·6 29·3 28·1 27·0	31.5	36·1 34·6 33·2 31·8 30·6		40.6 38.9 37.3 35.8 34.3	39·5 37·9	41.	4 0 7 0 0 0	47.8 45.8 43.9 42.2 40.4	0	46·3 44·4	0 0	46.7	0	55·5 53·3 51·1 49·0 47·0	0	58·2 55·9 53·6 51·4 49·4
36 40 44 48 52 56	15·8 14·5 13·1	17.0	18·3 16·7 15·1	19.6 17.8 16.2	19.0	22.2	28·1 25·8 23·7 21·6 19·6 17·6	29.8 27.4 25.1 22.9 20.8 18.7	31.6 29.0 26.6 24.3 22.0 19.8	30·7 28·1 25·7 23·3	32· 29· 27· 24·	4 0 7 0 1 0 6 0	37.2 34.2 31.3 28.6 25.9 23.3	0 0 0	30.1 33.0	0 0 0	41.2 37.9 34.7 31.7 28.7 25.8	0 0 0	43.3 39.8 36.5 33.3 30.2 27.2	0 0 0	34.9

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

* POLLUX.

Lat.	m. 43	m.	m		m. 46	m. 47	m. 48		m.	m. 50	m. 51	52		m. 53	m. 54		m. 55	m. 56
N.							RE	DU	CTIC	NS.								
53 54 55 56 57 58 59	1 10.4 1 6.4 1 2.7 0 59.2 0 55.9 0 52.8	1 13 1 9 1 5 1 1 0 58 0 55	·6 I I ·6 I ·9 I ·5 I ·5 I	16·91 12·61 8·51 4·71 1·21 57·81	25.0 I 20.2 I 15.8 I 11.6 I 7.6 I 3.8 I 0.3 I 57.0 0	23.7 19.0 14.6 10.5 6.6 2.9	I 27 I 22 I 17 I 13 I 9 I 5	·2 I ·3 I ·8 I ·5 I ·4 I	30·7 I 25·7 I 20·9 I 16·5 I 12·3 I	40.0 I 34.4 I 29.1 I 24.2 I 19.6 I 15.2 I 11.0 I	38·1 32·6 27·5 22·7 18·1 13·9	1 41 1 36 1 36 1 25 1 21 1 16	·8 I ·2 I ·9 I ·2 I ·7 I	45.6 39.8 34.3 29.1 24.2 19.6	1 49° 1 43° 1 37° 1 32° 1 22°	5 I 5 I 4 I 4 I	35.8	57.5 51.0 44.9 39.2 33.8 28.7
S. 0 1 2 3 4 5 6 7 8 10 12	1 49.2 1 46.0 1 42.0 1 40.0 1 37.3 1 34.7 1 32.2 1 29.8 1 27.6	2 I 54 I 50 I 47 I 44 I 4I I 36 I 36 I 34 I 31 I 27	·2 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1	59·3 2 55·7 2 52·4 1 49·3 1 46·3 1 43·5 1 40·8 1 35·7 1 33·1 1	4:42 0:82 57:32 54:11 50:91 48:01 45:21 42:51 39:91 35:11	9.7 5.9 2.3 58.9 55.7 52.6 49.7 46.9 44.2 39.2	2 15 2 11 2 7 2 3 2 0 1 57 1 54 1 51 1 48 1 43	·1 2 ·1 2 ·4 2 ·9 2 ·5 2 ·3 1 ·4 1 ·6 1	20·5 2 16·5 2 12·6 2 8·9 2 5·4 2 2·1 2 55·9 2 53·1 1 47·7 1	26·I 2 21·9 2 17·9 2 14·0 2 10·4 2 7·0 2 3·7 2 0·6 2 57·6 2 52·0 I	31·8 27·4 23·2 19·3 15·5 12·0 8·6 5·3 2·2 56·4	2 37 2 33 2 28 2 24 2 20 2 17 2 13 2 10 2 0	7.5 2 2 3.7 2 3.5 2 2 3.5 2 2 3.9 2 2 3.9 2 2	43.3 38.7 34.2 30.0 26.0 22.2 18.5 15.1	2 49° 2 44° 2 39° 2 35° 2 31° 2 27° 2 23° 2 20° 2 16° 2 10°	3 2 5 2 9 2 5 2 4 2 6 2 6 2	55:33 50:33 45:62 41:12 36:82 22:52 22:52 21:52 8:72	1.4 56.3 51.4 46.7 42.3 38.1 34.1 30.2 26.6 19.7
14 16 18 20 22 24 26 28 30 32 34 36 38	I 15.8 I 12.5 I 9.4 I 6.4 I 3.6 I 1.0 0 58.5 0 56.2 0 53.9 0 51.7 0 49.6 0 47.6 0 45.6	1 19 1 15 1 12 1 9 1 3 1 1 0 58 0 56 0 54 1 0 49 1 0 49	·4 I 4 ·9 I I 1 ·6 I I	22.9 1 19.3 1 15.9 1 12.7 1 9.6 1 6.8 1 4.1 1 1.5 1 59.0 1 56.6 0 54.3 0 52.1 0	26·6 I 22·8 I 19·2 I 15·9 I 12·7 I 9·7 I 6·9 I 4·2 I 1·6 I 59·I I 56·7 O 54·4 O 52·2 O	30·3 26·4 22·7 19·2 15·9 12·8 7·0 4·3 1·7 59·2 56·8 54·5	1 34 1 30 1 26 1 22 1 19 1 15 1 12 1 9 1 7 1 4 1 1 0 59 0 56	·2 I ·0 I ·2 I ·5 I ·1 I ·9 I ·8 I ·3 I ·7 I ·8 O	38·1 1 33·8 1 29·7 1 26·0 1 22·4 1 19·0 1 15·8 1 9·8 1 7·0 1 4·3 1 1·7 1 59·2 1	42.0 I 37.5 I 33.4 I 29.4 I 25.7 I 12.2 I 18.9 I 15.7 I 19.7 I 6.9 I 4.2 I 1.6 I	46·1 41·4 37·1 33·0 29·2 25·5 22·0 18·7 15·6 12·5 9·6 6·8 4·1	1 50 1 45 1 46 1 30 1 32 1 25 1 25 1 15 1 15 1 16	0.2 1 5.4 1 0.9 1 5.6 1 2.6 1 3.8 1 5.3 1 1.8 1 5.4 1 2.3 1 2.4 1 5.6 1	54.4 49.4 44.7 40.3 36.2 32.2 28.5 25.0 21.6 18.3 15.1 12.1	1 58 1 53 1 48 1 44 1 39 1 35 1 31 1 28 1 24 1 21 1 18 1 14 1 11	6 2 4 1 6 1 8	2·9 2 57·6 2 52·6 1 47·9 1 43·4 1 39·2 1 35·2 1 31·4 1 27·8 1 24·2 1 20·8 1 17·6 1	7·3 1·8 56·6 51·8 47·2 42·8 38·7 34·7 30·9
40 42 44 46 48 50 52 54 56	0 43.7 0 41.9 0 40.1 0 38.3 0 36.6 0 34.9	0 45 0 43 0 42 0 40 0 38 0 36 0 34 0 33	·8 0 4 ·8 0 4 ·1 0 4 ·3 0 4 ·5 0 3 ·7 0 3 ·3 0 3	47.9 0 45.9 0 43.9 0 41.9 0 40.0 0 88.2 0 86.3 0 84.5 0 82.7 0	50·0 0 47·9 0 45·8 0 43·8 0 41·8 0 39·9 0 38·0 0 36·0 0	52·2 50·0 47·8 45·7 43·7 41·6 39·6 37·6 35·7	0 54 0 52 0 49 0 47 0 45 0 43 0 41 0 39 0 37	·40 ·10 ·90 ·70 ·50 ·40 ·30 ·20 ·20	56·7 0 54·3 0 52·0 0 49·7 0 47·4 0 45·2 0 43·0 0 40·9 0 38·7 0	56.5 0 54.1 0 51.7 0 49.4 0 47.1 0 44.8 0 42.6 0 40.3 0	1.4 58.8 56.3 55.4 9.51.4 9.49.0 9.46.6 9.44.3 9.42.0	0 55 0 55 0 55 0 56 0 45 0 45	5.9 0 3.4 0 5.9 0 3.4 0 5.0 0 3.6 0	6·3 3·5 0·7 58·1 55·4 52·9 50·3 47·8	1 8 1 5 1 3 1 0 0 57 0 54 0 52 0 49 0 47	8 I 9 I 3 I 5 0 9 0 9 0 9 0 9 0	11·3 1 8·3 1 5·4 1 59·7 1 56·9 0 54·2 0 51·4 0	13.9 10.8 7.8 4.8 1.9 5.50 5.56.1
Lat.	1 m.	m. 8	m. 12	16 m.	m. 20	m. 24	m. 28	32		m.	m.	1 m.			n.	m. 60	70	m. 80
N.								1	IUTI						,			
53 54 56 58 60 S.	2·1 2·0 1·9 1·8 1·7	4.1 3.8 3.5 3.3	6·3 6·1 5·7 5·3 5·0	8·4 8·1 7·5 7·1 6·7	10·4 10·1 9·4 8·8 8·3	12·5 12·1 11·3 10·6 10·0	14·1 13·1 12·3	16·6 16·6 15·6 14·1 13·3	15.8	18.6	21·7 20·4 19·2	23.6	25	5 27 9 25 5 24	'3 2 '6 2	30.0 29.0 27.3 25.8 24.5	33.4 31.5 29.9	38·7 37·5 35·5 33·7 32·1
0 2 4 6 10	1.9 1.8 1.7 1.6 1.4 1.3	3.7 3.5 3.3 3.1 2.8 2.6	5.6 5.2 5.0 4.7 4.3 3.9	7.4 7.0 6.6 6.2 5.7 5.1	9·2 8·7 8·2 7·8 7·1 6·4	11.0 10.4 9.8 9.3 8.5	9·9 8·9	14.5	15.3 14.5 13.8 12.6	16·9 16·0 15·3 13·9	18·5 17·5 16·7 15·3	19·0 18·1 16·0	21 20 20 19 17 16	5 23 4 21 5 20 9 19	0 2 0 2 0 2 0 2 0 2 0 3	23·2 22·2 20·4 8·6	27·8 26·5 25·4 23·4 21·5	31·0 29·6 28·4 26·3 24·2
20 25 30 35 40 50 60	1·0 0·9 0·9 0·9	2·4 2·2 2·1 2·0 1·9 1·8	3.5 3.3 3.1 3.0 2.8 2.7 2.6	4.7 4.4 4.1 3.9 3.8 3.6 3.5	5.9 5.5 5.2 4.9 4.7 4.5 4.4	7·1 6·6 6·2 5·9 5·7 5·4 5·3	8·2 7·7 7·2 6·9 6·6 6·3 6·2	9.4 8.2 7.9 7.6 7.2 7.0	9.8 9.3 8.8 8.5 8.5	10.9 10.3 9.8 9.4 9.0	12.0 11.3 10.8 10.4	12·3 11·3 10·8	13	1 15 3 14 7 13 2 13 6 12	·1 1 1 ·3 1 ·6 1 ·6 ·1 ·5 ·1	5·3 4·6 4·1	19·9 18·7 17·8 16·9 16·4 15·6 15·4	21·2 20·1 19·3 18·6

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. \times PROCYON.

Lat.	m. 2	m. 4	m. 6	m. 8	m. 10	m. 12	m. 14	m. 16	m. 18	m. 20	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26
N.							RED	UCTI	ONS.							
32 34 36 38 40	0·2 0·2 0·2 0·2 0·2	1.0 0.9 0.8 0.8 0.7	2·2 2·0 1·9 1·7 1·6	3.9 3.6 3.3 3.0 2.8	6·2 5·6 5·2 4·8 4·4	8.9 8.1 7.4 6.9 6.3	12·1 11·0 10·1 9·3 8·6	15.7 14.4 13.2 12.2 11.2	19·9 18·2 16·7 15·4 14·2	24·5 22·4 20·6 19·0 17·5	27.0 24.7 22.7 20.9 19.3	29.6 27.1 24.9 22.9 21.2	32·3 29·6 27·2 25·1 23·1	35·2 32·2 29·6 27·3 25·2	38·1 34·9 32·1 29·6 27·3	41·2 37·8 34·7 32·0 29·5
42 44 46 48 50	0.1 0.1 0.1 0.1	0.6 0.6 0.6 0.5 0.5	1·5 1·3 1·2 1·1 1·1	2·6 2·4 2·2 2·1 1·9	4.0 3.7 3.5 3.2 3.0	5·8 5·4 5·0 4·6 4·3	7·9 7·4 6·8 6·3 5·8	9.6 8.9 8.2 7.6	13·1 12·1 11·2 10·4 9·6	16·2 15·0 13·9 12·8 11·9	17·8 16·5 15·3 14·2 13·1	19.6 18.1. 16.8 15.5 14.4	21.4 19.8 18.3 17.0 15.7	23·3 21·5 20·0 18·5 17·1	25°2 23°4 21°6 20°1 18°6	27.3 25.3 23.4 21.7 20.1
52 54 56 60	0.1 0.1 0.1 0.1	0.4 0.4 0.4 0.3	0.9 0.8 0.7	1.8 1.6 1.5 1.3	2·7 2·5 2·3 2·0	4.0 3.7 3.4 2.9	5·4 5·0 4·6 3·9	7·1 6·5 6·0 5·1	8·9 8·3 7·6 6·5	11.0 10.2 9.4 8.0	12·1 11·2 10·4 8·8	13·3 12·3 11·4 9·7	14·6 13·5 12·4 10·6	15·9 14·7 13·5 11·5	17·2 15·9 14·7 12·5	18·6 17·2 15·9 13·5
8. 22 24 26 28	0.3 0.3 0.3	0.8 0.0 1.0	2·3 2·2 2·0 1·9	4·2 3·9 3·6 3·3	6·5 6·0 5·6 5·2	9'4 8'7 8'1 7'5	12·8 11·0 10·2	16·7 15·4 14·3 13·3	21·1 19·5 18·1 16·8	26·0 24·0 22·3 20·8	28·7 26·5 24·6 22·9	31·4 29·1 27·0 25·1	34·3 31·8 29·5 27·4	37·3 34·5 32·1 29·9	40·5 37·5 34·8 32·4	43.7 40.5 37.6 35.0
30 32 34 36	0.2 0.2 0.2 0.2	0·8 0·7 0·7 0·6	1.7 1.6 1.5 1.4	3·I 2·9 2·5	4·8 4·5 4·2 4·0	7.0 6.5 6.1 5.7	9·5 8·9 8·3 7·8	12.4 11.6 10.9 10.2	15·7 14·7 13·7 12·9	19.4 18.1 16.9 15.9	21·4 20·0 18·7 17·5	23.4 21.9 20.5 19.2	25.6 23.9 22.4 21.0	27.9 26.0 24.4 22.8	30·2 28·2 26·4 24·8	32.6 30.5 28.6 26.8
40 45 50 55	0.1 0.1 0.1 0.1	0.6 0.5 0.4 0.3	0.8 1.1	1.4 1.4	3.2 3.0 2.2 2.1	5.0 4.3 3.7 3.1	6·9 5·8 5·0 4·2	8·9 7·6 6·5 5·5	9.7 8.2 6.9	14.0 11.9 10.1 8.6	15·4 13·1 11·2 9·5	16·9 14·4 12·3 10·4	18·5 15·8 13·4 11·3	20·I 17·2 14·6 12·4	21·8 18·6 15·8 13·4	23.6 20.1 17.1 14.5
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N.	27	28	29_	30	31	32	RED	UCTI	0NS	. 36	37	1 38	39	40	41	42
35 36 37 38 39	39.0 37.4 35.9 34.5 33.1	41.9 40.2 38.6 37.0 35.6	44.9 43.1 41.3 39.7 38.1	48.0 46.1 44.2 42.4 40.8	51·2 49·1 47·2 45·3 43·5	54.5 52.3 50.2 48.2 46.3	57.9 55.6 53.4 51.2 49.2	61.4 58.9 56.6 54.4 52.2	65.0 62.4 59.9 57.5 55.3	68.7 66.0 63.3 60.8 58.5	72·5 69·6 66·8 64·2 61·7	76·4 73·3 70·4 67·6 65·0	80.4 77.2 74.1 71.2 68.4	84.5 81.1 77.9 74.8 71.9	88.6 85.1 81.7 78.5 75.5	92·9 89·2 85·7 82·3 79·2
40 41 42 43 44	31·8 30·6 29·4 28·3 27·2	34·2 32·9 31·6 30·4 29·3	36·7 35·3 33·9 32·6 31·4	39·2 37·7 36·3 34·9 33·6	41.8 40.2 38.7 37.2 35.8	44.6 42.8 41.2 39.7 38.2	47°3 45°5 43°8 42°1 40°6	50·2 48·3 46·5 44·7 43·0	53°2 51°1 49°2 47°3 45°6	56·2 54·1 52·0 50·1 48·2	59°3 57°1 54°9 52°8 50°9	62·5 60·2 57·9 55·7 53·6	65·8 63·3 60·9 58·6 56·4	69·2 66·5 64·0 61·6 59·3	72.6 69.9 67.2 64.7 62.3	76·1 73·3 70·5 67·9 65·3
45 46 48 50 52	26·2 25·2 23·4 21·7 20·1	28·2 27·1 25·1 23·3 21·6	30·2 29·1 26·9 25·0 23·1	32·3 31·1 28·8 26·7 24·7	34.5 33.2 30.8 28.5 26.4	36·7 35·4 32·8 30·4 28·1	39.0 37.6 34.8 32.3 29.9	41.4 39.9 37.0 34.3	43.9 42.2 36.3 36.3	46·4 44·7 41·4 38·4 35·5	49.0 47.1 43.7 40.5 37.5	51.6 49.7 46.1 42.7 39.6	54°3 52°3 48°5 45°0 41°7	57·I 55·0 51·0 47·3 43·8	60·0 57·8 53·6 49·7 46·0	62·9 60·6 56·2 52·1 48·3
54 56 58 60	18·6 17·1 15·8 14·5	19·9 18·4 17·0 15·6	19·8 18·2 16·8	22·9 21·1 19·5 17·9	24·4 22·6 20·8 19·1	26·0 24·0 22·2 20·4	27·7 25·6 23·6 21·7	29.4 27.1 25.0 23.0	31·1 28·7 26·5 24·4	32·9 30·4 28·0 25·8	34.7 32.1 29.6 27.2	36.6 33.8 31.2 28.7	38·6 35·6 32·9 30·2	40.5 37.5 34.6 31.8	42.6 39.3 36.3 33.4	44.7 41.3 38.1 35.0
\$. 27 28 29 30 31	39·1 37·7 36·4 35·2 34·0	42.0 40.5 39.1 37.8 36.6	45.0 43.4 42.0 40.5 39.2	48·1 46·4 44·9 43·4 41·9	51·3 49·6 47·9 46·3 44·7	54.7 52.8 51.0 49.3 47.6	58·1 56·1 54·2 52·4 50·6	61.6 59.5 57.5 55.5 53.7	65·2 63·0 60·8 58·8 56·9	68·9 66·5 64·3 62·2 60·1	72·7 70·2 67·9 65·6 63·4	76.6 74.0 71.5 69.1 66.9	80·6 77·9 75·3 72·8 70·4	84·7 81·8 79·1 76·5 74·0	88·9 85·9 83·0 80·3 77·6	93°2 90°1 87°0 84°2 81°4
32 34 36 38	32·9 30·8 28·9	35.4 33.1	37.9 35.5 33.3 31.2	40.5 38.0 35.6 33.4	43°3 40°5 38°0 35°6	46·1 43·1 40·5 38·0	49.0 45.9 40.3	51.9 48.6 45.6 42.8	55.0 51.5 48.3 45.3	58·1 54·5 51·1 47·9	57·5 53·9 50·6	64.7 60.6 56.8 53.4 50.1	68·1 63·8 59·8 56·2 52·7	71.6 62.9 59.0	75·I 70·4 66·I 62·0	78·8 73·8 69·3 65·0
40	25·4 23·9	27.3	29.3	31.3	33.5	35.6	37.9	37.7	42.6	45.0	47.5	47.1	49.5	55.5	58.2	57.4

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

* PROCYON.

Lat.	m. 43	m. 44	1 m.			m. 47	m. 48	49		n. 50	m. 51	m. 52	53			m. 55	m. 56
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38 39 40 41 42	1 22.9 1 19.7 1 16.7	I 23	7 I 30 4 I 27 3 I 23	0.6 I 3 7.2 I 3.9 I 3	34·6 I 31·0 I	38·7 34·9 31·3	I 35 4	I 43	7.0 I 3.0 I	51·3 I 47·I I 43·I I	55.7 51.3 47.2	2 0·1	2 4 5 2 0 1 55	0 2 5 I 5	9·3 2 4·4 2 9·8 2	19·2 2 14·0 2 8·9 2 4·2 2 59·6 2	24.2 18.7 13.5 8.6 3.9
43 44 45 46 47	1 11.1 1 8.4 1 5.9 1 3.5 1 1.1	1 0	6 I I4 0 I I2 4 I 0	4·8 I	15.3 1	21·5 18·5 15·6	1 28·2 1 25·0 1 21·8 1 18·8 1 15·0	I 28	3·5 I 5·2 I 2·1 I	32·1 I 28·7 I 25·4 I	35.7 32.2 28.8	I 39.4 I 35.8 I 32.3	I 43 I 39 I 35	2 I 4 4 I 4 8 I 3	7.0 I 3.1 I	51.0 I 46.9 I 43.0 I	54·9 50·7 46·7
48 49 50 51 52	o 58.9 o 56.7 o 54.6 o 52.5 o 50.6	0 59 0 57 0 55	3 I 2 1 0 59	7.5 1	4.7 I 2.3 I 0.0 I	7·6 5·1 2·6	I 13.2 I 10.2 I 7.8 I 5.3 I 2.8	1 13	3·3 I	16·3 13·5 1	19·4 16·4 13·6	I 25.6 I 22.5 I 19.4 I 16.5 I 13.6	I 25 I 22 I 19	6 I 2 5 I 2 4 I 2	8·8 I 5·6 I 2·4 I	32·1 28·7 25·4 1	35.4 31.9 28.5
53 54 56 58 60	0 48.6 0 46.8 0 43.2 0 39.9 0 36.7	0 49 0 45 0 41	0 0 5 3 0 4 8 0 4	1·2 0 ; 7·3 0 ;	53·5 0 49·4 0 45·6 0	55·8 51·6 47·6	o 58°: o 53°	2 I 6 3 O 5 5 O 5	1.70	53.80	5·6 0·7 56·0	0 584	2 I 10 0 I 5 2 I 0	·8 I I ·5 I ·4 I	3.4 I 7.9 I 2.7 I	16·2 I 10·4 I 5·0 I	18.9
\$. 27 28 29 30 31	I 37.6 I 34.3 I 31.1 I 28.1 I 25.3	I 38 I 35 I 32	6 I 43	3·0 I 9·6 I 6·3 I	47·6 I 44·0 I 40·6 I	52·2 48·4 44·9	I 56.	9 2 0 I 5 3 I 5	1·6 2 7·6 2 3·8 1	6·5 2 2·3 2 58·3 2	7·1 3·0		5 2 21 0 2 17 7 2 12	·6 2 2 ·6 2 1	26.9	32·2 2 27·2 2 22·4 2	37·6 32·4 27·5
32 33 34 35 36	I 14.9	1 23 1 20 1 18 1 15	5 I 22 9 I 24 4 I 2	7·3 I 4·6 I 1·9 I 9·4 I	31·2 28·3 1 25·5 1 22·9	35°1 32°1 29°2 26°4	1 30. 1 30. 1 30.	1 1 4 0 1 3 0 1 3	3·2 I 9·9 I 6·8 I 3·8 I	47·3 I 44·0 I 40·7 I 37·6 I	51.6 48.1 44.7 41.5	I 55° I 52° I 48° I 45°	9 2 0 2 I 56 8 I 52 4 I 49	·9 I 5	53.2 I	9°3 2 5°3 2 1°4 2 57°7 2	9.8 5.8 1.9
37 38 39 40 42	1 10·3 1 8·1 1 6·0 1 4·0 1 0·1	1 11 1 9 1 7	3 1 1	4.2 I	17·8 I 15·4 I 13·1 I	18·7 16·3	1 24. 1 24.	6 I 2 0 I 2 5 I 2	8·1 1 5·4 1 2·8 1	31.7 I 28.9 I 26.2 I	35·3 32·4 29·6	I 30.	1 1 42 0 1 39 1 1 36	·8 I 4	46·7 I 43·4 I	50.6 I 47.2 I 43.9 I	54·6 51·1 47·7
44 46 48 50 52	0 49.8	0 55 0 52 0 48	50 5 10 5 80 5	4·5 0	4.5 I 0.6 I 56.9 0 53.3 0 49.9 0	55.7	I 5.	9 I 9 I	8·7 I 4·5 I 0·5 I	7.1 1	9·8 5·4		2 I 20 5 I I5 0 I I0	·2 I	23·2 I 18·1 I 13·3 I	26·3 1 21·0 1	29.4
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30 32 34 36	2·4 2·2 2·1 2·0	4.8 4.4 4.2 3.9	7·2 6·7 6·2 5·9	9.5 8.8 8.3 7.8	11.8 11.1 10.3 9.7	13.7	15.3	16.3	18.3	21.2	23.5	27·I 25·4 23·9 22·7	27.3	31.0 29.2 27.5 26.1	31.0	35.3	41.5 39.4 37.5 35.8
40 45 50 60	1.8 1.6 1.4 1.2	3.5 3.1 2.8 2.4	5·3 4·7 4·3 3·7	7·0 6·2 5·7 4·9	8·7 7·8 7·1 6·1	9°3 8°5 7°3	12·2 10·9 9·9 8·5	13·9 12·4 11·3 9·8		15.4		18·4 16·8	22·1 19·9 18·2 15·8			24.2	29.8
\$. 20 22 24 26	2·3 2·2 2·0 1·9	4·6 4·3 4·0 3·8	6·9 6·5 6·1 5·7	9·2 8·6 8·1 7·6	11·5 10·7 10·0 9·5		15·9 14·8 14·0 13·2	15.9		20.8	22.7	24.6	26.4		29.9	34.0	37·8
30 35 45 55	1.7 1.3 1.1	3.4 3.1 2.6 2.3	5·1 4·6 3·9 3·4	6·8 6·1 5·2 4·5	8·5 7·6 6·4 5·7	9·2 7·7 6·9	9.0	10.3	13.6	15.1	16·6 14·1	20.0 18.0 15.3 13.7	21·5 19·5 16·6 14·8	17.8	22.3	25.7	29·0 25·I

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. ** REGULUS.

Lat	. m		1.	m.	m.	m. 10	m. 12	m. 14	1 m		m. 18	m. 20	1 m.		m. 22	1 m		m. 24	m		m. 26
N.								REI	DUC	TIO	NS.										
40 42 44 46 48 50	0::	2 0 2 0 2 0 1 0	·7 ·6 ·6	1.9 1.7 1.6 1.4 1.3	3.4 3.0 2.8 2.5 2.3 2.1	5·3 4·8 4·4 4·0 3·7 3·3	7.6 6.9 6.3 5.8 5.3 4.8	10·3 9·4 8·6 7·8 7·2 6·6	112	2 I 2 I 2 I 4 I	7.0 5.5 4.1 2.9 1.9	21.0 19.1 17.4 16.0 14.6 13.4		1 2 2 2 6 1	25·3 23·1 21·1 19·3 17·7	27 25 23 21 19	2 2 0 2 1 2	30·1 27·5 25·1 23·0 19·3	29· 27· 24·	8 9 8	35·3 32·2 29·4 26·9 24·7 22·6
52 54 56 58 60	0. 0. 0.		°4 °4	0.8 0.8 0.8	2.0 1.8 1.6 1.5 1.4	3·1 2·8 2·6 2·4 2·2	4.4 4.1 3.7 3.4 3.1	6·0 5·5 5·1 4·6 4·2	6 6	6 I	0·0 9·1 8·4 7·7 7·0	12·3 11·3 9·5 8·6	13.6 12.2 11.2 10.2 9.5	4 1 4 1 4 1	14·9 13·6 12·5 11·4 10·4	16 14 13 12	9 1	17·7 16·2 14·9 13·6	19· 16· 14· 13·	6 1 8	20·8 19·0 17·4 16·0 14·6
S. 15 16 18 20 22	0.00	2 0	.0	2·4 2·3 2·1 2·0 1·9	4·3 4·1 3·8 3·6 3·3	6·7 6·4 6·0 5·6 5·2	9.7 9.3 8.6 8.1 7.5	13.1	16 15 14	5 2 3 I 3 I	1.6 0.8 9.4 8.1 6.9	26·7 25·7 23·9 22·3 20·9	29°2 28°3 26°3 24°0 23°0	3 3	32·2 31·0 28·9 27·0 25·3	35 33 31 29 27	9 5	88·3 86·9 84·3 82·1 80·0	37.	0 2 8	44·8 43·2 40·2 37·6 35·2
24 26 28 30 32	0.00	2 0	·7 ·6	1·8 1·6 1·5 1·5	3·1 2·9 2·8 2·6 2·5	4.9 4.6 4.3 4.1 3.9	7·1 6·6 6·3 5·9 5·6	9.6 9.6 8.5 8.6	11.	8 1 1 5 1	5.9 4.9 4.1 3.3 2.5	19·6 18·4 17·4 16·4 15·5	21·0 20·1 19·1 18·1	3 2	23·7 22·3 21·0 19·8 18·7	25 24 22 21 20	4 2	28·2 26·5 25·0 23·6 22·2	25.	8 1 6	33.0 31.1 29.3 27.6 26.1
35 40 50 60	0.	1 0	·5	1·3 1·1 0·8 0·6	2·3 2·0 1·5 1·1	3.5 3.1 2.3 1.7	5·1 4·4 3·3 2·1	7·0 6·0 4·5 3·3	5 5	9 1	1·5 0·0 7·5 5·4	14·2 9·3 6·7	15·2 13·6 10·:	6 1	17·2 14·9 11·2 8·1	18 16 12 8	•3 :	20·4 17·8 13·3 9·6	14.	3	24.0 20.8 15.6 11.3
Lat.	m. 27	m. 28	m. 29	m. 30	m. 31	m. 32	m.	m.	m. 35	m. 36	37		m. 38		n. 19		n. 10		m. 41		m. 42
N.								RE	DUC												
41 42 43	38·0 36·3 34·7 33·1 31·7	40.9 39.0 37.3 35.6 34.1	43.8 41.8 39.9 38.2 36.5	46.8 44.7 42.7 40.8 39.0	50.0 47.7 45.6 43.6 41.7	50·8 48·5	54.0	54·7 52·3	63·4 60·6 57·9 55·3 52·9	67·0 64·0 61·2 58·5 56·0	67·	6 I 7 I	14·5 11·2 8·0 5·0 2·2	I	18·4 14·9 11·6 8·5 5·5	I	22·4 18·7 15·2 11·9 8·8		26·4 22·6 18·9 15·5 12·3	I I I I	30.6 26.6 22.8 19.2 15.8
45 46 47 48 5 0	30·3 29·0 27·8 26·6 24·4	32·6 31·2 29·8 28·6 26·2	28.1	37·3 35·7 34·2 32·8 30·1	39.9 38.2 36.5 35.0 32.1	38.9	45·1 43·2 41·3 39·6 36·3	43.9	50·7 48·5 46·4 44·5 40·8	53.6 51.3 49.1 47.0 43.2	54. 51. 49.	1 0 8 0 7 0	59.6 57.0 54.6 52.3 48.0	0	2·7 0·0 57·5 55·1 50·6		5.9 3.1 0.4 57.9 53.2	III	9·2 6·2 3·5 0·8 55·8	I I I	9.5 6.5 3.8 58.5
58 60	22.4 20.5 18.8 17.2 15.7	24·I 22·I 20·2 18·5 16·9	25.8 23.7 21.7 19.8 18.1	27.6 25.3 23.2 21.2 19.4	29.4 27.0 24.8 22.7 20.7	31·4 28·8 26·4 24·1 22·0	33·3 30·6 28·0 25·7 23·4	35.4 32.5 29.8 27.2 24.9	37·5 34·4 31·5 28·8 26·4	39·6 36·4 33·3 30·5 27·9	38· 35· 32·	4 0 2 0 2 0		0	46·4 42·6 39·1 35·8 32·7	0	48·8 44·8 41·1 37·6 34·4	0	51·3 47·0 43·1 39·5 36·1	0 0 0 0	53.8 49.3 45.2 41.4 37.9
S. 20 21 22 23 24	36.7	39.5	43.7	148.3	48.3	53.1	60·2 58·3 56·4 54·7 53·0	61·8 59·8 58·0	63·4	64.9	73° 70° 68°	0 I 7 I 5 I	19.4 16.9 14.5 12.2	I I	16.0	I	27·8 25·0 22·4 19·8 17·4	I	32·2 29·2 26·5 23·8 21·3	I I I I	36·6 33·6 30·6 27·9 25·2
	34.5 33.5 31.6 29.8 28.1	33.0	38·6 36·4	38·9 36·7	45°4 44°1 41°5 39°2 37°0	46·9 44·2 41·7	51.4 49.9 44.4 41.9	52.9	56.0 52.8 49.8	52.7	58·	5 I 9 I 6 o	7·9 5·9 2·1 58·6 55·4	I I	9°4 5°4 1°7 58°3		15·1 12·9 8·7 4·9 1·3	I I	18·9 16·6 12·2 8·1 4·4	I	22·7 20·3 15·7 11·5 7·5
	26.6 25.1 23.8 22.5 21.2	24.1	29·0 27·4 25·9	31.0 29.3 27.7	31·3 29·6 28·0	35·2 33·3 31·5 29·8	39·6 37·4 35·4 33·5 31·7	39.7 37.6 35.5 33.6	39·8 37·6	44.5 42.1 39.8	47	0 0	46.9	0	52·2 49·3	0	58·0 54·8 51·9 49·1 46·4	0	0·9 57·6 54·5 51·5 48·8	0	
48		19.2		23.4	25.0	26·6 25·1	28·3 26·7		30.0	31.7	35	5 0		0	41.7 39.4 37.2 35.1	0		0		0	48·4 45·7 43·1 40·7

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

* REGULUS.

Lat.	m. 43	m. 44	1 4		m. 46	m. 47	m. 48	n		m. 50	m. 51	m. 52	53		n.	m. 55	m. 56
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45 46 47 48 49	I 12.7 I 9.7 I 4.0	1 16 1 12 1 9 1 7	911	9.5 I 6.2 I 3.0 I 0.0 I	26·7 I 23·0 I 19·6 I 16·2 I 13·1 I	26·6 23·0 19·5 16·2	1 20° 1 22° 1 19°	2 I 3 5 I 3 9 I 2 4 I 2	3.9 I 6.3 I 2.7 I	26·11	41.6 37.4 33.3 29.5	I 45. I 41. I 36. I 32.	5 I 49 I I 44 9 I 46 9 I 36	0.5 I 2 0.6 I 2 5.5 I 2	3.5 I 48.8 I 44.3 I	52·8 I 48·I I 43·7 I	1·9 56·8 52·0 47·4
50 51 52 53 54	0 51.7	0 58 0 56 0 54	5 I 9 I 5 0 5	4·3 I 1·6 I 9·0 I 6·6 0	1.6 I 20.1 I	10.0 7.1 4.3 1.6	I 13. I 10. I 7. I 4.	0 I I 0 I I 2 I	6.0 I 2.9 I 6.9 I		22·2 18·8 15·5 12·4	1 25. 1 21. 1 18. 1 15.	4 I 28 9 I 25 5 I 21 2 I 18	3·7 I 3 5·0 I 2 1·5 I 2	32·0 I 28·2 I 24·5 I 21·0 I	35·3 I 31·4 I 27·6 I 24·0 I	38·8 34·7 30·8 27·0
55 56 57 58 60	0 47.4 0 45.4 0 43.4	0 49 0 47 0 45	6 0 5 5 0 4 4 0 4	9·6 o 7·5 o	56.6 o 54.2 o 51.8 o 49.6 o 45.3 o	56·5 54·1 51·8	o 58° o 56° o 54°	9 I 4 0 5	6.20	6.7 I 3.9 I 58.5 I 53.5 O	0.8	1 9. 1 9.	0 1 11 1 1 8 2 1 4	r•6 I :	14.3 1	20.5 I 17.1 I 13.8 I 10.6 I 4.6 I	19·8 16·5 13·2
S. 20 21 22 23 24	I 38.0 I 34.9 I 32.0	I 42 I 39 I 36	·4 I 4 ·3 I 4	7.0 I 3.7 I 0.6 I	55°3 2 51°7 1 48°3 1 45°0 1 41°8 1	52·9 49·5	2 I I 57 I 54	4 2 6 2 1 1 5	6·3 2 2·4 2 8·7 2	15.6 2 11.4 2 7.3 2 3.5 2 59.8 2	16·5 12·3 8·4	2 21· 2 17· 2 13·	7 2 27 4 2 22 3 2 I	7·0 2 3 2·6 2 3 8·3 2 3	32·4 2 27·8 2 23·4 2		43.5 38.6 33.9
25 26 27 28 30	1 24·1 1 21·6 1 19·3	I 27 I 25 I 22	·9 I 3	1.9 1 29.2 1 6.7 1	38.8 I 36.0 I 33.2 I 30.5 I 25.5 I	40·I 37·2 34·4	I 44 I 41 I 38	3 I 4 3 I 4 4 I 4	8·6 I 5·5 I 2·5 I	56·3 2 52·9 1 49·7 1 46·6 1 40·7 1	57.4 54.0 50.8	2 1. 1 58. 1 55.	9 2 6 5 2 2 1 1 5	5·5 2 2·9 2	7·5 2 3·9 2	20·0 2 16·0 2 12·1 2 8·4 2 1·4 2	20·8 16·9 13·0
32 34 36 38 40	1 6.9 1 3.3 0 59.9 0 56.6	1 10 1 6 1 2 0 59	·0 I I ·2 I ·7 I ·3 I	3·2 I 9·2 I 5·5 I 2·0 I	4.7 1	19·7 15·4 11·4 7·6	I 23 I 18 I 14 I 10	6 1 2 4 1 1 4 1 1	26.6 I 21.9 I 17.5 I 13.4 I	25·2 I 20·7 I 16·3 I	33.7 28.6 23.9 19.4	1 37· 1 32· 1 27·	3 I 4 I I 3 2 I 3 5 I 2	1.0 I 5.6 I 5.7 I	44·8 I 39·2 I 33·9 I 28·9 I	48.6 I 42.8 I 37.3 I 32.1 I	52·5 46·5 40·9 35·5
42 44 46 48 50	0 50·7 0 47·9 0 45·2	0 50 0 47	0 0 5 1 0 5	5·5 0 2·4 0 9·5 0	1·3 I 57·9 I 54·7 0 51·7 0 48·7 0	53.9	0 59 0 56	·6 I	5.7 I 2.0 I 8.6 I	12·2 8·3 4·6 1·0 57·5	7·2 3·4	I 13°	8 I I	5·7 I	19·6 I 15·2 I	13.6	25.5
			TRI	JE I	BEAR	RING	OR	AZ	IMU	TH	OF -	* R1	EGU!	LUS.			
Lat.	m. 4	m. 8	m. 12	16	20	m. 24	m. 28	m. 32	36	m. 40	m. 44	m. 48	m. 52	m. 56	m. 60	70	80
N.			ı				1	ZIM	UTH	S.	,			1	ı		
40 42 44 46	2.0 1.9 1.8 1.7	4.0 3.7 3.5 3.4	6.0 5.3 5.1	7·9 7·5 7·1 6·7	9.9 9.3 8.8 8.4	11.8 11.5 10.6 10.1	13.8 13.0 12.3 11.7	15.7 14.8 14.0 13.4	15.8	17.4	21·2 20·1 19·1 18·2	23.0 21.8 20.8 19.8	24·8 23·5 22·4 21·4	26.6 25.2 24.0 23.0	28·3 26·9 25·6 24·5	32·5 30·9 29·5 28·3	36·4 34·8 33·3 31·9
50 55 60	1.3 1.4 1.3	3·1 2·6	4·6 4·2 3·9	5·6 5·2	7·7 7·0 6·4	9·2 8·4 7·7	9·8 9·0		13.8	13.9	16·7 15·3 14·1			17.9	20.7		
\$. 15 16 18 20	2·3 2·2 2·1 1·9	4.4 4.1 3.9	6·9 6·6 6·2 5·8	9·1 8·8 8·2 7·6	11·0 10·3 9·7		15.7 15.2 14.2 13.4		18.1	18.8	23·I 21·8 20·6	25.0 23.6 22.3	25.3	29.5 28.6 27.1 25.7			38.2
25 30 35 40	1.7 1.3 1.4	3.4 3.0 2.8 2.6	5·1 4·5 4·1 3·8	6.8 6.1 5.5 5.1	8·5 7·6 6·9 6·4	9·1 8·3 7·6	11·8 10·5 9·6 8·9	13.4 12.0 10.2	13·5 12·3 11·4	14.9 13.7 12.7	13.0	15.1	16.4	17.6	20.2	23.3	31·3 28·6 26·4 24·7
45 50 60	I·2 I·1 I·0	2·4 2·3 2·1	3.4 3.4	4.8 4.2	5·7 5·2	7·2 6·8 6·3	8·3 7·9 7·3	9·5 9·0 8·3		11.3	12.4		14.6		16.8	20·5 19·5 18·2	23.3

TABLE XV.

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. \times RIGEL.

Lat.	m. 2	m. 4	m.	m. 8	10 m.	12 m.	14 m.	m. 16	18 18	20 m.	m. 21	m. 22	1 m.	m. 24	m. 25	m. 26
N.			1	ſ	1		RED	UCT	ONS					1		
20 22 24 26 28 30	0·2 0·2 0·2 0·2 0·2 0·2	1.0 0.9 0.9 0.8 0.8 0.7	2·3 2·1 2·0 1·8 1·7 1·6	4·I 3·8 3·5 3·3 3·I 2·9	6·4 5·9 5·5 5·2 4·8 4·5	9:2 8:5 7:9 7:4 6:9 6:5	12·5 11·6 10·8 10·1 9·4 8·8	16·3 15·2 14·1 13·2 12·3 11·5	20·7 19·2 17·9 16·7 15·6 14·6	25·5 23·6 22·0 20·6 19·2 18·0	28·1 26·1 24·3 22·7 21·2 19·9	30.8 28.6 26.6 24.9 23.3 21.8	33.7 31.2 29.1 27.2 25.4 23.8	36.6 34.0 31.7 29.6 27.7 25.9	39.7 36.9 34.3 32.1 30.0 28.1	42.9 39.8 37.1 34.6 32.4 30.4
32 34 36 40 50 60	0.5 0.1 0.1 0.1 0.1	0.7 0.6 0.6 0.5 0.4 0.3	1.5 1.4 1.3 1.2 0.9 0.6	2·7 2·5 2·4 2·1 1·6 1·1	4.2 4.0 3.7 3.3 2.4 1.7	6·1 5·7 5·4 4·8 3·5 2·5	8·3 7·8 7·3 6·5 4·8 3·4	10·8 10·2 9·6 8·5 6·2 4·4	13·7 12·9 12·1 10·8 7·9 5·6	16·9 15·9 15·0 13·3 9·7 6·9	18·6 17·5 16·5 14·6 10·7 7·7	20·5 19·2 18·1 16·0 11·8 8·4	22.4 21.0 19.8 17.5 12.9 9.2	24·3 22·9 21·5 19·1 14·0 10·0	26·4 24·8 23·4 20·7 15·2 10·9	28·5 26·8 25·3 22·4 16·5 11·8
S. 34 36 38 40 42 44	0·2 0·2 0·2 0·2 0·2	0.9 0.8 0.7 0.7 0.6	2·2 2·0 1·8 1·7 1·6 1·4	3.9 3.6 3.3 3.0 2.8 2.5	6·2 5·6 5·1 4·7 4·3 4·0	8·9 8·1 7·4 6·8 6·2 5·7	12·1 11·0 10·1 9·2 8·5 7·8	15·7 14·4 13·1 12·0 11·1	19·9 18·2 16·6 15·2 14·0	24.6 22.4 20.5 18.8 17.3 15.9	27·1 24·7 22·6 20·7 19·0 17·5	29.7 27.1 24.8 22.7 20.9 19.2	32·4 29·6 27·1 24·8 22·8 21·0	35·3 32·2 29·4 27·0 24·8 22·9	38·2 34·9 31·9 29·3 26·9 24·8	41·3 37·7 34·5 31·6 29·1 26·8
46 48 50 52 54 56	0.1 0.1 0.1 0.1 0.1 0.1	0.6 0.5 0.5 0.5 0.4 0.4	1.3 1.5 1.1 1.0 0.9	2·3 2·2 2·0 1·8 1·7 1·6	3.7 3.4 3.1 2.9 2.7 2.4	5·3 4·9 4·5 4·1 3·8 3·5	7·2 6·6 6·1 5·6 5·2 4·8	9.4 8.7 8.0 7.4 6.8 6.3	11.9 11.0 10.1 9.3 8.6 7.9	14·7 13·5 12·5 11·5 10·6 9·8	16·2 14·9 13·8 12·7 11·7 10·8	17·7 16·4 15·1 13·9 12·8 11·8	19.4 17.9 16.5 15.2 14.0	21·1 19·5 18·0 16·6 15·3 14·0	22.9 21.1 19.5 18.0 16.6 15.2	24.7 22.8 21.1 19.4 17.9 16.5
Lat.	m.	m.	ı m.	ı m.	m.	m.	m.	/ m.	m.	m.	l m.	m.	ſm.	(m.	m.	m.
N.	27	28	29	30	31	32	RED	UCTI	ONS.	36_	37	38	39	40	41	42
24 25 26 27 28	40.0 38.6 37.3 36.1 34.9	42.9 41.5 40.1 38.8 37.5	46.0 44.5 43.0 41.6 40.2	49·2 47·5 46·0 44·5 43·0	52·5 50·7 49·0 47·5 45·9	55.9 54.0 52.2 50.5 48.9	59.4 57.4 55.5 53.7 52.0	63.0 60.9 58.9 57.0 55.1	66·7 64·5 62·3 60·3 58·4	70·5 68·1 65·9 63·8 61·7	74·4 71·9 69·5 67·3 65·1	78·4 75·8 73·3 70·9 68·7	82·5 79·7 77·1 74·6 72·3	86.6 83.8 81.0 78.4 75.9	90·9 87·9 85·1 82·3 79·7	95·3 92·2 89·2 86·3 83·6
30 32 34 36 38	32·8 30·8 28·9 27·2 25·6	35·2 33·1 31·1 29·3 27·5	37·7 35·5 33·3 31·4 29·5	40·4 37·9 35·6 33·6 31·6	43.1 40.5 38.0 35.8 33.7	45.9 43.1 40.5 38.1 35.9	48.7 45.8 43.1 40.5 38.2	51.7 48.6 45.7 43.0 40.5	54·8 51·5 48·4 45·6 42·9	57·9 54·4 51·2 48·2 45·4	61·1 57·4 54·0 50·9 47·9	64·4 60·5 57·0 53·6 50·5	67·8 63·7 60·0 56·4 53·2	71·3 67·0 63·0 59·3 55·9	74·8 70·3 66·2 62·3 58·7	78·5 73·8 69·4 65·4 61·6
40 42 44 46 48	24·1 22·7 21·4 20·1 18·9	25·9 24·4 23·0 21·6 20·3	27·8 26·2 24·7 23·2 21·8	29·7 28·0 26·4 24·8 23·3	31.8 29.9 28.2 26.5 24.9	33.8 31.9 30.0 28.2 26.6	36·0 33·9 31·9 30·0 28·2	38·1 35·9 33·8 31·9	40.4 38.1 35.8 33.7 31.7	42·7 40·3 37·9 35·7 33·6	45·1 42·5 40·0 37·7 35·5	47.6 44.8 42.2 39.7 37.4	50·I 47·2 44·4 4I·8 39·4	52·7 49·6 46·7 44·0 41·4	55.3 52.1 49.1 46.2 43.5	58·0 54·7 51·5 48·5 45·6
50 52 54 56 60	17·8 16·7 15·6 14·6 12·7	19·1 17·9 16·8 15·7 13·6	20·5 19·2 18·0 16·9 14·6	21·9 20·6 19·3 18·0 15·6	23·4 22·0 20·6 19·3 16·7	25.0 23.4 21.9 20.5 17.8	26·5 24·9 23·3 21·8 18·9	28·2 26·4 24·7 23·1 20·1	29·8 28·0 26·2 24·5 21·3	31·5 29·6 27·7 25·9 22·5	33·3 31·3 29·3 27·4 23·8	35·1 33·0 30·9 28·9 25·1	37·0 34·7 32·5 30·4 26·4	38·9 36·5 34·2 32·0 27·8	40.9 38.4 35.9 33.6 29.2	42·9 40·2 37·7 35·3 30·6
S. 36 37 38 39 40	40.6 38.8 37.2 35.6 34.1	43.6 41.7 39.9 38.2 36.6	46·7 44·7 42·8 41·0 39·3	49.9 47.8 45.7 43.8 42.0	53°3 51°0 48°8 46°7 44°8	56·7 54·3 52·0 49·8 47·7	60·2 57·6 55·2 52·9 50·7	63.9 61.1 58.5 56.1 53.8	67·6 64·7 62·0 59·4 56·9	71·5 68·4 65·5 62·8 60·2	75.4 72.1 69.1 66.2 63.5	79.4 76.0 72.8 69.8 66.9	83.6 80.0 76.6 73.4 70.4	87·8 84·0 80·5 77·2 74·0	92·1 88·2 84·5 81·0 77·7	96·5 92·4 88·6 84·9 81·5
41 42 43 44 46	32·7 31·4 30·1 28·9 26·6	35·2 33·7 32·4 31·1 28·6	37·7 36·1 34·7 33·3 30·7	40·3 38·6 37·1 35·6 32·8	43.0 41.2 39.6 38.0 35.1	45.8 43.9 42.1 40.5 37.3	48·6 46·7 44·8 43·0 39·7	51.6 49.5 47.5 45.6 42.1	54.6 52.4 50.3 48.3 44.6	57·7 55·4 53·2 51·1 47·1	60·9 58·5 56·1 53·9 49·8	64·2 61·6 59·2 56·8 52·5	67.6 64.9 62.3 59.8 55.2	71.0 68.2 65.5 62.9 58.1	74.6 71.6 68.7 66.0 61.0	78·2 75·0 72·1 69·2 63·9
48 50 52 54 56	24.6 22.7 20.9 19.3 17.8	26·4 24·4 22·5 20·8 19·1	28·3 26·2 24·1 22·3 20·5	30·3 28·0 25·8 23·8 21·9	32·4 29·9 27·6 25·4 23·4	34·5 31·8 29·4 27·1 24·9	36.6 33.8 31.2 28.8 26.5	38·9 35·9 33·1 30·6 28·1	41.2 38.0 35.1 32.4 29.8	43.5 40.2 37.1 34.2 31.5	46.0 42.4 39.2 36.1 33.3	48·4 44·7 41·3 38·1 35·1	51.0 47.1 43.5 40.1 37.0	53.6 49.5 45.7 42.2 38.9	56·3 52·0 48·0 44·3 40·8	59·1 54·5 50·4 46·5 42·8

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. ** RIGEL.

_					1				IGE								
Lat.	m. 43	m.			m. 46	m. 47	48 48	m 49		n. 50	m. 51	m. 52	m. 53		m. 54	m. 55	m. 56_
N.									CTIO			,	,	,	,	,	
28 29 30 31 32	1 44 4	1 23	4 1 2	7.11	39.9 I 36.8 I 33.8 I 31.0 I 28.2 I	34.0	1 38	0 I 4	3.0 I	47.11	51.3	2 6·9 2 3·0 1 59·3 1 55·7 1 52·2	2 3	02	6.5 2 12.4 2 8.4 2 4.5 2 0.8 2	21.5 17.2 13.0 9.0 5.2	13.6
34 36 38 40 42	I 12.7 I 8.5 I 4.5 I 0.8 O 57.3	I II I 7 I 3	6 I I 6 I	4.0 I	13.7	21·6 16·9 12·5	I 25°	0 I 2 I I 2 5 I I	8·6 I 3·5 I 8·7 I	32·2 I 26·9 I	35·8 30·3 25·1	I 45.6 I 39.5 I 33.8 I 28.5 I 23.4	I 43°	3 I 4 4 I 4 8 I 3	47·2 I 41·1 I 35·3 I	51·1 I 44·8 I 38·8 I	55·1 48·5 42·3
44 46 48 50 52	0 53.9 0 50.8 0 47.8 0 44.9 0 42.2	0 53 0 50 0 47	·2 0 5	5·6 0 2·3 0 9·2 0	54.60	53.6	0 59° 0 55°	2 I 4 I 9 0 5	5·8 I 1·9 I 8·2 I	8·5 I 4·4 I 0·6 I	7·0	I 5.5	1 16. 1 12. 1 8.	3 1 1	19·7 I	22·7 I 17·8 I 13·2 I	25·7 20·6
54 56 58 60	0 36.9	o 38	704	0.40	42.3 0	44'I 41'I	0 46	0 0 4 9 0 4	7.90	49.90	51·9 48·4	o 57.6 o 53.9 o 50.3 o 46.8	0 56	20 5	54.2 0		2·4 58·3
36 37 38 39 40	1 41·1 1 36·8 1 32·7 1 28·9 1 25·3	I 4I I 37 I 33	0 I 4	5·7 I I·3 I 7·2 I	50·3 I 45·8 I 41·4 I	55.0 50.3 45.7	I 59.	8 2 9 I 5 2 I 5	4·7 2 9·5 2 4·7 I	9.6 2 4.3 2 59.2 2	9.2	2 19.8	2 25	0 2 3 1 2 2	30·3 2 24·2 2 18·4 2	35.7 2	41·1 34·6 28·4
41 42 43 44 45	I 15.5	I 22 I 19 I 15	2 I 2 0 I 2 9 I I	5·9 I 2·5 I 9·3 I	29.7 1	33·5 29·8 26·3	I 37' I 33' I 30'	5 I 4 6 I 3 0 I 3	1·5 I 7·5 I 3·7 I	45.6 I 41.4 I 37.5 I	49.7 45.4 41.3	1 58-6 1 53-9 1 49-5 1 45-2 1 41-1	1 58 5 1 53 2 1 49	61	2·6 2 57·8 2 53·2 I	2·1 2 57·4 2	11·6 6·4 1·6
46 47 48 49 50	I 4.4 I 1.9 0 59.5	I 7	·3 I I ·7 I ·2 I	0.4 I	13.21	13.7	1 16 1 13	9 1 2	3·2 I 6·9 I	20.0 I	30·0 26·6 23·2	I 37°3 I 33°3 I 29°3 I 26°2 I 23°3	1 37 1 33 1 29	3 I :	40·7 I 36·8 I 33·1 I	44.4 I 40.4 I	48·I 44·0 40·0
51 52 53 54 55 56	0 54.9 0 52.8 0 50.7 0 48.7 0 46.7 0 44.9	0 55 0 53 0 51 0 48	2 0 5 0 0 5 0 0 5	2.2 o	55.6 o	55.7	I 5° I 3° O 58°	6 I 0 I 5 I	8·3 I 5·6 I 0·5 I	11.11	13.9 11.0 8.2 5.5	ı 8.	8 1 19 8 1 16 9 1 13 1 1 10	7 I 6 I 7 I	22·7 I 19·5 I 16·4 I 13·3 I	25.7 1	28·8 25·4 22·0 18·8
			T	RUE	BEA	RIN	īG C	R A	ZIM	UTH	OF	X I	RIGE	L.			
Lat.	m.	m. 8	m. 12	16	m. 20	m. 24	m. 28	m. 32	36	m. 40	m.	m. 48	m. 52	m. 56	m. 60	m. 70	m. 80
N.								AZI	MUT	HS.							
60 50 40 35 30	0 1·1 1·2 1·3 1·4 1·6	2·1 2·3 2·6 2·9 3·2	3·2 3·5 4·0 4·3 4·8	4·3 4·6 5·3 5·8 6·4	5·3 5·8 6·6 7·2 8·0		10.0	11.4	10.4	13·1 14·2	14.4	13·8 15·7 17·0	15·0 16·9 18·3	18·2 19·7	17·2 19·5 21·0	20.0	27.4
26 24 22 20	1.8 1.9 2.0 2.1	3.5 3.7 3.9 4.2	5·3 5·5 5·9 6·2	7·0 7·4 7·8 8·3	8·7 9·2 9·7 10·3	11.6	12.8		17.2	19.0	19.7	22.5	24.2	24·6 25·9	26.2	30.0 31.4 33.0	33.6
S. 34 36 38 40	2·3 2·1 2·0 1·9	4.6 4.3 4.0 3.8	6·8 6·4 6·0 5·6	9°1 8°5 8°0 7°5	11·3 10·6 9·9 9·4	11.9	15·7 14·7 13·8 13·0	16.7	17.6	20.6	21.3	26·0 24·5 23·1 21·9	26.3	28·1 26·6	29.9	34.2	36·4
45 50 55	1.4 1.2 1.4	3·3 3·0 2·7	5.0 4.2 4.1	6·6 5·9 5·4	8·3 7·4 6·8	9·9 8·9	11·5 10·4 9·5			14.7	16.2	19·5 17·6 16·2	10.0	20.4	21.8	27·8 25·3 23·3	28.6

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. * SIRIUS.

Lat.	m. 2	m. 4	m. 6	m. 8	m. 10	m. 12	m. 14	m. 16	m. 18	m. 20	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26
N.							RED	UCTI	ONS.				1			
10 12 14 16 18	0.3 0.3 0.2 0.2 0.2	0.8 0.0 1.0	2·5 2·3 2·2 2·0 1·9	4.4 4.1 3.8 3.6 3.4	6·9 6·4 6·0 5·6 5·2	9.9 9.2 8.6 8.0 7.5	13·5 12·5 11·7 10·9 10·3	17.6 16.3 15.2 14.3 13.4	22·2 20·6 19·3 18·1 16·9	27·3 25·4 23·7 22·2 20·9	30·2 28·0 26·2 24·5 23·1	33·1 30·7 28·7 26·9 25·3	36·1 33·6 31·4 29·4 27·6	39.3 36.5 34.2 32.0 30.0	42.6 39.6 37.0 34.7 32.6	46·0 42·7 40·0 37·5 35·2
20 22 24 26 30	0°2 0°2 0°2 0°1	0·8 0·7 0·7 0·7 0·6	1.8 1.7 1.6 1.5 1.4	3·2 3·0 2·8 2·7 2·4	4·9 4·7 4·4 4·2 3·7	7·1 6·7 6·3 6·0 5·4	9.7 9.1 8.6 8.1 7.3	12.6 11.9 11.2 10.6 9.6	16·0 15·1 14·2 13·5 12·1	19·7 18·6 17·5 16·6 14·9	21·7 20·5 19·3 18·3 16·4	23·8 22·5 21·2 20·1 18·0	26·0 24·5 23·2 21·9 19·7	28·3 26·7 25·2 23·9 21·4	30·7 29·0 27·4 25·9 23·3	33·2 31·3 29·6 28·0 25·1
35 40 50 60 65	0.1 0.1 0.1 0.1 0.1	0·5 0·5 0·4 0·2 0·2	1·2 1·0 0·8 0·6 0·5	2·1 1·8 1·4 1·0 0·9	3·3 2·9 2·2 1·6 1·3	4.7 4.2 3.2 2.3 1.9	6·4 5·6 4·3 3·2 2·6	8·4 7·4 5·6 4·1 3·4	10·6 9·3 7·1 5·2 4·3	13·1 11·5 8·8 6·4 5·4	14·4 12·7 9·7 7·1 5·9	15·8 13·9 10·6 7·8 6·5	17·3 15·2 11·6 8·5 7·1	18·8 16·5 12·6 9·3 7·7	20·4 17·9 13·7 10·0 8·4	22·I 19·4 14·8 10·9 9·I
S. 40 42 44 46 48	0·2 0·2 0·2 0·2 0·2	1.0 0.9 0.8 0.7 0.6	2·2 2·0 1·8 1·6 1·5	3.9 3.5 3.1 2.8 2.6	6·0 5·4 4·9 4·4 4·0	8·7 7·8 7·0 6·4 5·8	11.8 10.6 9.6 8.7 7.9	15.4 13.8 12.5 11.3 10.3	19·5 17·5 15·8 14·3 13·1	24.0 21.6 19.5 17.7 16.0	26·4 23·8 21·5 19·5 17·7	29·0 26·1 23·6 21·4 19·4	31.7 28.5 25.8 23.3 21.2	34.5 31.0 28.0 25.4 23.1	37.4 33.6 30.4 27.5 25.0	40·4 36·3 32·8 29·8 27·0
50 52 54 56	0.1 0.1 0.1 0.1	0.6 0.5 0.5 0.4	1.0 1.1 1.3	2·3 2·1 1·9 1·8	3·7 3·3 3·0 2·8	5·3 4·8 4·4 4·0	7·1 6·5 5·9 5·4	9:4 8:5 7:7 7:1	11.8 10.8 9.8 8.9	14·6 13·3 12·2 11·0	16·1 14·6 13·4 12·2	17·7 16·1 14·6 13·3	19·3 17·6 16·0 14·6	21.0 19.1 17.4 15.9	22·8 20·7 18·9 17·2	24.6 22.4 20.4 18.6
Lat.	m.	, m.	m.	m.	m.											
N.	27	28	29	30	31	1 32	$\frac{ 33 }{\text{RED}}$	UCTI	ONS	36	37	38	39	40	41	42
15 16 17 18	41.7 40.4 39.1 38.0 36.8	44·8 43·4 42·1 40·7 39·6	48·0 46·5 45·1 43·7 42·4	51·3 49·7 48·2 46·7 45·3	54·8 53·1 51·4 49·9 48·4	58·3 56·5 54·8 53·1 51·5	62.0 60.0 58.2 56.5 54.8	65·7 63·7 61·7 59·9 58·1	69.6 67.4 65.4 63.4 61.5	73·5 71·2 69·1 67·0 65·0	77.6 75.2 72.9 70.7 68.6	81·7 79·2 76·8 74·5 72·3	86·0 83·3 80·8 78·4 76·1	90·3 87·5 84·9 82·4 80·0	94·8 91·9 89·1 86·5 84·0	99.4 96.3 93.4 90.7 88.1
20 22 24 26 28	35·7 33·7 31·9 30·2 28·6	38·4 36·2 34·3 32·4 30·7	41·2 38·8 36·7 34·8 33·0	44.0 41.6 39.3 37.2 35.2	47.0 44.4 41.9 39.7 37.6	50·1 47·2 44·7 42·3 40·1	53·2 50·2 47·5 45·0 42·6	56·4 53·3 50·4 47·7 45·2	59.7 56.4 53.4 50.5 47.9	63·2 59·6 56·4 53·4 50·6	66·7 62·9 59·5 56·4 53·5	70·2 66·3 62·7 59·4 56·4	73.9 69.8 66.1 62.6 59.3	77·7 73·4 69·4 65·8 62·4	81.6 77.1 72.9 69.1 65.5	85·5 80·8 76·5 72·4 68·7
30 32 34 36 40	27·I 25·7 24·4 23·2 20·9	29·1 27·7 26·3 24·9 22·5	31·2 29·7 28·2 26·8 24·1	33.4 31.7 30.1 28.6 25.8	35.7 33.9 32.2 30.5 27.5	38·0 36·1 34·3 32·5 29·3	40·4 38·4 36·4 34·6 31·2	42.9 40.7 38.6 36.7 33.1	45°4 43°1 40°9 38°9 35°1	48·0 45·6 43·3 41·1 37·1	50·7 48·1 45·7 43·4 39·2	53.5 50.7 48.2 45.8 41.3	56·3 53·4 50·7 48·2 43·5	59·2 56·2 53·3 50·7 45·7	62·I 59·0 56·0 53·2 48·0	65.2 61.9 58.8 55.8 50.4
45 50 60 65	18·3 16·0 11·7 9·8	19·7 17·2 12·6 10·5	21·1 18·4 13·5 11·2	22·4 19·7 14·5 12·1	24·0 21·1 15·5 12·9	25.6 22.4 16.5 13.8	27·3 23·8 17·5 14·7	29.0 25.3 18.6 15.6	30·7 26·8 19·7 16·5	32·5 28·4 20·8 17·4	34°4 30°0 22°0 18°4	36·3 31·6 23·2 19·4	38·2 33·3 24·4 20·3	40°2 35°0 25°7 21°4	42·2 36·7 27·0 22·4	44·3 38·5 28·3 23·6
\$. 40 41 42 43 44	43.5 41.2 39.1 37.2 35.4	46·7 44·3 42·0 39·9 38·0	50·0 47·4 45·0 42·8 40·7	53.4 50.7 48.1 45.8 43.5	57.0 54.1 51.4 48.8 46.5	60·7 57·6 54·7 52·0 49·5	64·4 61·2 58·1 55·2 52·6	68·3 64·8 61·6 58·6 55·7	72·3 68·6 65·2 62·0 59·0	76·3 72·5 68·9 65·5 62·3	80·5 76·5 72·6 69·1 65·8	84.8 80.5 76.5 72.8 69.3	89·2 84·7 80·5 76·6 72·9	93.6 88.9 84.5 80.4 76.6	98·2 93·3 88·7 84·4 80·4	102·9 97·8 93·0 88·5 84·3
45 46 47 48 49	33·7 32·1 30·6 29·1 27·8	36·2 34·5 32·8 31·3 29·9	38·8 36·9 35·2 33·6 32·0	41·4 39·5 37·6 35·9 34·2	44.2 42.1 40.2 38.3 36.5	47·1 44·9 42·8 40·8 38·9	50·1 47·7 45·5 43·4 41·4	53·1 50·6 48·2 46·0 43·9	56·2 53·6 51·1 48·7 46·5	59°4 56°6 54°0 51°5 49°1	62·7 59·7 57·0 54·3 51·9	66·0 62·9 60·0 57·3 54·7	69·5 66·2 63·2 60·3 57·5	73·0 69·6 66·4 63·3 60·4	76·6 73·1 69·7 66·5 63·5	80·3 76·6 73·1 69·7 66·6
50 51 52 54 56	26·5 25·3 24·2 22·0 20·1	28·5 27·2 26·0 23·7 21·6	30·6 29·2 27·8 25·4 23·1	32·7 31·2 29·8 27·1 24·7	34°9 33°3 31°8 29°0 26°4	37·1 35·5 33·9 30·9 28·1	39·5 37·7 36·0 32·8 29·9	41.9 40.0 38.2 34.8 31.7	44.4 42.3 40.4 36.9 33.6	46·9 44·8 42·7 39·0 35·5	49.5 47.3 45.1 41.1 37.5	52·2 49·8 47·6 43·4 39·5	54·9 52·4 50·1 45·7 41·6	57.7 55.1 52.6 48.0 43.8	60·6 57·9 55·3 50·4 46·0	63.5 60.7 58.0 52.9 48.2

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

* SIRIUS.

Lat.	m. 43	m.		n.	m. 46	m. 47	1 m.	(SI	1.	m.	m. 51	m. 52	1 m		m. 54	m. 55	m. 56
N.	10	. 33	, ,		40 1	-21		DUC				. 00		,		00	
20 21 22 23 24	I 22'	1 1 31 5 1 28 3 1 26	9.9 I	35·2 I 32·5 I	36.6 I	43.6 40.8 38.0	I 48 I 45 I 42	OI 4	2.4 I 9.3 I	53.7	5.0 1.5 58.2 55.0	2 6.	8 2 7 5 2 4	1.0 2	15.8 2	24·7 2 20·7 2 16·9 2 13·2 2 9·7 2	25.8
26 28 30 32 34 36	I II:	9 I I 3 I 3 I I 3 I I 3 I 3 I I 3 I I 3 I	5.3 I	14.7 1	22.2 I	25.7 21.4 17.3 13.4	I 29 I 24 I 20	·4 I 3 ·8 I 2 ·6 I 2	3.0 I 8.3 I	31.91	35.6 30.8	1 50° 1 44° 1 39° 1 34° 1 29°	6 I 48 3 I 43 3 I 32	8·6 I 3·I I 7·9 I	52.6 I 46.9 I 41.6 I	50.8 1	0.9 54.8 49.1
38 40 42 44 46 48	0 50° 0 47° 0 45°	8 0 55 1 0 52 5 0 49	5·3 0 : 2·5 0 : 3·8 0 :	0.8 I 57.8 I 54.8 0 52.0 0 19.3 0 46.7 0	54.4 0 51.5 0	3.0 59.8 56.7 53.8	I 5 I 2 O 59 O 56	·6 I ·3 I ·2 I ·1 0 5	8·4 I 4·9 I 1·6 I 8·4 I	7.6 I 4.1 I 0.8 I	14.0 10.3 6.7	I 5.	9 I I I I I I I I I I I I I I I I I I I	9·9 I 5·9 I 2·0 I	22·9 I 18·7 I 14·7 I	25.9 1	29.0 24.6 20.3 16.1
50 52 54 56 60 65	0 38·3 0 36·6 0 33·6	0 39 0 37 8 0 35 7 0 31	0.90 4 7.60 3 5.40 3		43.6 0 41.1 0 38.7 0 34.0 0	45.5 42.9 40.4 35.4	0 47 0 44 0 42 0 37	·5 0 4 ·8 0 4 ·1 0 4	9.5 0 6.6 0 3.9 0 8.5 0	51.5 c 48.5 c 45.7 c 40.1 c	53.5 50.5 47.5 41.7	o 58. o 55. o 52. o 49. o 43. o 36.	7 0 5% 5 0 54 4 0 51 3 0 45	4·5 0 1·3 0 5·0 0	53·2 0 46·7 0	55°2 0	4.5 0.8 57.2
\$. 40 41 42 43 44 45	I 37.3	1 47 3 1 41 5 1 36 2 1 32	·8 I 2	10.3 I 10.3 I 11.2 I 16.4 I	50.9 I 45.6 I 40.6 I	1.5 55.6 50.1 44.9	2 6 2 0 I 54 I 49	·5 2 I ·4 2 ·6 I 5 ·2 I 5	1.6 2 5.2 2 9.3 2 3.7 I	16·7 2 4·0 2 58·2 2	22.0 15.2 8.8 2.8	2 34' 2 27' 2 20' 2 13' 2 7' 2 1'	4 2 32 4 2 25 7 2 18 5 2 12	2·9 2 5·6 2 8·7 2 2·3 2	38·4 2 30·9 2 23·8 2 17·1 2	44.0 2 36.2 2	49.7 41.7 34.1 27.0
46 47 48 49 50	I 13.0	1 120 1 16 1 12 1 12	0 I 2	23.6 I 19.8 I 16.2 I 12.8 I	27·3 I 23·3 I 19·6 I	26·9 23·0 19·3	I 34 I 30 I 26 I 22	·8 I 3 ·5 I 3 ·5 I 3 ·6 I 2	8.7 I 4.3 I 6.0 I	42.7 I 38.0 I 33.6 I 29.4 I	46·7 41·9	I 56. I 50. I 41. I 36. I 32.	8 I 55 8 I 49 I I 44 6 I 40	5.0 I 9.8 I 1.9 I 0.2 I	53·9 I 48·8 I 44·0 I	3.5 2 58.0 2 52.7 I	2·2 56·8 51·6
54 55	0 58·0 0 55·4 0 52·9 0 50·5	0 58 0 55	4 0 5		6.5 I 3.3 I 0.4 I		I 12 I 8 I 5	0 I I 8 I I 7 I	5.0 I	18.0 I 14.5 I 11.2 I	17.5	I 24.	3 I 27 5 I 23 9 I I9	7·5 I 3·6 I	30·7 I 26·7 I 22·8 I	29.8	37·4
			TI	RUE	BEA	RIN	G O	R A	ZIM	UTH	OF	* S	IRIU	JS.			
Lat.	m. 4	m. 8	m. 12	16	m. 20	m. 24	m. 28	m. 32	36	m. 40	m. 44	m. 48	m. 52	m. 56	60 m.	m. 70	80 80
N.			ı	1				ZIMI		1	1			1 .	1 -	1 -	
10 12 14 16 20	2·1 2·0 1·9 1·8 1·6	4·3 4·0 3·8 3·6 3·6	6.4 6.0 5.6 5.3 4.8	8·5 8·0 7·5 7·1 6·4	9.9 9.3 8.8 8.0	12.6 11.8 11.2 10.6 9.6			16.2	19·3 18·2	19.9	22.8	25·9 24·5 23·2 22·1 20·1	27.6 26.1 24.8 23.6 21.6	29·3 27·7 26·3 25·1 23·0	30.0	36.8 35.1 33.5 32.1 29.6
25 30 40 50 60 65	1.2 1.3 1.1 1.0 1.0	2·9 2·6 2·3 2·1 2·0 1·9	4.3 4.0 3.4 3.1 3.0 2.9	5.8 5.3 4.6 4.2 3.9 3.9	7·2 6·6 5·7 5·2 4·9 4·8	8·6 7·9 6·9 6·2 5·9 5·8	10·0 9·2 8·0 7·3 6·9 6·8	11.4 10.5 9.1 8.3 7.9 7.7	12.8 11.8 10.3 9.4 8.8 8.7	10.4	12.2	16·9 15·5 13·6 12·5 11·8 11·6	18·3 16·8 14·7 13·5 12·8 12·6	19.6 18.0 15.8 14.5 13.7	16.9	19·7 18·1 17·1	25·2 22·3 20·6
\$. 40 42 44 46 50 54 58	2·4 2·2 2·1 2·0 1·7 1·6 1·4	4.8 4.5 4.2 3.9 3.5 3.2 2.9	7·2 6·7 6·2 5·8 5·2 4·7 4·3	9.6 8.9 8.3 7.8 7.0 6.3 5.8	11.9 11.1 10.3 9.7 8.7 7.9 7.2	14·3 13·2 12·4 11·6 10·4 9·4 8·7	15.4 14.4 13.5 12.1 11.0	18·8 17·5 16·4 15·4 13·8 12·5	18·3 17·3 14·1	21.7 20.3 19.1 12.1	23.7 22.2 20.9 18.8 17.1	27.4 25.6 24.1 22.7 20.4 18.7 17.2	27.6 25.9 24.5 22.1 20.2	29.5 27.8 26.2 23.7 21.6	31.3 31.3	35·8 33·9 32·1 29·2 26·8	40.0

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

* SIRIUS.

Lat.		m. 57		m. 58		m. 59		m. 60		m. 61		m. 62		m. 63	6	4		n. 35		m. 66		n.		m. 88		m. 69	1	m. 70
N.												REI	DI	UCTI	0	NS.												
20 21 22 23 24	0 2 2 2 2 2 2	30· 26·	9 2 8 2 8 2	36. 31.	0 2 8 2	36 32	·3 2	37	621282	52.0	2 2 2	2·4 57·5 52·7 48·1	3 2 2	8·1 3·0 58·1 53·4 48·9	3 5	8·7 3·6 8·8	3 1 3 3	9·1 4·2	3 3 3	9.7	3 :	26·0 20·5 15·3	3	31·9 26·3 20·9	3	37·9 32·1 26·6	3	50·1 44·0 38·1 32·4 26·9
25 26 27 28 29	2 2 2 2	8.		16.	9 2	17	·0 2	25.	7 2 2 3 2	30·5 26·6 22·9	2 2 2	35·3 31 4 27·5	2 2	44.5 40.2 36.1 32.2 28.3	2 4	15.2	2 5 4 2 4	50·2 15·9 11·7	2 2 2	50·9	3 2	0·5 55·9 51·5	3 2	5·8 1·1 56·5	3	6.2	3 3	21.6 16.4 11.5 6.7 2.1
30 31 32 33 34	I I I	58·5 55·5 50·5 47·4	I	59° 56° 54°	92	57	·0 2	8.	2 2 2	9·0 5·8	2 2 2	16·6 13·2 9·9	2 2	24.6 21.0 17.5 14.0 10.7	2 2	5.4 1.7 8.2	2 2 2 2 2 2	29·8 26·1 22·5	2 2 2	34'4 30'5 26'8	2 3	38·9 35·0 31·1	2 2 2	43·6 39·5 35·6	2 2	48.3	2 2	48.8
35 36 37 38 39	I I I	39°5	I	45°	6 I 6 I 4 I	49 46 43	·2 1 ·5 1 ·8 1	52° 50° 47°] I] I	59·6 56·6 53·7 50·9 48·1	2 I I	0·4 57·4 54·5	2 2 1	7.4 4.3 4.3 58.2 55.2 1	2	8·2 2 5·0 2	2 1 2 2	12.1	2 2 2	16·1 12·7 9·4	2 :	20·2 16·7 13·3	2 2	24·3 20·7 17·2	2 2 2	28·5 24·8 21·2	2 2 2	36.6 32.7 28.9 25.3 21.6
40 41 42 43 44	I I	29·9 27·6 25·3	I	33° 30°	0 I 6 I 3 I	36 33 31	·2 I ·8 I	39°4 36°9 34°4	I	42.7 40.1 37.6	I I I	46·1 43·4 40·7	I I	52·3 1 49·5 1 46·7 1 44·0 1 41·3 1	5 5	2·9 1 0·1 1 7·2 1	5	6.4 3.5 0.6	2 I I		2 2 1 5	3·6 0·4 7·4	2 2 2	7·2 4·0 0·8	2 2		2 2	18·1 14·6 11·2 7·9 4·6
45 46 47 48 49	I I I	18·8 16·8	I	19:	6 I 4 I 3 I	24 22 20	4 I 2 I 0 I	27:3 24:9 22:7	I	30·2 27·8 25·4	I I I	33·1 30·6 28·2	I I I	38·7 I 36·1 I 33·6 I 31·1 I 28·6 I	3 3	9·1 1 6·5 1 3·9 1	3	2·2 9·5 6·8	I I I	45.3 42.6 39.8	I 4 I 4 I 4	8·5 5·6 2·8	I Z	51·7 18·8 15·9	I I I	55.0 51.9 49.0	I I	55.2 52.1
50 51 52 53 54	I I I I	10.7 8.7 6.8 4.9 3.0	I	9· 7·	2 I I I I I I I 2 I	11.	6 I	13.0	I	18·6 16·4 14·2	I I	18·9 16·6	I I I	26·2 I 23·8 I 21·4 I 19·1 I 16·8 I	2 2	6·4 I 4·0 I I·6 I	2 2	9·1 6·6 4·1	I I I	29·3 26·7	I 3 I 3 I 2	4·6 2·0 9·3	I 3 I 3	37:4 34:7 32:0	I I I	40·3 37·5 34·7	I	43·2 40·3 37·4
55 56 57 58 59	0	59·2 57·4 55·6 53·8	0	59° 57°	50	3° 59°			I I	9.9 7.8 5.7 3.6 1.5	I I	10.0	I I I	14·5 12·2 10·0 7·8 5·6	I	4.2 I	I	6·9 4·5 2·1	I I I	19·2 16·8	I 2 I I I I	6·6 1·6	I 2 I 2 I 1	4·0 1·4 8·9	I I I	26·5 23·8 21·2	I I I	29·0 26·2 23·5
60 61 62 63 64	0 0	50·2 48·5 46·7	0	52° 50° 48°	0 0 2 0 4 0	53 51 50	8 o 9 o	55.6 53.7 51.7	0 0 0	53.2	000	57·3 55·2	0 0	3.4 I 1.3 I 59.1 I 57.0 0 54.9	5			7·5 5·2 2·9 0·6 8·4	I I I	9·6 7·2 4·9 2·5 0·2	I I		I I I	1.3	I I	13·4 10·8	I I I	18·2 15·5 12·9 10·2 7·6
S. 42 43 44 45 46	2 2	39.4 32.1 25.1	2 2	37° 30°	8 2 2 2 I 2	50 42 35	2 2 4 2 0 2	55.7 47.7 40.1	3 2 2	1.3 53.1 45.3	3 2 2	58·5 50·5	3	22·0 3 12·7 3 4·0 3 55·7 3 47·9 2	1	8·6 3 9·6 3	2 I	4·4 5·2 6·4	3	30·4 20·9	3 3 3 2 3 1	6·4 6·7 7·5	3 4 3 3 3 2	2·5 3·1	3 3	48.6 38.4 28.8	3	44·4 34·5
47 48 49 50 51	2 2 I		2 2	59	8 2 0 2 4 2	15 9 3	1 2 2 2 5 2	19·6 13·4 7·5	2 2 2	24·I 17·8	2 2 2	28·7 22·2 15·9	2 2 2	40·4 33·4 26·6 20·2 14·0	3 2	8·1 2 1·1 2 4·5 2	3	2·8 5·7 8·9	2 2	47·7 40·3 33·3	2 5 2 4 2 3	2·5 5·0 7·8	2 5 4 2 4	7·5 19·8 12·4	3 2 2	2·5 54·6 47·0	3 2 2	51.6
52 53 54 55 56	I I I	36.4	I	39° 35°	3 I 7 I 3 I	47 43 38	·8 1 ·1 1 ·5 1	46.5	I	50.0 45.1	I I	53·6 48·5	2 I I	8·2 2 2·5 2 57·1 2 52·0 1 47·0 1	5	6·3 2 0·8 2 5·5 I	5	0·2 4·5 9·0	2 2 2	20·2 14·1 8·2 2·6 57·1	2 I 2 I 2	8.1	2 2 2 2 2 2	22·1	2 2	26·1 19·7 13·6	2 2	30.2

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. ** SPICA.

								SPI	<u></u>							
Lat.	m. 2	m. 4	6 m.	m. 8	m. 10	m. 12	14 14	16	18 m.	m. 20	21	m. 22	23 23	m. 24	25 25	m. 26
N.							REI	UCT	IONS	3.						
16 18 20 22 24	0.3 0.3 0.3 0.3	0.9 0.9 0.9	2·5 2·3 2·1 2·0 1·9	4·4 4·1 3·8 3·5 3·3	6.8 6.3 5.9 5.5 5.1	9·9 9·1 8·5 7·9 7·4	13.4 12.4 11.6 10.8 10.1	17·5 16·2 15·1 14·1 13·2	22·I 20·5 19·I 17·8 16·6	27·2 25·2 23·5 21·9 20·5	30·0 27·8 25·9 24·2 22·6	32·9 30·5 28·4 26·5 24·8	35.9 33.3 31.0 28.9 27.1	39·1 36·2 33·7 31·5 29·5	42.4 39.3 36.6 34.2 32.0	45.8 42.4 39.5 36.9 34.6
26 28 30 32 34	0.2 0.2 0.2 0.1	0·8 0·7 0·7 0·6 0·6	1.7 1.6 1.5 1.4 1.4	3·I 2·9 2·7 2·6 2·4	4·8 4·5 4·3 4·0 3·8	6·9 6·5 6·1 5·8 5·4	9.4 8.9 8.3 7.9 7.4	12·3 11·6 10·3 9·7	15.6 14.6 13.8 13.0 12.2	19·2 18·1 17·0 16·0 15·1	21·2 19·9 18·7 17·7 16·6	23·3 21·9 20·6 19·4 18·3	25.4 23.9 22.5 21.2 20.0	27·7 26·0 24·4 23·0 21·7	30·0 28·2 26·5 25·0 23·6	32·4 30·5 28·7 27·0 25·5
36 40 45 50 60	0.1 0.1 0.1 0.1 0.1	0.6 0.5 0.4 0.4 0.3	0.0 0.0 1.1 1.3	2·3 2·0 1·8 1·5 1·1	3.6 3.2 2.7 2.4 1.7	5·1 4·6 4·0 3·4 2·4	7.0 6.2 5.4 4.6 3.3	9·1 8·1 7·0 6·1 4·4	11.5 10.3 8.9 7.7 5.5	14·2 12·7 11·0 9·5 6·8	15·7 14·0 12·1 10·4 7·5	17·2 15·4 13·3 11·4 8·2	18·8 16·8 14·5 12·5 9·0	20·5 18·3 15·8 13·6 9·8	22·2 19·8 17·1 14·8 10·6	24.0 21.4 18.5 16.0 11.5
\$. 35 36 38 40 42	0.3 0.5 0.5 0.5	1.0 1.0 0.9 0.8 0.7	2·3 2·2 2·0 1·8 1·7	4·I 3·9 3·5 3·2 2·9	6·4 6·1 5·5 5·0 4·6	9·2 8·8 8·0 7·2 6·6	12·5 11·9 10·8 9·9 9·0	16·3 15·5 14·1 12·9 11·8	20·6 19·6 17·8 16·2 14·9	25.4 24.2 22.0 20.0 18.3	28·0 26·7 24·2 22·1 20·2	30·7 29·2 26·6 24·2 22·2	33·5 31·9 29·0 26·5 24·2	36·5 34·7 31·6 28·8 26·3	39.5 37.6 34.2 31.2 28.6	42.7 40.7 37.0 33.7 30.9
44 46 48 50 52	0.5 0.1 0.1 0.1	0·7 0·6 0·6 0·5 0·5	1·5 1·4 1·3 1·2 1·1	2·7 2·3 2·1 1·9	4·2 3·9 3·5 3·3 3·0	6·1 5·6 5·1 4·7 4·3	8·2 7·6 7·0 6·4 5·9	10·8 9·9 9·1 8·3 7·7	13.6 12.5 11.5 10.6 9.7	16·8 15·4 14·2 13·0 12·0	18·5 17·0 15·6 14·4 13·2	20·3 18·6 17·1 15·7 14·5	22·2 20·4 18·7 17·2 15·8	24·I 22·2 20·4 18·7 17·2	26·2 24·0 22·1 20·3 18·7	28·3 26·0 23·9 22·0 20·2
	m l	m.	m.	m.	m.	m.	m,	m,	m.							
Lat.	m. 27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
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20 21 22 24 26	42.6 41.1 39.8 37.2 34.9	45.8 44.2 42.7 40.0 37.5	49.0 47.4 45.8 42.9 40.3	52·4 50·7 49·0 45·9 43·0	55.9 54.1 52.3 49.0 45.9	59.6 57.6 55.7 52.1 48.9	63·3 61·2 59·1 55·4 52·0	67·1 64·8 62·7 58·8 55·1	71.0 68.6 66.4 62.2 58.4	75·1 72·6 70·2 65·8 61·7	79·2 76·6 74·0 69·4 65·2	83·4 80·7 78·0 73·1 68·7	87·8 84·9 82·1 77·0 72·3	92·2 89·2 86·3 80·9 76·0	96·8 93·6 90·6 84·9 79·8	98·1 94·9 89·0 83·6
28 30 32 34 36	32·8 30·9 29·1 27·5 25·9	35·3 33·2 31·3 29·5 27·9	37·8 35·6 33·6 31·7 29·9	40.5 38.1 35.9 33.9 32.0	43.2 40.7 38.3 36.1 34.1	46·0 43·3 40·8 38·5 36·3	48·9 46·0 43·4 40·9 38·6	51.9 48.8 46.0 43.4 41.0	54.9 51.7 48.7 46.0 43.4	58·1 54·7 51·5 48·6 45·9	61·3 57·7 54·4 51·3 48·5	64.6 60.8 57.4 54.1 51.1	68·0 64·0 60·4 57·0 53·8	71·5 67·3 63·5 59·9 56·6	75.0 70.7 66.7 62.9 59.4	78·7 74·1 69·9 66·0 62·3
38 40 42 44 46	24·5 23·1 21·8 20·6 19·4	26·3 24·8 23·4 22·1 20·9	28·2 26·6 25·1 23·7 22·4	30·2 28·5 26·9 25·4 23·9	32·2 30·4 28·7 27·1 25·6	34·3 32·4 30·6 28·9 27·2	36·5 34·4 32·5 30·7 29·0	38·7 36·5 34·5 32·6 30·7	41.0 38.7 36.6 34.5 32.6	43°3 40°9 38°7 36°5 34°4	45.8 43.2 40.8 38.5 36.4	48·3 45·6 43·0 40·6 38·3	50·8 48·0 45·3 42·8 40·4	53.4 50.5 47.7 45.0 42.4	56·1 53·0 50·1 47·3 44·6	58·8 55·6 52·5 49·6 46·8
48 50 52 54 56	18·3 17·2 16·2 15·2 14·2	19·7 18·5 17·4 16·3 15·3	21·1 19·9 18·7 17·5 16·4	22.6 21.2 20.0 18.7 17.6	24·I 22·7 21·3 20·0 18·7	25·7 24·2 22·7 21·3 20·0	27·3 25·7 24·2 22·7 21·2	29·0 27·3 25·6 24·1 22·5	30·7 28·9 27·2 25·5 23·9	32·5 30·6 28·7 27·0 25·3	34·3 32·3 30·3 28·5 26·7	36·1 34·0 32·0 30·0 28·1	38·1 35·8 33·7 31·6 29·6	40.0 37.7 35.4 33.3 31.2	42.0 39.6 37.2 34.9 32.7	44·I 4I·5 39·I 36·7 34·3
S. 38 39 40 41 42	39·8 38·0 36·4 34·8 33·3	42·8 40·9 39·1 37·4 35·7	45.9 43.8 41.9 40.0 38.3	49.0 46.8 44.8 42.8 41.0	52·3 50·0 47·8 45·7 43·7	55.7 53.2 50.9 48.6 46.6	59·2 56·5 54·0 51·7 49·5	62·7 59·9 57·3 54·8 52·5	66·4 63·4 60·7 58·0 55·6	70·2 67·0 64·1 61·3 58·7	74.0 70.7 67.7 64.7 62.0	78·0 74·5 71·3 68·2 65·3	82·0 78·4 75·0 71·8 68·7	86·2 82·4 78·8 75·4 72·2	90·5 86·5 82·7 79·2 75·8	94·8 90·6 86·7 83·0 79·5
43 44 45 46	31·8 30·5 29·2 28·0	34·2 32·8 31·4 30·1	36·7 35·1 33·7 32·3	39·2 37·6 36·0 34·5	41.9 40.1 38.4 36.9	44·6 42·7 40·9 39·2	47.4 45.4 43.5 41.7	50·3 48·2 46·2 44·2	53°2 51°0 48°9 46°9	56·3 53·9 51·7 49·5	59°4 56°9 54°5 52°3	62·6 60·0 57·5 55·1	65·8 63·1 60·5 58·0	69·2 66·3 63·6 61·0	72·7 69·6 66·8 64·0	76·2 73·0 67·1
48 50 52 54	25·8 23·7 21·8 20·0	27·7 25·5 23·4 21·5	29·7 27·3 25·1 23·1	31·7 29·2 26·9 24·7	33.9 31.2 28.7 26.4	36·1 33·2 30·5 28·1	38·4 35·3 32·5 29·8	40.7 37.4 34.4 31.7	43·1 39·7 36·5 33·5	45.6 41.9 38.6 35.5	48·1 44·3 40·7 37·5	50.7 46.7 42.9 39.5	53.4 49.1 45.2 41.6	56·1 51·6 47·5 43·7	58·9 54·2 49·9 45·9	61·8 56·9 52·4 48·2

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

* SPICA.

Lat.	m. 43	m. 44	45		n. 16	m. 47	m. 48	49		n. 50	m. 51	m. 52	53		n. 54	m. 55	m. 56
N.			1		4		RE	DUC	CTIO	NS,				,			
22 23 24 25 26	1 39.4 1 36.2 1 33.2 1 30.3 1 27.6	I 40 I 37 I 34	6 I 4 5 I 4	5·2 I 1·9 I 8·7 I	49·8 I 46·3 I 43·I I	50·9 47·5	I 59. I 55. I 52. I 48.	2 2 5 2 5 1 5 6 1 5	4·1 2 0·3 2 6·6 2 3·1 1	9·1 2 5·1 2 1·3 2 57·6 2	14·1 10·0 6·0 2·2	2 19 2 15 2 10	8 2 29 3 2 24 0 2 20 9 2 15	1.5 2 2 5.8 2 2 1.7 2 1	29·8 2 25·2 2 20·8 2 16·6 2	25·9 2 21·5 2	40.7 35.8 31.1 26.6
27 28 29 30 31	1 22.4 1 20.6 1 17.6 1 15.4	1 26 1 23 1 21 1 18	·2 I 3 ·7 I 2 ·2 I 2 ·9 I 2	0·1 I 2·5 I 2·9 I 2·4 I	36·9 I 34·I I 31·3 I 28·7 I 26·I I	38·1 35·2 32·5 29·8	I 33°	2 I 4 3 I 4 4 I 4 6 I 3	3·3 I 0·4 I 7·5 I	50·71 47·51 44·41 41·41	55.1 51.8 48.5 45.4	1 59 1 56 1 52 1 49	·6 2 4 ·1 2 6 ·7 1 57 ·5 1 53	1·1 2 0·5 2 7·0 2 3·7 1 5	5.0 2 1.4 2 57.9 2	13.4 2 9.5 2 5.8 2 2.2 2	18·1 14·1 10·3 6·6
32 34 36 38 40	1 5.3 1 1.0 0 58.2	1 12 1 8 1 4 1 1	.3 I I .3 I I	5.6 I 7.5 I 3.7 I	23.6 I 18.9 I 14.6 I 10.4 I 6.6 I	22·4 17·8 13·5 9·4	1 25° 1 21° 1 16° 1 12°	8 1 2 1 1 2 6 1 1 4 1 1	4.7 I 9.4 I 9.8 I 5.4 I	33.0 I 27.9 I 23.0 I 18.5 I	36·7 31·4 26·4 21·6	I 40 I 34 I 29 I 24	·4 I 50 ·5 I 44 ·9 I 38 ·7 I 33 ·8 I 28	3.6 I 2 3.6 I 2 3.0 I 3	8·2 I 2·2 I 36·6 I	46.0 I 40.2 I 34.7 I	56·2 49·8 43·8 38·1
42 44 46 48 50	0 46.2	0 54 0 51 0 48 0 45	·4 0 5 ·3 0 5 ·4 0 5 ·6 0 4	3.6 o 30.6 o 7.6 o	56.00 52.80 49.80	58·5 55·1	1 4. 0 57. 0 54.	6 I 0 I 5 0 5 I 0 5	3·5 I 9·9 I 6·4 0	6·1 1 2·3 1 58·7 1	12·8 8·7 4·8 1·1	1 15 1 11 1 7 1 3	- 1	3·6 1 2 1·2 1 3 5·6 1 3	21·5 1 17·0 1 12·6 1 8·4 1	24.5 I 19.8 I 15.3 I 10.9 I	27·6 22·7 18·0 13·5
52 54 56 58 60	o 38.4 o 36.6 o 33.6	0 40 0 37 0 35	·2 0 4 ·7 0 3 ·2 0 3	2·1 0 9·4 0 6·8 0	46.8 0 43.9 0 41.2 0 38.5 0 35.8 0	45.0 43.0 40.2	0 47. 0 44. 0 41.	80 4 80 4 90 4	6.7 o	51·8 0 48·6 0 45·4 0	53.9 50.5 47.2	0 56 0 52 0 49	·7 I 2 ·0 0 58 ·5 0 54 ·1 0 51 ·7 0 42	1·5 0 5	52.90	54.9	4·9 0·8 56·9
38 39 40 41 42	I 26.0	I 39 I 34 I 30	·2 I 4 ·9 I 3	3·6 I 9·2 I 5·0 I	48·2 I 43·5 I 39·1 I	52·8 47·9 43·4	I 57.	4 2 4 I 5 7 I 5	2·2 2 7·0 2 2·1 1	7·1 2 1·7 2 56·5 2	12·0 6·4 1·1	2 17 2 11 2 5	·2 2 28 ·1 2 22 ·3 2 16 ·7 2 16 ·5 2	2·2 2 2	27·4 2 21·1 2 15·3 2	32·6 2 26·2 2	38·0 31·4 25·1
43 44 45 46 47	I 16.5 I 13.3 I 10.3	1 20 1 16 1 13	·0 1 2 ·7 1 2 ·6 1 1 ·6 1 1	3.6 I 6.9 I 3.8 I	23·7 I 20·3 I 17·0 I	31.0 27.3 23.7 20.3	1 34· 1 27· 1 23·	8 I 3 0 I 3 3 I 3 7 I 2	8·7 I 4·7 I 0·9 I 7·2 I	42·7 I 38·5 I 34·5 I	46·7 42·4 38·3 34·3	1 50 1 46 1 42 1 37	·3 I 50 ·0 I 45 ·9 I 41	5.01 5.01 1.61	54·5 I 49·8 I 45·4 I	53·8 I	8.0 2.8 57.9 53.2
48 49 50 51 52		I 5	·0 I ·3 I		13.9 I 10.9 I 5.3 I 2.7 I	14.0	1 17. 1 14. 1 11.	1 1 2 0 1 1 0 1 1	7·1 1	23·5 I 20·2 I 17·0 I	26·9 23·4 20·0	I 30 I 26 I 23	·0 1 37 ·2 1 33 ·6 1 29 ·1 1 26 ·8 1 22	3·7 I 3 5·3 I 3	37·1 1 33·3 1 29·5 1	40.7 I 36.7 I 32.8 I	44°3 40°1 36°1
			T	RUE	BE.	ARII	NG C	R	AZIN	IUTH	I OF	· X	SPIC	CA.			
Lat.	1 m.	m. 8	m. 12	16	m. 20	m. 24	m. 28	m. 32	m. 36	m. 40	m. 44	m. 48	52	m. 56	60 60	70	m. 80
N.							A	ZIM	UTH	S.	,						
18 20 22 24	2.0 2.0 1.8 1.7	4·I 3·8 3·6 3·4	6·1 5·7 5·4 5·2	8·1 7·6 7·2 6·9	9.5 9.0 8.6	12·1 11·4 10·8 10·3	14.0 13.0 12.5 11.9	16.0 15.1 14.3 13.6	17.9 16.9 16.0 15.2	19.7 18.6 17.7 16.8	21·5 20·4 19·3 18·4	23.3 23.3 20.0	23.7	26·7 25·4 24·2 23·1	28·4 27·0 25·7 24·6	32·3 30·8 29·4 28·2	36.0 34.4 32.9 31.6
26 30 35 40	1.6 1.3 1.4	3·3 3·0 2·7 2·5	4·9 4·5 4·1 3·8	6·5 6·0 5·5 5·1	8·2 7·5 6·8 6·3	9·8 9·0 8·2 7·6	9·5 8·9	10.1	13.4	13.6	13.8	16·2	19.0 17.5 16.3	17.2	18.7	21.6	26.2
45 50 60 S.	I·1 I·0	2·4 2·3 2·1	3·4 3·1	4.7 4.5 4.2	5·9 5·6 5·2	7·1 6·8 6·2	8·3 7·9 7·3	9·5 9·0 8·3	6.3 10.1		12.3		13.2		16.7		
35 36 38 40	2·4 2·3 2·1 2·0	4.8 4.6 4.3 4.0	7·1 6·9 6·4 6·0	9·5 9·2 8·5 8·0	11.8 11.4 10.6 10.0	14·1 13·6 12·7 12·0	15.8	18·6 18·0 16·8 15·8	20·8 20·1 18·8 17·7	22.2	25·1 24·3 22·8 21·5	26.3	28.2	30.1	33.0 32.0 30.2 28.6	36.5	40·6 38·6
45 50 60	1·7 1·6 1·4	3.2 3.1 2.8	5·2 4·7 4·2	7.0 6.2 5.6	8·7 7·0	9°3 8°4	10.8	13·8 12·3 11·2	15·5 13·8 12·6	17·2 15·4 14·0		20·5 18·3 16·7	22·1 19·8 18·1	23·7 21·3 19·4	25·2 22·7 20·8	29·1 26·3 24·1	32·8 29·8 27·4

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. ** SPICA.

Lat.		m. 57	1	m. 58		5			m. 60	1	m. 61		m. 62	1	m. 63		m. 64		m. 65		m. 66		m. 67		m. 68		m. 69		m. 70
N.					,								RE	Ď	UCT	ΊC	NS	•											
25 26 27 28 29	2 2	31·7 27·2	2 2	36	9 2	3	2·1 7·4 2·8	2 2	47.5	2 2	58·2 52·9 47·9 43·0 38·4	2 2 2	53°2	3 2 2 2	58·7	3 3 2	9.7 4.2 58.9	3	21·3 15·4 9·7 4·3	3 3	27.2	3 3	33·3 27·1 15·4	3	33.0 33.0	3	39·0 32·7 26·7	3	51.8 45.1 38.7 32.5 26.5
30 31 32 33 34	2 2 2 2 2		2 2 2	11.		1 1	0·1 6·2 2·4	2 2	24·8 20·7 16·8	3 2	33.8 29.5 25.3 21.3 17.3	2 2 2	34°3 30°0 25°8	2 2 2	39·2 34·7 30·4	2 2 2	39°5	2 2	44.4 39.8	2 2 2	49.3	2 2	54°3	3 2 2	4.5 59.4 54.4	3 2	9·8 4·6 59·5 54·5	3	20·7 15·1 9·8 4·5 59·4
35 36 37 38 39	I I I	47.5	I	57 54 51	4 1	5 5	5.0	2 2 I	5.7 2.2 58.8	2 2 2 2 2 2	13·5 9·8 6·2 2·8 59·4	2 2 2	14.0	2 2 2 2	18·3 14·5 10·8	2 2 2	18·7 14·9	2 2	31·1 27·0 22·9 19·0 15·2	2 2 2	27.2	2 2	35.9 31.6 27.5	2 2 2	30·1 36·1	2 2 2	45·1 40·6 36·2	2 2 2	49·8 45·1 40·6
40 41 42 43 44	I I I	38·8 36·0 33·3	I	42 39 36	4 1	4	5.7 2.8 9.9	I I	49°2 46°2 43°2	1 2 1	56·1 52·9 49·7 46·7 43·7	I I I	53°3	5 2 3 I I I	56·9 53·6	2 2	4.0 0.6 57.2	2 2	4°3	2 2 2		2 2	11.9	2 2 2	19.6 15.8 12.0	2 2	23.7 19.7 15.8	2 2	31·9 27·8 23·7 19·7 15·8
45 46 47 48 49	I I I	25·6 23·2 20·8	I	28 26 23	6 1	2	9·0 6·5	I I	34°7 32°0 29°4	I	40.7 37.9 35.1 32.3 29.6	I I I	38·2 35·4	1 2 1	44.3 41.3 38.4	I	47.6 44.5 41.5	I	50·9 47·8 44·7	I I I	54°3 51°0 47°8	I	54.4 51.1	2 I I	57·8 54·4	2 2 I	4.7 1.2 57.7	2 2 2	12.0 8.3 4.7 1.1 57.6
50 51 52 53 54	I I I I	13.8	I	16 14	4 I 1 I	1 1	9·0 6·6 4·3	I	19·2 16·8	7 1	27.0 24.4 21.9 19.4 16.9	I I	27·2 24·5 22·0	I	30·0 27·2 24·6	I	32·8 30·0	I	35·7 32·8 30·0	I I I	38·6 35·6 32·7	I I	38·5 35·5	I	44.6 41.4 38.3	I I I	47.6 44.4 41.2	I I	50.7
55 56 57 58 59	I I 0 0	5.1 3.0 0.9 58.9 56.9	I	3	4 I 2 I 1 I 0 I		9·7 7·5 5·2 3·1 0·9	I	9°7 7°4 5°2 3°0	I	14·5 12·1 9·7 7·4 5·1	I I	14.4	I	16·8 14·3 11·8	I I	19·2 16·6	I I	24'4 21'7 19'0 16'4 13'8	I I I	24·2 21·5 18·7	I I	26·7 23·9 21·1	I	29·3 26·4 23·5	I I	31·9 28·9 26·0	I I	31·5 28·4
60 61 62 63 64	0	49.0	0	54 52 50	8080	5 5 5	6·7 4·6 2·5	0	54.3	0	2·8 0·5 58·3 56·1 53·9	I I O		I	59.8	I I I	6·6 4·1	I	8·7 6·1 3·6 1·2	I I I	8·2 5·6	I I	12.9	I I	15.1	I I	17·3 14·4 11·6	I I	
\$. 38 39 40 41 42	2 2 2	30.1	2 2 2	48	92	5	7.3	3 2 2	52·7 45·6	2 3	14·1 6·0 58·2 50·9 44·0	3 2	3·8 56·3	3 3	9.5	3	23·7 15·3 7·3	3	29·7 21·1 29·7	3 3 3	35·8 27·0 18·6	3 3	33.0 34.3	3	39·1 30·2	3	54.7 45.1 36.0	4 3 3	11.4 1.1 51.3 42.0 33.1
43 44 45 46 47	2	18·1 12·5 7·1 2·0 57·1	2	6.	5 2	I	5.9	2	20·4 14·8	2	37·3 31·0 25·0 19·2 13·6	2	29.6	2	34.3	2	39.0	2	43·8 37·3	2 2	48.7	2	53·6 46·8	2	58·7	3	3·7 56·5	3	8.8
48 49 50 51 52	I	43.7	I	51· 47· 43·	7 I 2 I 0 I	5 5 4	0·9 6·5	I I I	50.0	2 I	8·3 3·2 58·3 53·6 49·1	2 2	7·2	2 2 2	6.0	2 2	9.9 4.8	2 2	25·1 19·4 13·9 8·6 3·5	2 2 2	23·6 17·9 12·5	2 2	27.8	2 2	32·I 26·I 20·4	2 2 2	36·5 30·3 24·4	2 2 2	40.9 34.6 28.5
53 54 55 56 57	I	27·9 24·4 20·9	I	31· 27· 23·	0 I 3 I 7 I	3 3 2	4·1 0·3 6·6	I I I	37·3 33·3	I	44.7 40.5 36.4 32.4 28.6	I I I	43.7 39.5 35.4	I	47.0 42.7 38.4	I I	50.4 45.9	I	53·8 49·1	I I I	52.4 47.8	2 I I	55.8	2 I	4·2 59·2	2 2 I	7·8 2·6 57·6	2 2 2	16·9 11·4 6·1 1·0 56·0

TABLE XV.

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

 \times α TRIANGULI AUSTRALIS.

Lat	. m						m. 22	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	m. 36	m. 38	m. 40	m. 42	m. 44
N.								RE	DUC	TIOI	vs.			1	1 ,		1	
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REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

★ a TRIANGULI AUSTRALIS.

Lat.	m. 61	m. 62	m. 63	m. 64	m. 65	m. 66		m. 67	m. 68		m 69			n. 70		m. 71		m. 72	n:		7	1. 4	n 7	ո. 5
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4 4 5	9 1	1 2	.ı 3	.2 4	.2	5.3	6·3 6·6	7·0 7·3 7·7	8.	3	8·9 9·8	1	9·0 0·3 0·8	11	•3	11·7 12·2 12·8	1	13.8	14.3 15.0	5 1	7.1	19.	Ī	20·1 20·9 21·8

★ a TRIANGULI AUSTRALIS.

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45 50 55 60	0.1 0.1 0.1	0.6 0.6 0.5	1.3 1.5 1.1	2·3 2·2 1·9	3.6 3.3 3.0	5·2 5·0 4·7 4·3	6·2 5·8 5·5 5·1	7·1 6·8 6·4 5·9	8·2 7·8 7·3 6·8	9·3 8·9 8·3 7·7	10·5 10·0 9·4 8·7	11·8 11·2 10·6 9·8	10.9 11.8 13.1	14·6 13·8 13·0 12·1	16·0 15·2 14·4	17.6 16.7 15.8 14.6
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46 48 50 52 54	18·2 17·5 17·1 16·6	19·1 18·7 18·3 17·9	19·9 19·1 18·6	20·8 20·4 19·9 19·5	21.6 21.2 20.7 20.3 19.8	22·5 22·1 21·6 21·1	23.4 23.0 22.5 22.0 21.4	24·4 23·9 23·4 22·8	25·3 24·8 24·3 23·7 23·1	26·3 25·7 25·2 24·6 24·0	27·2 26·7 26·1 25·5 24·9	28·2 27·7 27·1 26·5 25·8	29°3 28°7 28°0 27°4 26°7	30·3 29·7 29·0 28·4	31·3 30·7 30·0 29·4 28·7	32·4 31·8 31·1 30·4 29·6
56 58 60	16·3 15·8	16·5 16·0	17·7 17·2 16·7	18·5 18·0 17·4	19.3	20·1 19·5 18·9	20.3	21.7	51.5 51.0 52.2	23·4 22·7 22·1	24·3 23·6 22·9	25·I 24·4 23·7	26·1 25·3 24·6	27·0 26·2 25·4	27·9 27·1 26·3	28·1 28·1 27·2
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34 36 38 40 42	36·0 35·4 34·8 34·3	37·2 36·6 36·0	38.4	39.6	40.3	42.2	43·5 42·8	44·8 44·I	46·1 45·4	47·5 46·7	48·9 48·1	50·3 49·5	50·9	52·3	54.6	56·0 55·2 54·3
	33.7	35.4 34.8	37·2 36·6 35·9	38·4 37·7 37·1	38·9 38·3	40°9 40°2 39°5	42·1 41·4 40·7	43.4 42.7 41.9	44.7 43.9 43.2	46.0 45.2 44.5	47·3 46·5 45·7	48·7 47·1 47·1	50·1 49·2 48·4	51.5 50.6 49.7	52.0 25.0	53.4 52.5
44 46 48 50 52	33.0 32.4 31.8 31.1	34.8 34.1 33.5 32.8 32.1 31.4	36·6 35·9 35·3 34·6 33·9 33·2 32·4	37·7 37·1 36·4 35·7 35·0 34·3 33·5	38·9 38·3 37·6 36·9 36·1 35·3 34·5	40·2 39·5 38·8 38·0 37·2 36·4 35·6	41.4 40.7 40.0 39.2 38.4 37.6 36.7	42.7 41.9 41.2 40.4 39.6 38.7 37.8	44.7 43.9 43.2 42.4 41.6 40.7 39.9 39.0	45.2 44.5 43.6 42.8 41.9 41.1 40.1	46·5 45·7 44·9 44·1 43·2 42·2 41·3	47.9 47.1 46.2 45.3 44.4 43.5 42.5	49·2 48·4 47·5 46·6 45·7 44·7 43·7	50·6 49·7 48·8 47·9 46·9 45·9 44·9	52.9 52.0 51.1 50.2 49.2 48.2 47.2 46.1	53.4 52.5 51.5 50.5 49.5 48.5 47.4
46 48 50	33.0 32.4 31.8 31.1	34·8 34·1 33·5 32·8 32·1	36·6 35·9 35·3 34·6 33·9 33·2	37·7 37·1 36·4 35·7 35·0 34·3	38·9 38·3 37·6 36·9 36·1 35·3 34·5 32·8 32·4 31·9	40·2 39·5 38·8 38·0 37·2 36·4 35·6 34·8 33·9 33·4 32·9 32·4	41.4 40.7 40.0 39.2 38.4 37.6	41.2 40.4 38.7 37.8 36.9 36.0 35.5 35.0 34.4	44.7 43.9 43.2 42.4 41.6 40.7 39.9 39.0 38.0 37.0 36.5 36.0	45.2 44.5 43.6 42.8 41.9 41.1 40.1 39.2 38.1 37.6 37.1 36.5	46.5 45.7 44.9 44.1 43.2 42.2 41.3 40.3 39.2 38.7 38.1 37.6	47.9 47.1 46.2 45.3 44.4 43.5	49.2 48.4 47.5 46.6 45.7 44.7 42.6 41.5 40.9 40.3	50.6 49.7 48.8 47.9 46.9 45.9	52.9 52.0 51.1 50.2 49.2 48.2 47.2	53.4 52.5 51.5 50.5 49.5 48.5
46 48 50 52 54 56 57 58 59 60	33.0 32.4 31.8 31.1 30.4 29.6 28.9 28.5 28.1 27.6	34.8 34.1 33.5 32.8 32.1 31.4 30.6 29.8 29.4 29.0 28.6	36·6 35·9 35·3 34·6 33·9 33·2 32·4 31·6 30·8 30·4 30·0 29·5	37.7 37.1 36.4 35.7 35.0 34.3 33.5 32.7 31.8 31.4 30.9 30.5	38·9 38·3 37·6 36·9 36·1 35·3 34·5 33·7 32·8 32·4 31·9 31·4	40·2 39·5 38·8 38·0 37·2 36·4 35·6 34·8 33·9 33·4 32·9 32·4 31·9	41·4 40·7 40·0 39·2 38·4 37·6 36·7 35·8 34·9 34·4 33·9 33·4	41.2 40.4 38.7 37.8 36.9 36.0 35.5 35.0 34.4	44.7 43.9 43.2 42.4 41.6 40.7 39.9 39.0 38.0 37.0 36.5 36.0 35.5	45.2 44.5 43.6 42.8 41.9 41.1 40.1 39.2 38.1 37.6 37.1 36.5	46.5 45.7 44.9 44.1 43.2 42.2 41.3 40.3 39.2 38.7 38.1 37.6	47.9 47.1 46.2 45.3 44.4 43.5 42.5 41.5 40.4 39.8 39.2 38.7 38.1	49.2 48.4 47.5 46.6 45.7 44.7 43.7 42.6 41.5 40.9 40.3 39.8	50·6 49·7 48·8 47·9 46·9 45·9 44·9 43·8 42·7 42·1 41·5 40·9 40·2	52.9 52.0 51.1 50.2 49.2 48.2 47.2 46.1 45.0 43.8 43.2 42.6 42.0	53.4 52.5 51.5 50.5 48.5 47.4 46.2 45.0 44.4 43.8 43.1
46 48 50 52 54 56 57 58 59	33.0 32.4 31.8 31.1 30.4 29.6 28.9 28.5 28.1 27.6	34.8 34.1 33.5 32.8 32.1 31.4 30.6 29.8 29.4 29.0 28.6	36·6 35·9 35·3 34·6 33·9 33·2 32·4 31·6 30·8 30·4 30·0 29·5	37.7 37.1 36.4 35.7 35.0 34.3 33.5 32.7 31.8 31.4 30.9 30.5	38·9 38·3 37·6 36·9 36·1 35·3 34·5 32·8 32·4 31·9 31·4 31·0	40·2 39·5 38·8 38·0 37·2 36·4 35·6 34·8 33·9 33·4 32·9 32·4 31·9	41·4 40·7 40·0 39·2 38·4 37·6 36·7 35·8 34·9 34·4 33·9 33·4	41.2 40.4 39.6 38.7 37.8 36.9 36.0 35.5 35.0 34.4	44.7 43.9 43.2 42.4 41.6 40.7 39.9 39.0 38.0 37.0 36.5 36.0 35.5	45.2 44.5 43.6 42.8 41.9 41.1 40.1 39.2 38.1 37.6 37.1 36.5	46.5 45.7 44.9 44.1 43.2 42.2 41.3 40.3 39.2 38.7 38.1 37.6	47.9 47.1 46.2 45.3 44.4 43.5 42.5 41.5 40.4 39.8 39.2 38.7 38.1	49.2 48.4 47.5 46.6 45.7 44.7 43.7 42.6 41.5 40.9 40.3 39.8 39.1	50·6 49·7 48·8 47·9 46·9 45·9 44·9 43·8 42·7 42·1 41·5 40·9 40·2	52.9 52.0 51.1 50.2 49.2 48.2 47.2 46.1 45.0 43.8 43.2 42.6 42.0	53.4 52.5 51.5 50.5 48.5 47.4 46.2 45.0 44.4 43.8 43.1
46 48 50 52 54 56 57 58 59 60	33.0 32.4 31.8 31.1 30.4 29.6 28.9 28.5 28.1 27.6 27.2	34·8 34·1 33·5 32·8 32·1 31·4 30·6 29·8 29·4 29·0 28·6 28·1	36·6 35·9 35·3 34·6 33·9 33·2 32·4 31·6 30·8 30·4 30·0 29·5 29·1	37.7 37.1 36.4 35.7 35.0 34.3 33.5 32.7 31.8 30.9 30.5 30.0	38·9 38·3 37·6 36·9 36·1 35·3 34·5 32·4 31·9 31·4 31·0	40·2 39·5 38·8 38·0 37·2 36·4 35·6 34·8 33·9 32·4 31·9	41·4 40·7 40·0 39·2 38·4 37·6 36·7 35·8 34·9 33·4 33·9 33·4 32·9	42.7 41.9 41.2 40.4 33.6 38.7 37.8 36.9 36.9 35.5 35.0 34.4 33.9	44.7 43.9 43.2 42.4 41.6 40.7 39.9 39.0 36.0 36.0 36.5 36.0 35.5 34.9	45·2 44·5 43·6 42·8 41·9 41·1 40·1 39·2 38·1 37·6 37·1 36·5 36·0	46.5 45.7 44.9 44.1 43.2 42.2 41.3 40.3 39.2 38.7 38.1 37.6 37.0	47.9 47.1 46.2 45.3 44.4 43.5 42.5 41.5 40.4 39.8 39.2 38.7 38.1	49.2 48.4 47.5 46.6 45.7 43.7 42.6 41.5 40.9 40.3 39.8 39.1 I HO	50·6 49·7 48·8 47·9 46·9 44·9 43·8 42·7 42·1 41·5 40·9 40·2 UR.	52.9 52.0 51.1 50.2 49.2 47.2 46.1 45.0 43.8 43.2 42.6 42.0 41.3	53.4 52.5 51.5 50.5 49.5 47.4 46.2 45.0 44.4 43.8 43.1 42.5
46 48 50 52 54 56 57 58 59 60 Lat.	33.0 32.4 31.8 31.1 30.4 29.6 28.9 28.5 28.1 27.6 27.2	34·8 34·1 33·5 32·8 32·1 31·4 30·6 29·8 29·4 29·0 28·6 28·1	36·6 35·9 35·3 34·6 33·9 33·2 32·4 31·6 30·8 30·4 30·0 29·5 29·1	37.7 37.1 36.4 35.7 35.0 34.3 33.5 32.7 31.8 30.9 30.5 30.0	38·9 38·3 37·6 36·9 36·1 35·3 34·5 32·4 31·9 31·4 31·0	40·2 39·5 38·8 38·0 37·2 36·4 35·6 34·8 33·9 32·4 31·9	41·4 40·7 40·0 39·2 38·4 37·6 36·7 35·8 34·9 33·4 33·9 33·4 32·9	42·7 41·9 41·2 40·4 33·6 38·7 37·8 36·9 36·9 35·5 35·0 34·4 33·9	44.7 43.9 43.2 42.4 41.6 40.7 39.9 39.0 36.0 36.0 36.5 36.0 35.5 34.9	45·2 44·5 43·6 42·8 41·9 41·1 40·1 39·2 38·1 37·6 37·1 36·5 36·0	46.5 45.7 44.9 44.1 43.2 42.2 41.3 40.3 39.2 38.7 38.1 37.6 37.0	47.9 47.1 46.2 45.3 44.4 43.5 42.5 41.5 40.4 39.8 39.2 38.7 38.1	49.2 48.4 47.5 46.6 45.7 43.7 42.6 41.5 40.9 40.3 39.8 39.1 I HO	50·6 49·7 48·8 47·9 46·9 44·9 43·8 42·7 42·1 41·5 40·9 40·2 UR.	52.9 52.0 51.1 50.2 49.2 47.2 46.1 45.0 43.8 43.2 42.6 42.0 41.3	53.4 52.5 51.5 50.5 49.5 47.4 46.2 45.0 44.4 43.8 43.1 42.5

TABLE XV.

REDUCTION TO THE MERIDIAN TABLE NEAR THE MERIDIAN BELOW THE POLE. \times $_{\alpha}$ TRIANGULI AUSTRALIS.

					* a	IKI		HOUI	R.							
Lat.	m. 16	m.	m. 18	m.	m. 20	m.	m. 22	m. 23	m.	m. 25	m. 26	m. 27	m. 28	m. 29	30 m.	m. 31
S.								CTIC							, ,	
24 26 28 30 32	61·7 60·9 60·1 59·2 58·4	63·4 62·5 61·6 60·8 60·0	65.0 64.1 63.2 62.4 61.4	66.6 65.8 64.9 64.0 63.0	68·3 67·4 66·5 65·6 64·6	70.0 69.1 68.2 67.2 66.2	71.7 70.8 69.8 68.9 67.9	72·5 71·5 70·5	75·3 74·2 73·2 72·2 71·2	77.0 76.0 75.0 73.9 72.9	78·9 77·8 76·7 75·7 74·6	80·7 79·6 78·5 77·4 76·3	82·5 81·4 80·3 79·2 78·1	84·4 83·3 82·1 81·0 79·8	86·3 85·1 84·0 82·8 81·6	88·2 87·0 85·8 84·6 83·4
34 36 38 40 42	57.5 56.6 55.7 54.8 53.8	59.0 58.1 57.2 56.2 55.2	60·5 59·6 58·7 57·7 56·7	62·1 61·1 60·2 59·2 58·1	63·7 62·7 61·7 60·7 59·6	65·2 64·2 63·2 62·2 61·1	66.8 65.8 64.8 63.7 62.6	67·4 66·3 65·2	70·1 69·0 67·9 66·8 65·7	71·8 70·7 69·6 68·4 67·2	73·5 72·3 71·2 70·0 68·8	75·2 74·0 72·8 71·6 70·4	76·9 75·7 74·5 73·3 72·0	78·6 77·4 76·2 74·9 73·6	80·4 79·2 77·9 76·6 75·3	82·2 80·9 79·6 78·3 77·0
44 46 48 50 52	52·8 51·8 50·8 49·7 48·6	54·2 53·2 52·2 51·0 49·9	55.7 54.6 53.5 52.4 51.2	57·1 56·0 54·9 53·7 52·5	58·5 57·4 56·3 55·1 53·8	60·0 58·9 57·7 56·4 55·2	61·5 60·3 59·1 57·8 56·5	63.0 61.8 60.6 59.3 57.9	64.5 63.3 62.0 60.7 59.3	66.0 64.8 63.5 62.1 60.7	67.6 66.3 65.0 63.6 62.2	69·1 67·8 66·5 65·1 63·6	70·7 69·4 68·0 66·6 65·1	72·3 71·0 69·5 68·1 66·5	73.9 72.5 71.1 69.6 68.0	75.6 74.2 72.7 71.1 69.5
	m. m 32 3			m.	m. 37	38	m. 39	m. 40	m.		n.	m. 43	m.		m.	m. 46
S.	UL DI		x 90	, 50	. 01			CTIC			1	30	. 33			
26 8 28 8 30 8 32 8 34 8	0·1 92 8·9 90 7·7 89 6·5 88 5·2 87 4·0 85	8 92. 3 90. 1 88.	8 94.7 5 93.4 2 92.1 9 90.8 6 89.5	96.7 95.4 94.1 92.7 91.3	100.0 98.7 97.4 96.0 94.6	99.4 98.0 96.6 95.1	101.4	103.4	106.		49.0 47.5 46.0 44.5	52.6 1 51.1 1 49.6 1 48.1 1 46.5	1 54 1 53 1 51 1 50 1 48 1 47	·2 I ·7 I ·2 I ·6 I	56.9 55.4 53.8 52.3 50.7 1	57.6 56.0 54.4 52.7
36 8 38 8 40 8 42 7	2.7 84 1.4 83 0.0 81 8.7 80 7.9 79	5 86· 84· 8 83· 4 82·	3 88·1 9 86·7 5 85·3 1 83·8 3 83·1	90.0 88.5 87.1 85.6 84.8	91·8 90·4 88·9 87·4 86·6	93.7 92.2 90.7 89.1 88.3	94.1	96·0 94·4 92·8	97.9 96.3 94.6		41·4 39·8 38·2 36·5	1 43.4 1 41.7 1 40.1 1 38.4 1 37.5	I 45 I 43 I 42 I 40 I 39	·7 I ·0 I ·3 I	47.4 I 45.7 I 44.0 I 42.2 I 41.3 I	47·7 45·9
44 7 45 7 46 7 47 7	7·2 78 6·5 78 5·8 77 5·0 76 4·3 75	9 80· 2 79· 4 79· 7 78·	6 82·3 8 81·5 1 80·8	83·2 82·4 81·6	85.8 85.0 84.2 83.3 82.5	86·7 85·9 85·0 84·2	88.5	90·3 89·4 88·5	92.0		33·9 33·0	36.6 35.7 34.8 33.9	I 38 I 37 I 36 I 35 I 34	·6 I ·6 I	40.4 I 39.4 I 38.5 I 37.5 I	41.3
49 7 50 7 51 7	3·5 75 2·7 74 1·9 73 1·1 72	76·3 75·5 75·	7 78·3 9 77·5 0 76·6	80.0 79.1 78.2	81.6 80.8 79.9 78.9	83·3 82·4 81·5	85.0 84.1 83.2	86.7 85.8 84.8	88·2 87·3 86·3	II	30°2 29°2 28°2	1 31.0 1 30.0 1 30.0	I 33 I 32 I 31 I 30	·7 I	35.5 I 34.5 I 33.4 I 32.4 I	37·3 36·3 35·2
Lat.	m. 47	1 m.	m.	50		51	m. 52	m. 53	m. 54	m. 55				m. 58	m. 59	m. 60
S.		l.	la		. -			CTIC		_	1.	, 1-		, 1-	. 1.	
37	2 1.4 1 59.8 1 58.1 1 56.5 1 54.8	2 2· 2 0· 1 58· 1 57· 1 55· 1 53· 1 52·	0 2 4 3 2 2 7 2 0 0 1 59 3 1 57 5 1 55 6 1 54	·2 2 ·5 2 ·8 2 ·1 2 ·4 1 59 ·6 1 5	6·5 2 4·7 2 3·0 2 1·3 2 9·5 2 7·7 1 5	8.0 2	12.8 2 11.0 2 9.2 2 7.5 2 5.7 2 3.8 2 1.9 2 1.0 2	13·3 2 11·5 2 9·7 2 7·9 2 6·0 2 4·1 2 3·1 2	2 15·6 2 13·8 2 12·0 2 10·1 2 8·2 6·3 2 5·3	2 16· 2 14· 2 12· 2 10· 2 8· 2 7·	0 2 3 3 2 3 4 2 3 4 2 3	20·4 2 2 18·5 2 2 16·6 2 3 14·6 2 3 12·7 2 3 9·7 2 3	22.72 20.82 18.92 16.92 14.92	17·2 2 15·1 2 14·1 2	27.6 2 25.6 2 23.6 2 21.6 2	30.0 28.0 26.0 23.9 21.8 19.7
39 40 41 42 43	1 48.8 1 47.9 1 47.0 1 46.1 1 45.1 1 44.2	I 49. I 49. I 47.	8 I 52 9 I 5I 0 I 5I 0 I 50 I I 49	·9 I 5. ·9 I 5. ·0 I 5. ·0 I 5.	4·9 I 5 4·0 I 5 2·0 I 5 1·0 I 5	57.0 I 56.0 I 55.0 I 54.0 I	59·1 2 58·1 2 57·1 1 56 1 1 55·0 1	1·2 2 0·2 2 59·2 2 58·1 2 57·1 1	3·3 2·3 2·3 2·59·1	2 5· 2 4· 2 3· 2 2· 2 1·	4 2 4 2	7.6 2 6.5 2 5.5 2 4.4 2 3.3 2 2.2 2	9.8 2	12·0 2 10·9 2 9·8 2	14·2 2 13·1 2 12·0 2 10·8 2 9·7 2	16·4 15·3
45 46 47 48 49 50 51	I 43.2 I 42.2 I 41.2 I 40.2 I 39.1 I 38.1 I 37.0	1 45° 1 44° 1 42° 1 41° 1 39° 1 38°	1 1 47 1 1 46 1 1 45 0 1 43 0 1 42 9 1 41 8 1 40	·0 I 4 ·0 I 4 ·0 I 4 ·9 I 4 ·8 I 4 ·7 I 4 ·6 I 4	9.0 I 5 8.0 I 5 5.9 I 4 5.8 I 4 4.7 I 4 3.6 I 4	50.0 I 50.0 I 48.8 I 47.7 I 46.6 I 45.5 I 44.3 I	52.9 I 51.9 I 50.8 I 49.7 I 48.5 I 47.4 I 46.2 I	54.9 1 53.9 1 52.7 1 51.6 1 50.4 1 49.3 1 48.1 1	57.0 55.8 54.7 53.6 52.4 51.2	1 59° 1 57° 1 56° 1 55° 1 54° 1 53° 1 51°	0 2 9 1 5 7 1 5 5 1 5 1 1 1	1.0 2 59.9 2 58.7 2 57.5 1	3·I 2 1·9 2 0·7 2 59·5 2 58·3 2 57·0 I 55·8 I	5·2 2 4·0 2 2·8 2 1·6 2 0·3 2 59·0 2 57·7 I	7·3 2 6·1 2 4·9 2 3·6 2 2·3 2 1·0 2 59·7 2	9·4 8·2 6·9 5·7 4·4 3·0 1·7

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. \star \star URSÆ MAJORIS.

La	t.	m.	m.	m. 12	m. 16	m. 20	m. 22	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	m. 36	m. 38	m. 40	m. 42	m. 44
N.								REI	UC:	OI	VS.				1	1	1	
34 32 30 28	2 3	0·6 0·6	2·5 2·4 2·3 2·1 2·1	5.7 5.3 5.1 4.8 4.6	9.5 9.0 8.6	15.7 14.8 14.0 13.4 12.8	18.9 17.9 17.0 16.2 15.5	22.5 21.3 20.2 19.3 18.4	26·4 24·9 23·7 22·6 21·6	30·5 28·9 27·4 26·1 25·0	35.0 33.1 31.4 30.0 28.7	37·6 35·7 34·1	44.8 42.3 40.2 38.4 36.8	50·1 47·4 45·0 43·0 41·2	55.7 52.7 50.1 47.8 45.8	61.6 58.3 55.4 52.9 50.7	64·1 61·0 58·3	70·2 66·8 63·8
24 22 20 18	2	0·5 0·5		4·4 4·3 4·1 4·6	7.6	12·3 11·8 11·4 11·1	14·9 14·3 13·8 13·4	17·7 17·0 16·5 15·9	20·8 20·0 19·3 18·7	24·0 23·2 22·4 21·6	27·6 26·6 25·6 24·8	30.3	35.4 34.1 32.9 31.8	39·6 38·1 36·8 35·6	44·1 42·4 41·0 39·7	48·7 47·0 45·4 43·9	50.0	56·7 54·8
16 12 8	3	0·4 0·4	1.2	3·9 3·6 3·4 3·2		10·7 10·1 9·6 9·1	13.0 12.2 11.6 11.0	15·4 14·5 13·8 13·1	18·1 17·1 16·2 15·4	21.0 19.8 18.7 17.8	24.0 22.7 21.5 20.4	25·8 24·4	30·8 29·1 27·6 26·2	34·5 32·6 30·9 29·4	38·5 36·3 34·4 32·7	42.6 40.2 38.1 36.2	44.3	48.5
S. 4	1 3	0.3	1.3	3·1 3·0 2·9 2·7	5·6 5·3 5·1 4·9	8·7 8·3 7·9 7·6	10·5 10·0 9·6 9·2	12·5 11·9 11·4 11·0	14·7 14·0 13·4 12·9	17·0 16·3 14·9	19·5 18·6 17·8 17·1	21.3	25·0 23·9 22·0	28·0 26·8 25·7 24·6	31·2 29·9 28·6 27·4	34·6 33·1 31·7	36.4	40.0
16 26 24 28		0.3	I.I I.I	2·6 2·5 2·4 2·3	4·7 4·5 4·3 4·1	7·3 7·0 6·7 6·4	8·8 8·5 8·1 7·8	10·5 10·1 9·7 9·2	12·3 11·8 11·3 10·8	14·3 13·7 13·1 12·6	16·4 15·7 15·1 14·4	17.2	21·1 20·2 19·4 18·5	23·6 22·6 21·7 20·8	26·3 25·2 24·2 23·1	29·1 27·9 26·8 25·6	30.8	33.8
Lat.	m.	m.	l n		m.	m.	m.	m.		n.	m.	m.						
N.	45	46	47	48	49	50	51	RED	UCT		54 IS.	55	56	57	5	8 1	59	60
34 33 32 31 30 29	77.4 75.3 73.4 71.5 69.8 68.2	80·8 78·6 76·6 74·6 72·9 71·2	84·3 82·0 79·8 77·8 76·0 74·2	87.8 85.4 83.2 81.1 79.2 77.4	91·3 88·9 86·6 84·4 82·4 80·5	95·0 92·4 90·0 87·8 85·7 83·8	98·7 96·0 93·5 91·2 89·1 87·1	99° 97° 94° 92° 90°	7 10: 7 9: 5 9:	3.4 1	07·2 04·5 01·9 99·5 97·3	114·1 111·1 108·2 105·6 103·1 100·8	118.1 115.0 112.0 109.3 106.8	122. 118. 115. 113. 110. 108.	9 11 9 11 1 11 5 11	3·0 9·9 7·0 4·3	130·5 127·0 123·9 120·9 118·1 115·5	134·7 131·2 127·9 124·8 122·0 119·3
28 27 26 25 24 22	66·7 65·3 63·9 62·7 61·5 59·3	69.6 68.1 66.7 65.4 64.2 61.9	72·6 71·1 69·6 68·3 67·0 64·6	75·7 74·1 72·6 71·1 69·8 67·3	78·8 77·1 75·6 74·1 72·7 70·1	81·9 80·2 78·6 77·1 75·6 72·9	85·2 83·4 81·7 80·1 78·6 75·8	84. 83. 81.	6 8 9 8 2 8 6 8	1·8 9·9 8·1 6·4 4·7	95·2 93·2 91·3 89·6 87·9 84·8	98·6 96·6 94·7 92·8 91·1 87·9	102·1 100·0 98·0 96·1 94·3 91·0	105· 103· 101· 99· 94·	5 10 5 10 7 10	7·1 4·9 2·9 1·0	113·0 110·7 108·5 106·4 104·4 100·8	116·7 114·3 112·1 109·9 107·9 104·1
20 18 16 14 12	57·3 55·4 53·7 52·2 50·7	56·1	62·4 60·4 58·6 56·9 55·3	65.0 62.9 61.0 59.3 57.6	67.7 65.5 63.6 61.7 60.0	70·4 68·2 66·2 64·2 62·5	73·2 70·9 68·8 66·8 65·0	73° 71° 69°	7 7 7 7 4 7 7	9.0 6.5 4.2 2.1	81·9 79·4 77·0 74·8 72·7	84·9 82·3 79·8 77·5 75·4	88·0 85·2 82·7 80·3 78·1	88· 85· 83· 80·	2 9 6 8 2 8	4·2 1·3 8·6 6·0 3·7	97·4 94·4 91·6 89·0 86·6	97·5 94·6 92·0 89·5
8 6 4 2	49.4 48.1 46.9 45.8 44.7	50.2	53·8 52·4 51·2 49·9 48·7	56·1 54·7 53·3 52·0 50·8	58·4 57·0 55·6 54·2 53·0	60·8 59·3 57·8 56·4 55·1	63·3 61·6 60·1 58·7 57·3	62.	6 6 6 6	8·2 6·5 4·9 3·3	70·8 69·0 67·3 65·7 64·2	73:4 71:6 69:8 68:1 66:6	76·1 74·1 72·3 70·6 69·0	78· 76· 74· 73· 71·	8 7 9 7 1 7	1·5 9·5 7·5 5•7 3·9	84·3 82·2 80·2 78·3 76·5	87·1 84·9 82·9 80·9 79·1
S. 0 2 4 6 8	43.7 42.7 41.8 40.9 40.0	44·6 43·7 42·7	47.6 46.6 45.6 44.6 43.7	49.7 48.6 47.5 46.5 45.5	49.5	52.7	54·8 53·6	56.	9 59 7 59 5 50	0·5 9·1 7·8 6·6 5·4	62·7 61·4 60·0 58·7 57·5	65·1 63·6 62·2 60·9 59·6	67·4 65·9 64·5 63·1 61·8	69. 68. 66. 65. 64.	3 7 8 6 4 6	2·3 0·7 9·1 7·7 6·3	74·7 73·1 71·5 70·0 68·5	77·3 75·6 73·9 72·4 70·8
10 12 14 16 18	39·2 38·4 37·6 36·8 36·1	40·1 39·3 38·5	41.0 40.1		44.5	48·3 47·3 46·3 45·4 44·5	48.2	50· 49·	2 5: I 5: I 5:	4·2 3·1 2·0 1·0	56·3 55·1 54·0 52·9 51·8	58·4 57·2 56·0 54·9 53·7	60·5 59·3 58·0 56·8 55·7	62· 61· 60· 58· 57·	4 6 1 6 9 6	4·9 3·5 2·2 0·9	67·1 65·7 64·4 63·1 61·8	69·4 67·9 66·5 65·2 63·9
20 22 24 26 28	35·3 34·6 33·8 33·1 32·4	36·1 35·4 34·6	38·5 37·7 36·9 36·1 35·4	37.7	39.3	43·5 42·6 41·7 40·9 40·0	42.5	46.	I 40 I 40 2 45	8·9 7·9 5·9 1·9	50·7 49·7 48·7 47·6 46·6	52.6 51.5 50.5 49.4 48.3	54.5 53.4 52.3 51.2 50.1	56· 55· 54· 53· 51·	3 5: 2 5: 0 5:	8·5 7·3 6·1 4·9 3·7	60·5 59·2 58·0 56·8 55·6	62·5 61·3 60·0 58·7 57·5

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. \div URSÆ MAJORIS.

Lat.	m. 61	m. 62	63	m. 64	m. 65	m. 66	m.	m. 68	m. 6 9	m. 70	m. 71	m. 72	m.	74		m. 75	m. 76
N.							REI	DUCI	YON	S.			,				
32 31 30 29 28	128.9	132.0	140.4 137.1 133.9 131.0 128.2	141·3 138·0	145.5 142.2 130.1	149.8 146.4 143.2 140.2	154·1 150·7 147·4 144·3	155.0 151.6 148.5	159·3 152·7	163.8 160.2 156.9	168·2 164·6 161·2	170.7 172.7 169.1 165.6	177	3 186 3 181 6 178	.0 I	95·2 90·8 86·6 82·7 79·0	200.1 195.6 191.3 187.3 183.5
27 26 25 24 23	113.5	119.4	125.6 123.2 120.8 118.6 116.5	127·0 124·6	130·8 128·4 126·0	134·7 132·2 120·8	138·7 136·1	142.7 140.0	146·7 144·0	150·8 148·0 145·4	155.0 152.1 140.4	156.3	160.	5 167 4 164 6 161	·8 I	75.4 72.1 68.9 65.9 63.1	179·9 176·5 173·3 170·2 167·3
22 21 20 19 18	105°7 104°0 102°3	109.1	114·5 112·6 110·7 109·0	116·1 114·2 112·4	119·6 117·7 115·8	123·2 121·2 119·3	126·9 124·8 122·8	128·4 126·4	134.3 130.1	138·1 135·8 133·7	141·9 139·6 137·5	145·8 143·5 141·2	149	7 153 3 151 0 148	·7 I	60·3 57·7 55·2 52·8 50·5	164.5 161.8 159.2 156.8 154.4
17 16 15 14 12	99°2 97°8 96°4 95°0 92°4	99:5	1 ^	107·4 105·8 104·4	110·7 109·1 107·6	114.0 112.4 110.8	117·4 115·7 114·1	120·8 119·1 117·5	124·3 120·9	127·8 126·0 124·3	131·4 129·6 127·8	135.0	136	7 142 8 140 9 138	·4 I	48·3 46·2 44·1 42·1 38·4	152·1 150·0 147·9 145·8 142·0
10 8 6 4 2	90.0 87.7 85.6 83.6 81.7	90.6 88.4 86.3	93·5 91·2 89·1	96·4 94·1	99·4 97·0 94·7	102.4	105·5 102·9 100·5	103.2	111·7 109·1 106·5	114·9 112·2 109·6	118·2 112·6	124·5 121·4 118·5 115·8	124	8 128 8 125 0 122	·I I ·I I ·2 I	34.8 31.5 28.4 25.4 22.6	138·4 135·0 131·7 128·7 125·8
S. 0 2 4 6 8	79.8 78.1 76.4 74.8 73.2	80.6 78.9 77.2	83·2 81·4 79·7	85.8 84.0 82.2	88·5 86·6	93·2 91·2 89·2 87·4 85·5	96·0 93·9 90·0 88·0	96·7 94·7		102·4 100·2 98·1	103·1 100·3		108	2 114 8 111 6 109	·2 I ·8 I ·5 I	19·9 17·3 14·8 12·4 10·1	123.0 120.4 117.8 115.3 113.0
10 12 14 16 18	71.7 70.2 68.8 67.4 66.0	72.5	74·8 73·3 71·8	75·6	79·6 78·0 76·4	83·8 82·1 80·4 78·7 77·1	86·3 84·5 82·8 81·1 79·5	88·9 87·0 85·3 83·5 81·8	91·5 89·6 87·8 86·0 84·2	90·3 88·5	94·8 92·9 91·0	97·4 95·5 93·5	98· 96·	I 102 I 100 I 98	·8 I	07·8 05·6 03·5 01·4 99·3	110·6 108·4 106·2 104·1 102·0
20 22 24 26 28	64·6 63·3 62·6 60·7 59·4	65.4	67·5 66·1 64·7	69·6 68·2 66·7	70·3 68·8	75·6 74·0 72·5 70·9 69·4	77·8 76·2 74·7 73·1 71·6	80·1 78·5 76·9 75·3 73·7	82·5 80·8 79·1 77·5 75·9	81·4 79·7	85.5 83.8 82.0	87·9 86·1 84·3	90° 88° 86°	4 92 5 90 7 89	1.7 2.8 0.9 0.0	97°3 95°3 93°4 91°4 89°5	97·8 95·8 93·8 93·8
		TR	UE I	BEAI	RING	OR	AZI	MUT	ΗО	F +	· e 1	URSA	E M.	AJO:	RIS		
Lat	t. I	n. n			m. 20	m. 24	m. 28	32	m. 36	m. 40	m. 44	m. 48	m. 52	m.	m. 70	80	90
N. 34 32 30 28		·3 2	9 4:3 7 4:5 3:3	7 4.9	6.6	8·6 7·9 7·4 6·9	A2 10.0 9.2 8.6 8.0	ZIMU 11.4 10.5 9.8 9.2	12·7 11·7	14.0 13.0 12.1		14.3	16·5 15·4	18.7	22·8 21·3 20·0 18·9		26·0 24·5
26 24 22 20	I	·0 2	·2 3: ·1 3: ·0 2: ·9 2:	1 4·1 9 3·9	5.1	6·5 6·1 5·8 5·6	7·6 7·2 6·8 6·5	8·6 8·1 7·7 7·4	9.7 9.1 8.7 8.3	10·7 10·1 9·6 9·2	11·7 11·1 10·5 10·0	12.0	12.3	14.8	17·8 16·9 16·2 15·4	20·0 19·0 18·2 17·4	21.0
16		·8 1	·7 2· ·6 2· ·5 2· ·4 2·	4 3.2	3.9	4.4	5·9 5·5 5·2 4·9		7·6 7·0 6·6 6·2	8·4 7·8 7·3 6·9	9·2 8·6 8·0 7·6		9·4	10.8	14·3 13·3 12·5 11·8	16·1 15·0 14·1	16.6
8. 10 20 30		6 1 6 1	·3 2· ·3 1· ·2 1· ·1 1·	9 2·5 8 2·4 7 2·3	3·2 3·0 2·8	3·8 3·6 3·4	4·6 4·4 4·2 4·0 3·9	5·1 4·8 4·5	5·9 5·7 5·4 5·1 5·0	6·6 6·3 6·0 5·7 5·5	7·2 6·9 6·6 6·2 6·1	7·9 7·5 7·2 6·8 6·6	8·5 8·2 7·8 7·3 7·2	9.4	9.6 10.3 10.9	11.2	13.7

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. * * URSÆ MAJORIS.

Lat.	7		m. 78		m. 79		m. 80		m. 81		m. 82		m. 83		m. 84		m. 85	I	m. 86		m. 87		m. 88		m. 89		m. 90
N.											RE	D	UCT	ΊC													
32 31 30 29 28 27	3 2	0.43	12.7	3 3 3	30·3 25·8 21·5 17·4	3 3 3	35·3 30·7 26·3 22·2	3 3 3	40·3 35·6 31·2 27·0	3 3 3	45.4 40.6 36.1 31.8	3 3 3	50.6 45.7 41.1 36.7	3 3 3	50·8 46·1 41·6	4 3 3	6·4 1·0 55·9 51·1 46·6 42·3	4 4 3 3	6·3 56·2 51·6	4 4 3	6·3 56·6	4 4 4	16·9 11·6 6·5 1·7	4 4 4	28·1 22·4 16·9 11·8 6·9 2·2	4 4 4 4 4 4 4 4	33.7 27.8 22.3 17.0 12.1 7.3
26 25 24 23 22 21	2 5 2 5 2 4	8.6 2		3 3 2	6·5 3·2 0·1 57·1	3 3 3	7·7 4·5 1·4	3 3 3	15.6	3 3 3 3	20·2 16·7 13·4 10·2	3 3 3	24·9 21·3 17·9 14·6	3 3 3	29·5 25·9 22·4 19·1	3 3 3	38·2 34·3 30·6 27·0 23·7 20·4	3 3 3 3	39·1 35·3 31·7 28·2	3 3 3	47.9 43.9 40.0 36.4 32.8 29.5	3 3 3	48·7 44·8 41·1 37·5	3 3 3	53.7 49.7 45.9	3 5 3 5 3 5 3	54·5 50·7 17·0
20 19 18 17 16	2 4 2 3 2 3	10·8 2 38·4 2 36·0 2	47.4 44.8 42.3 40.0 37.7	2 2 2	48·9 46·4 43·9	2 2	53.0 50.4 48.0	2 2	57·2 54·6 52·0	3 2 2	1·4 58·7 56·1	3 3	5·7 2·9 0·3	3 3	10.0	3 3	17·3 14·3 11·5 8·7 6·1	3 3	18·7 15·8 13·0	3 3	26·3 23·2 20·2 17·3 14·6	3 3	27·6 24·6 21·7	3 3	26·1	3 3 3 3 3 3	36·7 33·6 30·5
15 14 13 12 11	2 2 2 2 2	9.6 2 27.6 2 25.6 2	35·5 33·4 31·3 29·3 27·4	2 2 2	33.0 32.1	2 2	38·9 36·8	2 2	45.0 42.8 40.6	2 2 2	48·9 46·7 44·5	2 2	50·6 48·4	2 2 2	57·0 54·6 52·4	3 2 2	3.5 1.0 58.6 56.3 54.1	3	7.7 5.2 2.7 0.4 58.1	3 3	9.3 6.8 4.4 2.1	3 3	8.5	3 3		3 2 3 3 3	22·0 19·4 16·9
10 9 8 7 6	2 2 2 1 2 1	20·2 2 (8·4 2 (6·8 2	25.5 23.7 22.0 20.3 18.6	2 2 2	27·3 25·5 23·8	2 2	31·0 29·1 27·3	2 2	34.7 32.8 31.0	2 2 2	38·4 36·5 34·6	2 2	42·2 40·2 38·3	2 2 2	46.0 44.0 46.0	2 2	49·8 47·8 45·8	2 2 2	53.7 51.6 49.6	2 2 2	59·8 57·6 55·5 53·4 51·4	3 2 2	57.3	3 3	7·9 5·6 3·4 1·2 59·1	3 3 3	12·0 9·6 7·4 5·2 3·0
5 4 3 2 1	2 I 2 I 2	2·0 2 0·5 2 0·1 2	12.4	2 2 2	18·8 17·2 15·7	2 2	22·3 20·6 19·1	2 2	25.7 24.1 22.5	2 2 2	29·3 27·6 25·9	2 2	29.4	2 2 2	36·4 34·7 32·9	2 2 2	41.9 40.1 38.3 36.5 34.8	2 2 2	43.8 41.9	2 2 2	43.8	2 2 2	47.4	2 2	55.0 53.1 51.0	2 5 2 5 2 5	54.9
S. 0 1 2 3 4	2 2 2	6·2 2 4·8 2 3·5 2 2·2 2 0·9 2	8·0 6·7 5·3	2 2 2	9.9 8.5	2 2	14·5 13·1 11·7	2 2	17·8 16·4	2 2 2	21·2 19·7 18·2	2 2	24·6 23·0 21·5	2 2 2	28·0 26·4 24·9	2 2	33·1 31·4 29·8 28·2 26·7	2 2 2	34·9 33·3 31·7	2 2	38·5 36·8	2 2 2	42·I 40·3 8·6	2 2	45.7	2 4 2 4	19·3 17·5 15·7
5 6 7 8 9	I 5		1.4	2 2	5·8 4·5 3·2 1·9 0·6	2 2		2 2	0.4	2 2 2	13·9 11·1	2 2 2	17·1 15·7 14·3	2 2 2	20.4 18.9 17.5	2 2	25·2 23·6 22·2 20·7 19·3	2 2 2	27·0 25·5 24·0	2 2 2	30·3 28·8 27·3	2 2 2	33·7 32·2 30·6	2 2 2	37·2 35·6 34·0	2 4 2 3 2 3	10·6 39·0 37·4
10 11 12 13 14	I 5	2·4 I 1·2 I 0·1 I	56·4 55·3 54·1 52·9 51·8	I	58·2 57·0 55·8	2 I I	2·4 1·1 59·9 58·7 57·5	2 2 2	5°4 4°1 2°9 1°6 0°4	2	8·5 7·2 5·9 4·6 3·3	2 2	8.9	2 2 2	13·3 12·0	2 2	17·9 16·5 15·1 13·7 12·4	2 2	19.6 18.2 16.8	2 2	22.8 21.4 20.0	2 2 2	24·6	2 2	29·3 27·8 26·3	2 3 2 2 2	32·6 31·1 29·6
15 16 17 18 19	I 4 I 4 I 4	6.8 I 5.7 I 4.6 I	50·6 49·5 48·4 47·3 46·2	I I	52·3 51·2 50·0	I I I	55·1 54·0 52·8	I I	58·0 56·8 55·6	2 1 1	58.4	2 2	5.0 3.8 2.5 1.3 0.1	2 2 2	8·0 6·7 5·4 4·2 2·9	2 2	9.7 8.4 7.1 5.8	2 2 2	12·7 11·4 10·1	2 2	17·2 15·8 14·4 13·1 11·7	2 2 2	18·9 17·5 16·1	2 2 2	22.0 20.6 19 I	2 2 2 2 2 2	25·I 23·7 22·2
20 21 22 23 24	I 4 I 4 I 3	1·4 I 0·4 I 9·4 I	45°I 44°I 43°0 41°9 40°9	I	46·7 45·6 44·5	I I	49.4 48.3 47.2	I I I	52·1 51·0 49·8	I I	54.9 53.7 52.5	I I I	56·4 55·2	2 I I	1·7 0·4 59·2 58·0 56·8	2 2 2	4.6 3.3 2.0 0.8 59.5		7·5 6·2 4·9 3·6 2·3	2 2 2	10·4 9·1 7·7 6·4 5·1	2 2 2	12·0 10·7 9·3	2 2 2	15.0	2 1 2 1 2 1	8·0 6·6 5·2
25 26 27 28	13	6.3 1	39·8 38·8 37·7 36·7	I	41.3	1	43.8	I	47·6 46·4 45·3 44·2	I	40.0	1	51.7	1	54.4	I	58·3 57·1 55·8 54·6	r	1·1 59·8 58·5 57·3	2	3·8 2·6 1·3 0·0	2	6·7 5·4 4·0 2·7	2 2 2 2	9·5 8·2 6·8 5·5	2 1 2	

Lat.	m. 4	m. 8	m. 12	m. 16	m. 20	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	m. 36	m. 38	m. 40	m.	m.
N.	1 4		12	10	20			JCTI		02	1 04	50	90	***	42	44
38 42 46 50 54 58 62 64	0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.1	0.9 0.9 0.8 0.8 0.7 0.7 0.6 0.6	2.0 2.0 1.8 1.7 1.6 1.5 1.4 1.3	3.7 3.5 3.3 3.1 2.9 2.7 2.5 2.4	5.7 5.5 5.1 4.8 4.5 4.2 3.9 3.7	8·2 7·8 7·4 7·0 6·6 6·1 5·6 5·3	9.6 9.2 8.7 8.2 7.7 7.1 6.5 6.2	11·2 10·6 10·1 9·5 8·9 8·3 7·6 7·2	12.8 12.2 11.6 10.9 10.2 9.5 8.7 8.3	14·6 13·9 13·2 12·4 11·6 10·8 9·9 9·4	16·5 15·7 14·9 14·0 13·1 12·2 11·1 10·6	18.5 17.6 16.7 15.7 14.7 13.7 12.5 11.9	20.6 19.6 18.6 17.5 16.4 15.2 13.9 13.3	22.8 21.7 20.6 19.4 18.1 16.8 15.4 14.7	25·2 23·9 22·7 21·4 20·0 18·6 17·0 16·2	27.6 26.2 24.9 23.4 21.9 20.3 18.7 17.8
35 40 50 60 64	0.6 0.6 0.6 0.6 0.6	i·i i·i i·2 i·2 i·3	i·7 i·7 i·7 i·9 i·9	2·2 2·2 2·3 2·5 2·6	2·8 2·8 2·9 3·1 3·2	3·3 3·3 3·5 3·7 3·8	3.6 3.6 3.7 4.0 4.2	3.9 3.9 4.0 4.3 4.5	HS. 4·1 4·2 4·3 4·6 4·8	4·4 4·6 4·9 5·1	4·7 4·7 4·9 5·2 5·4	5.0 5.0 5.2 5.6 5.8	5·2 5·3 5·5 5·9 6·1	5.5 5.5 5.8 6.2 6.4	5.8 5.8 6.0 6.5 6.7	6·1 6·3 6·8 7·1
Lat.	m. 45	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	m. 54	m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
N.	Δ0							JCTI							. 00	
38 42 46 50 54 56	28·9 27·4 26·0 24·5 22·9	30·2 28·7 27·2 25·6 24·0 23·1	31·5 29·9 28·3 26·7 25·0 24·1	32·8 31·2 29·6 27·9 26·1 25·2	34·2 32·5 30·8 29·0 27·2 26·2	35·6 33·9 32·1 30·2 28·3	37·0 35·2 33·4 31·4 29·4 28·4	38.6 36.6 34.7 32.7 30.6 29.5	40.0 38.0 36.0 33.9 31.8	41.5 39.5 37.4 35.2 33.0 31.8	43·I 41·0 38·8 36·6 34·2 33·0	44.6 42.5 40.2 37.9 35.5 34.2	46·2 44·0 41·6 39·2 36·8	47·9 45·5 43·1 40·6 38·0 36·7	49.5 47.1 44.6 42.0 39.4 38.0	51·2 48·7 46·1 43·5 40·7
58 60 62 64	21·3 20·4 19·5 18·6	22·2 21·4 20·4 19·4	23·2 22·3 21·3 20·3	24·2 23·2 22·2 21·1	25·2 24·2 23·2 22·0	26·3 25·2 24·1 22·9	27·3 26·2 25·1 23·9	28·4 27·2 26·1 24·8 MUTI	29·5 28·3 27·1 25·8	30·6 29·4 28·1 26·8	30·5 30·5	32·9 31·6 30·2 28·8	34·1 32·7 31·3 29·8	35·3 33·9 32·4 30·9	36·6 35·1 33·5 31·9	39·3 37·8 36·3 34·7 33·0
35 40 50 60 64	6.2 6.5 6.9 7.2	6·3 6·4 6·6 7·1 7·4	6.5 6.5 6.8 7.2 7.5	6.6 6.6 6.9 7.4 7.7	6.7 6.8 7.0 7.6 7.9	6·9 6·9 7·2 7·7 8·0	7·0 7·1 7·3 7·9 8·2	7·1 7·2 7·5 8·0 8·3	7·3 7·3 7·6 8·2 8·5	7·4 7·5 7·8 8·3 8·7	7.6 7.6 7.9 8.5 8.8	7·7 7·7 8·0 8·6 9·0	7·8 7·9 8·2 8·8 9·1	8.0 8.0 8.3 8.9 9.3	8·1 8·2 8·5 9·1 9·4	8·2 8·3 8·6 9·2 9·6
							ı H	OUR	2.							
Lat.	m. 0	m. 1	m. 2	m. 3	m. 4	m. 5	m. 6	m. 7	m. 8	m. 9	10 m.	m. 11	m. 12	m. 13	m. 14	m. 15
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38 40 42 44 46	51·2 49·9 48·7 47·4 46·1	52.9 51.6 50.3 49.0 47.7	54.6 53.3 52.0 50.6 49.2	56·4 55·0 53·7 52·3 50·8	58·2 56·8 55·4 53·9 52·5	60.0 58.6 57.1 55.6 54.1	61.9 60.4 58.9 57.3 55.8	63.8 62.2 60.6 59.1 57.5	65.7 64.1 62.5 60.8 59.2	67.6 66.0 64.3 62.6 60.9	69.6 67.9 66.2 64.4 62.7	71.6 69.8 68.1 66.3 64.5	73.6 71.8 70.0 68.1 66.3	75.6 73.8 71.9 70.0 68.1	77·7 75·8 73·9 72·0 70·0	79.8 77.8 75.9 73.9 71.9
48 50 52 54	44.8 43.5 42.1 40.7 40.0	46·3 44·9 43·5 42·1	47·8 46·4 45·0 43·5	49°4 47°9 46°4 44°9	51.0 49.5 47.9 46.3	52.6 51.0 49.4 47.8	54·2 52·6 50·9 49·2	55·8 54·2 52·4 50·7	57·5 55·8 54·0 52·2	59·2 57·4 55·6 53·8	60·9 59·1 57·2 55·3	62.6 60.8 58.9 56.9	64·4 62·5 60·5 58·5	66·2 64·2 62·2 60·2	68·0 66·0 63·9 61·8	69·9 67·8 65·7 63·5
55 56 57 58	39·3 38·5 37·8	41·3 40·6 39·8 39·1 38·3	41.1 41.1	44°1 43°3 42°5 41°6	45.5 44.7 43.8 43.0	46·9 46·1 45·2 44·3	48·4 47·5 46·6 45·7	49.8 48.9 48.0 47.1 46.1	51·3 50·4 49·5 48·5	52.8 51.9 50.9 49.9	53.4 52.4 51.4	55.9 54.9 53.9 52.8	57·5 56·5 55·4 54·3	59·1 58·0 56·9 55·8	59·6 58·5 57·4	62·4 61·2 60·1 58·9
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35 40 50 60 62	8·2 8·3 8·6 9·2 9·4	8·4 8·4 8·8 9·4 9·6	8.5 8.6 8.9 9.5 9.7	8.6 8.7 9.1 9.7 9.9	8.8 8.8 9.2 9.9 10.0	8.9 9.0 9.3 10.0 10.2	9.0 9.1 9.5 10.2	9·2 9·6 10·3 10·5	9·3 9·4 9·7 10·5	9.4 9.5 9.9 10.6 10.8	9.6 9.7 10.0 10.8 11.0	9.7 9.8 10.2 10.9	0.3 10.3 0.9 0.9	10.0 10.1 10.5 11.2 11.5	10·1 10·2 10·6 11·4 11·6	10·2 10·3 10·7 11·5 11·8

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50 51 52 53 54	69·7 68·6 67·5 66·4 65·2	70·4 69·3 68·1	73.4 72.2 71.1 69.9 68.7	75·2 74·1 72·9 71·7 70·5	77·1 75·9 74·7 73·5 72·2	79·1 77·8 76·6 75·3 74·0	81·0 79·8 78·5 77·2 75·9	83·0 81·7 80·4 79·1 77·7	85.0 83.7 82.3 81.0 79.6	87.0 85.7 84.3 82.9 81.5	89·1 87·7 86·3 84·8 83·4	91·1 89·7 88·3 86·8 85·3	93·2 91·8 90·3 88·8 87·3	95·3 93·8 92·3 90·8 89·3	97·5 95·9 94·4 92·9 91·3
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45 46 47 48 49	144.9 142.9 140.9 138.9	147.6 145.5 143.5 141.5 139.4	150·3 148·2 146·2 144·1 142·0	153·1 151·0 148·8 146·7 144·6		158·6 156·5 154·3 152·1 149·9	161·5 159·3 157·0 154·8 152·5	164·3 162·1 159·8 157·5 155·2	167·2 164·9 162·6 160·3 158·0	170·1 167·8 165·4 163·1 160·7	173.0 170.7 168.3 165.9 163.5	176·0 173·6 171·2 168·7 166·3	178·9 176·5 174·1 171·6 169·1	181·9 179·5 177·0 174·5 171·9	185.0 182.4 179.9 177.4 174.8
50 51 52 53 54	134·8 132·7 130·6 128·4 126·3	137·3 135·2 133·0 130·8 128·6	139·8 137·7 135·5 133·2 131·0	142.4 140.2 138.0 135.7 133.4	145.0 142.7 140.5 138.2 135.8	147·6 145·3 143·0 140·7 138·3	150·2 147·9 145·6 143·2 140·8	152·9 150·5 148·1 145·7 143·3	155.6 153.2 150.7 148.3 145.8	158·3 155·8 153·4 150·9 148·3	161.0 158.5 156.0 153.5 150.9	163.8 161.2 158.7 156.1 153.5	166·5 164·0 161·4 158·7 156·1	169·3 166·7 164·1 161·4 158·7	172·1 169·5 166·8 164·1 161·3
55 56 57 58 59 60	124·1 121·8 119·5 117·2 114·9 112·5	126·4 124·1 121·8 119·4 117·1 114·6	128·7 126·4 124·1 121·7 119·2 116·8	131·1 128·7 126·3 123·9 121·4 118·9	133·5 131·1 128·6 126·2 123·7 121·1	135.9 133.5 131.0 128.4 125.9 123.3	138·3 135·8 133·3 130·7 128·1 125·5	140·8 138·2 135·7 133·1 130·4 127·7	143·2 140·7 138·1 135·4 132·7 130·0	145.7 143.1 140.5 137.8 135.0 132.2		150·8 148·1 145·3 142·5 139·7 136·8	153·3 150·6 147·8 145·0 142·1 139·1	155.9 153.1 150.3 147.4 144.5 141.5	158·5 155·7 152·8 149·9 146·9 143·8
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45 46 47 48 49	188·0 185·5 182·9 180·3 177·6	191·1 188·5 185·9 183·2 180·5	194·2 191·5 88·9 186·2 183·5	197·3 194·6 191·9 189·2 186·4	200·4 197·7 195·0 192·2 189·4	203.6 200.8 198.0 195.2 192.4	206·8 204·0 201·1 198·3 195·4	210·0 207·1 204·3 201·4 198·4	213·2 210·3 207·4 204·5 201·5	216·5 213·5 210·6 207·6 204·6	219·7 216·8 213·8 210·7 207·7	223.0 220.0 213.0 213.9	226·4 223·3 220·2 217·1 213·9	229·7 226·6 223·5 220·3 217·1	233·I 229·9 226·7 223·5 220·3
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52 56 60	15·3 15·3		16·9 16·3	16·1 16·6 17·2	16·4 16·9 17·5	16·7 17·2 17·8	17·0 17·5 18·1	17·3 17·8 18·4	17·5 18·1 18·7	17·8 18·4 19·0	18.6 18.1	18·4 18·9 19·6	18·7 19·2 19·9	18·9 19·5 20·2	19·2 19·8 20·5

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. * η URSÆ MAJORIS.

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16 14 12 8 4	0·6 0·5 0·5 0·5	2.2	5·1 4·9 4·5	9.4 9.0 8.6 8.0 7.5	14.6 14.0 13.5 12.6 11.8	17·7 17·0 16·3 15·2 14·2	20·2 19·4 18·1	24·6 23·6 22·8 21·2 19·9	28·5 27·4 26·4 24·6 23·0	32· 31· 30· 28· 26·	4 35° 2 34° 2 32°	7 40·3 4 38·8 0 36·1	45·1 43·4 40·5	50·2 48·3 45·0	53·5 49·9	63.6 61.1 58.9 54.9 51.5	69.7 67.0 64.5 60.2 56.5
8. 0 4 8 12 16	0·4 0·4 0·4 0·4 0·4	1.5	3·8 3·6 3·4	7·1 6·7 6·3 6·0 5·7	11·1 10·5 9·9 9·4 8·9	13.4 12.7 12.0 11.4 10.8	15.0 14.2 13.5	18·7 17·7 16·7 15·9 15·1	21·7 20·5 19·4 18·4 17·5	24· 23· 22· 21· 20·	5 26· 2 25· 1 24·	7 30·1 3 28·5 0 27·1	33·7 32·0 30·3	37·6 35·6 33·8	39.4 37.4		53·2 50·3 47·6 45·2 42·9
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21 20 19 18 17	81·3 79·4 77·6 75·9 74·3	84·8 82·9 81·0 79·3 77·6	88·5 86·4 84·5 82·7 80·9	92·2 90·0 88·0 86·1 84·4	95·9 93·8 91·7 89·7 87·8	99·8 97·5 95·3 93·3 91·4	99·1 97·0	105	2 IO 9 IO 7 IO	9·2 6·8 4·5	115·8 113·2 110·7 108·4 106·2	114.7	124·2 121·5 118·8 116·3 113·9	125.7 122.9 120.4	130·0 127·2 124·5	134·3 131·4 128·7	138·7 135·7 132·9
16 15 14 12 10	72·8 71·4 70·0 67·5 65·1	76·0 74·5 73·1 70·4 68·0	79·3 77·7 76·3 73·5 70·9	82.6 81.0 79.5 76.6 73.9	86·0 84·4 82·8 79·7 77·0	89·5 87·8 86·1 83·0 80·1	91·2 89·5 86·3	94° 93° 89°	8 9 0 9 6 9	8.4	104·0 102·0 100·1 96·5 93·2	105·7 103·7 100·0	111.4 103.4 103.6 100.0	113·3 111·2 107·2	117·2 115·0 110·9	121·2 114·7	125·2 122·9 118·5
8 6 4 2 0	62·9 60·9 59·0 57·3 55·6	65·7 63·6 61·6 59·8 58·1	68·6 66·4 64·3 62·4 60·6	71.5 69.2 67.1 65.1 63.2	74·4 72·0 69·8 67·8 65·8	77·4 75·0 72·7 70·5 68·5	78·0 75·6 73·3	81 78 76	0 8 5 8 2 7	6·8 4·1 1·5 9·1 6·9	90·1 87·2 84·6 82·1 79·7	93·4 90·4 87·7 85·1 82·7	96·8 93·7 90·9 88·2 85·7		97·3 94·5		107.3
S. 2 4 6 8 10 12	49.8	56·5 54·9 53·4 52·0 50·7 49·4	58·9 57·3 55·8 54·3 52·9 51·5	61·4 59·7 58·1 56·6 55·1 53·7	64.0 62.2 60.6 59.0 57.4 56.0	63.0 61.4 59.8	67·4 65·6 63·8	70 68 66 64	0 7 1 7 3 6 6 6	4·7 2·7 0·7 8·9 7·1 5·4	77.5 75.4 73.4 71.5 69.6 67.9	80·4 78·2 76·1 74·1 72·2 70·4	83·3 81·0 78·9 76·8 74·8 72·9		86·8 84·5	89·8 87·4 85·1 83·0	92·8 90·4 88·0 85·8
14 16 18 20 22 24	46·1 44·9 43·8 42·7 41·6 40·6	48·1 46·9 45·7 44·6 43·5 42·4	50·2 49·0 47·7 46·5 45·4 44·2	52·4 51·1 49·8 48·5 47·3 46·1	54.6 53.2 51.9 50.6 49.3 48.1		57.6 56.2 54.8 53.4	59 58 56 55	9 6 9 5 5 5	3·8 2·2 0·6 9·1 7·6 6·2	66·2 64·5 62·9 61·3 59·8 58·3	68·6 66·9 65·2 63·6 62·0 60·5	71·1 69·3 67·6 65·9 64·3 62·7	73.6 71.8 70.0 68.3 66.6 64.9	70·7 68·9	73.1	77·5 75·6 73·7
26 28 30 32 34 36	39.6 38.6 37.6 36.6 35.6 34.6	41·3 40·3 39·2 38·2 37·2 36·2	43·I 42·0 40·9 39·9 38·8 37·8	45.0 43.8 42.7 41.6 40.5 39.4	46·9 45·7 44·5 43·3 42·2 41·0	48.8 47.5 46.3 45.1 43.9 42.7	49.5 48.2 46.9 45.7	51 50 48 47	4 5 8 5 5 4	4·8 3·4 2·0 0·7 9·3 8·0	56·8 55·4 54·0 52·6 51·2 49·8	59.0 57.5 56.0 54.5 53.1 51.7	61·1 59·6 58·0 56·5 55·0 53·5	63·3 61·7 60·1 58·5 57·0 55·5	65.5 63.9 62.2 60.6 59.0 57.4		70·1 68·3 66·6 64·8 63·1 61·4

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

Lat.	m. 61	m. 62	m. 63	m. 64	m. 65	m. 66	m. 67	68 68	69 69		n.	m. 71	m. 72	m. 73	m. 74	75 m.	m. 76
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26 25 24 23 22	161·5 157·4 153·5	166.6 162.3 158.4	176·3 171·7 167·4 163·3 159·4	176·9 172·4 168·2	182·1 177·6 173·3	187·4 182·8 178·3	188.0	188. 198.	3 203 3 198 7 194	·8 20 ·7 20 ·0 19	9·3 4·2 9·3	215·0 209·7 204·7	226.4 220.6 215.2 210.2 205.4	226·4 220·9 215·7	232·2 226·6 221·3	238·0 232·3 226·9	244.0 238.1 232.6
21 20 19 18 17 16	143·2 140·1 137·2 134·5	147·8 144·6 141·6 138·8	143.1	157.0 153.7 150.5 147.5	161.8 158.3 155.1 152.0	166·6 163·0 159·7 156·5	171.2 167.8 164.3 161.1	176· 172· 169· 165·	3 181 6 177 1 173 7 170	·3 18 ·5 18 ·9 17 ·4 17	6·3 2·4 8·7 5·2	191·4 187·4 183·6 180·0	200·8 196·5 192·5 188·6 184·9 181·4	201·7 197·6 193·6 189·8	207·0 202·7 198·7 194·8	212·3 207·9 203·8 199·8	217·7 213·2 209·0 204·9
15 14 13 12 11	126·9 124·6 122·4 120·3	131.0 128.6 126.3 124.1	135·1 132·6 130·3 128·1	139·3 136·7 134·3 132·0	146·2 143·5 140·9 138·4 136·1 133·8	147·8 145·1 142·6 140·2	152·1 149·4 146·8	156· 153· 151· 148·	6 161 8 158 1 155 5 152	·0 16 ·1 16 ·4 15 ·7 15	5·5 2·6 9·8	170·1 167·1 164·2 161·4	178.0 174.8 171.7 168.7 165.8 163.1	179·4 176·3 173·2 170·3	180·9 177·8 174·8	189.0 185.7 182.5 179.4	193·8 190·4 187·2 184·0
9 7 6 4 2	114·4 112·6 110·8 107·5	118·1 116·2 114·4 110·9	119·9 114·5	125·6 123·6 121·7 118·1	129·5 127·4 125·4	133.4 131.3 129.2	137·3 135·2 133·1	141· 139· 137· 132·	3 145 1 143 0 140 9 136	·4 14 ·1 14 ·9 14 ·7 14	9·5 7·2 4·9 0·6	153·7 151·3 149·0 144·5	160·5 157·9 155·4 153·1 148·5 144·3	162·2 159·7 157·2 152·6	166·5 163·9 161·4 156·7	170·9 168·2 165·7 160·8	175·3 172·6 170·0 165·0
S. 0 2 4 6 8	101·4 98·6 95·9 93·4 90·9 88·6	99.0 96.4 93.9	105.0 102.2 99.5 96.9	108·3 105·4 102·6 100·0	105.8	115·1 112·0 106·2	118·5 112·3 109·4	112· 115· 112·	0 125 7 122 6 119 6 115	·5 12 ·2 12 ·0 12 ·9 11	9·1 5·7 2·4 9·2	132·8 129·2 125·8	140·2 136·4 132·8 129·3 126·0	140·2 136·4 132·9 129·5	143·9 140·1 136·5	147·8 143·8 140·1 136·5	151.6 147.6 143.8 140.1
12 14 16 18 20 22	86·4 84·2 82·1 80·1 78·1 76·2	87.0 84.8 82.7 80.7	92·1 89·8 87·5 85·4 83·2 81·2	95.0 92.6 90.3 88.1 85.9 83.8	97.9 95.5 93.1 90.8 88.6 86.4		98·8 96·2 94·6	96. 101.	4 107 8 104 3 102 8 99	·4 II ·7 IO ·2 IO ·6 IO	0·5 7·8 5·1 2·5	110.8	116·8 113·9 111·1 108·4	120·0 117·0 114·2 111·4	120·2 117·3 114·4	126·5 123·4 120·4 117·5	129.9
24 26 28 30 32 34	74·3 72·4 70·6 68·8 67·0 65·2	74·8 72·9 71·0 69·2	79·2 77·2 75·2 73·3 71·4 69·5	81·7 79·6 77·6 75·7 73·7 71·7	84·2 82·1 80·1 78·0 76·0 74·0	86.8 84.6 82.5 80.4 78.3 76.3	87.2 85.0 82.1 80.2	89. 87. 85. 83.	8 92 5 90 3 87 1 85	'4 9 '1 9 '8 9	7·5 5·1 2·7 0·3 8·0 5·7	97.8 95.3 92.9 90.5 88.1	98·0	103·3 100·7 98·2 95·6	100·1 100·9 98·3	100.0 100.3 100.0	114.7 111.9 109.1 106.3 103.6 100.9
Lat.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.			m.	m.	m.	m.
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26 25 24 23	1.6 1.5 1.4	3·2 3·1 3·0 2·9	4.8 4.6 4.5 4.3	6·4 6·2 5·9 5·7	8·0 7·7 7·4 7·1	9.2	10.9	12.1	14.0 13.5 13.0 12.6	15·4 14·9 14·4	15.	3 17.	6 18·9	21.7	24.3	27.0	29·4 28·6
22 20 18 16	I·4 I·3 I·2 I·2	2·8 2·6 2·5 2·3	4·2 3·9 3·7 3·5	5·5 5·2 4·9 4·6	6·9 6·5 6·1 5·8	8·3 7·8 7·3 6·9		9.7	12·2 11·5 10·8 10·3	13·5 12·7 12·0 11·4	14· 13· 13·	9 15·	0 16.2	2 18·2 3 17·5	21.0	23.5	25.8
14 12 8 4	0.0 1.0 1.1	2·2 2·1 1·9 1·8	3·3 3·2 2·9 2·7	4·4 4·2 3·9 3·6	5·5 5·3 4·8 4·5	6·6 6·3 5·8 5·4	7·7 7·3 6·7 6·3	8·7 8·4 7·7 7·2	9·8 9·4 8·6 8·0	10·8 10·4 9·6 8·9	0. 10. 11.	4 12· 5 11·	3 13.	3 15·2	1 16.2	19.6	21.7
S. 0 4 10 20 30	0·8 0·8 0·7 0·7 0·7	1·7 1·6 1·5 1·4	2·5 2·4 2·2 2·1 2·0	3·4 3·2 3·0 2·8 2·6	4·2 4·0 3·7 3·4 3·3	5·1 4·8 4·5 4·1 4·0	5·9 5·6 5·2 4·8 4·6	6·7 6·4 6·0 5·5 5·2	7·6 7·2 6·7 6·2 5·9	8·4 7·9 7·4 6·9 6·5	9° 8° 7° 7°	7 9. 2 8. 5 8.	5 10·2 9 9·6 2 8·9	10.7	3 13.6 12.8 2 11.8	13.5	17·1 16·1 15·0

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. $* \eta ~ \mathrm{URS} \text{ } \text{E} ~ \mathrm{MAJORIS}.$

Lat.		m. 77	m. 78		m. 79		m. 80		m. 81		m. 82		m. 83		m. 84		m. 85	Ī	m. 86		m 87		m. 88		m. 89		m. 90
N.		,									RE	D	UCT	Ί	ONS.												
26 25 24 23 22	4 4 3	16.3 9.9 3.9 58.3 53.0	16·0 9·8	4 4 4	22·0 15·8	4 4 4	21.8	4 4	34·4 27·9 21·8	4 4 4	40·6 34·0 27·8	4 4 4	46·9 40·2 33·0	4 4 4	53·3 46·5 40·0	4 4 4	7.0 59.7 52.7 46.2 40.0	5 4 4	52.4	5 4	20.2 12.6 5.5 58.7 52.2	5 5 5	5.0	5 5	33.6 25.8 18.4 11.4 4.7	5 5 5	40.4 32.4 24.9 17.8 11.0
21 20 19 18 17	3 3	43·1 3 38·5 3 34·2 3	3 53·5 3 48·6 3 43·9 3 39·5 3 35·3	3 3	49°4 44°8	3 3	59.7 54.9 50.2	4 4 3	5°4 0°4 55°7	4 4 4	6.0 1.2	4 4 4	16.8	4 4 4	17·4 12·4	4 4	34°1 28°5 23°1 18°0 13°2	4 4 4	34·4 28·9 23·7	4 4 4	40·3 34·8 29·5	4 4 4	46·3 40·7 35·3	4 4 4	52.4 46.7 41.2	4 4	52.7
16 15 14 13 12	3	22·3 3	31·2 37·4 323·7 20·1 16·7	3	32·5 28·7	3	33.7	3 :	42·8 38·9	3	48·0	3	49.2	3	54.5	4	4·1 59·8	4	5.2	4	10.6	4 4 4	20·6 16·0 11·7	4 4 4	30·9 26·2 21·6 17·1 12·9	4 4 4	31·8 27·1 22·6
11 10 9 8 7		8·7 3 5·6 3 2·6 3 59·8 3 57·0 3	4.3	3 3	15.0 11.9 8.9	3 3	13.2	3 :	24·6 21·3 18·2	3 3	20.1 20.1	3 3	34·3 31·0 27·7	3 3	39·3 35·8 32·5	3 3	48·0 44·3 40·8 37·4 34·1	3 3	49.4	3 3	54.5 50.8 47.3	3 3	55·9	4 4 3	4.8 1.0 57.3	4 4	14·1 10·1 6·2 2·4 58·8
6 5 4 3 2	2 . 2 . 2 . 2	51·72 49·22 46·82 44·42	58.7 56.1 53.5 51.0 48.6 46.2	3 2 2	55.3	3 2	7·7 4·9 2·2 59·6 57·0 54·6	3 3 3	9.4 6.6 3.9 1.4 58.8	333333	13·9 11·1 8·4	3 3 3	12.8 10.1	3 3 3	23·1 20·2 17·3 14·6	3 3 3	30·9 27·8 24·8 21·9 19·1 16·3	3 3 3	26.5	3 3 3	37·3 34·2 31·1 28·2	3 3 3	42·1 38·9 35·8 32·8	3 3 3	43.7 40.6 37.5	3 3 3	51.9 48.6 45.3 42.2
S. 0 1 2 3 4 5	2 2 2	35·5 2 33·4 2 31·4 2	43.9 41.7 39.5 37.4 35.3 33.2	2 2 2 2 2	48·0 45·7 43·5 41·3 39·2	2 2 2 2 2	52·2 49·8 47·5 45·3 43·1	2 : 2 : 2 : 2 : 2	56·4 54·0 51·6 49·4 47·1	2 2	53.4 51.2	3 2 2	4·9 2·4 0·0 57·6 55·2 53·0	3 3 2	6·7 4·2 1·8 59·4	3 3 3	13.6 11.0 8.5 6.0 3.5 1.2	3	18·1 15·4 12·8 10·2 7·8 5·3	3 3 3	19·8 17·1 14·5	3 3 3	24·3 21·6 18·9 16·3	3 3 3	28.8	3 3 3	33·3 30·5 27·7 25·0
6 7 8 9 10	2 2 2 2	25·6 2 23·7 2 21·9 2 20·1 2	31·3 29·3 27·4 25·5 23·7 21·9	2 2 2	33·I 29·2 27·3	2 2 2	36·9 34·9 31·0	2 2 3 2 3 2 3	40·7 38·7 36·7 34·7	2 2 2	44.6 42.5 40.5 38.5	2 2 2	48·6 46·4 44·3 42·3	2 2 2	52·5 50·4 48·2 46·1	2 2 2 2	54.3 52.1 50.0	2 2 2	3.0 0.6 58.3 56.1 53.9 51.8	3 3 2	7:1 4:7 2:4 0:1 57:9 55:7	3 3 3		3 3 3	15·5 13·0 10·6 8·3 5·9 3·6	3 3 3	17.3
12 13 14 15 16 17	2 2 2	14·9 2 13·3 2 11·6 2 10·0 2	20·1 18·4 16·7 15·0 13·3	2 2 2	21.9 20.1 18.4 16.7	2 2 1 2	25.4 23.6 21.9 20.1	2 : 2 : 2 : 2 : 2	29·0 27·2 25·4 23·6	2 2 2	32·6 30·8 28·9 27·1	2 2 2 2	36·3 34·4 32·5 30·6	2 2 2	40.0 38.0 36.1 34.2	2 2 2 2	43·8 41·7 39·8 37·8	2 2 2 2	45·5 43·5	2 2 2	51.4 49.3 47.2 45.2	2 2 2	55·2 53·1 51·0 48·9	2 2 2	1·4 59·1 57·0 54·8 52·7 50·6	3 2 2	
18 19 20 21 22 23	2 2 2 2 2 1	6·8 2 5·3 2 3·7 2 2·2 2 0·7 2	6·9 5·3	2 2 2	10.1	2 2 2	15.0 13.4 11.7 10.1	2 : 2 : 2 : 2 :	18·4 16·7 15·0 13·4	2 2 2	21.8 20.0 18.3 16.6	2 2 2	25·2 23·4 21·6 19·9	2 2 2	28·6 26·8 25·0 23·2	2 2 2	32·1 30·3 28·4	2 2 2	35·6 33·7 31·9 30·0	2 2 2	39·2 37·3 35·4 33·5	2 2 2	42·8 40·8 38·9 36·9	2 2 2	46·5 44·4 42·4 40·4	2 . 2 . 2 . 2	50·1 48·1 46·0 44·0
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30 31 32 33 34	I.	47·7 1 46·3 1 44·9 1	51·9 50·5 49·0 47·6 46·2	I I	53·3 51·8 50·4	I I I	46·1 54·6 53·1	I I I	57·5 55·9	2 2 1	3·5 1·9 0·4 58·8 57·2	2 2 2	6·5 4·9 3·3 1·7 0·1	2 2		2 2 2		2	14.0 12.2 10.5	2 2 2	17.0 15.3 13.5	2 2 2	20·2 18·3 16·5	2 2 2	23.3	2 : 2 : 2 :	26·5 24·6 22·7

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42 46 50 54	0·2 0·2 0·2 0·2	0.9 0.9 0.8	2·3 2·1 2·0 1·8	4.0 3.8 3.5 3.3	6·3 5·5 5·5	9.0 8.5 8.0 7.4	10.6 10.0 9.3 8.7	12·3 11·6 10·8 10·0	14·1 13·3 12·4 11·5	16·1 15·1 14·1 13·1	18.1 17.0 15.9 14.7	20·3 19·1 17·8 16·5	22.6 21.3 19.9 18.4	25·1 23·6 22·0 20·4	27.6 26.0 24.3 22.5	30·3 28·5 26·6 24·7
58 62 64	0·2 0·2 0·2	0·8 0·7 0·6	1·7 1·5 1·5	3·0 2·7 2·6	4·7 4·3 4·1	6·8 6·2 5·8	8·0 7·2 6·9 AZI	9·2 8·4 8·0 MUT	10·6 9·6 9·1 HS.	12·0 10·9 10·4	13·6 12·3 11·7	15·2 13·8 13·1	17·0 15·4 14·6	18·8 17·1 16·2	20·7 18·8 17·8	22·7 20·6 19·6
40 50 60 64	0.6 0.7 0.7 0.7	1·3 1·4 1·4	1·9 2·1 2·1	2.6 2.6 2.8 2.8	3·2 3·3 3·4 3·5	3·9 3·9 4·1 4·2	4·2 4·3 4·5 4·6	4.5 4.6 4.8 4.9	4·8 4·9 5·1 5·3	5·2 5·2 5·5 5·6	5·5 5·6 5·8 6·0	5·8 5·9 6·2 6·3	6·1 6·2 6·5 6·7	6·5 6·9 7·1	6·8 6·9 7·2 7·4	7·1 7·2 7·5 7·8
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N.	45	46	47	48	49	50 F	51 EDU	JCTIC	53 ONS.	54_	55	56	57	58	59	1 60
42 46 50 54	31·7 29·8 27·8 25·8	33·1 31·1 29·1	34·6 32·5 30·4 28·2	36·1 33·9 31·7 29·4	37·6 35·3 33·0 30·6	39·1 36·8 34·4 31·9	40.7 38.2 35.7 33.2	42·3 39·8 37·2 34·5	44.0 41.3 38.6 35.8	45.6 42.9 40.1 37.2	47·3 44·5 41·5 38·6	49·I 46·I 43·I 40·0	50·8 47·7 44·6 41·4	52.6 49.4 46.2 42.9	54.4 51.1 47.8 44.4	56·3 52·9 49·4 45·9
58 60 62 64	23·7 22·7 21·6 20·5	24·8 23·7 22·6 21·4	25·9 24·7 23·6 22·3	27·0 25·8 24·6 23·3	28·2 26·9 25·6 24·2	29·3 28·0 26·6 25·2	30·5 29·1 27·7 26·3 AZII	31.7 30.3 28.8 27.3 MUTI	32·9 31·5 29·9 28·4	34·2 32·6 31·1 29·4	35·5 33·9 32·2 30·5	36·8 35·1 33·4 31·6	38·1 36·4 34·6 32·8	39.4 37.6 35.8 33.9	40·8 39·0 37·1 35·1	42·2 40·3 38·3 36·3
40 50 60 64	7·2 7·4 7·7 7·9	?·4 7·5 7·9 8·1	7.6 7.7 8.1 8.3	7·7 7·8 8·2 8·5	7·9 8·0 8·4 8·6	8·0 8·2 8·6 8·8	8·2 8·3 8·7 9·0	8·4 8·5 8·9 9·2	8·5 8·7 9·1 9·3	8·7 8·8 9·3 9·5	8·8 9·0 9·4 9·7	9.6 9.1 9.0	9·2 9·8 10·1	9.3 9.5 9.9	9.5 9.6 10.1 10.4	9.6 9.8 10.6
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42 44 46 48 50	56·3 54·6 52·9 51·2 49·4	58·2 56·4 54·6 52·9 51·1	60·1 58·3 56·4 54·6 52·7	62.0 60.1 58.3 56.4 54.4	64.0 62.0 60.1 58.2 56.2	66.0 64.0 62.0 60.0 58.0	68.0 66.0 63.9 61.8 59.7	70·1 68·0 65·8 63·7 61·6	72·2 70·0 67·8 65·6 63·4	74·3 72·1 69·8 67·6 65·3	76·4 74·2 71·8 69·5 67·2	78.6 76.3 73.9 71.5 69.1	80·8 78·4 76·0 73·5 71·0	83·1 80·6 78·1 75·6 73·0	85·4 82·8 80·2 77·6 75·0	87·7 85·0 82·4 79·7 77·0
52 53 54 55 56	47.7 46.8 45.9 44.9 44.0	49·2 48·3 47·4 46·5 45·5	50·9 49·9 49·0 48·0 47·0	52·5 51·5 50·6 49·5 48·5	54·2 53·2 52·2 51·1 50·1	55°9 54°8 53°8 52°7 51°7	57·6 56·5 55·5 54·4 53·3	59.4 58.3 57.1 56.0 54.9	61·1 60·0 58·9 57·7 56·5	62·9 61·8 60·6 59·4 58·2	64·8 63·6 62·3 61·1 59·9	66·6 65·4 64·1 62·9 61·6	68·5 67·2 65·9 64·6 63·3	70·4 69·1 67·8 66·4 65·1	72·3 71·0 69·6 68·3 66·9	74·3 72·9 71·5 70·1 68·7
57 58 59 60 61	43·I 42·2 41·2 40·3 39·3	44.6 43.6 42.6 41.6 40.6	46·0 45·0 44·0 43·0 42·0	47.5 46.5 45.5 44.4 43.3	49.0 48.0 46.9 45.8 44.7	50·6 49·5 48·4 47·3 46·1	52·1 51·0 49·9 48·7 47·5	53.7 52.6 51.4 50.2 49.0	55·3 54·1 52·9 51·7 50·5	57·0 55·7 54·5 53·2 51·9	58·6 57·3 56·1 54·8 53·4	60·3 59·0 57·7 56·3 55·0	62.0 60.7 59.3 57.9 56.5	63·7 62·3 60·9 59·5 58·1	65·5 64·1 62·6 61·2 59·7	67·2 65·8 64·3 62·8 61·3
62 63 64	38·3 37·3 36·3	39·6 38·6 37·5	40·9 39·9 38·8	42·3 41·2 40·0	43·6 42·5 41·3	45.0 43.8 42.6	43.9	47·8 46·5 45·3 MUT]	46.6	50·7 49·3 48·0	52·1 50·8 49·4	53·6 52·2 50·8	55·1 53·7 52·2	56·7 55·2 53·7	58·2 56·7 55·2	59·8 58·2 56·7
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49 50 51 52 53	80·5 79·1 77·7 76·3 74·9	82·7 81·2 79·8 78·3 76·9	84.8 83.3 81.9 80.4 78.9	87.0 85.5 84.0 82.4 80.9	89·2 87·6 86·1 84·5 82·9	91.4 89.8 88.2 86.6 85.0	92.0 90.2 88.8	94 1 92 3 90	·6 ·9	98·2 96·5 94·8 93·1 91·4	98 97 95 93	·8 1 ·1	02·9 01·1 99·4 97·6 95·7	105·3 103·5 101·7 99·8 98·0	107·7 105·9 104·0 102·1 100·2	110·2 108·2 106·3 104·4 102·5	112.6 110.7 108.7 106.8 104.8
54 55 56 57 58	73·5 72·0 70·6 69·1 67·6	75.4 73.9 72.4 70.9 69.4	77.4 75.8 74.3 72.7 71.2	79·3 77·8 76·2 74·6 73·0	81·4 79·7 78·1 76·5 74·8	83.4 81.7 80.1 78.4 76.7	83.8	85 84 82	·8	89.6 87.9 86.1 84.3 82.5	91 89 88 86 84	·3	93·9 92·1 90·2 88·3 86·4	96·1 94·2 92·3 90·4 88·4	98·3 96·4 94·4 92·4 90·4	98·5 96·5 94·5 92·5	102·8 100·7 98·7 96·6 91·6
59 60 61 62 63 64	66·1 64·5 63·0 61·4 59·8 58·2	67.8 66.2 64.7 63.0 61.4 59.7	69.6 68.0 66.3 64.7 63.0 61.3	71·4 69·7 68·0 66·3 64·6 62·9	73·2 71·5 69·8 68·0 66·2 64·5	75.0 73.3 71.5 69.7 67.9 66.1	75.3 7 71.2 7 69.6	76 3 75 4 73 5 71	·9 ·1 ·2 ·3	80·6 78·7 76·9 74·9 73·0 71·0	82 80 78 76 74 72	·6 ·7 ·7	84·5 82·5 80·5 78·5 76·5 74·4	86·4 84·4 82·4 80·3 78·3 76·1	88·4 86·4 84·3 82·2 80·1 77·9	90·4 88·3 86·2 84·1 81·9 79·7	92.4 90.3 88.1 85.9 83.7 81.4
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56 60 64	13.4	13.	3 13	·7 I	4.0 1	[4·0 [4·4 [4·8	14·4 14·7	14·7 15·0 15·5	15°	4 1	5·4 5·7 6·2	15·7 16·1 16·6	16. 16.	4 16.	7 17.1		17·3 17·8 18·3

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44 45 46 47 48	168.7 166.1 163.5 160.9 158.3	169·2 166·6 163·9	175.0 172.3 169.6 166.9 164.2	178·2 175·5 172·7 170·0 167·2		179·0 176·2	188.0 185.1 182.2 179.3 176.4	191·3 188·4 185·4 182·5 179·5	194.6 191.7 188.7 185.7 182.6	198.0 195.0 191.9 188.9 185.8	198·3 195·2 192·1	204.8 201.7 198.6 195.4 192.2	208·3 205·1 201·9 198·7 195·5	211.8 208.5 205.3 202.0 198.7	215·3 212·0 208·7 205·4 202·0
49 50 51 52 53	155.6 152.9 150.3 147.5 144.8	155.8 153.1 150.3	161.4 158.7 153.1 150.3	158.8	167·4 164·5 161·6 158·7 155·8	161.6	173.4 170.5 167.5 164.5 161.4	176·5 173·5 170·4 167·4 164·3	179.6 176.5 173.4 170.3 167.2	182·7 179·6 176·4 173·3 170·1	179·5 176·2	189.0 185.8 182.5 179.3 176.0	192·2 188·9 185·6 182·3 178·9	185.3	198·7 195·3 191·9 188·4 184·9
54 55 56 57 58	142·1 139·3 136·5 130·7	144.7 141.9 130.0 136.1 133.2	141.6			149.2 146.4	158·4 155·3 152·1 149·0 145·8	161·2 158·0 154·8 151·6 148·4	164.0 160.8 157.6 154.3 151.0	157.0	163.1	172.6 169.2 165.8 162.4 158.9		178·5 175·0 171·5 167·9 164·3	181·4 177·9 174·3 170·7 167·0
59 60 61 62 63 64	127.8 124.9 121.9 118.9 115.8 112.7	124·2 121·1 118·0	132.6 129.6 126.5 123.3 120.1 116.9	132.0 128.8 125.6 122.4	124.6	133.5 130.2 126.8	142.5 139.2 135.9 132.5 129.1 125.6	145·1 141·7 138·3 134·9 131·4 127·8	133.7	136.0	149.2	148·2 144·5 140·7	146.9		163·3 159·6 155·7 151·9 147·9 144·0
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49 50 51 52 53	201·9 198·5 195·0 191·5 188·0	205·2 201·7 198·2 194·6 191·1	208·5 205·0 201·4 197·8 194·2	208·3 204·6 201·0	207·9 204·2	211·2	222.0 218.3 214.5 210.6 206.8	225·5 221·7 217·8 213·9 210·0	229.0 225.1 221.1 217.2 213.2	228·5 224·5 220·5	232.0 227.9 223.8	239·5 235·4 231·3 227·2 223·0	243·1 238·9 234·8 230·6 226·4	246·7 242·5 238·3 234·0 229·7	250·3 246·0 241·7 237·4 233·1
54 55 56 57 58	184·4 180·8 177·2 173·5 169·8	187·4 183·8 180·1 176·3 172·6	190·5 186·8 183·0 179·2 175·4	193.5 189.8 185.9 182.1 178.2	196·6 192·8 188·9 185·0 181·0	195·8 191·9 187·9	194.9		196.8	208·2 204·1 199·8		210.3	222·1 217·8 213·4 209·0 204·5	225·4 221·0 216·6 212·1 207·5	228·7 224·2 219·7 215·2 210·6
59 60 61 62 63 64	166·0 162·2 158·3 154·4 150·4 146·3	152.9	171.5 167.5 163.5 159.5 155.3	174·2 170·2 166·1 162·0 157·8 153·6	172.9 168.8 164.6 160.3			181·2 176·9 172·5 168·0	179·6 175·1 170·6	186.8 182.4 177.8 173.2	185·1 180·5 175·9	197.0 192.5 187.9 183.3 178.5 173.7	200·0 195·4 190·7 186·0 181·2 176·3	202·9 198·3 193·6 188·8 183·9 178·9	205·9 201·2 196·4 191·5 186·6 181·6
	7	RUE	BE	ARIN	G OI	R AZ	IMUT	Н О	F *	ηU	RSÆ	MAJ	ORIS).	
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56 60 64	17·6 18·1 18·7	18·0 18·4 19·0	18·8 18·8	19·7	19.0 19.4 20.1	19·3 19·8 20·4	19·6 20·1 20·7	19·9 20·5 21·1	20·3 20·8 21·5	20·6 21·1 21·8	20·9 21·5 22·1	21·2 21·8 22·5	21.6 22.1 22.8	21·9 22·5 23·2	22·2 22·8 23·5

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. \div VEGA.

Lat.	m. 2	m.	m. 6	m. 8	m. 10	m.	m.	m. 16	m. 18	m.	m.	m. 22	m.	m. 24	m. 25	m. 26
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0 14 12 10 8	0·2 0·2 0·2 0·2	0.9 0.8 0.8	2·I 2·0 I·9 I·8	3.8 3.5 3.3 3.2	5.9 5.5 5.2 4.9	8.5 8.0 7.5 7.1	11.6 10.8 10.2 9.7	15·1 14·1 13·3 12·6	19·1 17·9 16·8 16·0	23·5 22·1 20·8 19·7	25.9 24.3 22.9 21.7	28·4 26·7 25·2 23·8	31·1 29·2 27·5 26·0	33·8 31·7 29·9 28·3	36·6 34·4 32·4 30·7	39·6 37·1 35·0 33·2
6 4 2 0	0'2 0'2 0'2 0'2	0.7 0.7 0.7 0.6	1.2 1.2 1.2	3.0 2.9 2.7 2.6	4.7 4.5 4.3 4.1	6·7 6·4 6·1 5·9	9 ² 8·7 8·3 8·0	12.0 11.4 10.0	15'1 14'4 13'8 13'2	18·7 17·8 17·0 16·3	20.6 19.6 18.7 17.9	22.6 21.6 20.6 19.7	24.7 23.6 22.5 21.5	26.9 25.6 24.5 23.4	29°2 27°8 26°5 25°4	31.5 30.0 28.7 27.4
8. 2 4 6 10	0.1 0.1 0.1 0.1	0.6 0.6 0.6 0.5	1.4 1.3 1.3	2·5 2·4 2·3 2·1	3·9 3·7 3·6 3·3	5.6 5.4 5.2 4.8	7·6 7·3 7·0 6·5	10.0 9.6 9.2 8.6	12·6 12·1 11·7 10·8	15·6 15·0 14·4 13·4	17·2 16·5 15·9 14·7	18·9 18·1 17·4 16·2	20·6 19·8 19·0 17·7	22·4 21·5 20·7 19·2	24·3 23·4 22·5 20·9	26·3 25·3 24·3 22·5
14 18 22 26	0.1 0.1 0.1 0.1	0°5 0°5 0°4 0°4	0.0 1.0 1.0	2.0 1.8 1.7 1.6	3·1 2·9 2·7 2·5	4.5 4.2 3.9 3.7	6·1 5·7 5·3 5·0	7·9 7·4 6·9 6·5	10·1 9·4 8·8 8·2	12·4 11·6 10·8 10·1	13·7 12·8 11·9 11·2	15·0 14·0 13·1 12·3	16·4 15·3 14·3	17·9 16·7 15·6 14·6	19·4 18·1 16·9 15·8	21·0 19·6 18·3 17·1
30 34 38 42 46	0.1 0.1 0.1 0.1	0.4 0.3 0.3 0.3	0·8 0·8 0·7 0·7 0·6	1·5 1·4 1·3 1·2 1·1	2·4 2·2 2·1 1·9 1·8	3.4 3.2 3.0 2.8 2.6	4.6 4.3 4.1 3.8 3.5	6·1 5·7 5·3 4·9 4·6	7·7 7·2 6·7 6·2 5·8	9·5 8·9 8·3 7·7 7·1	9.8 9.1 8.5 7.8	11·5 10·7 10·0 9·3 8·6	12·5 11·7 10·9 10·2 9·4	13.6 12.7 11.9 11.1 10.2	14·8 13·8 12·9 12·0 11·1	16·0 15·0 13·9 13·0
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9 8 7 6 5	36·7 35·7 34·8 34·0 33·1	39.5 38.4 37.4 36.5 35.6	42·3 41·2 40·1 39·1 38·1	45°2 44°0 42°9 41°8 40°8	48·2 47·0 45·8 44·6 43·6	51·4 50·0 48·8 47·5 46·4	54·6 53·1 51·8 50·5 49·3	57°9 56°4 55°0 53°6 52°3	61·3 59·7 58·2 56·7 55·4	64·8 63·1 61·5 60·0 58·5	68·3 66·6 64·9 63·3 61·8	72·0 70·1 68·4 66·7 65·1	75.7 73.8 71.9 70.2 68.5	79.6 77.5 75.6 73.8 72.0	83·5 81·4 79·4 77·4 75·6	87.6 85.3 83.2 81.2 79.3
4 3 2 0	32·4 31·7 30·9 29·6	34·8 34·0 33·2 31·8	37·3 36·5 35·6 34·1	39·9 38·1 36·5	42.6 41.6 40.7 38.9	45·3 44·3 43·3 41·4	48·2 47·1 46·0 44·1	51·1 49·9 48·8 46·7	54·1 52·9 51·7 49·5	57·2 55·9 54·7 52·3	60·4 59·0 57·7 55·1	63.6 62.2 60.8 58.2	66·9 65·4 64·0 61·3	70·4 68·8 67·3 64·4	73·9 72·2 70·6 67·6	77.5 75.7 74.1 70.9
S. 2 4 6 8	28·4 27·2 26·2 25·2	30·5 29·3 28·2 27·1	32·7 31·4 30·2 29·1	35.0 33.6 32.3 31.1	37·3 35·8 34·5 33·2	39.7 38.2 36.7 35.3	42·2 40·6 39·0 37·6	44·8 43·1 41·4 39·9	47.5 45.6 43.9 42.2	50°2 48°2 46°4 44°7	53.0 50.9 49.0 47.2	55·8 53·7 51·6 49·7	58·8 56·5 54·3 52·3	61·8 59·4 57·1 55·0	64·9 62·4 60·0 57·8	68·1 65·4 62·9 60·6
10 12 14 16	24·3 23·4 22·6 21·8	26·I 25·2 24·3 23·5	28·0 27·0 26·1 25·2	30·0 28·9 27·9 26·9	32·0 30·9 29·8 28·8	34·1 32·9 31·7 30·6	36·2 34·9 33·7 32·6	38·4 37·1 35·8 34·6	40·7 39·3 37·9 36·6	43°1 41°5 40°1 38°7	45·5 43·9 42·4 40·9	47·9 46·2 44·7 43·1	50·5 48·7 47·0 45·4	53·1 51·2 49·4 47·8	55.7 53.8 51.9 50.2	58·4 56·4 54·5 52·6
18 20 22 24 26	21·1 20·4 19·7 19·1 18·5	22.7 21.9 21.2 20.5 19.8	24·3 23·5 22·7 22·0 21·3	26·0 25·2 24·3 23·5 22·8	27·8 26·9 26·0 25·1 24·3	29.6 28.6 27.7 26.8 25.9	31·5 30·4 29·4 28·5 27·5	33.4 32.3 31.2 29.2	35.4 34.2 33.1 32.0 31.0	37·5 36·2 35·0 33·9 32·8	39.6 38.2 37.0 35.8 34.6	41.7 40.3 39.0 37.7 36.5	43.9 42.4 41.0 39.7 38.4	46·2 44·6 43·2 41·8 40·4	48·5 46·9 45·3 43·9 42·4	50·9 49·2 47·6 46·0 44·5
28 30 32 34 36	17·9 17·3 16·1 15·6	19·2 18·6 17·9 17·3 16·8	20·6 19·9 19·2 18·6 18·0	22.0 21.3 20.6 19.9 19.2	23·5 22·7 22·0 21·3 20·5	25·1 24·2 23·4 22·6 21·9	26·6 25·8 24·9 24·1 23·3	28·3 27·3 26·4 25·6 24·7	30·0 29·0 28·0 27·1 26·2	31·7 30·6 29·6 28·6 27·7	33·5 32·4 31·3 30·2 29·2	35·3 34·1 33·0 30·8	37·2 35·9 34·7 33·6 32·5	39·1 37·8 36·5 35·3 34·1	41.0 39.7 38.4 37.1 35.9	43·1 41·7 40·3 38·9 37·6
38 40 42 44 46	15.0 14.5 14.0 13.5 13.0	16·2 15·6 15·0 14·5 13·9	17·3 16·7 16·1 15·5 15·0	18·6 17·9 17·3 16·6 16·0	19·8 19·1 18·4 17·7 17·1	21·1 20·4 19·6 18·9 18·2	22.4 21.7 20.9 20.1 19.4	23.8 23.0 22.2 21.4 20.5	25·2 24·4 23·5 22·6 21·8	26·7 25·8 24·9 23·9 23·0	28·2 27·2 26·2 25·3 24·3	29·8 28·7 27·7 26·7 25·7	31·3 30·2 29·2 27·0	33.0 31.8 30.7 29.5 28.4	34.6 33.4 32.2 31.0 29.9	36·3 35·1 33·9 32·6 31·3

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

★ VEGA.

Lat.	m. 43	m.	m		m. 46	m. 47	m. 48	1 m		n. 50	m. 51	m. 52	53	1 5	n.	m. 55	m. 5 6
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9 8 7 6 5	I 29.4 I 27.1 I 25.0	I 33 I 31 I 28	5 I 3 I I 3	7·7 I 5·2 I 2·9 I	44.6 I 41.9 I 39.4 I 37.0 I 34.7 I	46·3 43·6 41·2	I 48. I 45. I 42.	4 I 49 9 I 47	0.4 I 5 0.7 I 5	6.6.9 2 54.1 1 51.4 1	4.5 1.5 58.6 55.8	2 9·3 2 6·1 2 0·3	2 10 2 7 2 4	921	9.0 2 5.7 2 2.5 2 9.4 2	27·7 2 24·0 2 20·6 2 17·3 2 14·1 2	25.2 52.1
4 3 2 1	1 19·3 1 15·9	I 23 I 21 I 19	0 I 2 2 I 2 4 I 2	6·7 I 4·8 I 3·0 I		34'4 32'3 30'4	1 36. 1 36.	4 I 42 2 I 40 2 I 38	0.4 I 4	6.5 I 4.2 I	50·7 48·3 46·0	1 57.6 1 55.0 1 52.5 1 50.1 1 47.8	I 56 I 54	3 1 5	3·7 2 1·1 2 8·5 2	8·2 2 5·5 2 2·8 2 0·3 2	12.8
S. 1 2 3 4 5	I 0.0	I 14 I 13 I II	6 I I I I 7 I I	8.0 I 6.4 I 4.0 I	23·1 1 21·4 1 19·8 1 18·3 1 16·8 1	24.9 23.2 21.6	1 28· 1 26· 1 25·	5 I 32 8 I 30 I I 28	2 I 3 3 I 3 6 I 3	35.9 I 34.0 I 32.2 I	39.7 37.7 35.8	I 43.5 I 41.5 I 39.6	I 47 I 45 I 43	5 I 5	1.5 I 19.3 I 17.2 I	22.2 I	59.7 57.4 55.1
6 8 10 12 14	1 5.9 1 3.5 1 1.2 0 59.1 0 57.1	I 6	5 I I I 8 I	0·5 I	15·3 12·6 10·0 7·5 5·2 1	15.7 13.0 10.5 8.0	1 10. 1 12. 1 19.	9 I 22 I I 19 5 I 16 9 I I3	2·2 I 2 3·3 I 2 5·5 I I	22·5 I 19·6 I 16·9 I	28·9 25·8 22·8 20·0	1 20·1 1 26·0 1 23·1	I 35 I 32 I 29 I 26	9 I 3 5 I 3 3 I 3	39·5 I 36·0 I 32·7 I 29·5 I	30.11	46·8 43·1 39·5 36·2
16 18 20 22 24	0 53.3	0 53	80 5	6·4 0 4·6 0	3.0 I 0.9 I 58.9 I 57.0 0 55.1 0	5·8 3·6 1·5 59·5 57·5	I 6. I 4. I 0.	3 I 9 I I 6 O I 4 O I 2	0.0 I I 0.0 I I 0.8 I 0.6 I 0.5 I	14·3 I 11·9 I 9·5 I 7·2 I 5·0 I	14·7 12·3 9·9	I 17.6 I 15.1 I 12.7 I 10.3	1 20 1 18 7 1 15 1 13	6 1 2 0 1 2 4 1 1	23.7 I 20.9 I 18.3 I	29.7 I 26.8 I 23.9 I 21.2 I 18.6 I	29·9 27·0 24·1 21·4
32 34	0 46.6 0 45.1 0 43.7 0 42.2 0 40.8	0 47 0 45 0 44 0 42	20 4 70 4 20 4 70 4	9.4 0 7.8 0 6.2 0 4.7 0	51.6 0 49.9 0 48.3 0 46.7 0	53.9 52.1 50.4 48.7	0 54· 0 52· 0 50·	2 0 58 3 0 56 5 0 54 8 0 52	0.60 1.70 2.90	57·0 0	3·3 1·3 59·2 57·3	1 5.8 1 3.7 1 1.6 0 59.5	8 1 8 7 1 6 6 1 4 6 1 1	·4 I I ·1 I ·0 I ·8 I	8·6 I 6·4 I 4·2 I	16.0 I 13.6 I 11.2 I 8.8 I 6.5 I	16·2 13·8 11·3 9·0
38 40 42	o 38·1	0 39 0 38 0 37	90 4 50 4 10 3	1.7 0 0.2 0 8.8 0	40.20	45.4 43.9 42.3	0 47° 0 45° 0 44°	40 49 70 47 10 45	0.4 0 3 7.6 0 4 5.9 0 4	53·2 0 51·4 0 49·6 0 47·8 0 46·1 0	53.5 51.6 49.7	0 51.	0 57 0 55 7 0 53	·70 ·70 ·70	57·8 0 55·7 0	4·3 I 2·I I 59·9 I 57·8 0 55·7	4.4 59.9
			T	RUE	BE	ARIN	1G C	OR A	ZIM	UTH	OF	* `	VEG.	Α.			
Lat.	m.	m. 8	m. 12	m. 16	m. 20	m. 24	m. 28	m. 32	m. 36	m. 40	m. 44	m. 48	m. 52	60	70	m. 80	90
N.							A	ZIMU	JTH:	3.							
14 12 10 8	1.6 1.5	3.7 3.5 3.2 3.1	5.6 5.2 4.9 4.6	7.4 6.9 6.5 6.1	9·2 8·6 8·1 7·6	0.1 0.9 10.3	12·8 11·9 11·2 10·5	14·5 13·5 12·7 12·0	16·2 15·1 14·2 13·4	17.8 16.7 15.7 14.8	19·5 18·2 17·1 16·2	21.0 19.7 18.6 17.6	22.6 21.2 19.9 18.9	25.4 23.9 22.6 21.4	27·2 25·7 24·5	30·2 28·6 27·3	34·6 32·9 31·3
6 4 2 0	I·4 I·3 I·2	2·9 2·7 2·6 2·5	4·3 4·1 3·9	5·7 5·5 5·2 5·0	7·2 6·8 6·5 6·2	8·6 8·1 7·8 7·4	9°5 9°0 8°6	0.3 10.8 11.3	12·7 12·1 11·5 11·0	14.0 13.4 12.8 12.2	14.0	16·7 15·9 15·2 14·6	16.3	20·4 19·5 18·6 17·9	21.4	25.0	
\$. 2 4 6 8	I·I I·I I·I	2·4 2·3 2·2 2·1	3·6 3·4 3·3 3·2	4·8 4·6 4·4 4·3	6·0 5·7 5·5 5·4	7·1 6·8 6·6 6·4	8·3 8·0 7·7 7·5	9.5 9.1 8.8 8.5	10·6 10·2 9·9 9·6	11·7 11·3 10·9	12.4	14.0 13.5 13.0 12.6	15·1 14·5 14·0	17·2 16·6 16·1	18.5	20.9	
10 12 16 20	0.0 1.0 1.0	2·1 2·0 1·9 1·8	3·1 3·0 2·9 2·7	4·I 4·0 3·8 3·6	5·2 5·0 4·8 4·6	6·2 6·0 5·7 5·5	7·2 7·0 6·7 6·4	8·2 8·0 7·6 7·3	9·2 9·0 8·5 8·2	10·2 10·0 9·5 9·1	10.4 9.9	10.8 11.3	13·2 12·8 12·2 11·7	15·1 14·7 14·0	17.0	19·3 18·4 17·7	19.7
30 40 50	0·8 0·8 0·8	1·6 1·6	2·3 2·4 2·3	3.1 3.3	4.0 4.5	5.0 4.8 4.7	5·8 5·6 5·8	6·3 6·3	7·5 7·1 7·0	8·3 7·9 7·8	9·1 8·7 8·6	9.5	10.1	11.8	13.8		17.6

REDUCTION TO THE MERIDIAN TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN. \star VEGA.

Lat.	m. 57	}	m. 58			m. 59		m. 60		m. 61		m. 62		m. 63		m. 64		m. 65		m. 66	m. 67		m. 68		m. 69		m. 70
N.												REI	ΟĪ	JCTJ	С	NS.											
14 13½ 13 12½ 12	2 58.	13	59	7·3 4·6 2·0 9·4 7·0	3 3 3	13.5 10.7 8.0 5.4 2.8	3 3	16.8	3	26.0 23.0 20.2 17.4 14.7	3	26.4	3	38·8 35·7 32·7 29·8 26·9	3	45.3 42.2 39.1	3	48.7	3	58.6 55.3 52.0 48.9 45.8	\$ 5°2 \$ 2°0 3 58°0	5 4	8·7 5·3	4	19·1 15·5 12·1 8·7 5·4	1 4 4	26·1 22·4 18·9 15·4 12·1
11½ 11 10½ 10	2 42	6 2 4 2 3 2	5: 5: 4:	2.2	2 2 2	55·6	3 2	3°7 1°3 59°0	3 3	7.1	3	15·5 13·0 10·5 8·1	3 3 3	- 1	3 3 3	27·6 24·9 22·3 19·8	3 3 3	33.7 31.0 28.3 25.7	3 3 3	42.9 40.0 37.2 34.4 31.7	3 46·3 3 43·4 3 40·6 3 37·8	3 3 3 5 3 3 5 3 3	52.6 49.7 46.8 44.0	3 3 3	56·1 53·1	4 4 3 3	-
98 76 5	2 34	3 2	39	9°5 5°7	2	44.8	2	46.2	2 2	0·1 55·7 51·5 47·6 43·8	3	1·2 57·0	3	11.5 6.9 2.5 58.3 54.2	3	8.0	3	18·3 13·7 9·2	3 3 3	10.2	3 30·0 3 25·3 3 20·3 3 16·0	0 3 1 3 5 3	36·0 31·0 26·2	3	36·9 36·1	3 3 3	48·2 42·9 37·9
4 3 2 1 0	2 17 2 14 2 11	4 2 5 2 7 2	1	2·1 9·1 6·2	2 2	26·9 23·8 20·8	2 2 2	31·8 28·6 25·5	2 2	36·7 33·4 30·2	2 2	38·3 35·0	2 2	39.9	2 2	51.9 48.3 44.8	2 2	53.4 49.8	2	6·3 2·4 58·6 54·9 51·4	3 7°	3 3 3	9·1 5·2	3 3	22·9 18·6 14·5 10·5 6·7	3 3 3	24·1 19·9 15·9
S. 1 2 3 4 5	2 3	9 2 5 2 2 2			2 2 2	12.5	2 2	16.0 14.3	2 2 2	21·4 18·7 16·1	2 2 2	25·9 23·1 20·4	2 2	30·5 27·7 24·9	2 2 2	35·2 32·2 29·4	2 2 2	39·9 36·9 39·9	2 2	48.0 44.7 41.6 38.6 35.6	2 49·0 2 46·2 2 43·3	5 2 4 2 3 2	54.5 51.2 48.0	2 2	56·1 52·8	3	8·2 4·6 1·1 57·7 54·4
6 7 8 9	I 50	7 I 6 I	5:	6·6 4·5 2·4	2 I I	58·4 56·3	2 2	4·6	2 2 2	8.6	2 2 2	12.8	2 2 2	14.6	2 2 2	21·3 16·3	2 2	25·6 23·0	2 2 2	32.8 30.0 27.4 24.8 22.2	2 34.	2 2 2	39·0 36·2 33·4	2 2 2	43.6 40.7 37.9	2 .	48·2 45·2 42·3
11 12 13 14 15	I 43' I 41' I 39'	1 1 3 1 6 1	44	6·6 4·8 3·0	I I	50·3 48·4 46·6	I I I	54.0 52.0 50.1	I	59·8 57·7 55·7 53·8 51·9	2 I I	57.5	2 2	7·6 5·4 3·3 1·2 59·2	2 2 2	9.4	2 2	15·7 13·4 11·1 8·9 6·7	2 2 2	19·8 17·4 15·1 12·8 10·6	2 19.1	2 2 2	25·7 23·2 20·8	2 2 2	29·9 27·4 24·9	2 :	34·I 31·6 29·0
16 17 18 19 20	I 34 I 33 I 31	6 1	3:	7·9 6·3 4·8	I I	39·6 38·0	I	44.7 43.0 41.3	I	48·2 46·4 44·7	I I I	51.7 49.9 48.1	I I	57·2 55·3 53·4 51·5 49·7	I I I	55.0	2 2 I	4.6 2.6 0.6 58.6 56.7	2 2	8·4 2 6·3 2 2·2 2 0·2 2	5.6	2 2	13·9 11·7 9·6	2 2 2	20·1 17·8 15·6 13·4 11·2	2 :	21·8 19·4 17·2
21 22 23 24 25	I 27	71	3	0°2 8°7	I	33.3	I	36.4	I	39·6	I I	42.9	I	46.2	I	49·5 47·7	I	52.0 51.1	I	58·3 2 56·4 5 52·6 5 50·8	59.9	2	5°4 3°4 1°4 59°4 57°5	2	9·1 2 7·0 2 4·9 2 2·9 2	2 :	
26 27 28 29 30	1 19 1 17	7 1	2	1·7 0·4	I	24.5	I	27·4	I	30·3 38·8	I I	33·2	I	36·2 34·7	1	39·3 37·7	I	42.4 40.7	I I	49.0 47.2 45.5 43.8 42.1	1 48°; 1 46°9	I	20.1	I I	55.2		56.6
31 32 33 34 35	I 13 I 12 I II	6 1	I	6·5 5·2 3·9	I I I	19·1 17·8 16·5	I	20.7	11	24·5 23·1 21·7	I I I	27·3 25·8 24·4	I I	30·I 28·6 27·I	I I I	32.9 31.4 35.9	I I I	35·8 34·2 32·7	I I I	40.4 38.8 37.1 35.5 33.9	41.7 40.1 1 38.4	1 1	44.8 43.0 41.3	I I I	47·8 1 46·1 44·3	[51.0 49.1 4 7 .3
36 37 38 39 40	I 7 I 6 I 5	·0 1 ·9 1 ·7 1 ·5 1	I I I	0°2 9°0	I I	12.7	I	13.8	3 1	15.0 16.3	I I	20·2 18·8 17·4	I I	21.3	I I I	25.4 23.9 22.4	I I	26·5 25·0	I I	32·3 30·7 29·2 27·6 26·1	1 30.3 1 31.6 1 33.5	5 I 9 I 8 I	36·3 34·6 33·0	I I I	39·1 1 37·4 1 35·7 1	[4 [4	41·9 40·2 38·5
41 42 43 44	I 2	·2 1	. I	5°4 4°2 3°1 1°9	I	7·7 6·5 5·2 4·0	I	8·2	7 1	9.7	I I	13.3	I	15.7	I	18.1	I	20.2	I	24.6 23.0 21.5 20.0	25.5	I	28·1 26·5	I I	30.7		33·3

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE FOR HOUR-ANGLES FROM UPPER MERIDIAN.

→ VEGA.

Lat.		m. 71	1	m. 72		m. 73		m. 74		m. 75		m. 76		m. 77		m. 78		m. 79		m. 80		m. 81	Ī	m. 82	Ī	m. 83	1	m. 84
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14 13½ 13 12½ 12	4	33°2 29°4 25°8	4 4 4	40.3 36.5 32.7 29.1	4	47.5 43.6 39.8	4 4	54.7	4	2.0 58.0 54.0 50.2 46.4	5		5	16·9 12·7 8·5 4·6 0·7	5 5 5	24·4 20·1 15·9 11·9	5	32.0 27.6 23.3 19.2 15.1	5	39.6 35.2 30.8 26.6 22.5	5 5 5	42.8 38.4 34.1	5	41.6	5 5	40.2	6	10.9 6.1 1.4 56.9 52.5
11½ 11 10½ 10	4 4 4	12.2	4 4	18·9 15·6 12·5	4 4	25·6 22·3 19·1	4 4	29·0	4 4 4	39.3	4 4 4	46·2 42·7 39·2	4 4 4	56·9 53·2 49·6 46·1 42·7	5 4 4	53.0	5 5 5	7.4 3.7 0.0 56.4	5 5 5	7.0	5 5 5	18.0 14.2	5 5 5	29·1 25·2	5 5	40.7 36.5 32.5 28.6 24.8	5 5 5	48·2 44·0 39·9 35·9 32·0
9 8 7 6 5	4 3 3 3 3	43.8	4 3 3	6.4 0.6 55.1 49.9 44.8	4 4 3	6·9 55·9	4 4 4	19.4 13.3 7.6 2.1 56.8	4 4 4	19.8	4 4 4	26.3	4 4	39·3 32·9 26·7 20·9 15·3	4 4 4	39.5	444	53.0 46.3 39.9 33.7 27.9	4 4 4	46.2	4 4 4	53°2	5 4	6·8	5 5 5	21.0 13.8 6.8 0.2 53.9	5 5 5	28·1 20·8 13·7 7·0 0·5
4 3 2 1 0	3 3 3 3	29.7 25.4 21.3	3	35.4 31.0 26.7	3 3	36·6 32·2	3 3	46·9 42·3 37·8	3 3	48·0 43·5	3	49.2	4 3 3	4.7	4 4 4	5.7 0.8	4 4	22·3 16·9 11·7 6·7 1·9	4 4 4	17.8	4 4	29·3 23·9 18·7	4 4 4	35.6 30.1 24.8	4 4 4	42·0	4 4 4	48·4 42·6 37·1
S. 1 2 3 4 5	3 3 3 2	13·4 9·7 6·1 2·6 59·3	3	18·7 14·9 11·2 7·6 4·2	3	12.7	3	17.8	3	34·9 30·8 26·8 23·0 19·3	3	28.5	13	33.2	3	38.9	13	57·3 52·8 48·5 44·3 40·3	13	49.8	3	4°2 59°7 55°3	4	5'4	4 4	15.8	4 4	16.9
6 7 8 9	2 2 2 2 2	49·8	2 2	51.5	3 2 2	5.8 2.5 59.3 56.1 53.1	3 3	7°3 4°0 0°8	3 3	15·7 12·2 8·9 5·6 2·4	3	20·8 17·2 13·8 10·4 7·2	333	18·7 15·3	3 3	27·4 23·8 20·2	333	36·3 32·5 28·8 25·2 21·7	3 3	37·7 34·0	3 3	39·1	3	48·3 44·4 40·5	3	53°7 49°7 45°7	3 3	3.4 59.1 55.0 51.0 47.1
11 12 13 14 15	2 2 2 2 2	38·5 35·8	2 2	42.8 40.1 37.4	2 2	47.3 44.5 41.7	2 2 2	51·8 48·9 46·1	2 2	56·3 53·4	2	4.0 0.9 57.9 54.9 52.1	3 2	5°5 2°5 59°4	3	13·5 10·3 7·1 4·0 1·0	333	8.6	3 3	16.2	3 3	24.7 21.3 18.0	3 3	26·1 26·1	3	34.6	3 3	39·6
16 17 18 19 20	2 2 2 2 2 2	23.4	2	27.4	2	31.4	2	35.2	2 2	42·2 39·6	2 2 2	46·5 43·8 41·1	2 2	48.0	2 2	55°1 52°3 49°5	2 2	2·5 59·5 56·6 53·8 51·0	3 2	7.0 4.0 58.1 55.3	3 3	8·5 5·4 2·5	3	13.0	3 3	17.6 14.5	3 3	25.6 22.3 19.0 15.9 12.7
21 22 23 24 25	2 2 2 2 2	14.3 10.0	2 2	18.0 15.8 13.7	2 2	21·8 19·6 17·3	2 2 2		2 2	27·2 24·8	2 2	33·5 31·0 28·6	2 2	37·5 35·0 32·5	2 2	38·9 36·4	2 2	48·3 45·6 42·9 40·3 37·8	2 2	47°0	2 2	53·9 51·1 48·4	2 2	55°3	3 2 2	56.6	3	9·7 6·7 3·7 0·8 57·9
26 27 28 29 30		5·9 3·9 1·8 59·9 57·9	2 2	9.4 7.3 5.3 1.2	2 2	8.7	2 2	14.4 15.2 10.1	2 2	13.2	2 2	19·3 17·1	2 2	20.6	2 2 2	29·0 26·6 24·2	2 2	35·3 32·8 30·3 27·9 25·5	2 2	36·6 34·1	2 2	40·4 37·9 35·3	2 2	44.3 41.2	2 2	48·3 45·6 42·9	2 2	49°5 46°8
31 32 33 34 35	I	54°1 52°2 50°3	I I I	55°4	2 I I	56.6	2 2 I	5.9 3.8 1.8 59.7 57.7	2 2	9·2 7·1 5·0 2·9 0·9	2 2	10.2	2 2	9.2	2 2 2	17·3 15·1 12·8	2 2 2	23·1 20·8 18·5 16·2 13·9	2 2	24·3 22·0 19·6	2 2 2	27·9 25·5 23·1	2 2	31·5 29·0 26·6	2 2 2	35·2 32·6 30·1	2 2 2	36·3 33·7
36 37 38 39 40	I I	44.8 43.0 41.3	I I I	47.8 45.9 44.1	I I	50·8 48·9 47·0	I I	53.8 51.8 49.9	I I I	58·9 56·8 54·8 52·8 50·9	I I	57·9 55·8	2 2 I	5°2 3°1 1°0 58°9 56°8	2 2 2	6·2 1·9	2 2 2		2 2 2	12.7	2 2 2	16·0 13·7 11·4	2 2 2	19·3 16·9 14·6	2 2 2	22·7 20·2 17·8	2 2 2	26.1
	I	35.9	I I	38·6 36·8	I I	41.4	I	44·I	I	45.0	I I	49.8	I	52.7	I I	55.6	I	0·7 58·5 56·4 54·2	2 I	3·7 1·5 59·3 57·1	2	6·8 4·5 2·2 0·0	2		2 2	10.6	2	16·2 13·8 11·3 8·9

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

* VEGA.

Lat.	m. 4	8 m.	m. 12	m. 16	m. 20	m. 24	m. 26	m. 28	m. 30	m. 32	m. 34	m. 36	38	m.	m.	m. 44
N.							RED	UCT	ONS	•						
54 56 58	0·2 0·2 0·2	0.0 0.0 1.0	2·1 2·2	3.8 3.7 3.5	6.0 5.7 5.4	8.6 8.2 7.8	9.7 9.2	11.8 11.2 10.7	13·5 12·9 12·3	15·4 14·7 13·9	17·4 16·5 15·7	19·4 18·5 17·6	21·7 20·7 19·6	24·0 22·9 21·8	26·5 25·2 24·0	29.0 27.7 26.3
60 62 64	0·2 0·2 0·2	0·8 0·8 0·7	1·9 1·8 1·7	3.3 3.1	5·2 4·6 4·6	7·4 7·0 6·6	8·7 8·2 7·7	0.0 0.0	11.0	13·2 12·5 11·7	14·9 14·1 13·3	16·7 15·8 14·9	18·6 17·6 16·6	20·6 19·5 18·3	22·7 21·5 20·2	25.0 23.6 22.2
		1 .						IMU"				ı				
54 56 58	0.8 0.8 0.8	1.6 1.6	2·3 2·3 2·3	3.1 3.1 3.1	3.8 3.8	4·7 4·7 4·7	2.1 2.1	5.2 5.2 5.2	5·9 5·9	6·3 6·3	6·6 6·7 6·7	7·0 7·1	7·4 7·4 7·5	7·8 7·8 7·8	8·2 8·2 8·2	8.6 8.6 8.6
60 62 64	o·8 o·8 o·8	1.6 1.6	2·4 2·4 2·4	3.5 3.5 3.5	4·0 4·0	4.7 4.8 4.8	5·1 5·2 5·2	5·5 5·6 5·6	5·9 6·0	6·3 6·4 6·4	6·7 6·7 6·8	7·I 7·I 7·2	7·5 7·6	7·9 7·9 8·0	8·3 8·4	8·7 8·7 8·8
Lat.	m.	m.	m.	m.	m.	m. 50	m.									
N.	45	46	47	48	49	1 90	RED	UCT	IONS	. 54	55	56	57	58	59	60
54 55 56 57	30·3 29·6 28·9 28·2	31·7 31·0 30·2 29·5	33·1 32·3 31·6	34·5 33·7 32·9 32·1	36·0 35·1 34·3 33·5	37·4 36·6 35·7 34·8	38·9 38·0 37·1 36·2	40.5 39.5 38.6 37.7	42.0 41.1 40.1	43.6 42.6 41.6 40.6	45'3 44'2 43'2 42'1	46·9 45·8 44:7 43·6	48.6 47.5 46.3 45.2	50·3 49·1 48·0 46·8	52·1 50·8 49·6 48·4	53.8 52.6 51.3 50.1
58 59 60 61	27·5 26·8 26·1 25·4	28·8 28·0 27·3 26·5	30·0 29·2 28·5 27·7	31·3 30·5 29·7 28·9	32.6 31.8 30.9 30.1	33.3 33.1 33.1 31.3	35·3 34·4 33·5 32·6	36·7 35·8 34·8 33·8	38·1 37·2 36·2 35·2	39.6 38.6 37.5 36.5	41·1 40·0 38·9 37·8	42.6 41.5 40.3 39.2	44.1 42.9 41.8 40.6	45.6 44.5 43.3 42.1	47·2 46·0 44·8 43·5	48·8 47·6 46·3 45·0
62 63 64	24·7 23·9 23·2	25·8 25·0 24·2	26·9 26·1 25·3	28·0 27·2 26·4	29·2 28·3 27·5	30·4 29·5 28·6	31·6 30·7 29·8	32·9 31·9 30·9	34·2 33·1 32·1	35·5 34·4 33·4	36·8 35·7 34·6	38·1 37·0 35·9	39·5 38·3 37·1	40·9 39·7 38·4	42·3 41·0 39·8	43°7 42°4 41°1
								IMU]						,		
54 56 58	8.8 8.8 8.8	6.0 6.0	9·2 9·2	9.4 9.4 9.4	9·5 9·6	9·7 9·7 9·8	10.0 10.0 6.0	10.1 10.5 10.5	10.4 10.4 10.4	10.2	10.7	10.0 10.0	11.1 11.1	11.3	11.2 11.2	11.7 11.7 11.8
60 62 64	8·9 8·9 9·0	9·1 9·1	9·3 9·3 9·4	9·5 9·6	9·7 9·7 9·8	10.0 6.0 6.0	10.3 10.1 10.0	10.4 10.3	10·4 10·5 10·6	10.6 10.7 10.8	11.0 10.8 10.8	11.5 11.1 11.0	11·4 11·4	11.4 11.2 11.6	11.8 11.8	11.8 11.9
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Lat.	m. 0	m. 1	m. 2	m. 3	m. 4	m. 5	m. 6	m. 7	m. 8	m. 9	m. 10	m. 11	m. 12	m. 13	m. 14	m. 15
N.					•			·	IONS		10			10	47	1.0
54 55 56 57	53·8 52·6 51·3 50·1	55.6 54.3 53.1	57.5 56.1 54.8 53.5	59·3 57·9 56·6 55·2	61·2 59·8 58·4 56·9	63·1 61·6 60·2 58·7	65.0 63.5 62.0 60.5	67·0 65·5 63·9 62·4	69.0 67.4 65.8 64.2	71·1 69·4 67·8 66·1	73·1 71·4 69·7 68·0	75·2 73·5 71·7 70·0	77·3 75·5 73·7 72·0	79·5 77·6 75·8 74·0	81.6 79.8 77.9 76.0	83·8 81·9 80·0 78·0
58 59 60 61	48·8 47·6 46·3 45·0	50·5 49·2 47·8 46·5	52·1 50·8 49·4 48·1	53·8 52·4 51·0 49·6	55.5 54.1 52.6 51.2	57·3 55·8 54·3 52·8	59.0 57.5 55.9 54.4	60·8 59·2 57·7 56·1	62·6 61·0 59·4 57·7	64·5 62·8 61·1 59·4	66·3 64·6 62·9 61·2	68·2 66·5 64·7 62·9	70·2 68·3 66·5 64·7	72·1 70·2 68·4 66·5	74·1 72·1 70·2 68·3	76·1 74·1 72·1 70·2
62 63 64	43.7 42.5 41.1	45°2 43°9 42°5	46·7 45·3 43·9	48·2 46·8 45·3	49.7 48.2 46.8	51·3 49·8 48·2	52·9 51·3 49·7	54.5 52.8 51.2	56·1 54·4 52·8	57·8 56·0 54·3	59°4 57°7 55°9	59.3 57.5	62·9 61·0	64·6 62·7 60·8	66·4 64·4 62·4	68·2 66·1 64·1
	1 . 1		1	,			1	IMUI								
54 56 58	11.4	11.0 11.0	12·I 12·I 12·I	12.3	12·5 12·5 12·5	12·6 12·7 12·7	12·8 12·9 12·9	13.1 13.0	13·3 13·3 13·3	13.2 13.2	13.7 13.7	13.8 13.8	14.0 14.0	14·2 14·3	14·4 14·4 14·5	14·6 14·7
60 62 64	11.8 11.9 12.0	12·2 12·1 12·2	12·4 12·4	12·4 12·5 12·6	12·6 12·7 12·8	12·8 12·9 13·0	13.5 13.1	13·4 13·3	13·4 13·5 13·6	13.6 13.8	13·8 13·9 14·0	14.0 14.1 14.2	14·3 14·4	14°4. 14°5 14°6	14·6 14·7 14·8	14·8 14·9 15·0

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

¥ VEGA.

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Lat.	m. 16	m.	m. 18	19 m.	m. 20	m. 21	m. 22	m. 23	m. 24	m. 25	m. 26	m. 27	28	m. 29	30 m.
N.						R	EDU	CTION	NS.						
52 53 54 55 56	90.0 88.0 86.0 84.1 82.1	92·4 90·3 88·3 86·3 84·2	94·8 92·7 90·6 88·5 86·4	97·2 95·1 92·9 90·8 88·6	99.6 97.5 95.3 93.1	99·9 97·6 95·4 93·1	104.6 102.3 100.0 97.7 95.4	107·2 104·8 102·5 100·1 97·7	109.7 107.3 104.9 102.5 100.1	112·3 109·9 107·4 104·9 102·5	115.0 112.5 109.9 107.4 104.9	117.6 115.1 112.5 109.9 107.3	120·3 117·7 115·0 112·4 109·8	123.0 120.3 117.6 114.9 112.2	125.8 123.0 120.3 117.5 114.7
57 58 59 60	80·1 78·1 74·0	82·2 80·1 78·1 76·0	84·3 82·2 80·1 78·0	86·5 84·3 82·1 80·0	88·7 86·5 84·2 82·0	90.9 88.6 86.3 84.0	93·1 90·8 88·4 86·1	95'4 93'1 90'6 88'2	97.7 95.2 92.8 90.3	97.5 95.0 92.5	102·3 99·8 97 ·2 94·6	104.7 102.1 99.5 96.8	107·1 104·4 101·7 99·0	101.3	112.0 103.2 106.4 103.5
61 62 63 64	72.0 70.0 67.9 65.8	73.9 71.8 69.7 67.5	75·8 73·7 71·5 69·3	77·8 75·6 73·3 71·1	79·7 77·5 75·2 72·9	81·7 79·4 77·0 74·7	83.7 81.4 78.9 76.5	85.8 83.3 80.9 78.4	87.8 85.3 82.8 80.3	89·9 87·4 84·8 82·2	92.0 89.4 86.8 84.1	94.2 91.5 88.8 86.1	96·3 93·6 90·8 88·0	98·5 95·7 92·9 90·0	97·8 95·0 92·0
Lat.	31	32	m. 33	m. 34	m. 35	m. 36	37	m. 38	m. 39	m. 40	m. 41	m. 42	m. 43	m. 44	m.
N.						R	EDU	CTIO	NS.						
52 53 54 55 56 57	128·5 125·7 122·9 120·1 117·3	125.6 122.7 119.8 116.9	134·2 131·3 128·3 125·4 122·4 119·5	128·1 125·0 122·0	133·8 130·8 127·7 124·6	139.7 136.6 133.5 130.4	145.8 142.6 139.4 136.3 133.0	142·3 139·0 135·8	151.8 148.5 145.2 141.8 138.5	148·1 144·7 141·3 137·9	154·5 151·0 147·6 144·1 140·6	161.0 157.5 154.0 150.5 146.9	164·1 160·5 157·0 153·4 149·8	167·3 163·6 160·0 156·3 152·7	170·5 166·7 163·0 159·3 155·6
58 59 60 61	108.7 105.8 102.9	114.0 111.1 108.1 105.2	110.5	119.0 115.9 112.8	118.4	124.0 120.8 117.6 114.4	126.6 123.3 120.1 116.8	129·2 122·5 119·2	131.8 128.4 125.0 121.6		133.6	139.8 136.2 132.6 129.0	142.5 138.9 135.2	145·3 141·5 137·8	148·0 144·2 140·4 136·6
62 63 64	97.1	99.2	101.3		105.7	111.2	113.2	112.4	118.1	120.2	119.3	121.6	127.7	130.2	132.7
	94.1	96.1	98.2	100.3	102.4	104.6	106.8	108.9	111.3	113.4	115.6	117.9	120.3	122.5	124.9
Lat.	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	m. 54	m. 55	m. 56	m. 57	m. 58	m. 59	m. 60
	m.	m.	m.	m.	m.	m. 51	m.	m. 53	m. 54	m.	m,	m.	m.	m,	m.
Lat. N	m.	m. 47 176·9 173·0 169·2 165·3 161·4	m. 48 180·2 176·2 172·3 168·4 164·4	m. 49 183.4 179.5 175.5 171.5 167.4	m. 50 186.8 182.7 178.7 174.6 170.5	m. 51 RI 190·1 186·0 181·9 177·7 173·5	m. 52 EDUC 193·5 189·3 185·1 180·9 176·6	m. 53 196.9 192.6 188.3 184.1 179.7	m. 54 VS. 200·3 196·0 191·6 187·3 182·9	203·8 199·4 195·0 190·5 186·0	m. 56 207·3 202·8 198·3 193·8 189·2	210·8 206·2 201·7 197·1 192·5	m. 58 214·3 209·7 205·1 200·4 195·7	m. 59 217.9 213.2 208.5	m.
N. \$52 53 54 55 56 57 58 59 60	m. 46	m. 47 176.9 173.0 169.2 165.3 161.4 157.5 153.6 149.7 145.7	m. 48 180·2 176·2 172·3 168·4 160·5 156·5 152·5 148·4	m. 49 183.4 179.5 175.5 171.5 167.4 163.4 159.3 155.3 151.1	m. 50 186.8 182.7 178.7 174.6 170.5 166.4 162.2 158.1 153.9	m. 51 R1 190·1 186·0 181·9 177·7 173·5 169·3 165·1 160·9 156·7	m. 52 EDUC 193·5 189·3 185·1 180·9 176·6 172·4 168·1 163·8 159·4	m. 58 196-9 192-6 188-3 184-1 179-7 175-4 171-1 166-7 162-3	m. 54 VS. 200·3 196·0 191·6 187·3 182·9 178·5 174·0 169·6 165·1	m, 55 203.8 199.4 195.0 190.5 186.0 181.6 177.1 172.5 168.0	m. 56 207·3 202·8 198·3 193·8 189·2 184·7 180·1 175·5 170·8	m. 210·8 206·2 201·7 197·1 192·5 187·8 183·2 178·5 173·8	m. 58 214·3 209·7 205·1 200·4 195·7 191·0 186·2 181·5	m. 59 217·9 213·2 208·5 203·7 199·0 194·2	m. 80 221.5 216.7 211.9 207.1
Lat. N	m. 46	m. 47 176·9 173·0 169·2 165·3 161·4 157·5 153·6 149·7	m. 48 180·2 176·2 172·3 168·4 164·4 160·5 152·5 148·4 144·4 144·4 140·3 136·1	m. 49 183.4 179.5 175.5 167.4 163.4 155.3 151.1 147.0 142.8	m. 50 186.8 182.7 174.7 174.6 170.5 166.4 162.2 158.1 153.9	m. 51 R) 190·1 186·0 181·9 177·7 173·5 169·3 165·1 160·9 156·7 152·4 148·1	m. 52 193·5 189·3 185·1 180·9 176·6 172·4 168·1 163·8 159·4	m. 58 196-9 192-6 188-3 184-1 179-7 175-4 171-1 166-7	m. 54 VS. , 200·3 196·0 187·3 182·9 178·5 174·0 169·6 165·1 160·6 151·5	m, 55 203.8 199.4 195.0 190.5 186.0 177.1 172.5 168.0 163.4	m. 56 207·3 202·8 198·3 193·8 189·2 184·7 180·1 175·5 170·8 166·2 161·5 156·7	m. 210·8 206·2 201·7 197·1 192·5 187·8 183·2 178·5 173·8	m. 58 214·3 209·7 205·1 200·4 195·7 191·0 186·2 181·5	m. 59 217.9 213.2 208.5 203.7 199.0 194.2 189.4 184.5 179.6	m. 80 221·5 216·7 211·9 207·1 202·3 197·4 192·5 187·6
Lat. N	m. 46 173.7 169.9 166.1 162.3 158.5 154.7 150.8 146.9 143.1 139.1 135.2 127.2 m.	m. 47 1/6·9 1/3·0 1/69·2 1/65·3 1/61·4 1/57·5 1/33·6 1/49·7 1/41·7 1/37·7 1/33·7 1/29·6	m. 48 180·2 176·2 176·2 172·3 168·4 166·5 152·5 148·4 144·4 140·3 136·1 132·0	m. 49 183.4 179.5 175.5 171.5 167.4 163.4 159.3 155.3 151.1 147.0 142.8 138.6 134.4	m. 50 186.8 182.7 178.7 174.6 170.5 166.4 162.2 158.1 153.9 149.7 145.4 141.2 136.9	m. 51 R) 190·1 186·0 181·9 177·7 173·5 165·7 152·4 148·1 143·7 139·3	m. 52 EDU(193.5 189.3 185.1 180.9 176.6 172.4 168.1 163.8 159.4 155.1 140.8 141.8	m. 53 196-9 192-6 188-3 184-1 179-7 175-4 171-1 166-7 162-3 157-8 153-4 148-8 144-3	m. 54 VS. 200·3 196·0 191·6 187·3 182·9 178·5 174·0 169·6 155·1 160·6 156·0 151·5 146·8	m. 55 203.8 199.4 195.0 190.5 181.6 177.1 172.5 168.0 163.4 158.7 154.1 149.4	m. 56 207·3 202·8 198·3 193·8 189·2 184·7 180·1 175·5 170·8 166·2 161·5 156·7 151·9	m. 57 210·8 206·2 201·7 197·1 192·5 183·2 178·5 173·8 169·0 164·2 159·4 154·5	m. 58 214·3 209·7 205·1 200·4 195·0 186·2 181·5 176·7 171·9 162·1 157·1 m.	217·9 213·2 208·5 203·7 199·0 194·2 189·4 184·5 174·7 169·8 164·8 159·8	m. 80 221.5 216.7 211.9 202.3 197.4 192.5 187.6 172.6 177.6 167.5 162.4
N. 52 53 54 55 56 57 58 59 60 61 62 63 64	m. 46	m. 47 176-9 173-0 169-2 165-3 161-4 157-5 149-7 145-7 137-7 133-7 129-6	m. 48 180·2 176·2 172·3 168·4 160·5 152·5 148·4 140·3 133·1 132·0	m. 49 183.4 179.5 175.5 177.5 167.4 159.3 155.3 151.1 147.0 142.8 138.6 134.4	m. 50 186·8 182·7 178·7 174·6 170·5 166·4 162·2 158·1 153·9 149·7 145·4 141·2 136·9	m. 51 R1 190·1 186·0 181·9 177·7 173·5 169·3 165·1 160·9 156·7 152·4 148·1 143·7 139·3	m. 52 EDU(193·5 189·3 185·1 180·9 176·6 168·1 163·8 159·4 155·1 150·7 146·3 141·8	m. 53 TIO1 196-9 192-6 188-3 184-1 179-7 175-4 171-1 166-7 162-3 157-8 148-8 144-3 m. 32	m. 54 NS. 200·3 196·0 191·6 187·3 182·9 178·5 174·0 169·6 155·6 155·6 156·0 151·5 146·8	m. 55 203.8 199.4 195.0 190.5 181.6 177.1 172.5 168.0 163.4 158.7 154.1 149.4	m. 56 207·3 202·8 198·3 193·8 189·2 184·7 180·1 175·5 170·8 166·2 161·5 156·7 151·9	210·8 206·2 201·7 197·1 192·5 187·8 183·2 178·5 173·8 169·0 164·2 159·4	m. 58 214·3 209·7 205·1 200·4 195·7 191·0 186·2 181·5 176·7 171·9 167·0 162·1 157·1	217.9 213.2 208.5 203.7 199.0 194.2 189.4 184.5 179.6 174.7 169.8 164.8 159.8	m. 60 221·5 216·7 211·9 207·1 202·3 197·4 192·5 187·6 177·6 172·6 172·5 162·4
Lat. N	m. 46 173.7 169.9 166.1 162.3 158.5 154.7 150.8 146.9 143.1 139.1 135.2 131.2 127.2 m. 16 14.7 14.7 14.7 14.8 14.8 14.8	m. 47 176.9 173.0 169.2 165.3 161.4 157.5 153.6 149.7 145.7 141.7 133.7 129.6 m. 18	m. 48 180·2 176·2 176·2 172·3 168·4 164·4 160·5 152·5 148·4 144·4 140·3 136·1 132·0 m. 20	m. 49 183.4 179.5 177.5 167.4 163.4 159.3 151.1 147.0 142.8 138.6 134.4 m. 22	m. 50 186.8 182.7 178.7 174.6 170.5 166.4 162.2 158.1 153.9 149.7 145.4 141.2 136.9 m. 24	m. 51 R) 190·1 186·0 181·9 177·7 173·5 169·3 165·1 160·9 156·7 152·4 148·1 143·7 139·3 m. 26	m. 52 EDUC 193.5 189.3 185.1 180.9 176.6 172.4 168.1 163.8 159.4 155.1 150.7 146.3 141.8 M. 28 AZIM 17.0 17.0 17.1 17.1	m. 58 TION 196-9 192-6 188-3 184-1 175-4 171-1 166-7 162-3 157-8 153-4 148-8 144-3 m. 32 UTHS 17-8 17	m. 54 VS. , , , , , , , , , , , , , , , , , , ,	203.8 199.4 195.0 180.5 186.0 181.6 177.1 172.5 168.0 163.4 158.7 154.1 149.4 19.3 19.3 19.3 19.3 19.4	m, 568 207·3 202·8 198·3 193·8 189·2 184·7 180·1 175·5 170·8 166·2 161·5 156·7 151·9 44	m. 57 210·8 206·2 201·7 197·1 192·5 187·8 183·2 173·8 169·0 164·2 159·4 154·5 m. 48 20·8 20·8 20·9 20·9	m. 58 214·3 209·7 205·1 200·4 195·7 191·0 186·2 181·5 176·7 171·9 162·1 157·1 m. 52 21·5 21·6 21·6 21·6 21·7	m. 59 217.9 213.2 208.5 203.7 199.0 194.2 189.4 164.8 164.8 159.8 m. 56	m. 60 221·5 216·7 211·9 207·1 202·3 197·4 192·5 187·6 167·5 162·4 m. 60 23·0 23·1 23·1 23·2 23·2
Lat. N	m. 46 173.7 169.9 166.1 162.3 158.5 154.7 150.8 146.9 143.1 139.1 139.1 139.1 137.2 131.2 127.2	m. 47 176.9 173.0 169.2 165.3 161.4 157.5 153.6 141.7 1437.7 1437.7 129.6 m. 18	m. 48 180·2 176·2 176·2 176·2 176·2 164·4 160·5 150·5 148·4 144·4 140·3 136·1 132·0 m. 20	m. 49 183.4 179.5 177.5 167.4 163.4 159.3 151.1 147.0 142.8 138.6 134.4 m. 22	m. 50 186.8 182.7 178.7 174.6 170.5 166.4 162.2 158.1 153.9 149.7 145.4 141.2 136.9 m. 24	m. 51 R) 190·1 186·0 181·9 177·7 173·5 169·3 165·1 160·9 156·7 152·4 148·1 143·7 139·3 m. 26	m. 52 EDUC 193·5 189·3 185·1 180·9 176·6 172·4 168·1 163·8 159·4 155·1 150·7 146·3 141·8 m. 28 AZIM 17·0 17·0 17·1	m. 58 TION 196-9 192-6 188-3 184-1 175-4 171-1 166-7 162-3 157-8 148-8 144-3 m. 32 UTHS 17-8 17-8 17-8 17-8 17-8	m. 54 VS. 200·3 196·0 191·6 187·3 182·9 178·5 174·0 155·5 146·8 m. 6 18·5 18·5 18·5 18·6 18·6	203.8 195.6 195.5 186.0 181.6 177.1 172.5 168.0 163.4 154.1 149.4 19.3 19.3 19.3 19.3	m. 56 207·3 202·8 198·3 193·8 189·2 184·7 180·1 175·5 170·8 166·2 161·5 156·7 151·9 m. 44	210·8 206·2 201·7 197·1 192·5 187·8 183·2 178·5 173·8 169·0 164·2 159·4 154·5 m. 48 20·8 20·8 20·9	m. 58 214·3 209·7 205·1 200·4 195·7 191·0 186·2 181·5 176·7 171·9 162·1 157·1 m. 52	m. 59 217.9 213.2 208.5 203.7 199.0 194.2 189.4 164.8 164.8 159.8	m. 80 221·5 216·7 211·9 207·1 202·3 197·4 192·5 187·6 182·6 177·6 167·5 162·4 m. 80 23·0 23·1 23·1 23·2

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

₩ VEGA.

Lot							2 HC	URS	•						
Lat.	m. 1	m. 2	3.	1 m.	m. 5	m. 6	m.	m. 8	9 m.	10 m.	m. 11	m. 12	m. 13	m. 14	m. 15
N.						\mathbf{R}	EDUC	TION	IS.						
52 53 54 55 56	225·1 220·3 215·4 210·5 205·6	228·8 223·9 218·9 208·9	232·5 227·5 222·4 217·4 212·3	236·2 231·1 226·0 220·8 215·7	239·9 234·8 229·6 224·3 219·1	243·7 238·4 233·2 227·9 222·5	247.5 242.2 236.8 231.4 226.0	251·3 245·9 240·4 235·0 229·5		259.0 253.5 247.8 242.2 236.6	257.3	266·9 261·1 255·3 249·6 243·7	270·8 265·0 259·1 253·3 247·3	274·8 268·9 262·9 257·0 251·0	278·8 272·8 266·8 260·7 254·7
57 58 59 60	200·6 195·7 190·7 185·6	l	207·2 202·0 196·9 191·7	210·5 205·3 200·0 194·8	213.8 208.5 203.2 197.9	217·2 211·8 206·4 201·0	220·6 215·1 209·6 204·1	224.0 218.4 212.9 207.3	227.4 221.8 216.1 210.5	230·9 225·2 219·4 213·7	234·4 228·6 222·8 216·9	237·9 232·0 226·1 220·1	241.4 235.5 229.5 223.4	245.0 238.9 232.8 226.7	248·6 242·4 236·2 230·0
61 62 63 64	180·6 175·4 170·3 165·1	183·5 178·3 173·1 167·8	175.9	189·4 184·1 178·7 173·2	192·5 187·0 181·5 176·0		198·5 192·9 187·3 181·6	201·6 195·9 190·2 184·4	193.1	207·8 202·0 196·0 190·1	205.0 199.0 192.9	214·1 208·1 202·0 195·8	217·3 211·2 205·0 198·8	220·5 214·3 208·0 201·7	
_	2						o III	URS							
Lat.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.
N.	16	17	18	19	20	21 R	EDUC	TION	J 24 JS	25	26	27	28	29	30
52 52½ 52½ 53 53½ 54	282·8 279·8 276·8 273·7 270·6	286·9 283·8 280·7 277·6 274·5	291.0 287.9 284.7 281.6 278.5	295·1 291·9 288·8 285·6 282·4	299·2 296·0 292·8 289·6 286·4	303·4 300·2 296·9 293·6 290·4	307·6 304·3 301·0 297·7 294·4	308.5	309.3	320·3 316·9 313·5 310·0 306·6	324·6 321·2 317·7 314·2 310·7	329.0 325.4 321.9 318.4 314.8	333·3 329·7 326·2 322·6 319·0	337·7 334·1 330·5 326·8 323·2	342·I 338·4 334·8 331·I 327·4
54½ 55 55½ 56½ 56½	267·6 264·5 261·4 258·4 255·3	271.4 268.3 265.2 262.1 258.9	275·3 272·1 269·0 265·8 262·6	279·2 276·0 272·8 269·6 266·4	283·1 279·9 276·6 273·4 270·1	287·1 283·8 280·5 277·2 273·9	291·1 287·7 284·4 281·0 277·7	295.1 291.7 288.3 284.9 281.5	299·1 295·7 292·2 288·8 285·3	303·1 299·7 296·2 292·7 289·2	307·2 303·7 300·2 296·6 293·1	311·3 307·7 304·2 300·6 297·0	315.4 311.8 308.2 304.6 301.0	319·6 315·9 312·3 308·6 304·9	323.7 320.1 316.3 312.6 308.9
57 57½ 58 58½ 59	252·2 249·1 245·9 242·8 239·7	255.8 252.6 249.5 246.3 243.1	259·5 256·3 253·1 249·8 246·6	263·1 259·9 256·6 253·4 250·1	266·8 263·6 260·3 257·0 253·6	270·6 267·2 263·9 260·5 257·2	274·3 270·9 267·6 264·2 260·7	278·1 274·7 271·2 267·8 264·3	281.9 278.4 274.9 271.5 268.0	285·7 282·2 278·7 275·1 271·6	289.6 286.0 282.4 278.8 275.2	293.4 289.8 286.2 282.6 278.9	297·3 293·7 290·0 286·3 282·6	301·2 297·5 293·8 290·1 286·4	305·2 301·4 297·7 293·9 290·1
59½ 60 60½ 61 61½	236·5 233·4 230·2 227·0 223·8	233·5 230·3 227·0	243.4 240.1 236.9 233.6 230.3	246·8 243·5 240·2 236·9 233·6	250·3 247·0 243·6 240·2 236·9	253·8 250·4 247·0 243·6 240·2	257·3 253·9 250·4 247·0 243·5	260·9 257·4 253·9 250·4 246·9	264.4 260.9 257.4 253.8 250.2	268·0 264·5 260·9 257·3 253·6	268·0 264·4 260·7 257·I	275·3 271·6 267·9 264·2 260·5	278·9 275·2 271·5 267·7 264·0	282.6 278.8 275.1 271.3 267.5	286·3 282·5 278·7 274·8 271·0
62 62½ 63 63½ 64	220·6 217·4 214·1 210·9 207·6	223.8 220.5 217.2 213.9 210.6	227·0 223·7 220·3 217·0 213·6	230·2 226·9 223·5 220·1 216·7	233·5 230·1 226·6 223·2 219·7	229.8	236·5 233·0	243·3 239·8 236·2 232·6 229·0	246·7 243·1 239·4 235·8 232·2		253.4 249.7 246.0 242.2 238.5	256.8 253.0 249.3 245.5 241.7	260·2 256·4 252·6 248·8 244·9	263.6 259.8 255.9 252.0 248.1	263·2 259·3 255·4 251·4
			TRU	JE B	EARI	NG	OR A	ZIMI	UTH	OF ·	X VI	EGA.			
Lat.	- m ·	m 1	m '	m 1				URS						1	
	m.	m.	m.			50 8	n. m	8 39	36			48 48	52 m.	56	60_
N.	101	0	o 1	۱ ٥	o 1	0 1	AZIM					1 0	. 0	1 0	, ,
52 53 54 55 55 56	23·1 23·1 23·2 23·2	23·8 23·9 23·9 24·0	24·5 24·5 24·6 24·6 24·7	25·3 2 25·3 2 25·4 2 25·5 2	6·0 2 6·1 2 6·1 2 6·2 2	6.7 2 6.8 2 6.8 2 6.9 2	7.5 28 7.5 28 7.6 28 7.6 28 7.7 28	·2 29 ·3 29 ·4 29	0 29 0 29 1 29	6 30. 7 30. 8 30. 8 30. 9 30.	4 31·1 5 31·2 6 31·3 7 31·4	31·9 32·0 32·0	32·5 32·6 32·7 32·8	33·2 33·3 33·4 33·5 33·6	33.9 34.0 34.1 34.3 34.4
57 58 59 60	23·3 23·4 23·5	24·1 24·2 24·3	24.8 24.9 25.0	25.6 2 25.7 2 25.8 2	6·4 2 6·5 2 6·5 2	7·I 2 7·2 2 7·3 2	7·8 28 7·9 28 8·0 28 8·1 28	·6 29 ·7 29 ·8 29	4 30 5 30 6 30	1 30. 3 31. 4 31.	31.6 31.8 31.8	32·4 32·5 32·6	33·4	33·8 33·9 34·0 34·2	34·5 34·6 34·8 34·9
62 63 64		24.4	25·2 2 25·3 2	26·0 2 26·1 2	6·8 2 6·9 2	7.6 2	8·2 29 8·3 29 8·4 29 8·6 29	·1 29	9 30	8 31.	4 32·2 6 32·3	32.0		34·3 34·5 34·7 34·9	35·1 35·2 35·4 35·6

REDUCTION TO THE MERIDIAN AND AZIMUTH TABLE NEAR THE MERIDIAN BELOW THE POLE.

→ VEGA.

							2 H	URS							
Lat.	m. 31	m. 32	m. 33	m. 34	m. 35	m. 36	m. 37	m. 38	m. 39	m. 40	m. 41	m. 42	m. 43	m. 44	m. 45
N.	,					RI	EDUC	TION	īs.					,	
52 52 52 53 53 53 54	346·5 342·8 339·1 335·4 331·7	351.0 347.2 343.5 339.7 335.9	355.4 351.7 347.9 344.0 340.2	356·1 352·3 348·4	360·6 356·7 352·8	369·0 365·1 361·2 357·2 353·3	373.6 369.6 365.7 361.7 357.7	374·2 370·2 366·1	378·8 374·7 370·6	387·5 383·4 379·3 375·1 371·0	383·8 379·7	396·9 392·7 388·5 384·2 380·0	401.6 397.4 393.1 388.8 384.5	406·4 402·1 397·7 393·4 389·1	406.8
54½ 55 55½ 56 56½	327·9 324·2 320·4 316·7 312·9	332·2 328·4 324·6 320·8 317·0	336·4 332·6 328·7 324·9 321·0	336·8 332·9 329·0	345.0 341.0 337.1 333.2 329.2	341·3	353.6 349.6 345.6 341.5 337.5	358.0 353.9 349.8 345.7 341.6	354°I	362·6 358·5	362·8 358·6	375.7 371.4 367.2 362.9 358.6	380·2 375·9 371·6 367·2 362·9		389·2 384·8 380·4 376·0 371·5
57 57½ 58 58½ 58½ 59	309·1 305·3 301·5 297·7 293·9	313·1 309·3 305·4 301·6 297·7	317·1 309·3 305·4 301·5	321·2 313·3 309·3 305·3	325·2 321·2 317·2 309·2	325·3 321·2 317·1		337·5 333·4 329·2 325·1 320·9	341.7 337.5 333.3 329.1 324.8	345.8 341.6 337.4 333.1 328.8	345.7 341.4 337.1	354.2 349.9 345.6 341.2 336.8	358·5 354·1 349·7 345·3 340·8	362·7 358·3 353·9 349·4 344·9	367.0 362.5 358.0 353.5 349.0
59½ 60 60½ 61 61½	290.0 286.2 282.3 278.4 274.5	293·8 289·9 285·9 282·0 278·0	297.5 293.6 289.6 285.6 281.6	293·3 289·2	305·1 301·1 297·0 292·9 288·8	304·9 300·7 296·6	312·8 308·7 304·5 300·3 296·1	316·7 312·5 308·3 304·0 299·8		324·5 320·2 315·9 311·5 307·2	324·1 319·7 315·3	323.6	336·4 331·9 327·4 322·9 318·4	331.3	344.4 339.9 335.3 330.7 326.0
62 62½ 63 63½ 64	270·6 266·6 262·7 258·7 254·7	274·1 270·1 266·1 262·0 258·0	277.6 273.5 269.5 265.4 261.3	281·1 277·0 272·9 268·8 264·6		284.1	291.8 287.6 283.3 279.0 274.7	295·5 291·2 286·8 282·5 278·1	299°1 294°8 290°4 286°0 281°6	302·8 298·4 293·9 289·5 285·0	302·0 297·5 293·0	310·2 305·6 301·1 296·5 292·0	313.9 309.3 304.7 300.1 295.5	317.6 313.0 308.3 303.7 299.0	321.4 316.7 312.0 307.3 302.5
					·										
Lat.								OURS							
	m. 46	m. 47	m. 48	m. 49	m. 50	m. 51	m. 52	m. 53	m. 54	m. 55	56	m. 57	58	59 59	60 60
N.						Rl	EDUC	TIOI	IS.	1		1			
52 52 52 53 53 53 54	407·1	416·3 411·9 407·4	425.6 421.1 416.6 412.1 407.5	426.0 421.4 416.8	430.8	420.3	445°3 440°6 435°9 431°1 426°4	445.5	440.8	455°5 450°6 445°7	460·5 455·5 450·6	470·4 465·5 460·5 455·5 450·5	475.5 470.5 465.5 460.4 455.4	470.5	485.8 480.7 475.6 470.4 465.2
54½ 55 55½ 56½ 56½	384·9 380·4	398·4 393·9 389·3 384·8 380·2	403.0 398.4 393.8 389.2 384.6	398·4 393·7	407·6 402·9 398·2	416·9 412·2 407·5 402·7 398·0	412.1	421·5 416·7	416.4	431.0 426.0 421.1	425.7	445.5 440.5 435.4 430.3 425.3	450·3 445·2 440·1 435·0 429·9	455°2 450°0 444°9 439°7 434°5	460·1 454·9 449·7 444·4 439·2
57 57½ 58 58½ 58½ 59	362·2 357·7	361.8	370.7	375·0	379·3 374·5	378.8	387·9 383·0	392·3 387·3		401·0	410.2 402.2 400.4		414.4	429.3 424.1 418.9 413.6 408.3	433.9 428.7 423.4 418.0 412.7
59½ 60 60½ 61 61½	339°2	347·9 343·2	351.9 342.4	356·0 351·2 346·3	360·0 355·2 350·3	359.2	368·2 363·3 358·3	372·4 367·4 362·3	371.2	380·7 375·6 370·4	390·1 384·9 379·7 374·5 369·3	383.9	393.4 388.1 382.8		401·9 396·5
62 62½ 63 63½ 64	320·4 315·7 310·9	319.4	327·9 323·1 318·2	331·7 326·8 321·9	340·5 335·5 330·6 325·6 320·5	329.3	343.2	352·2 347·1 341·9 336·8 331·6	340.5	354·8 349·6 344·3	358·8 353·4 348·1	357.3		370·6 365·2 359·6	363.5

CORRECTIONS OF ALTITUDE OF THE SUN AND STARS. (Involving Dip, Refraction, \odot 's Semidiameter, and Parallax.)

Add the Cor. to the Alt. of the ①'s Lower Limb.

Sun's				Height	of the	Eye, i	n Feet			
Obs. Alţ.	6 ft.	8 ft.	10 ft.	12 ft.	14 ft.	16 ft.	18 ft.	20 ft.	22 ft.	24 ft.
5 6 7 8 9 10 11 12 13 14 15 16 17 18 20 22 24 26	3.9 5.4 7.2 7.9 8.4 9.3 9.6 9.9 10.4 10.6 10.8 11.3 11.6	3:55 4:8 5:9 6:8 7:55 8:05 8:59 9:2 9:58 10:03 10:46 10:7 11:02 11:4	3·1 4·5·6 6·5·5 7·2 7·7·8 8·6 8·9 9·5 9·7 9·9 10·1 10·7 10·7 10·9	2.8 4.2 5.3 6.8 7.4 7.9 8.6 8.9 9.4 9.6 9.9 10.1 10.3 10.6 10.7	2:53 3:90 5:90 6:66 7:16 8:46 8:99 9:4 9:7 9:81 10:11	2·2 3·7 4·8 5·6 6·3 6·9 7·4 7·8 8·1 8·6 8·9 9·1 9·3 9·4 9·8 10·0 10·2	1.9 3.4 4.5 5.4 6.6 7.1 7.5 7.9 8.4 8.6 9.9 9.2 9.3 9.6 8.9	1.7 3.2 4.3 5.8 6.4 7.6 7.9 8.4 8.6 8.9 9.1 9.6 9.8	1.59 4.99 4.96 6.27 7.4 7.70 8.2 8.46 8.79 9.2 9.2 9.5	1.3 2.78 3.78 4.7 5.4 6.5 7.5 7.5 8.2 8.4 5.7 9.2 9.3
28 30 35 40 45 50 55 60 65 70 80 90	11.7 11.9 12.1 12.6 12.8 12.9 13.1 13.2 13.3 13.4 13.6	11.4 11.5 11.7 12.0 12.2 12.4 12.5 12.7 12.8 12.9 13.0 13.2	11.1 11.2 11.4 11.7 11.9 12.1 12.2 12.4 12.5 12.6 12.7 12.9	10.7 10.9 11.1 11.3 11.6 11.8 11.9 12.1 12.2 12.3 12.4 12.6 12.7	10.5 10.6 10.8 11.1 11.3 11.5 11.6 11.8 11.9 12.0 12.1 12.3 12.5	10.2 10.4 10.5 10.8 11.0 11.2 11.4 11.5 11.6 11.8 11.9 12.0	10.0 10.2 10.3 10.6 10.8 11.0 11.2 11.3 11.4 11.5 11.6 11.8	9.8 9.9 10.1 10.4 10.8 10.9 11.1 11.2 11.3 11.4 11.6 11.7	9.5 9.7 9.9 10.1 10.5 10.7 10.9 11.0 11.1 11.2 11.4 11.5	9°3 9°5 9°7 9°9 10°3 10°5 10°8 10°9 11°0 11°2

CORRECTION OF A STAR'S ALTITUDE. (Subtract.)

Star's		Height of the Eye, in Feet.												
Alt.	8 ft.	8 ft.	10 ft.	12 ft.	14 ft.	16 ft.	18 ft.	20 ft.	22 ft.	24 ft				
5	12.3	12.6	13.1	13.4	13.7	13.0	14.2	14.4	14.6	14.8				
5	10.0	11.3	11.6	12.0	12.3	12.5	12.8	13.0	13.5	13.4				
7 8	9.7	10.2	10.5	10.0	11.1	11.4	11.6	11.0	12.1	12.3				
8	9.0	9.3	9.7	10.0	10.3	10.2	10.8	11.0	11.2	11.4				
9	8.3	8.7	9.0	9.3	9.6	9.8	10.1	10.3	10.2	10.7				
10	7.7	8.1	8.4	8.7	9·0 8·5	9·3 8·8	9.5	9.7	10.0	10.3				
II	7.3	7.6	7.9	8.3	8.5		9.0	8·9	9.5	9.7				
12	6.9	7.2	7.5	7.9	8.1	8.4	8.6	8.9	9.1	9.3				
13	6.5	6.9	7.2	7.5	7.8	8.0	8.3	8.5	8.7	8.9				
14	6.2	6.6	6.9	7.2	7.5	7.8	8.0	8.2	8.5	8.7				
15	6.0	6.3	6.6	7.0	7.2	7.5	7.7	8·o	8.2	8.4				
16	5.8	6∙1	6.4	6.8	7.0	7.3	7.5	7.7	8.0	8.2				
17	5.2	5.0	6.2	6.5	6.8	7.0	7.3	7.5	7.7	7·9 7·8				
- 1	5.4	5.7	6.0	6.4	6.6	6.9	7.1	7.3	7.6	7.8				
20	5-2	5.6	5.9	6.0	6.5	6.7	7.0	7.2	7.4	7.6				
22	5·0 4·8	5.4	5.7		6·3	6.6	6.8	7·0	7.3	7.5				
24	4.6	5-2	5.2	5·8 5·6	5.8	6·3	6.5	6.6	7·0 6·8	7.2				
26	4.4	4·9 4·8	2.3	5.4	5.2		6·3	6.4	6.6	7·0				
28	4.2	4.6	4.9	5.2	5.2	5.9	6.0	6.2	6.4	6.6				
30	4.1	4.4	4.8	5·I	5.3	5·7 5·6	5.8	6.1	6.3	6.5				
35	3.8	4.2	4.2	4.8	5.1	5.3	5.2	5.8	6.0	6.2				
40	3.6		4.3	4.6	4.8	2.1	5.3	5.6	5.8	6.0				
45	3.4	3.8	4.1	4.4	4.6	4.9	2.1	5.4	5.6	5.8				
50	3.5	3.6		4.2	4.5	4.7	5.0	5.2	5.4	5.6				
55 60	3.1	3.4	3.8	4.1	4.4	4.6	4.8	5·I	5.3	5.2				
	3.0	3.3	3.7	4.0	4.2	4.5	4.7	5.0	5.2	5.4				
65	2.9	3.5	3.6	3.9	4.1	4.4	4.6	4.9	5.1	5.3				
70	2.8	3.1	3.2	3.8	4.0	4.3	4.5	4.8	5.0	5.2				
80	2.6	2.9	3.3	3.6	3.9	4.1	4.3	4.6	4.8	5.0				
90	2.4	2.8	3.1	3.4	3.7	3.9	4.2	4.4	4.6	4.8				

TABLE XVIa.

	A	ccelerat	ion.	
H. 1 2 3 4 4 5 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 1 22 23 24	M. 0 0 0 0 0 0 0 1 1 1 1 1 1 1 2 2 2 2 2 3 3 3 3 3 3 3 3	s. 9·86 19·71 29·54 39·28 59·14 9·00 18·85 28·71 38·56 48·42 8·13 17·98 37·70 47·54 27·85 37·70 47·54 26·56 56·56	M. 1 2 3 4 4 5 6 7 8 9 10 11 12 13 14 15 6 17 18 19 20 21 22 23 24 5	s. 0·16 0·33 0·49 0·68 0·98 1·15 1·31 1·48 1·64 2·13 2·30 3·29 3·12 3·32 3·35 3·37 4·41 4·41
			26 27 28 29 30 31	4·27 4·44 4·60 4·76 4·93 5·09

CORRECTIONS OF ALTITUDE OF THE SUN AND STARS. (Involving Dip, Refraction, ©'s Semidiameter, and Parallax.)

Add the Cor. to the Alt. of the ©'s Lower Limb, except where morked -(minus).

					c morn		minus	<i>′</i>			
Sun's bs. Alt.				Heig	ght of	the E	ye, in	Feet.		,	
Sur Obs.	26 ft.	28 ft.	30 ft.	35 ft.	40 ft.	45 ft.	50 ft.	55 ft.	60 ft.	70 ft.	80 ft.
55667889101112131415166171819200222426628830555555555	1.11 2.53 3.63 4.55 5.88 6.77 7.66 7.76 8.02 8.33 8.77 9.03 9.13 9.13 9.13 9.13 9.13 9.13 9.13 9.1	0'99 2'44 3'55 4'33 5'066'1 6'58 6'17'44 7'88 8'22 8'68 8'89 9'13 9'88 10'01 10'11	0.7 2.2 3.3 4.2 4.8 5.4 5.9 6.3 6.9 7.2 7.6 8.0 1 8.4 8.8 8.9 9.1 9.4 9.8 9.9 9.9 9.9	0'33'74'80'37'4'90'38'37'4'90'38'92'38'97'38'99'39'99'57'99'38'99'39'99'57'99'38'99'57'99'99'99'99'99'99'99'99'99'99'99'99'99	-0.11 3.33 4.66 5.05 5.88 6.14 6.66 6.80 7.71 7.73 7.78 8.33 8.58 9.00 9.13	-0.5 -0.9 2.1 3.06 4.2 4.7 5.4 5.7 6.2 6.4 6.6 6.8 7.7 7.7 7.7 7.7 9.8 8.2 8.6 8.7 9.8 8.6 8.7	-0.68 1.72.63 3.88 4.37 5.11 5.46 5.59 6.13 6.458 7.00 7.24 8.84 8.84 8.85	-1·2 1·3 2·2 2·3 3·5 4·4 4·7 5·3 5·5 5·7 6·2 6·7 7·7 8·0 8·2 8·2 8·2 8·2 8·3 8·4 8·7 8·7 8·7 8·7 8·7 8·7 8·7 8·7	-1.6 -0.1 -0.1 -0.1 -0.2 -0.3 -0.2 -0.3 -0.3 -0.3 -0.3 -0.3 -0.3 -0.3 -0.3		-33 -02 0.74 2.00 2.55 3.22 3.58 4.02 4.72 5.54 5.57 6.02 6.64 6.65 6.67
60 65 70 80 90	10·6 10·7 10·8 11·0	10.4 10.5 10.6 10.8 10.9	10·2 10·3 10·4 10·6 10·8	9·8 9·9 10·0	9.4 9.5 9.6 9.8 9.9	9.0 9.1 9.4 9.6	8·6 8·7 8·8 9·0 9·2	8·3 8·4 8·5 8·7 8·9	8·0 8·1 8·2 8·4	7.4 7.5 7.6 7.8	6·8 6·9 7·0 7·2 7·4

CORRECTION OF A STAR'S ALTITUDE. (Subtract.)

s Alt.		Height of the Eye, in Feet.									
Star's	26 ft.	28 ft.	30 ft.	35 ft.	40 ft.	45 ft.	50 ft.	55 ft.	60 ft.	70 ft.	80 ft.
° 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 22 24 28 30 35 5 50 6 6 5 5 70	15:0 13:6 12:5 10:9 10:4 9:9 9:5 9:1 8:4 8:4 8:1 7:7 7:8 7:7 7:6 6:7 6:7 6:7 6:7 6:7 6:5 6:7 5:5 6:5 5:5	15.2 13.8 12.7 11.1 10.1	15:4 14:0 12:0 11:3 10:7 10:3 9:5 9:5 9:5 9:5 8:7 8:5 8:0 7:5 7:4 6:8 6:4 6:2 5:8 7:5 7:5	15.8 14.4 13.3 111.7 111.2 110.3 9.9 9.7 4 9.2 2 8.9 8.8 8.6 5.5 2 8.0 7.6 6.5 6.4 4 6.3 3	16·3 14·8 13·7 12·8 12·1 11·6 11·1 10·7 10·3 10·1 10·9 8·9 9·6 8·9 3·9 7·6 4 7·2 7·6 9 6·6 6·6 6·6 6·6	7·7 7·6 7·4 7·3 7·1 7·0		17.4 15.9 14.8 13.9 12.2 12.6 12.2 12.1 10.8 10.4 10.2 10.1 10.9 9.7 9.7 9.7 9.8 7.7 7.8 7.7 7.7	17.7 16.3 15.1 13.3 13.5 13.0 12.5 11.7 11.7 11.2 10.9 10.7 10.5 10.4 10.2 9.8 9.6 8.4 9.6 8.4 8.8 8.8 8.8 8.8 8.8	18.4 16.9 15.8 14.9 14.2 13.6 11.2 11.3 11.8 11.6 11.4 11.2 11.0 10.9 9.6 9.6 9.6 9.8 8.8 8.7 8.6	18.9 17.5 16.3 15.4 14.7 14.2 13.3 12.9 12.3 12.1 11.7 11.6 11.4 11.2 10.9 10.4 10.4 10.9 9.8 9.5 9.3 9.1
80 90	5.2	5·4 5·2	5·6 5·4	6·0 5·8	6.4	6.8	7.1	7.5	7·8 7·6	8·4 8·2	9.0

SUPPLEMENTARY TABLES FOR LOW ALTITUDES.

	Correction for Small Altitudes.						
	bs.		40 ft.	Va:	nd Correction, rious Heights.		
	Sun's Obs.	Altitude.	Height, 40 ft.	-	$ \frac{Add \text{ to}}{Subt.} \left. \right\} $ from	Alt.	
	°333333344444555566667778888899	0 10 20 30 40 50 0 20 40 0 20 40 0	-4.9 4.4 3.9 3.4 3.0 2.5 2.1 1.8 1.4 0.8 0.2 +0.4 0.9 1.7 2.1	Ft. 68 10 12 146 18 20 22 24 26 30 32 34 36 8 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	+ 3'8' 3'4' 3'1' 2'8 2'5 2'3 2'1 1.8 1.6 1.4 1.2 1.0 0.8 0.7 0.5 0.3		
П	7778888999001011	0 40 0 20 40 50 0 20 40 0 30 0	2·4 2·7 3·0 3·3 3·5 3·8 4·0 4·2 4·4 4·6 4·8 5·0	40 42 44 46 48 50 52 54 56 60 65 70 75	0.0 -0.2 0.3 0.5 0.6 0.7 0.9 1.0 1.1 1.4 1.7 2.0 2.3		

's de.	40 ft.	Va Va	d Correction, rious Heights.
Star's Altitude.	Height, 40 ft.	-	\[\frac{Add \to}{Subt.} \\ \frac{\frac{1}{5}}{\text{From}} \right\} \frac{\frac{1}{5}}{\text{V}}
3 0 3 10 3 20 3 30 3 50 4 0 4 10 4 30 4 40 5 20 6 40 7 0 6 20 6 40 7 20 8 20 9 20 9 40 10 0 11 0 11 0	20.6 20.0 19.5 19.1 18.7 18.3 17.9 16.3 15.8 15.8 14.4 14.1 13.7 12.8 12.4 12.4 12.1 12.1 12.1 12.1 11.7 11.7 11.7 11.7	Ft. 68 10 12 14 16 18 20 22 26 28 30 2 34 44 46 48 50 52 56 66 67 75	+ 3'.8 3'.4 3'.1 2'.8 2'.5 2'.3 2'.1 1'.6 1'.4 1'.2 1'.0 0'.8 0'.7 0'.3 0'.2 0'.0 -0'.2 0'.3 0'.5 0'.6 0'.7 0'.9 1'.0 1'.4 1'.7 2'.0 2'.3

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[From the Syren and Shipping, 23rd August 1905.]

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[From the Nautical Magazine, September 1908.]

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[From the Nautical Magazine, December 1908, on the latest edition.]

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[From Syren and Shipping Illustrated, London, 4th November 1908.]

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[From Shipping Illustrated, New York, 5th December 1908.]

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[From the Shipping World, 9th December 1908.]

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[From the United Service Magazine, December 1908.]

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[From the Mariner, 15th December 1908.]

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[The Press, Christchurch, 24th January 1912.]

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"The great beauty of these tables and the methods presented by Captain Blackburne for position-finding from two observations is that the navigator need never concern himself about either of the bodies being too near the meridian or the prime vertical, or too high in altitude for a Sumner or double-altitude position, as even such well-known writers as the late Captain Lecky would consider a bar to reliable results; but he impresses on the navigator that the only necessary condition of importance to ensure good results is that the two observations should be sufficiently far apart in bearing to give a good cut."

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EXTRACTS FROM LETTERS re THE A, B, and C "AZIMUTH AND REDUCTION TABLES."

[From Captain SQUIRE T. S. LECKY, R.N.R.]

"I intend shortly to tackle a new edition of 'Wrinkles,' and will try to make it as perfect as possible. Now, I have so much admiration for your A and B tables that I consider my book incomplete without them, etc.—Neyland House, Neyland, R.S.O., Wales, 3rd November 1890."

[From Admiral William R. Lang, R.N.]

"Your very simple and most useful azimuth tables will be a great boon to many navigators. What labour you will save them by your splendid work. . . .! What a very useful book for navigators you have compiled!—Harrogate, 27th April 1903."

[From Lieutenant Alexander G. Wright, R.N.]

"I think it is a most excellent book indeed, and quite the best of its kind that I ever came across. Your A and B tables are old friends of mine. I had the good fortune to meet with them when I was on the China Station in 1897.—H.M.S. *Brilliant*, Cruiser Squadron, 21st June 1903."

[From Captain T. S. Angus, Nautical Inspector, P. & O. S. N. Company.]

"Your latest A and B tables are certainly the most concise for practical work I have seen.—London, 14th September 1903."

[From Captain THOMAS LIDDLE, s.s. Kurrachee.]

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[From Captain Robert W. Ferguson, Brisbane, Queensland, 1st July 1906.]

"You indeed deserve the gratitude of seamen for the publication of these valuable tables. I have long held that every other method should give place to this. Personally, I have used Lecky's tables and the skeleton tables 27 A and B and 28 C of Norie for many years, but I shall discard them in future for your excellent tables. I do not understand why the Board of Trade continue the old cumbersome Sumner method in the examinations in preference to the graphic methods of Pagel, Johnson, and yourself."

[From Captain Thomas Mincham, Teacher of Navigation, Auckland, New Zealand, 7th December 1908.]

"The A, B, C Azimuth Tables I have used from the start of their publication. I prefer them to all others as more simple, and much easier to learn."

[From Mr W. H. SWENY, Chief Officer, P. & O. s.s. Moolton, Adelaide, 23rd January 1909.]

"I have now had your new edition of Azimuth and Reduction to the Meridian Tables in use for one Australian voyage, using them almost daily for stellar observation. The results obtained have been surprising, and so satisfactory that I have discarded all other books on these problems."

[From Captain John Owen, Teacher of Navigation, Cardiff, 25th January 1909.]

"Your method of solving the Time Azimuth problem by the A, B, C Tables is concise, and easy of solution. If these tables were more generally known, I think seafarers would use them in preference to Burdwood's or any other special tables employed at present."

[From Mr John Blencowe, late Second Officer, B.I. s.s. Shirala, Auckland, New Zealand, 9th February 1909.]

"In Lyttelton I obtained a copy of your new Azimuth and Ex-meridian Tables, and on showing them to my brother officers they were so taken with them that they all bought a copy themselves. I think the tables are splendid, and for the sake of the profession will do all I can to make them more widely known."

[From Mr S. C. Warner, Chief Officer, P. & O. s.s. Socotra, off Minikoi Island, 13th September 1910.]

"I should like to add my humble testimonial to the new A, B, C Book you have brought out, and to tell you how much it is appreciated here on board. I certainly think it is the very best book of navigation ever printed."

EXTRACTS FROM LETTERS-Continued.

[From Captain George Burton, Instructor of Cadets, Ocean Training-Ship Port Jackson, off Australia, 26th November 1910.]

"I have shown your book to all our senior cadets, and advised them to procure copies. The book is certainly altogether the most complete education in modern navigation yet published."

[From Captain J. King Davis, commanding the Australasian Antarctic Expedition, s.y. Aurora, Macquarie Island, 16th December 1911.]

"We have already several copies of the previous edition, as I use nothing else, and have insisted on my officers learning to use them, as they are the only suitable tables for our work, and are much handier, in my opinion, for any latitude. I hope that they will become very widely known, as I am sure you make matters much simpler than many of the bulky and expensive tables which seem to be of much less value."

[From Mr H. Rochford Hughes, Navigating Officer, H.M. Cable Steamer Iris, Auckland, 8th February 1912.]

"I have tried 'new navigation' methods, and all the principal tables of the day, during my search for the shortest and most accurate methods, and have come to the conclusion that for our work your tables and system generally are the best."

[From Commander Inving B. Miles, R.N., Officer in charge of Survey on Atlantic Coast of the Dominion of Canada, Department of the Naval Service Hydrographic Survey, Ottawa, 18th January 1912.]

"You may be interested to know that on my recommendation the Department here is providing all ships with your latest edition of tables. I have still your 'third edition,' 1886, which has been everywhere with me from New Zealand to Hudson Bay and Strait."

[From Commander Richard Hyde, R.N., Navigation School, Portsmouth, 12th April 1912.]

"I have just returned from a cruise with our gunboats the *Dryad* and *Harrier*, when I used your tables exclusively for finding azimuths, and personally I prefer them to Burdwood or Weir's diagram."

[From Lieutenant EDWARD R. G. R. EVANS, R.N., who Commanded the British Antarctic Expedition R.Y.S. *Terra Nova* from England to Antarctic in 1910. Christchurch, 17th April 1912.]

"I shall endeavour to bring your tables into more general use in the Navy, as I consider them facile princeps of their kind. Burdwood and Davis are so cumbersome. I think you will be pleased to hear that on the southern journey I used your tables exclusively, and worked out all magnetic variations and true bearings by means of them up to latitude 85° and hence to 88° almost by exterpolation."

[From Captain L. B. Bennett Gillman, s.s. Matatua, London, 30th April 1912.]

"Before leaving Wellington on our last homeward voyage I procured a 1911 edition of your tables for azimuth and reduction to the meridian. I think it is the cheapest and best book on practical navigation ever offered to the seafaring community. Had the price been two guineas instead of six shillings it would have been nearer the intrinsic value of the book. The tables are absolutely the last word in modern and up-to-date navigation."

[From Lieutenant Harry Pennell, R.N., commanding the British Antarctic Expedition R.Y.S. Terra Nova, Lyttelton, 3rd June 1912.]

"I have used your A, B, C and Ex-meridian Tables whenever the *Terra Nova* has made a voyage south, and have found them invaluable. In parts of Ross Sea the variation changes 1° for every four miles run at right angles to the lines of equal variation, and the large number of azimuths that it is necessary to take during the twenty-four hours would mean a prohibitive amount of work if your all-embracing tables were not at hand."

[From Captain Thomas Liddle, 31 Argyle Square, Sunderland, 30th December 1912.]

"Your last 1911 edition is undoubtedly the best book published for navigation, and the cheapest."

From Lieut.-Col. W. A. Tilney, commanding 17th Lancers, Sialkot, India, 29th July 1913, to Captain Blackburne.]

"Your tables have practically enabled us to revolutionise night marching, as you see by the enclosed report."

ON

TABLES OF CALCULATED HOUR-ANGLES

ANI

ALTITUDE AZIMUTH TABLE, ETC.

[Extract from Shipping Illustrated, New York, U.S.A., April 3rd, 1915.]

"The main purpose of these tables is to make as easy as possible the problem of finding the ship's position from combined altitudes of the sun, moon, or stars, and especially to facilitate the much-neglected practice of determining the ship's position from two or three stars at twilight, a few minutes before sunrise, and a few minutes after sunset. By the aid of the calculated star reduction and azimuth tables in this book a latitude and position line can be obtained at any time when the stars are visible almost as easily as by meridian altitude of a star. This method is the simplest yet brought forth for quickly and accurately solving the problem of determining position from stellar observations out of the meridian, or for determining latitude and position line from a single observation, which may be used in connection with a sounding, or the bearing of some mountain peak or light."

[Extract from Shipping and Commerce, Wellington, N.Z., March 11th, 1915.]

"This publication again shows the author's extraordinary faculty and grasp of the art of condensation in applied navigation. The tables comprise over a quarter of a million tabulations of calculated hour-angles, azimuths, reductions, and variations for the hour angles to I degree of latitude, altitude, and declination. The calculated reductions and azimuths of 27 bright stars from one hour to three hours from the meridian, some of them for hour-angles from the meridian below the Pole as well as above, have been made for the actual declination of the stars for the year 1920. This does away with the need for any interpolation for the declination, and these tables will be in this respect perfectly accurate for many years. The tables have been computed to an extreme degree of accuracy, and are especially helpful for determining the ship's position from combined altitude of the sun or stars. By these tables the problem of finding the ship's position from two or three stellar observations out of the meridian or for the numerous adaptations in conjunction with fixed shore objects and soundings in obtaining 'a fix' is copiously explained. The great advantage of these tables for daylight or twilight observations is that the ready determination of the altitude and azimuth from the table prevents the possibility of a wrong star being taken, and an observation may be obtained by setting the approximate altitude to the sextant before the star is visible to the naked eye."

[Extract from Evening Post, Wellington, N.Z., March 29th, 1915.]

"Nothing, it is understood, has ever before been published for so readily and accurately finding the latitude by stellar observations, as the reduction to the meridian is taken out at sight, for 27 of the brightest stars, for one hour on each side of the meridian, and up to 2 and 3 hours from the meridian below the Pole for all the brightest circumpolar stars. The true bearings of these stars are also taken out more simply and accurately than by any other tables, as the calculation has been made for the actual declination of the star, thus saving the interpolation required with other azimuth tables. The bearings given of the circumpolar stars supplement the omissions of Davis's Star Azimuth Tables, as no bearings are given in these tables within 3 hours of the meridian below the Pole, when the altitude is low and in the most suitable position for compass bearings.

"By combining observations from two stars within the limits of the Reduction and Azimuth Tables, when about 30° from the meridian, the latitude and longitude may be obtained in a very simple way. In this work Captain Blackburne has once again drawn attention to the value of double altitude observations for a 'Sumner' position in low latitudes, as well as in high, and in his effort to remove the wrong impression which exists among many officers in the merchant service in this direction he has given two or three convincing examples with altitudes not more than 2° from the zenith.

"The completeness and conciseness of the calculations, which greatly facilitate the task of navigation, make the book very valuable to all mariners in responsible positions."

EXTRACTS FROM LETTERS RECEIVED re "TABLES OF CALCULATED HOUR-ANGLES," Etc.

The late Commander Harry Pennell, R.N., H.M.S. Duke of Edinburgh, wrote:—
"These hour-angle and azimuth tables reduce sights now to the minimum of work conceivable when they fall within its limits."

Captain Herbert H. Edmonds, Teacher of Navigation, Sydney, writes:—" Received my copy of your book, with which I am greatly pleased. I have tested a few critical cases and find results all that can be desired, both with hour-angle and azimuths. What a boon to have all you want with a position-line in one act!"

Commander Edward R. G. R. Evans, R.N., H.M.S. Viking, writes:—"Very many thanks for 'Tables of Calculated Hour-Angles, Star Reductions, and Azimuth Tables.' Like all your works this is excellent, and simple enough for any navigator who will read the explanation and work a few examples until he is familiar with their use—then they are a pleasure."

Lieut. E. B. Dalby, R.N.R., H.M.S. Carmania, writes:—"I have purchased a copy of your new book, and hasten to say how much I like it. The printing is good, the arrangement could not be bettered, the explanations are copious, and the whole book a marvel of cheapness. I have checked the hour-angles in Table 1 by working out quite a number of sights in the usual way, and then working the same sights by this table. In no case did I get a difference of over a second, and in most cases the error was under half a second. The facility and accuracy with which the azimuth is obtained through the latitude variation (with a little mental interpolation in some cases) is certainly remarkable. For your star reduction and azimuth tables I have nothing but admiration. For stellar navigation I know of nothing to equal these incomparable tables."

Captain Robert W. Ferguson, of Brisbane, Queensland, writes:—"The tables are magnificent, and the most singular part of them is the truly graphic Altitude Azimuth Table No. IV, it being the best and most ingenious I have ever seen. . . . These tables are of inestimable value to the science of navigation, and your methods supersede all others in accuracy and brevity."

Captain Walter Lumsden, C.V.O., R.N., Director Royal Indian Marine, writes, saying:—"I am obtaining copies of this publication for supply to Royal Indian Marine seagoing vessels."

Captain John J. K. Konghan, commanding R.M.S. Sierra, writes:—"I use your books in preference to all other books on navigation. They give me entire satisfaction. . . . Your books are very popular with the Japanese. They know a good thing when they see it. . . . Have read and used nearly all the new books on navigation. Your books are the best I have seen up to this date. I intend to introduce it into the United States."

Later, Captain Konghan writes:—"Five copies of 'Calculated Hour-Angles' and eight of the small books, 'Azimuths,' have been purchased by the officers of this steamer for themselves and friends. I believe every voyage they purchase some."

Sub-Lieut. T. Konishi, of H.I.J.M.S. Azuma, Japanese Navy, writes:—"I tried your new book, and found it very good—very simple and very accurate. I tried (1) by logarithms; (2) Ball's Altitude Table... most used; (3) The Newest Navigation, Altitude and Azimuth Tables, by Lieut. Radler de Aquino, Brazilian Navy; and your table I think the best."

Sub-Lieut. Konishi took very high honours at the Naval College in Japan. His opinion, therefore, is much valued.

Naval Instructor S. F. Card, B.A., R.N., Head of the Navigation Department, and Lecturer in Navigation at the Royal Naval College, Greenwich, writes:—"Personally, I am a great admirer of your latest tables, and have brought it to the notice of the sixty new Naval Instructors that I have been training here at the R.N. College. The Azimuth Table I prefer to Burdwood's," etc.

Sir E. LIONEL FLETCHER, Manager Oceanic Steam Navigation Co., Ltd. (White Star Line). writes:—"We think it well to advise you that we have ordered 40 copies of your new Navigation Table, for use by the commanders in this Company's service."

The P. & O.S.N. Company, the N.Z.S.S. Company, the White Star Line, and the U.S.S. Company of New Zealand supply copies of the work to their steamers. The New Zealand Government are also supplying each of H.M.N.Z. transport steamers with a copy of the book.

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