
a Weekly journal 0f practical informátion, art, science, mechanics, chemistry, and manufactures.


## HOLMES' NEW BARREL MACHINERY.

knives are so arranged that either a hollow or straight joint
Several months ago we laid before our readers a detailed can be made, as desired.
chine represented in Fig. 2. A prepared head is laid upon the table and in front of a planer cylinder, on which are means of the operations involved in barrel-making by The dowels are next inserted by hand, and the separate several blades, and which is swiftly rotated by the driving refen a variety of entirely novelmachinery. The article pieces put together, forming rough squares, ready for the pulley shown on the left. The pulleys on rhe right actuate refed to will be found on page 191, Vol. XXX., and we next process. This consists in leveling, facing, and dressing four corrugated feed rolls which are held firmly against the took occasion therein to trace the course of the staves, be- the material on one side, and it is accomplished by the ma- work by weighted levers acting upon the bearings. The re ginning with their preparation in the jointing machine, thence to their being set up in barrel shape, the bending by heat, the leveling of the cask so that it would stand perpendicularly on end, the trussing, and, lastly, the chamfering, howeling, and crozing. We left the barrels en tirely complete, with the exception of the heads, the machines for the manufacture of which we failed to describe for the very excellent reason that they were still in the hands of the inven tors. We are now, however, enabled to make good the deficiency; and in the following de scription and accompanying engravings, the reader will learn of the three ingenious devices which produce the above mentioned essential portions of the barrel, and, besides, of a nove machine which combines the powers of both trusser and leveler, and of still another apparatus that bends, punches, and rivets metal hoops.
Every one knows that barrel heads are not usually made of a single piece, and that for ordinary casks they are generally of several portions jointed and doweled together. To make the joints and to prepare the pieces of heading, which have been previously sawn to the proper length, for the dowels, is the object of the ma chine exhibited in Fig. 1. This consis s in a large rotating metal disk, in the face of which are fixed three cutters, equidistant from each other. In front of the disk is a standard and rest. Upon the latter the piece of rough heading is laid, and its edges are press a against the disk by hand, so that they are thus rendered perfectly smooth and straight. The work is then removed and laid upon another rest on top of the machine, where it encounters two swiftly revolving augers or bits, which are forced against the edge by the foot treadle shown, and which speedily bore the holes for the dowels. There are no shavings visible about this machine, since the disk acts as a fan and blows them away through the shoot shown at the right hand of the engraving. Theheads of a large number of barrels can thus be pre pared per day by a single man, and the joint


Fig. 1.-barrel head jointing and boring machine. volution of the feed rolls carries the head over the planer knives, which rapidly smooth off the under side at the rate of from fifteen to the under side at the rate of from fifteen to
twenty-five heads a minute. The machine will also dress piece heading, taking off just sufficient material to produce the requisite finish.
The next operation is turning the heads in circular form and, at the same time, beveling the edge with two bevels, the upper bevel being less than the lower one. The machine employed is represented in Fig. 3, and is a remarkably ingenious contrivance. The head is placed Jetween two disks, one of which, that on the right in the illustration, is provided with a number of spring pins near its periphery, which press the work against the opposite disk. The pin disk is not connected with the driving machinery. Its spindle enters the cylindrical standard on the right, in which is placed apparatus by means of which the disk is thrown forward and locked in that position, firmly holding the work. Through the rotation of the opposite disk, the pin disk is also carried around, but for only one revolution, at the end of which stop mechanism, in rear of the standard and not shown in the engraving, is actuated to unlock the clamp, so that the pin disk springs back and allows the work to fall out. In case it be desired to accomplish this unlocking before a revolution is completed, the handle (shown protruding from the center of the top of the standard) serves to actuate the mechanism necessary therefor. Before the unfinished head is put into the machine to be rounded, its center is found and marked by an apparatus for that purpose. When the head is put into the machine, the centering pin, which is jointed to the hand lever beside the standard, is pushed forward by the use of the lever, and is brought in contact with the center mark on the head, thus centering it perfectly and saving all the material. The cen tering apparatus can be used or not, as desired. The disk on the left is rotated by mechanism by the driving pulley, which is thrown into or out of gear by the horizontal handle shown.
[For remainder, see page 86.]


Fig. 2.-MACHINE FOR DRESSING BARREL HEADS.


Fig. 3.-MACHINE FOR TURNING HEADS OF DIFFERENT SIZES

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NEW YORK, SATURDAY, FEBRUARY 6, 1875.


## THE EXAMPLE OF FRANCE

We think it is Smiles, who, in one of his biographies, tells of an engineer who said that, if you asked a man what he thought of a financial or political question, he would give you an elaborate opinion without a moment's hesitation; but if the question referred to the best kind of cement, he would perhaps take a week to decide on his answer. We are not finances, but propose to call attention to a few facts in relation to these matters, as presented by Mr. Bennet, an able financial writer of France. Certainly, if any people are in need of instruction on the currency question, it is ourselves, need of instruction on the currency question, it is ourselves,
and we commend Mr. Bennet's pamphlet to the attentive consideration of all who feel inclined to learn. We have only space to present a few of its salient points.
The Franco-German war ended in May, 1871; and in two years and a half from that time, the French had paid to Germany an indemnity of $\$ 1,000,000,000$ in specie, their own expenses incurred in the war having reached to about an equal amount. In making this large payment, with an inconvertiole paper currency, the latter was maintained almost continually at par, never having depreciated more than $2 \frac{1}{2}$ per cent. These are interesting facts, and in his pamphlet Mr. Bennet gives us the reasons. It is first to be noticed that, for nearly the whole period since the war, France has been the creditor of other nations, and it was on the occasion of the exchange turning the other way that the paper currency was depreciated. It is estimated that the amount of specie in France is largely in excess of the legal tender circulation, and the Bank of France has a specie reserve of 52 per cent of its outstanding circulation. In other words, the paper money of France is strengthened by specie, which, though not in circulation, is still in the country, and can be utilized if occasion arises. Mr. Bennet, while contending that bank if occasion arises. Mr. Bennet, while conten $\begin{aligned} & \text { ing that bank } \\ & \text { bills not fully protected by specie reserve are a source of }\end{aligned}$ great danger, shows their great convenience and, in his view, absolute necessity, in these times, if their issue is un-
net in a clear and thorough manner, and we hope that his
pamphlet will be widely circulated. Our own finances have not been managed in so wise a manner, and the condition of affairs in the country is not so prosperous at present, that we can afford to disregard the " Example of France," which country, incurring a war debt nearly two thirds as large as our own, in the short space of ten months is apparently on the direct road to a sound financial sy
experienced a serious monetary crisis.

## THE " SCIENCE" OF SPIRITUALISM.

On page 350 of the last volume of the Scientific AmerrCAN, we presented some of the teachings of science regarding spiritualism; today we further elucidate the subject by brief allusions to some of the facts in the history of this latest epidemic of superstition.
It broke out about twenty-five years ago, and the manifestations were popularly known as Rochester knockings or spirit rappings. The first mediums were three sisters; their name was Fox. They invented the raps, the rap language,
and a good part of the spiritual lingo and a good part of the spiritual lingo. They originated the
seance, and drove a lively business. séance, and drove a lively business. Spiritualism speedily
became a recognized institution; there was no lack of mebecame a recognized institution; there was no lack of me-
diums; notoriety and money were the substantial incentives; people, it is said, are fond of humbug, and pay more liberal ly for it than for the necessaries of life. The majority of people, as at the present day. looked upon spiritualism as supremely silly thing; the scientific world treated
ridicule or with a silence inspired by disgust and contempt There were investigations; and although many of them were very foolish, the rapping trick was fairly exposed The raps were traced to the persons of the Fox girls The mechanism of the raps was concealed and protected by the defences of womanhood; to the modest investigator the girls' skirts were barriers more formidable than stone walls. Had women dressed like men, there surely could have been no spirit rappings, and probably no spiritualism; we commend the fact to Herr Teufelsdroeck, the great philosopher of clothes, and we shall look for a discussion of it in a future edition of his "Sartor Resartus." Of the devices employed by the early mediums, the most elaborate and successful was that of a bar of lead suspended at its center by an elastic cord attached to and operated by the leg; of course this was available only to women, and the men were obliged to resort to something else.
The devotees appeared in swarms, and at the very beginning, and with the same capacity of $s$ wallowing as those of the present day; let a jackass bray in the presence of your genuine spiritualist, and, at a hint from his medium, he hears therein only the gentle and loving voice of his dead grandmother. The early exposures counted for little among the faithful ; a thousand bogus raps, they said, could not dis turb their faith in the one that they knew to be genuine. Also the theory was invented at a very early day that ther are wicked spirits, which make honest mediums cheat and lic.
Thus the Rochester knockings became modern spiritualism, with a vitality and diffusiveness comparable to those of the Canada thistle. From the ridiculous beginning of what, in its inception, was probably an innocent freak of $\mathfrak{i}$ little girl, we have today a superstition which will make the nineteenth century memorable for all time.
Spiritualism, as an ism or theory, was soon perfected. But the charlatanry, by which it is mainly kept alive, depends upon juggling tricks which may be modified and improved. For jugglery, like all human arts, is improvable, and is governed by the laws of evolution. The raps grew into thousand and one modified forms. Some of the new tricks, like the spirit speaking and writing, and planchette, were
too thin, and are retained only among the most saturated of the devotees, while those that had the strength of real merit of ingenuity, like the Davenports' cabinet and rope tying, have maintained their popularity. At last, and we wish we could believe it the final culmination of such things, we have the spirit materialization. The materialization trick was invented by a medium of this city, named Gordon, about two years ago. His exhibition was somewhat artistic, and is worthy of a description. A curtain of mosquito netting stretched across the room, separated the operator and his par aphernalia from the spectators; the netting served to protect the medium from intrusion, and also to give a more ghostly appearance to the objects exhibited. In the middle of the spiritual sanctum was erected a gorgeous altar or throne, about which Gordon, arrayed in a priestly robe, incanted or chasseed during the performance. The light was turned down to that faintness in which ghosts and spirits love to walk abroad. Gordon makes his right arm invisible by drawing over it a black cloak. He raises this arm away from and at the side of his body, holding in his right hand a common paper mask or false face, such as the children get for their amusement at a cost of five or ten cents each. Then he gen tly moves the mask through the air, or ducks it or bobs it up and down, etc. The performance is repeated with variations, other masks and other motions, for an hour or two. Some of the masks are a little dressed up by means of a white handkerchief thrown over a part or dangling from the lower end; in such simple ways is an old lady with a white cap, or a baby in a long dress, constructed; a bride is got up by placing a gauze veil in front of the mask. Gordon's repertoire of masks was extensive; he was able to bring up the
men, women, and babies of all races of mankind.
From the front of the netting, the view, especially to the eyes of the devotee, was impressive. Gordon was a solemn eyes of the devotee, was impressive. Gordon was a solemn
great h :gh priest, or head center; and in response to his in-
spirits were often recognized. It was a common thing to hear from the crowd of eager spectators, sighs and sobs, and such expressions as " Is that you, Jane?" " Is it my grandmother?" "Is your name Smith?" "It is my darling Bobbie; are you happy ?" To all of which, through Gordon's skillful manipulation of the masks, came the appropriate responses But Gordon's career as a materializer lasted only a few weeks. One evening, in the midst of the performance, gentleman of the audience leaped over an intervening table, dodged Gordon's confederate, dashed through the mosquito netting and had Gordon securely in his arms. Gordon was thus caught in the act; he held a mask in his hand, and others. were taken from the folds of his robe and other places. In our next article, we shall give further particulars con erning other forms of "spiritual materializations."

## TO OUR FRIENDS.

In dealing with our legions of friends. it is our earnest desire to give satisfaction to every one of them. At this season of the year, when old subscribers are renewing and new names are coming in by the hundred every day, it is impossible to answer all enquiries the very day they are re ceived. But should any suppose that we have overlooked ceived. But should any suppose that we have overlooked
their requests or slighted their interests, we hope they will at all times promptly inform us. Speak plainly, and do not hesitate to complain.
Our mail writers and folders are under special injunctions write our subscribers' names upon the envelopes legibly and fold each paper neatly. We shall be glad to be informed if anybody receives slovenly work from this office.
At the beginning of the year, many thousands of subscriptions are renewed, new clubs formed, etc. If any person fails to receive the paper or any premium to which he is en titled, we will thank him to inform us promptly
If, by any chance, any editor or publisher, who by any agreement is to receive our paper, should fail to receive it we shall be glad to be informed.
Persons who have written to us upon business or sent en quiries for the paper which have not been answered, are re quested to repeat their enquiries. Letters sometimes fail to each us. Be particular to mention the State in which you live. In some cases we are perplexed to know where to di rect, when no State is given and there are many post offices of the same name.

## HAVE A SPECIALTY

The sooner people begin to comprehend that practically there is no business, calling, trade, or profession which any one man can master in all its branches in a lifetime, the better will it be for every individual's prosperity. We believe that half the failures in the great struggle for liveli hood are due to men trying to do too much, trying to fulfil all the requirements indicated by a name because their fathers did, but forgetting that, in their fathers' time, tha: name included an aggregate of labor of very different extent to that which it now encompasses. Every day as it closes leaves the world richer in knowledge, and the aggregation of many days produces a store of learning which increases vastly the quantity which the beginner must master ere he approaches proficiency. A couple of centuries ago all that the world knew of the healing art was within the easy grasp of any average intellect. Now, there is no physician living, however eminent, who pretends to have mastered or even to be moderately versed in all the details of medicine and surgery. So it is with Science, with law, with mechanics with journalism, until each calling has reduced itself to an agglomeration of specialties ; and, without doubt each spe cialty in the future will be divided and subdivided as learn ing and education advance
That which is true of the professions is equally true of the trades. The lawyers say that the man most to be dreaded as an adversary is "he of one book." The individual who knows only one thing, but that root and branch, is unques tionably abler and wiser than another who has dabbled in this and that until his mind is but a jumble of ill assorted ideas, superficial at the best. If a mechanic, for example finds that there is any one operation for which he has a special liking, and can accomplish it just a little better than anything else, that is the thing for him to stick to. He should make up his mind to cling to it through thick and thin, to try and improve certain parts until a uniform per fection is attained. It does not take the world very long to discover who is the best man for this or that purpose; and when it finds out that man, who has made a specialty of on operation and unquestionably does it better than anybody else, the world must avail itself of his labor and, in so doing, must pay him his own terms.
We do not mean to argue that a man should be like a horse,capable of entertaining but one idea at a time, for that would be to advocate narrowmindedness; but we do mean to say that no man should be without one essential and pre vailing object, in the prosecution of which he is determined to excel, and it does not make any difference what that is, whether cleaning a gutter or saving lives. We should liken this uppermost purpose in a man's brain to an elaborat treatise on one subject alone in a library of general encyclo pædias. Thelast indicate the expansion and grasp of one views on all things, the first their concentration on a life work. The simile is all the more apt, for, after all, when we come to examine everything we know outside our one calling, we find we are only in possession of a more or less copious in tex. And we are led to the certain conclusion that the ver best we can ever hope to do in the attainment of knowledg is to learn where this fact or that theory is to be found mos
perhaps we may safely say that one of the cardinal differ ences between the educated and uneducated is that the former are capable of instantly selecting the proper means of refreshing their memory, while the latter might spend days in sarch of the same.
Suppose, for example, that the reader has carefully studied the Scientific American over a dozen or more volumes. Now if a question occur, the answer to which he has seen in any volume, doubtless he will be able to turn to the proper page, or to its vicinity, and so easily oltain the desired information. But on the other hand, if an individual who had never read the volumes, although knowing, of course, the general nature of their contents, should undertake to find some special information, he would have to pore over the long indices of every volume, and search the pages, wasting perhaps valuable time. In this case the knowledge acquired has a direct pecuniary value, for "time is money"-and this apart from its intrinsic benefit to its possessor.

All this adds weight to our first advice, namely, have a specialty, and push it. Be sure that you are right before you select it. We do not believe that any man can rise to eminence in a calling which he dislikes, and herein lie the oft repeated mistakes of parents in forcing children into trades and professions against the latter's inclinations. A boy who has a feeling for art, who spends every moment with paint and brush, will chafe under coarse mechanical labor; while another whose delight is in his tool chest will rebel against the slavery of books and brain work. Both, when they become their own masters, will eventually abandon their distasteful tasks; and it is only a question of their continuity of purpose whether they become " rolling stones," drifting from one business into another all their days, or workers, firm and steadfast because buoyed up by a constant sense of enjoyment of their chosen labors.
Intermittent toil is wasted effort: so also are attempts to manage two or three different pursuits at once. There must be one definite aim; and toward this every thought must be concentrated, for nothing is more certain than that fame, wealth, and happiness are the rewards of only those who

## Still advancing, still pursuing,

## OURSELVES, AS OTHERS SEE US."

It is pretty generally conceded that a newspaper may " blow its own trumpet" with moderation, and still not be considered egotistical, provided, however, that there really exists good reason for awakening the echoes with the brazen (adjective to be taken in its literal sense only) throat aforesaid. But when there is no substantial basis to warrant the instrumental flourishes, a discriminating public speedily unearths the fact, and, letting the aspiring soloist severely alone, permits him to exhaust his lungs in inglorious solitude. These sententious observations occurred to us just now, while busily looking over a multitude of newspapers which have been pouring in lately from every quarter of the country. Scissors in hand, we have clipped from each journal a certain paragraph which to us is especially interesting-naturally, since it relates to ourselves. Each one of these scraps of paper is a blast from somebody else's trumpet for our benefit ; and when we regard their number, we can hear an imaginary chorus which fairly overwhelms the feeble notes which we occasionally raise in our own behalf. This is very encouraging; there is a general verdict of "' well done", which is more than reassuring, and certainly we may arrogate to ourselves the idea that we are far from resembling the luckless performer on the metaphorical clarion, whose efforts neither merit nor meet appreciation.

Compliments and kind wishes must, however, be acknowledged : and besides, perhaps there are some of our readers who may be sufficiently interested in our labors to desire to know what other people say and think regarding the same. Therefore, we print a few of the pleasant things written about us-if we had space, we would publish all-just to show the tone of the whole. At the same time, we gratefully te'nder our cordial thanks, not merely to the authors of the opinions below quoted, but to all of our professional brethren who have kindly said a good word for the Scientific AmeRICAN.
"We can cordially recommend it,", remarks the Mattoon (III.)
Gctzette, "as an instructorthat quietly and Gcazette, "as an instructor that quietly and unobtrusively makes its weekly visits, and oftener than otherwise gives information that is so pat, so timely, and so much needed that you are disposed to sit
down and drop the publishers a postal card, and inquire by what sort of divination they discovered just what you wanted to know."
The divination of nearly thigrty years' experience in seeking just sucl information, is our answer to our contemporary's query.
The Weckly Mirror, of Lyons, Iowa, "can imagine no class of useful arts and employments of life, or at the same time is pre sented in a more attractive form. Drop the trashy publications and take the Scientific American, which cannot fail to benefit any who reads it.'
This last sentence is especially true. No one ever made a cent by reading maudlin love stories or yellow covered novels. Hundreds have made thousands of dollars by ideas suggested while reading the Scientific American.
The Moline (Ill.) Review thinks that, "of its class, this paper is the best in the world; and it is a compliment to the good sense of our
manufacturing city to know that few papers are more largely ead."
This reminds us of the remark of an eminent clergyman of this city, who said that whenever, in visiting a strange dwelling, he found a copy of the Scientific American about the room, he was assured that he was in the abode of people of intelligence and education. The Corner Stone, of College Corner. Ind., evidently has a like opinion, as it re College

## "Always full

The Albany Sunday Press chimes in with : "The man, or reading and studying child even, who is without it keeps himself at a disadvantage with others having it, for he who knows most of this world sible to receiving the sum which is pained through the bnowledge sible to compute the sum whin,
imparted by such a publication,
Here are a quantity of such
lly we faudatory opinions that, actually, we feel a sense of diffidence pervade us as we cull them from the various paragraphs; especially when the Crionville (Mn.) Ledger begins by saying that
"Words utterly fail us in attemptin

## "Words ut periodical."

We-well, our natural modesty-we cannot-However, proceed with others less embarrassing:
Nearly thirty years ago we scanned its pages with extreme delight, and we have never since laid it
pointment."-Bellefonte (Ark.) Record.
"This is one of the most valuable
chanic of any kind could possibly have in his household,"-Harrison Ark.) Highlander
"Nothing like it can be found elsewhere."-Waverly (Iowa) Republican.
"One of the best papers for the farmer, the merobant, machinist, "aborcr, and in fact for everybody."-Oregon (III.) Grange.
"It is a promoter of knowledge and progress t.
where it circulates."-Galena (Ill.) Daily Gazette.
"There is rarely a number issued that is

## "absaription."-St. Charles (Mo.) Neus.

"It contains more solid information than can be obtained in almost any other way for the same money."-Trenton (Mo.) Republican. "Foremost of all industrial publications."-Wichita (Kan.) Eagle. "Its reputation is so well established that no eulogy from us could increase the public appreciation of its great merits."-Monctom (N.
B.) Times. B.) Times.
ws, or a desire to the day."-Waterville (N. Y.) Times.
"Clear of technical terms, fully up with the times, and explains the latest improvements and discoveries in every department of SciThe above is but Independent.
The above is but a portion of the collection before us, but
we will not take room for more in the present number.

## A PROBLEM RELATING TO THE SPHERE.

A correspondent, in a recent letter, asks us to solve the following problem: " What sized auger will bore out just half of a ball eight inches in diameter?"
This is a new question, so far as we know, with regard to the volumes that can be cut from a sphere; and though there is nothing very difficult in the solution, it affords an opportunity for showing the general methods employed in discussing such questions, and the rules that are given for finding volumes will be useful to many of our readers.


By a reference to Fig. 1, it will be apparent that, if a hole is bored through a sphere by an auger, the volume cut away is that of a cylinder, the diameter of whose base, A B or C D, is equal to the diameter of the auger, together with the two spherical segments, each of which has the same base as the cylinder, and a hight equal to half the difference between the diameter of the sphere and the hight of the cylinder. Now
if we can obtain expressions for the volumes cut away, in some value of the diameter of the cylinder, we can readily form an equation from which the diameter can be ascertained. To do this, the following notation will be employed; and to make the solution as general as possible, we will suppose that, instead of half of the volume of the sphere being cut away, any portion whatever, represented by $m$, is removed: $x=$ radius of auger.
$2 y=$ hight of cylindrical part of cut.
$a=$ radius of the sphere.
$a-y=$ hight of each spherical segment cut away
The volume of a cylinder is equal to the area of the base multiplied by the altitude, and will be, in the present in stance, $3 \cdot 1416 \times x^{2} \times 2 y=6 \cdot 2832 \times x^{2} \times y$.
The volume of a spherical segment is found by adding three times the square of the radius of its base to the square of its hight, and multiplying the sum by $0 \cdot 5236$ times the hight. Hence, the volume of the two segments in question will be $\left[3 \times x^{2}+(a-y)^{2}\right] \times 0.5236 \times(a-y) \times 2=3 \cdot 1416 \times x^{2} \times(a-y)$ $+1 \cdot 0472 \times(a-y)^{3}$.
The volume of a sphere is equal to the cube of its diameter, or eight times the cube of its
0.5236 , or $8 \times a^{3} \times 0.5236=4.1888 \times a^{3}$.
The volume of that part of the sphere which is to be cut away by the auger is $4.1888 \times m \times a^{3}$.
Now, having two different expressions for the volume cut away, we obtain the equation of condition by putting them equal to each other: $6.2832 \times x^{2} \times y+3 \cdot 1416 \times x^{2} \times(a-y)+$ $1.0472 \times(a-y)^{n}=4 \cdot 1888 \times m \times a^{3}$.
As there are two unknown quantities, $x$ and $y$, it will be necessary to form another independent equation of condition. Fig. 2 is a section of the sphere, in which B C is the diameter of the auger, E C or $x$ the radius, A C or $a$ the radius of the sphere, and A E or $y$ half the altitude of the cylindrical portion of the cut. From the right angled triangle, E A C e obtain $x^{2}=a^{2}-y^{2}$.
Substituting this value of $x^{2}$ in the first equation of condition, and performing the operations indicated, the equation
$-3.1416 \times a \times y^{2}-3.1416 \times a^{2} \times y+3.1416 \times y^{3}+1.0472 \times a^{3}$ $+3.1416 \times a \times y^{2}-3.1416 \times a^{2} \times y-1.0472 \times y^{3}=4.1888 \times m$ $\times a^{3}$, which reduces to $y^{3}=a^{3}-m \times a^{3}$. For the special case, given by our correspondent : $a=4, m=\frac{1}{2}$, hence $y^{3}=32$, and $y=\sqrt[3]{\overline{32}}=3 \cdot 1748$ inches; and the diameter of the auger that will cut out half the volume of the sphere is
$x=\sqrt{(4)^{2}-(3 \cdot 1748)^{2}}=2 \cdot 4332$ inches.
As the numbers from which $x$ and $y$ are determined are not perfect squares and cubes, the roots are not exact; but by carrying them out to a sufficient number of decimal places, any desired degree of accuracy can be attained. The values given above, for $x$ and $y$, are very nearly correct, as can be shown by the following proof:

Volume of cylindrical part cut away : $3.1416 \times(2 \cdot 4332)^{2} \times$ $6 \cdot 3496=118 \cdot 1033$ cubic inches. Volume of the two end segments: $(2.4332)^{2} \times 3.1416 \times 0.8252+(0.8252)^{3} \times 1.0472=15.9371$ cubic inches. Total volume cut away : $118 \cdot 1033+15 \cdot 0371=$ 134.0404 cubic inches. Half the volume of the sphere: $4 \times$ $(4)^{3} \times 0 \cdot 5236=134 \cdot 0416$ cubic inches.
The difference of only $\frac{1 \frac{1}{0} 0}{1000}$ of a cubic inch between the two independent calculations shows that the above values of $x$ and $y$ are exceedingly close to the absolute results; but any of our readers can reduce the difference still farther if they so desire.

## SCIENTIFIC AND PRACTICAL INFORMATION.

## A sulphur region.

The Winnemucca (Nevada) Silver State says: " Right here n Humboldt, within a hundred yards of the Central Pacific railroad, and in the immediate vicinity of the silver mines of the Humboldt range, are beds of sulphur, carable, it is believed, of supplying the whole world with that article for centuries. These sulphur deposits are located in the Humboldt valley, not much over a mile from the Humboldt House, and probably thrice that distance from the base of the Humboldt range. But little is known in reality of the extent of the beds, except that they cover a large area in the valley, and have been prospected in one place to a derth (f several feet, where the excavations expose hundreds of tuns of the pure article, which can be made available for commercial purposes at no greater expense than loading it on the cars and shipping it to the great commercial centers."

## value of discipline.

A suggestive instance of the value of discipline in times of emergency is found in the circumstances attending the loss of an Austrian man of war, recently, off Sicily. After the vessel had struck and it was found that she wust shortly go to pieces, the captain ordered every man into the rigging. The command obeyed, the word was passed for all hands to strip and be ready to jump overboard at the signal. The instrip and be ready to jump overboard ater was given, every one leaped. A few seconds after, the ship keeled and went to pieces. Every man after, the ship keeled and went to pieces. Every man
reached shore safely, except one who neglected to remove reached shore safely
his clothes as ordered.

## A New explosive.

A new kind of prismatic powder is being tested by the German military authorities. Its specific weight is greater than that of ordinary prismatic powder ( 1.69 against $1 \cdot 65$ ) and its effect is so powerful that it is said to render the Prussian 28 centimeter 11.02 inches cannon a match for the English 11 inch gun.

## ignorance in massachusetts.

The Deputy Constable, appointed to look after the children employed in the factories of Massachusetts, reports that fully 60,000 children are growing up in ignorance on account of their being set to work at too early an age.
new discoveries on the action of galvanism on the throat.
The faculty of Jefferson Medical College, Philadelphia, have recently conducted a series of interesting experiments upon the body of an executed criminal, which have revealed several novel and important facts in physiological science. Dr.W.W. Keen, after dissecting the chords of the neck which connect with the larynx, galvanized each in turn. When the left chord was galvanized, this only responded, and the same was the case with the right. It was found that there was no crossing of the chords from one side to the other, and that the action of each was distinct and independent. The doctor also examined and galvanized separately the external and internal intercostal muscles (between the ribs) and found that their function was not uniform but different. Physicians have long been at variance on this question, but the present discovery seems to settle the matter, since it proves that the external muscles are for expiration and the internal for inspiration. It has been believed by some that, by the for inspiration. It has been believed by some that, by the This impression is incorrect; for while the application of a battery, to the cadaver from which life has been extinct but a short time, will serve to produce muscular action, the result shows that only a portion of the body, and not the brain, is excited by external power.

## butter salting tees.

A select committee of the New York Butter and Cheese Exchange is at present investigating the important question as to the best salt to be used for butter making. A merican and English salts are in competition, and the result which will be reached is of great pecuniary moment to dairymen generally. The report will appear during next April, and will be based on practical tests of butter salted by the various varieties of salt. The committee is to judge simply from the samples, no information being given as to the manner in which each has been prepared.

THE PERNOT ROTARY PUDDLER.
The new puddling furnace represented herewith has its characteristic feature in an inclined hearth, not more than one half of which is ever covered by the molten metal. This modification, it is stated, has given important advantages, as the higher part of the hearth forms a rapidly oxidizing surface for the thin layer of metal by which, because of adhe sion and by centrifugal force, it is constantly covered,
The hearth is supported by two pairs of wheels, which rest on a circular track, and is guided in its rotation by its porting bed. Rotary motion is given to it by a worm, F, which engages in the cogs on the cir cular portion, D on which the hearth rests. The whole is mounted on trucks, as shown, resting on a suitable rail on a suitable rail way. The meta has a lining of coria or ore few inches thick
The hearth, mounted upon its car, is wheeled directly into the furnace, in a position as near as possible to the metal plate that supports the ma sonry above When the hearth is at a reddish white heat, the interstices are closed with frag ments of ore, and the operation of
puddling is carried on by rotating the hearth some three or four turns per minute, care being taken to spread the contents evenly over the surface. The formation of blooms is the same as in ordinary puddling, except that, owing to the rotation of the hearth, the work can always be done directly in front of the door. Water circulation can be employed for cooling. The ordinary charge is about 1,100 pounds, and this is divided into seven or eight blooms, the average time of forming which is about half an hour, including the period necessary to transport them to the forge. A complete operation, comprising the squeezing, lasts about two hours, the cleaning of the grate and reheating of the furnace occupying about half an hour of this period.
At the foundery of St. Chamond, France, in one week, there were produced, in 11 heatings of 25 hours $\epsilon$ ach, 25 tuns of fine puddled iron, while by hand puddling the same iron (gray charcoal) did not yield over 12 tuns. In the former case the loss did not exceed 30 pounds of raw per 1,000 pounds of finished product; in the latter the loss was fully 200 pounds. The consumption of fuel, at the sametime, was reduced from 3,300 to 2,640 pounds.

## A SELF-CORKING BOTTLE.

This is an ingenious plan for arranging the cork inside the bottle, so that, when the latter is filled, the stopper rises into place and so closes the mouth. The neck of the bottle, at the

point where it joins the main portion, is provided with projections, four in number, which prevent the cork placed above them from pulling through. During the filling, the weight of liquid coming from above keeps the cork down upon the ribs, and the fluid, of course, flows in between said projections. As soon, however, as the bottle is full, the cork necessarily rises with the contents, and, being tapered upwards, wedges into the mouth. To open the bottle, the cork is simply pushed down; then, as the bottle is inverted to discharge the liquid, the cork will rise upward and so leave a
clear place of exit at the orifice. The ribs on the neck of the bottle act as strengthening pieces, and may be molded with the vessel in the ordinary way. Patented April 28, 1874, by Messrs. Henry and Thomas Miller, of Pittsburgh, Pa.

## A Universal Language.

A language which could be understood all over the globe, says a contemporary, would be exceedingly useful in science, commerce, and social intercourse. Enthusiastic philosophers have more than once tried to invent a universal language, but have not succeeded; and the students or traders who

wealthy residents. Two gentlemen, Messrs. Elder and Hughes, have given $\$ 100,000$ each to found a university, and the colonial government has appropriated 95 acres of land for a site and 50,000 acres as an endowment

## Mysterious Fire.

The Niagara Falls Gazette gives the following account of a mysterious fire which was discovered in a house occupied by Mrs. P. A. Porter, at that place: "About noon, one of the servants noticed a little smoke issuing from the floor in first floor of the house. Smokehad been noticed in the house the day
before, but no indications of dangerous fires had otherwise been apparent. A messenger was sent for Mrs. Porter's business manager, who was at church. Upon his arrival search was instantly made for thefire, which was evidently making headway somewhere between the floor and ceiling below. The trouble was finally found under the dining room floor, in a place where it would seem impossible for fir.e to originate. The floor has a deep layer of sawdust beneath for the purpose of deadening sound. Be-

## THE PERNOT ROTARY PUDDLER.

desire to communicate have still to learn a number of languages, or to betake themselves to translations. To overcome these difficulties, a learned German, Dr. Bachmaier, has invented a method of correspondence in which numerals stand for words and ideas. Assuming (in round numbers) that four thousand words are sufficient for all purposes, he prepares a dictionary with columns of numbers from one to four thousand, each number having a word against it which it represents in every language. For example, if the word fire is number fifty-two, the same number will stand against feu in the French, and against Feuer in the German dictionary, and the same in any other that may be compiled. From this it will be understood that an Englishman entirely unacquainted with French or German might easily make a communication in either of those languages. He would look at his alphabetical list of words and set down the corresponding numbers. The Frenchman or German would look at his list of numbers, would set down the corresponding words, and thus have before him his correspondent's statement, and would have equal facility in answering. To make known masculine and feminine, nouns and adjectives, tenses and inflections, and other grammatical requirements, Dr. Bachmaier affixes certain simple marks to the numerals. He has already published three dictionaries-English, French, and German,-and is at work on other languages. At the meeting of the Oriental Congress last autumn, copies of these dictionaries were exhibited, and by the most competent judges were warmly approved.

## Silica in Cancer

In the November number of the Edinburgh Medical Jour nal, Mr. Fawcett Battye narrates his experience with an en tirely new remedy in cancer. This is silica, powdered very fine, and administered internally twice or thrice a day in fine, arain doses, combined with a third of a grain of mor phia. He found it to diminish the pain in a marked degree and by the tenth day to disperse it altogether. He does not precisely claim, however, that the patients recovered. They were relieved and benefited; and when they took it continuously, the disease was retarded. No satisfactory explana tion of its action is advanced.

The Preservation of Smoked Meat
Professor Nessler saysthatthe keeping qualities of smoked meat do not depend upon the amount of smoking, but upon the uniform and proper drying of the meat. It is of considerable advantage also to roll the meat on its removal from the salt, before smoking, in sawdust or bran. By this means the crust formed in smoking will not be so thick; and if moisture condenses upon the meat it remains in the bran, the brown coloring matter of the smoke not penetrating. The best place to keep the meat is in a smoke house in which it remains dry, without drying out entirely as it does when hung in a chimney.

## cientific Progress in Australia.

Our advices from Port Adelaide, South Australia, report the foundation of an institute in that city for the advancement of art, science, and literature. The first stone of the building was laid on October 31, 1874, a large sum of money
ath the sawdust, and about an inch and a half above the , ceiling beneath, is a thin flooring, keeping the sawdust from
the lathing and plaster. The fire was found burning the unthe lathing and plaster. The fire was found burning the un-
der side of this thin flooring, between the flooring and the der side of this thin flooring, between the flooring and the
ceiling. It had evidently been smoldering for two or three days, but had burned through to the sawdust in only two or three small places. How fire could originate in such a confined place, several feet from any chimney or flue, remains an unsettled question. The only plausible theory that has been advanced throws the responsibility for the trouble upon ome mischievous mouse."
Apropos of the above, a French paper states that quite an alarming proportion of the number of private houses burned down is to be traced to the thefts of mice, who are particularly fond of the wax matches which are chiefly in use in Europe. They steal these matches and carry them away to their nests, where, at some more convenient time, they commence their meal, and a single nibble in contact with the phosphorus may ignite the whole collection.

## COMBINED KNIFE AND PEPPER BOX

This is an ingenious arrangement of a pepper or


## Fir. 1.

 salt box in a knife handle. The latter is hollow, and into it screws the box, which is shaped as in Fig. 2. The receptacle is filled from the top and then inserted in the handle, a neat cap, attached to its extremity, passing over and making a finish to the end of the same. Perforations around the bottom of the box allow of the escape of the condiment when the box is slightly drawn out.The devicewill be found useful for pienics and camping parties, as it saves the room taken up by the ordinary pepper and salt cellars, and besides secures a supply of the useful seasoning materials being constantly, and literally,on hand. Patented April 21, 1874, by Messrs. R. W. and R. F. F. Brown, of Utica, N. Y.

## Carbolic Acid a Preservative for Hides.

In South America and Australia, it is stated that the immersion of hides for 24 hours in a two per cent solution of carbolic acid, and subsequently drying them, has been successfully substituted for the more tedious and expensive process of salting.

## the tulip tree.

This noble tree deserves a place on every lawn, as it seldom fails to develope itself into a stately specimen in any good, deep, well drained soil. In habit of growth, it closely resembles the common maple, but its conspicuous orangetinted blossoms and scaly fruits at once suggest its near affinity to magnoliads, to which it belongs. The flowers are not unlike those of a tulip, and hence the name by which it is most generally known. The broadly expanded leaves, instead of being palmate as in the plane, are irregularly four lobed, and somewhat resemble a saddle in conformation; and it is sometimes called in the vernacular the saddle tree, from this peculiarity. Our illustration gives an excellent idea of the flowers, foliage, and fruit. The flowers are profusely borne during the summer months; and although not strikingly ornamental on the tree on account of their being somewhat hidden amid the ample foliage, when cut and arranged in a vase with the foliage that naturally belongs to them, they have a distinct and striking appearance. This tree is from 100 to 150 feet in hight, but in Europe it rarely exceeds 70 or 80 feet. In the old arboretum at Chiswick, Eng., there used to be two specimens of this fine tree, one having much largerand brighter col ored flowers than the other; and, doubtless, other varieties of it exist where plants are raised from seeds. All through the summer the foliage is of a fresh, pale green; and, in the autumn, it dies off a brilliant golden yellow. Striking effects might, therefore, be obtained by grouping it with quercus coccinea or the purple-leaved beech. In addition to its ornamental properties, its distinct and noble port commending it at once to the notice of intending planters, it is valuable as a timber tree, the wood being firm in texture and capable of taking a fine polish.

## The Diving Bell.

M. Tosellistates that he has been making expe riments with his submarine vessel, or "marine riments with his submarine vessel, or "marine
mole," as he calls it (of which we gave a descripmole," as he calls it (of which we gave a descrip-
tion on page 19 of our last volume). He is struck with the correspondence, of many of the phenomena, to those observed in ballooning; and considers that it is at the bottom of the sea that the problem of aeria navigation will be solved. In a liquid mass which is still, the machine moves quite well in obedience to the screw propeller, which is driven by the hand. But if the vessel meets a current, it is vain to think of contending with it. Another difficulty, as in bal loons, is orientation. Once a balloon has got to some distance from the earth, it becomes impossible to tel the direction in which it is going. The needle is use less. And, similarly, in the " marine mole," when it is only $0 \cdot 39$ of an inch under the surface, and no thing is seen in motion but the fish, the compass is found of no use. To go to a certain point, an artifi cial meridian has to be arranged outside. M. Toselli remarks, too, on the great distinctness with which sounds are heard. At a depth of 110 feet, the screw of a steamer, passing about 660 yards off, sounded in the (hermetically closed) mole as if directly overhead. The contrivance of M. Toselli, affording, as it does, a novel opportu nity of observation, may furnish some instructive data in physics.

## The Remarkable Mineral Treasures discovered in Copper, and Lead.

Since the gold excitement a quarter of a century ago, says the Boston Advertiser, when the " forty-niners" flocked to the Pacific coast, there has been no discovery of the precious metals so important and yet exciting so little generai inter est, as the developments made during the past three months in the little town of Newbury, in Essex county,Mass. Four months ago the existence of any such ores was known to but two persons, and they were by no means aware of the magnitude of their discovery. When the matter got into the local papers, one gentleman of this city thought it worth while to investigate it, and the result has been, in brief, preparation for mining on an extensive scale, with prospects of returns far more remunerative than were ever known before. The discovery dates back only to 1868 , when a Byfield man, named Rogers, said to be a rather dissolute character, in his wanderings over Highfield Pasture first noticed the ore Something in the weight of the stones which he picked up and occasional gleams as the sun glanced on small, smooth surfaces, induced the belief that there was metal in their composition; and if metal, then something of value. With this idea he collected a number of the best specimens, and some time after took them to Mr. Albert Adams, a quiet bachelor farmer residing in Newbury. Mr. Adams became greatly interested in the matter, believing that a great dis covery had been made. He began to study mineralogy and geology. Becoming convinced that metal was present in qualogy. Becoming convinced that it was soon confident that it was silver and lead. He pursued his investigations very quietly; and finally con He pursued his investigations very to secure by purchase the land on which the speci mens were found. For this purpose advances were made t an old farmer named Jaquish, who had long owned the pas ture, and the lot, measuring twelve acres, was transferred to him for $\$ 350$ early in April of last year. He then began digging. The surface finds, or float ore, were naturally more or less oxydized by the action of the elements, but at a depth of six feet he struck the true vein. Several tun


FOLIAGE, BLOSSOM, AND FRUIT OF THE;TULIP TREE,
were sold a few years ago to a company for $\$ 10,000,000$, yield only $\$ 15$ per tun of silver. The Belcher mines in Colorado which yield about $\$ 40$ per tun, divided $\$ 900,000$ among the stockholders as the profits of work during the month of August, 1874; and these mines had not the additional profits accruing from the product of lead.

## Chalk in Artificial Fuels.

We have remarked paragraphs in sundry home and foreign cientific journals relative to the utilization of chalk, such as is found in natural beds.as a source of heat. Various de scriptions of improved fuel have appeared, in which the above material has been mixed with bituminous coal and various earthy substances, and the com pound thus produced is stated to have increased ca lorific properties. How this result can be directly ascribed to any active effect of the chalk, we fail clearly to comprehend.
Chalk is a body already the result of a combina tion of carbonic acid and lime. By heating at a high temperature, the material may be decomposed ; and it absorbs an amount of heat equivalent to that produced at the moment of combination. Carbonic acid and lime result, and these themselves are also burnt bodies, neither of which can individually produce heat. If the carbonic acid, after contact with an in candescent combustible, is transformed into carbo nic oxide, it is simply through the absorption of exactly the quantity of heat which would be pro duced by the transformation of carbonic oxide, in turn, into carbonic acid. So that,theoretically and according to all present chemical ideas, it is impos sible to conceive that lime, no matter in what form i be utilized, can be a source of heat.
It remains therefore to account for the advanta geous results which are claimed to have been secured by the admixture. In domestic heating, the types of apparatus commonly employed are the grate and the stove. A grate fire utilizes about one tenth of the heat developed by the combustible, that is, about this fraction goes to warm the room, while the remaining nine tenths flies up the chimney. It is radiant heat that warms our apartments. Now if, by mixing chalk or limestone with the fuel, the combustion is retarded, the chalk, by absorbing a portion of the heat which otherwise would be lost serves to increase the radiating surface, it thu probably augments the quantity of heat utilized.
In stoves an analogous state of affairs exists, and it is not impossible to conceive that such, in the instances noted, may be advantageous. But for the production of steam, wherein active combustion is required, it is certain that the addition of such foreign matter to the fuel can exercise no useful effect.

## Talent and Tact.

Talent, it has been said, knows what to do, tact knows how to do it; talent is wealth, tact is ready
talent has many compliments from the bench, tact
of silver, $\$ 1,270$ per tun ; gold, $\$ 129$ per tun; and about 27 per cent of copper. The fourth specimen, weighing about three pounds, tried for lead, was found to be nearly pure and hammered quite readily. The lead was fifty-two per cent of the whole matter
After this a large extent of the adjoining property was secured, and in September last systematic mining operations were begun by the sinking of a shaft ten feet square. As the shaft increased in depth, the vein-which is what is known as a fissure vein, that is, metal between two walls of granite, where in all probability it was thrown by volcanic action-broadened from three feet at the surface to seven feet at present working, twenty-five feet down. As the men descend, the vein grows richer and purer, the proportion of silver and gold increasing, while that of lead remains about the same. The south wall has not yet been reached. The men are therefore working on the pure metal, the north wall being perfectly perpendicular. In conse quence of this fact, which is totally without a parallel in mining history, there is but the smallest possible expense incurred in removing the ore-about one dollar per tun. About en tuns are taken out, being hoisted up in baskets, every twenty-four hours. To work this quantity, only four men are required by day, and a relieving gang of equal number by night. This ore, which is piled in a storehouse, as at present mined yielded $\$ 90$ per tun of silver, $\$ 70$ of lead, and $\$ 11$ f gold; a total of $\$ 171$. The cost of smelting and separation is $\$ 20$ per tun, so the profit is about $\$ 150$ per tun. Near this first shaft, on the forty acre lot, they have sunk the second shaft, begun in last October. This is of about the same size as the first and is down almost as deep, the vein working about four feet in width and the ore being of similar purity. This vein, like that first found, broadens as it is dug out. Four men work in this shaft at night and four during the day. Shaft houses have been erected over the mines, and a large storehouse and a boarding house for the men built near by. Housing the shafts will enable the men to continue rork during the winter.
Mining experience has demonstrated that a fissure vein is always without bottom. This vein is estimated by geologists to extend in its general direction, $20^{\circ}$ east of north, about six or seven miles in length. Bearing this fact in mind, the wealth to be reasonably expected from this "find" can only be estimated by comparison. The Comstock lode in Nevada, hitherto supposed to be the richest silver mine in the world, yields only $\$ 45$ per tun on the average, while the Newbury port yields just double that. The Mariposa mines, which
touches the fees of the client; talent makes the world won der that it gets on no faster, while tact excites astonishmen that it gets on so fast. Tact makes no false step; it takes all hints, and, by keeping its eye on the weathercock, is able to take advantage of every wind. This promptness in seizing an opportunity, and diligence in following it up, is scarcely less valuable than industry. Instances might be given indefinitely of the results that have followed the immediate uti lizing of an accidental discovery in mathematical demonstration, in chemical analysis, in mechranical invention, and in manufacturing operation.

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## Remarkable Optical Phenomena

## To the Editor of the Scientific American.

Last evening, a curious optical phenomenon was visible at this place at sundown. For three days the weather has been very sharp (thermometer $10^{\circ}$ to $12^{\circ}$ below zero); and yester day afternoon, flaky clouds lay in the west. Just at sunset, the full disk of the sun, considerably magnified, was seen behind a thin veil of cloud, but shorn of its rays, lusterless, and resembling the full moon, which it did not much exceed in brightness. The full disk was so clearly seen in all its parts that it was a matter of surprise that it was not brighter. This surprise wasincreased on observing, about twenty de grees to the right and a little above, a dazzling brilliancy, as if the sun were struggling to burst through a rift in the the clouds. It was hard to believe that the real sun was the lack-luster orb that was slowly passing down through the distant hemlocks, and not the one of which the radiance was making the whole west a blaze of light. The phenomenon lasted for some ten or fifteen minutes, and until the disk of the sun had completely passed out of sight. The luster then slowly faded away. The explanation that I give is that two clouds of snow crystals lay in such positions that the one cuts off the light from the sun, the other reflected it to our eyes.
To-night, another optical phenomenon has attracted my attention. The frame of a picture in my room has the appearance of being bent, when seen across the room, the lamp being on one side. This is beyond our power of explanation at present. At the point where the light strikes upon the frame, which is a gilt one, it seems bent or broken.
Troy, Pa.
O. B. J.

## To the Editor of the Scientific American:

In your journal of January 9th, Mr George B. Prescott gives a brief account of some of the earlier experiments in sub-aqueous telegraphy. As this is a matter of much scientific as well as historical interest, I trust you will afford me space for a few notes on the same subject.
Prior to the employment of gutta percha for this purpose, various attempts were made to insulate sub-aqueous tele graphic conductors, which were attended with only partial success. The plan usually adopted was that of winding the conducting wire with thread saturated with insulating compound, and inclosing it in a tube. Dr. W. O'Shaughnessy made the first actual experiments of this kind for telegraphic purposes. He built a line, 21 miles in length, of iron wire, supported on bamboo poles, near Calcutta, India, in 1839 His line also embraced 7,000 feet of submerged wire, insulated with cotton thread saturated with pitch and tar. This was
the first telegraph line of any length ever constructed in any country, and was worked successfully.
The first public telegraph line in England was opened from London to Gosport, 88 miles, in February, 1845. In the summer of 1846, an attempt was made under the direction of Professor Wheatstone to extend this line across the harbor to Portsmouth by means of a submarine wire a mile in length, but it failed to work successfully. This wire was, I think, insulated with india rubber, and euclosed in a leaden tube.
Gutta percha was first introduced into England in 1845. In March of that year R. A. Brooman patented the method now universally employed, for preparing the raw material for use
in the arts. Covering everything into which gutta percha could in the arts. Covering everything into which gutta percha could be manufactured, this was called the Master Patent. In September of the same year, Henry Bewley patented a machine for making tube, hose, etc., similar in principle to the American lead pipe machine of Tatham, patented in 1841. percha to his brother Dr. Werner Siemens, who had been ap. pointed a commissioner by the Prussian government to consider a telegraphic system, to see whether it would answer for coating subterranean wires. The latter soon discovered its remarkable insulating properties, and recommended an experiment upon a large scale, which having been sanctioned, he laid down a line of about five English miles near Berlin, Prussia, in the summer of 1847, which worked successfully. (Journal of Society of Arts, April 23d, 1858.)
In 1847 and 1848 more than a thousand miles of gutta percha covered wire was laid down in Prussia, which for several years proved successful, after which it gradually failed owing to the impurity of the material. In March, 1848, Dr. Siemens made several successful experiments in the harbor of
Kiel for the Schleswig-Holstein government, using a gutta percha cable of considerable length for firing submarine torpedoes. The same year he laid across the Rhine, at Cologne, a gutta percha coated wire, which was protected by a strong chain.
In 1846 the Gutta Percha Company was formed in London for the purpose of working the Brooman, Bewley, and other patents. In June, 1846, Mr. Samuel T. Armstrong of New York received from one of the directors of this company a small quantity of the raw gutta percha, together with an invitation to visit the works in London. He left for Europe in March, 1847, spent six months in England and on the continent, visiting all the gutta percha factories then in existence, and finally purchased the patents for the United States, returning to New York in September, 1847. While in Europe he doubtless witnessed the manufacture of the insulated wire for Dr. Siemens, an immense quantity of which was furnished in 1847 by the same Gutta Percha Company of Londen.

In the latter part of 1847, W. S. Wetmore, of New York imported a consignment of gutta percha for Mr. Armstrong, It was probably some of this lot with which Mr. Craven experimented, as mentioned by Mr. Prescott. I have been
told that Mr. Craven and his wife covered a wire themselves told that Mr. Craven and his wife covered a wire themselves
at their home in Newark,N. J., which he laid down as an experiment at the Passaic river crossing, in that city. On the 22 d of May, 1848, Mr. T. M. Clark,Secretary of the Magnetic Telegraph Company, wrote to the Treasurer,George H. Hart, Esq., of Philadelphia:
" The wire has been down there (at Passaic river) nearly a month, and it has worked to a charm. It has been tested in various ways to see if there is any difficulty about it, but none has ever yet appeared. I am well satisfied that the
plan is a good one, provided the wires can be kept out of the plan is a good one,provided the wires can be kept out of the
reach of anchors." This cable was therefore probably laid the last of April, 1848. Mr. Prescott states that James Reynolds covered the first cable that was laid across the Hudson River from New York to Jersey City, but makes no mention whatever of Mr. Armstrong, who was the proprietor of the establishment at which the cable was covered, and the owner of the Brooman and Bewley patents under which it was made, Mr. Reynolds (who was then employed by him) being the man who built and probably ran the machine used in coating the wire. This machine was the same in principle as Bewley's and Tatham's, previously mentioned. The cable referred to consisted of a No. 9 iron wire covered
with half an inch in diameter of gutta percha. It was laid at 5 o'clock on the morning of the 15 th of June, 1848, by the steamboat United States, from Cortlandt street, New York, to Jersey City, under the personal supervision of T. M. Clark and John W. Norton, directors of the Magnetic Telegraph Company. This cable had a leak in it from the start, but New York and Philadelphia telegraphed through it-by
alternately cutting off the battery at the receiving stationfor four days, when the wire was cut by an anchor

Mr. Craven applied for a patent on the 12th of May, 1848 for his process of insulating wire by means of gutta percha. William Gordon also applied for a patent for the same thing on the following day, May 13. Both of these applications were rejected on the ground that, the insulating property of gutta percha being well known, its use to protect wires was not a patentable invention. Reynolds applied for a patent on his machine, June 9, 1848, which was rejected for lack of novelty. But notwithstanding all this, one George B. Simpson of Washington succeeded in engineering a bill through Congress, giving him a patent for insulating wires with gutta percha, which was issued May 21, 1867, and is now in cult to see how any one in this country could rightfully claim the invention, as it was made by Dr. Siemens in the winter of 1846-47, and the first importation of gutta percha into the United States was not until near the close of 1847. Mr. Prescott says: "One of Mr. Reynolds' workmen named Champlin, shortly after this cable was laid, went to England and communicated the process to the Gutta Percha Company"
etc. This statement cannot be correct for as we have seen, etc. This statement cannot be correct; for as we have seen, the cable in question was not laid till June 15,1848 , while the Gutta Percha Company probably covered Dr. Siemens' four miles of wire in the summer of 1847 , and certainly the 1,000 miles subsequently laid down by him in 1847 and ' 48.
W. H. Barlow took out a patent in England, April 27, 1848 for covering wire with gutta percha by means of heated
grooved rollers. The Bewley machine has, however, been much more generally used for this purpose than any other, having of course received more or less improvement at the hands of subsequent inventors.
F. L. Pope.

## Our Visual Organs

To the Editor of the Scientific American:
The communication of W.S. Turner, published in your issue of January 9, covers only a portion of the subject reated upon.
By hearing a discussion between some medical men upon the general theory of inverted vision, I was led to conduct a series of experiments, more to enlighten my own mind than to convince others. Of many test experiments, during thre or four years, only two or three can be here referred to. I first tried the stereotyped experiment with the eye of an ox, and soon found a vast difference between looking into or out of an eye, and looking through one. In the latter case, the image is inverted; in the former, it is in its true position. I subsequently constructed an immense eye by boarding up the windows of a large workshop, leaving only a small hole, into which was fitted a double convex lens, from a pair of No. 15 spectacles, my own vision being substituted for the sense of sight to this artificial eye. By placing myself some distance back from the lens, I saw upon it an inverted picture of the landscape lying in front of the building, and a covered carriage before the window was very distinctly represented in the foreground. But by placing my eye close to the lens, I no longer saw an inverted picture painted upon it, but was enabled to look out, through the lens, upon the outer world and view the entire landscape within range of my vision, not inverted, but in its true position. T'o compare this with the legitimate office of our visual organs: if a person could be found who could not actually look out upon his surroundings, but, to the contrary, saw the picture as painted upon the crystaline lens situated within the interior of his eye, would any scientist suppose that the person's visual organs were performing their proper functions? If not, is it logical to suppose that we receive cognizance of the outer world only through the telegraphy going on between
the internal nervous tissue of the eye (retina) and the brain through the optic nerve? A person reading a book whil lying supinely, with his head falling over in an inverted his in, would naturally hold his book before his face to suit by crossing the optic nerves, carrying the right nerve to the the left lobe of the brain, and vice versct.
By investigating still farther, it was found that the anteior portions of the eye (except the outer cuticle, whic ough and hardy) are supplied with a microscopic network of sensitive nerves, well lubricated by a subtle nervous or mag. netic fluid, and that this delicate system of nerves forms a conjunction with a more extensive system of nerves running from the spinal column, and these, through the latter, come nto communication with every portion of the brain.
I am thus led to the conclusion that through this wonderul arrangement we are enabled through our senses to approach close to and look out through the crystaline lens of our visual organs upon the outer world, unconscious of the fact that an inverted image of things seen is daguerreotyped apon the retina of those organs; and further, that the office of the retina, like the mirror in a telescope, is to collect the rays and reflect them upon the lens, thereby rendering a per
fect image.
Charles Thompson. St. Albans, Vt

Charles Thompson.

## Electroplating Iron Surfaces

To the Editor of the Scientific American;
I have considerable experience in the beautiful art of elecroplating; and having received numerous letters from your readers, asking for information respecting the method of deositing silver upon iron, I give you the following:
It is by no means an easy matter to coat iron with silver It may, however, be successfully done if sufficient care be taken. Silver may be deposited upon iron either directly or indirectly, the latter plan being much the best, especially for
the inexperienced electroplater. In depositing silver upon
iron, observe the following instructions: The article should first be rendered free from rust by rubbing with emery cloth, or by dipping it into a pickle composed of sulphuric acid, 2 ozs., hydrochloric acid 1 oz ., water 1 gallon. After the article has remained some time in this pickle, it should be taken out and the rust removed by a brush and wet sand. If the oxide cannot be easily cleaned off, it must be returned to the pickle. As soon as the article is rendered bright, it is washed in a warm solution of soda, for the purpose of removing all grease. Lastly, it is well rinsed in hot water, and immediately placed in the plating solution, which should contain only about one fourth as much silver as that used for plating copper and brass articles. The battery power must also be weak. When the object receives a slight coating, the process may be carried on more rapidly by increasing the battery power, and by placing the article in a much stronger plating bath, using about 1 ounce of silver in a gallon of solution.
The indirect method consists in first coating the iron with copper, which insures success. Copper adheres firmly to iron, but silver does not; hence copper acts the part of a gobetween. After the article has been cleaned, as above described, it is coated with copper by placing it in a solution composed of carbonate of potassa 4 ozs., sulphate of copper 2 ozs., liquid ammonia about 2 ozs., cyanide of potassium 6 ozs., water about 1 gallon. The sulphate of copper may be dissolved in warm rain water, and, when cold, the carbonate of potassa and ammonia added; the preripitate when formed is redissolved. The cyanide of potassium should now be added, until the bluish color disappears. Should any precipitate be found in the bottom of the vessel, the clear solution may be poured off from it. The solution is worked cold, and with moderate battery power. Let the article remain in the bath until a thin film of copper is deposited, then remove quickly, rinse in hot water, and place in the silvering solution, where the process may go on as rapidly as if plating a copper article.
Friendsville, Ill.

## Patents and Patent Laws

To the Editor of the Scientific American:
Some time since a large and enthusiastic meeting of the shoe and leather dealers was held in Boston, Mass., the object of which was to protest against the alleged unjust conduct of the owner of certain patents connected with the manufacture of boots and shoes. The inventor, after trying in vain to collect his dues for the use of his inventions, proceeded to take legal measures to obtain them, and has been insolent enough to sue some very wealthy and influential parties, and to attach their property. The remarks made and the resolutions passed were very strong and earnest, and have attracted much attention; and in addition, there was a general attack upon inventors and patentees, and the whole patent system received no small amount of condemnation.
I do not know the inventor, nor am I in any way whatever interested in any kind of pegging or other machinery for the manufacture of boots and shoes. But I have read the proceedings of that meeting, and stood pretty well the patriotic allusions to "Bunker Hill" and the " Heroes of the Revolu tion," etc.; but I have always noticed that when, in busi ness, the American eagle is very much spread, and " Bunker
Hill" and the " Boston Tea Party," etc., are much paraded, the cause behind is either very weak or positively bad. think also that in this case two questions will at once arise in the mind of every honest and fair-minded man. First If the invention is good for nothing, and there are other de vices just as good or better, why have the shoe manufacturers used this invention? Secondly: If they have used and still do use it, why not pay him the royalty like honest men? It may be that the inventor has been very unjust in his proceedings, but it is but fair to infer that his claims for royalty upon his highly useful invention have been long and persistently refused by those who have made money by its use; for unless this is the case, no sane man would institute the measures he has taken to obtain redress.
In one corner of the village graveyard in Billericay, Mass., here is a monument which bears the following inscription

## 

This
genius.
Whe
Who was Major Samuel Parker? He was the original in ventor of the leather-splitting machine; and by his genius nd his labors, tens of thousands of leather dealers and shoe manufacturers have been enriched, and the wealth of our ation and of the world very greatly increased. His invention has saved tens of millions of dollars worth of property from utter waste. For all this, Major Parker received nothing from the leather dealers and the public but outrage and wrong. They infringed upon his patent, hunted him from court to court, and robbed him of all he had. Four years after his death some of them came and placed the small, cheap granite monument above mentioned upon his grave. Truly, of the leather dealers and the business world, in return for the immense services he had rendered them, the great inventor asked bread, and they gave him (after his death) : stone. Doubtless they thought it an ample return for all he did and suffered. Looking back, I cannot help thinking that the men who had robbed and wronged him for years only insulted his memory in placing a monument upon his grave, though it is some gratification to know that in doing this they also unconsciously recorded upon the stone their own mean ness and dishonesty!
In view of the facts above narrated, it is certainly most ratifying to learn, from the speeches and resolutions at the late meeting, that the shoe and leather dealers of the present
time are in the highest degree noble, honest, and honorable men, who in all their dealings love nothing so much as justice. Yet it seems evident that the meeting was intended to be an encouragement to the crusade which is beginning throughout the country, the object of which is to destroy or to render nugatory the rights of inventors and patentees. The Granger combination, supposing that invention and improvement in agricultural implements have reached their highest point, have begun a systematic warfare upon patents and patentees, and the great manufacturing interests seem disposed to follow the lead of the Grangers in their efforts to break down the legal protection-always slight enoughwhich the inventor has of the profits upon his invention for a short term of years. But however much certain class interests may be benefited, or seem to be, by the destruction of the rights of inventors and patentees, the public cannot afford quite yet to spare them. Amazing as has been the progress of invention, the field is hardly yet entered upon, and in every direction new inventions and improvements upon old ones are called for, and the vital interests of the world demand that all the rights of those who produce useful inventions should be sacredly guarded.
One gentleman at this meeting proposed that, when a man applies for a patent, notice of his application should be given broadcast over the country for six months. Of course to do this a description of his invention must necessarily be given. Now there is nothing perhaps so cheap in this country as perjury; and a small chance indeed would the real inventor have, after his secret has been published to the world for six months, to obtain his patent. Scores of scoundrels with well trained witnesses would claim the invention, proving that they had long used the same thing, and perjury would win the day. As it now is, the inventor who seeks to obtain a patent is obliged to use the greatest care and secrecy to precontemplated effort to get his expired patent renewed, the question is not (as stated at the meeting) whether his family are starving or not; but whether he has received a full and sufficient compensation for the great benefit his inventions have been to the boot and shoe manufacturers, and to the public. I hope, therefore, that the Committee on Patents will not be influenced in their decision by the loud clamor of deeply interested men about Bunker Hill and the Boston Tea Party; but that they will judge the matter upon its merits only, and decide it justly. The claim for the renewal or extension of a patent for a useful invention is a right in equity which belongs to the inventor who has not been adequately rewarded for his invention. It is a right based on long usage in the management of patents by the United States Government, and all honest men will endorse the usage as a matter of justice, right, and true policy. The difficulties which beset inventors are many. Men devoid of either conscience or honor are constantly on the watch to find out good inventions, which are likely to become profitable. If the inventor is poor, these men commence a system of annoyance to compel him to sell out his patent for a trifle to avoid long and costly litigation in the courts; and they too often succeed in ther
nefarious attempts. Even if the inventor is not hunted by these human wolves and driven into ruinous litigation to maintain his rights, yet (if his invention is of any magnimaintain his rights, yet (if his invention is of any magni-
tude) such is the indifference and prejudice, with which almost every new invention of importance is received by the public, that a large portion of the seventeen years allotted to him expires before he can overcome them and start his invention. In fact it is too often considered that the inventor is a fair subject for jeering and insult, and that neglect and derision are the only suitable reward for the man who attempts to create some new thing for the use of the public. Empty your factories tomorrow of all the patented machinery therein, and see how much will remain of them besides the bricks and mortar of their walls.
Because among the large number of inventions patented there are soms which are useless, and because in the patent business (as in every department of life) there are some dishonest men, the large mass of inventors and patenteeswhose usefulness to society is greater than that of any class of men whatever-are denounced and almost outlawed by fits of their genius, skill, and labor. In view of this, it is high time that the public should take this important subject into consideration, and see that justice is done to the Inventors of the Nation.

## Cure for Catarrl.

A medical authority asserts that the severest catarrh cold can be removed in about ten hours by a mixture of carbolic acid, 10 drops, tincture of iodine and chloroform, each 7.5 drops. A few drops of the mixture should be heated over a spirit lamp in a test tube, the mouth of which should be applied to the nostrils as volatilization is effected. The operation should be repeated in about two minutes, when, after the patient sneezes a number of times, the troublesome symptoms rapidly disappear.

## Pigeon Post in France.

The French military authorities are about to organize carricr pigeon post between frontier fortresses, on the plan already adopted by Russia, Italy, Austria, and Germany. Two thousand pairs of pigeons, it is said, are being trained for the purpose.

IT is one of heaven's blessings that we cannot foreknow the hour of our death; for a time fixed, even beyond the possibility of living, would trouble us more than doth this uncertainty.

What is success? The answer to this question, says one of ou: English contemporaries, depends on the different courses which men pursue, and the ends they have in view. The general object of pursuit is that which people most want -money. The money test of success is that which they best understand. To make a certain income, therefore, is among the first duties which the world prescribes. People cannot all appreciate the poet or the thinker, and they estimate his works accordingly by the prices which they realize. There are other ideas of success, however, than this trading notion. scholar in the discovery or enunciation of truth; the poet in the praises of his generation ; the lawyer in professional advancement; the politician in the ascendency of his party and his accession to office. When Agassiz, engrossed in scientific pursuits, was told that he ought to look more after the ractical ends of life, in leaving a provision for his family

## I have no time," he replied, "to make money."

The making of "getting on" an end in life is purely an English notion. The ideal of man is generally in happy continuance. As to making advancement in the world, as we understand it, the object of existence, an Asiatic would think his life thrown away. "Why should he get on? He is where he is by the Almighty's will, and why should he interfere with the Divine appointment?" It is this anxiety to succeed which gives to English practical life its fierce competition and earnest tone. The attainment of almost any position or dignity being made possible, to suitable talent and well directed effort, inspires hope. What a blessed posses sion is hope! It is the salt of human life that sweetens all toil and difficulty. Phœnis-like, it "springs eternal" from the ashes, of the pyrites we place in the crucible, as gold; it is the panacea to the disappointment that makes the heart sick; it is the dawn of the radiant orb which, after a season of darkness, is yet to shine in noonday splendor; it is the buoyant element that keeps our bark afloat till we reach the harbor, for without hope there can be no endeavor. Excelsior is only hope intensified. Whatever a man's position or alling may be, he should aim at the first rank and the fore most place. "It can't be done" is a cry of indecision, indif ference, and indolence. Such a plea is a mere excuse for not
attempting at all. Difficuities should serve but to reveal a man's true strength, to test his power of will, to train him to the exercise of his noblest faculties. Failures discipline the strong; only the weak and unstable are overwhelmed. Diligence in business should form part of a man's religion as it is indissolubly associated with the spiritual in worship. To attain a position in society, or achieve success in a profession, other qualities must be added to those required to work out results in material nature, because a different class of opposing forces are here encountered. They are not of the nature of those that are overcome by the engineer in the tunneling of a mountain or the bridging of a valley : but such uncertain and subtle elements as public opinion, the ing health, ind equally fluctuating, latent or deceptive. Perseverance is essential. All the performances of human art are instances of its resistless force. Attention to the minutest particulars of duty, conscientious watchfulness in little things, that are not really little although trifling in appearance, surmount ail obstacles. He who is not disheartened, but boldly and
fearlessly grapples with difficulties, never fails. The determination which plods unweariedly through drudgery and details is the foundation of greatness of character and of ultimate success. It accomplishes more than genius.

## The New Paris Waterworks.

The great reservoirs at Montsouris for the reception of the waters of the Vannes possess great interest for the hydraulic engineer. It will be remembered that in July last a portion of the arched roof gave way. The accident has now been repaired, and the water will be let into the upper reservoir in a few days. The arches have been reconstructed as beforethat is to say, two bricks thick-but the piers and supporting walls have been strengthened, and the vaulting supported in such a manner that, should one or more arches fa'l in, they will not carry the rest with them. Thearea of the reservoirs is 363,800 square feet, and they are two stories high, with an enormously thick wall in the middle of the whole, which divides the reservoir into four chambers, two below and two above. All the masonry of the lower chambers has been fin-
ished for a long time, but the conduits and pipes for the distribution of the water remain to be executed. The upper chamber, of which the vaultings have been reconstructed and which has an area of 181,900 square feet, and will contain 75,000 tuns of water, will be the first filled. The hundred arches which cover this chamber are being covered gradually with mold to the depth of 10 inches; and when this done, and the arches show no tendency to give way, the will be about 2,600 cubic yards. Several hydrants will be about 2,600 cubic yards. Several hydrants are
placed around the edge for the purpose of irrigating the grass. The second upper chamber is now being constructed, and is about one quarter finished. Around the reservoirs, earth is now being thrown up to the hight of the roof of the lower chambers, with the double view of adding support to the walls and of keeping the water within fresh. At one of the angles of the main structure rises a structure 132 feet square, and with walls 6 feet 7 inches thick. This is the receiving chamber, and has been for some time in use. Its capacity is about 320 feet square by 13 feet 2 inches deep; the bottom is so pure and translucent that a motto inscribed on the tiles at the bottom is plainly visible. At the bottom of this smaller
reservoir may be seen the orifice of a pipe 5 feet 9 inches in diameter, which will carry the water to a point 16 feet 5 nches above the level of the ground ; opposite to this is another pipe of the same dimensions, which, when there is an overflow of water, will carry it to the main sewers. Just in front of this receiver are three pipes, two of them inches in diameter and the third somewhat less, bound together by means of a cast iron hood and fitted each aith valves; one of these will serve to fill the upper chambers of the main reservoir, a second the lower chambers, and the third, and smallest, already supplies the highest portions of Passy with water. At the base of the recipient chamber is a telegraphic office, which is in communication with another at the reservoirs at Arcueil, with the prefecture of police, and several other public establishments, to aid in the regulation of the whole service of the city. The public is admitted to view the recipient chamber, and the purity of the water, which will shortly supply a very large proportion of the population, is a constant theme of admiration.

## Gramme's Electric Machines.

M. Gramme has made a communication to the Paris Acad emy of Sciences respecting the improvements which he has made in his electric machines. The original machines ig nited four inches of platinum wire 0.0118 inch in diameter the improved machines will heat to redness four times that length of the same wire, without any increase in the weight of the materials or in labor. This augmentation in the intensity of the current is principally due to the employment of the new thin plate magnets of M. Jamin. The new electrogalvanic machines have only one central ring instead of two, and two electro-magnets in piace of four, in the former machines. They weigh only 390 lbs . instead of $1,650 \mathrm{lbs}$; only measure 19 inches by 1 foot 9 inches in hight, in place of 2 feet 4 inches by 4 feet 5 inches; but deposit 4 lbs. 9 ozs. of silver per hour in lieu of 1 lb .5 ozs . The power required o work the new machines, as compared with the old, is only as 50 to 75 . They have the following advantages: (1) They only require half the space; (2) they are three fourths lighter; (3) they economize three quarters. of the copper in construction; (4) they require thirty per cent less motive power. These improvements have been achieved by the suppression of the exciting coil, the bringing of the electro-magnet into the circuit of the current, by an improved arrangement of the copper garniture of the bars of the electro-magnots, and br a slight increase in speed. The original electric light machine fed a regulator of 900 carcel burners, its weight amounted to tun, and it occupied a space of 2 feet 4 inches square by 4 feet in hight. This machine heated itself, and gave rise to sparks between the bobbins and the conductors. The new
machine is composed of a framework in cast iron, two elecmachine is composed of a framework in cast iron, two elec-
tro-magnetic bars, and a single movable central ring, instead of six bars and three rings. Its normal power is two hundred burners.

## Dogs and Books as Vehicles of Disease

A case of scarlet fever has recently happened in England, in which the disease was communicated to two children by a dog. It is believed that the animal, which had been the constant companion of a scarlet fever patient, had had its hair mpregnated with contagious matter. This suggests the possibility of dogs, cats, and other household pets transferring the malady from one house to another, and renders it advisable to keep them out of the way during prevalence of the fever. Another little considered source of disease may be books in public libraries, particularly volumes which are freely circulated and which cannot be prevented from reach. ng the hands of patients afflicted with contagious diseases.

## Railroad on the fee

A brilliant Duluth newspaper proposes a railroad on the ice from Duluth to the Sault-the whole length of Lake Superior. It would simply spike the rails to the ice, without grading, filling, excavating, ballasting, or ties. The track, it says, could be taken up every spring and stowed away. The road would be about 400 miles long, and a dead level. It claims that the ice lasts till April; is thick enough to sustain a train of cars; the freight cars could be transferred to the ice without reloading, and the rails could be spiked to the ice, or they could be fastened in a frame and laid on
well."
If som
If some ingenious man will provide a way to float the track when the thaw comes, the railway might be used summer and winter, with no occasion to take her up. If Duluth did not then become the capital of an empire, then locomotion would be at a discount.

## Horse Clipping.

The Evening Post is our authority for saying that Com modore Vanderbilt's mind has been exercised about the cruel if not actually criminal, custom of clipping the hair from valuable horses, with the idea of adding to their beauty. This veteran horse fancier, who has hardly his superior in America, remarked, in presence of several gentlemen, that he would himself willingly give a handsome premium to anyone who would compile a correct report of deaths occurring among the valuable horses in the city of New York from colds and other diseases engendered by this practice. "In fact," added the Commodore, "I thought of this matter be. fore getting out of bed this morning, and I really don't understand how it is that Mr. Bergh has not got after these inhuman fashionables. They certainly deserve his special attention."

Sperm oil is the best for oil stones. Do not use kerosene.
[Continued from first page.]
The saw is mounted on a separate carriage and has its own belt. Upon one side of the blade are secured two peculiarly arranged knives, so that, when the cutting mechanism is moved up against the edge of the head by the foot treade both sides are cut at once; and, at the same time, through its rotating, the work is turned in circular form. The saw carriage is provided with a counterpoise to bring it back bring it back into position dle is released. The machine The machine is so constructed that, with one and the same concave saw, all kinds and sizes of heads can be made, and the made, and the turning of one hand wheel quickly sets the
machine to any size required; and the saw is so presented to the wood that it runs with the same freedom and smoothand smoothness, and requires no more power or set
than an ordinary circular saw of the same diameter; and its work is done with great celerity and excellent finish. The machine has also an attachment which gives the heads an oval form, to compen. sate for the shrinkage of material. The attachment can be used or not, as desired; if not used, the heads will be perfectly round. This completes the operation of making the heads, which are then transported to the proper place and inserted in the barrels.
The next machine, to which we shall now call attention, serves to level the barrels and also to truss them. This, in our previous description, we explained as done by two separate devices, the first by a machine which compressed the barrel endwise between two disks, and the other by iron hooks and projections coming up through the floor, which, engaging with the truss hoops, forced them into place. In the apparatus represented in Fig. 4, the devices are all connected with the leveling disks, and, by means of handles on each of the latter, are all opened at once. The barrel with the truss hoops on is then inserted, and a pressure of the foot treadle closes all simultaneously. By means of the clutch lever the machine is then thrown into action The pulley shaft actuates (through gearing) a screw shaft, which forces the movable disk toward the stationary one, thus, through the drivers, pushing the truss hoops to their proper places on the barrel, and; at the same time, leveling the ends of the same. This machine, we are informed, will truss and level 2,000 flour, sugar, cement, or any other kind of slack bar rels, of various sizes, per day.
Fig. 5 represents the device used for bending and giving to metal hoops the requisite flare,
and also for riveting the ends $t$ together. The bending and 'scribed. The side lever below the cam slot is square, and book of Job; and Professor Tyndall, addressing the world which are adjusted by set screws through the lolls shown, two lugs are formed thereon. Under these the hoop, with the from the throne of modern science-which the chair of the doing this is clearly represented in the illustration. The ends descent the lugs strike the rivets and close them, completing mocritus and Epicurus as the last guesses of the modern sciare pierced by placing them under the punches arranged the operation and leaving the hoop ready for placing upon entific mind at the end of a lever actuated by an eccentric cam on the the barrel.
spindle of the lower roll. This done, the ends of the hoop We need hardly point out to our readers the remarkable Clean files by holding them in a jet of high pressure steati

## THE SARDINE INDUSTRY.

the Mediterranean and other coasts of France. It is a mem- A very excellent substitute for the sardine, however, is the
The purity and delicacy of the little fish which haunts the ber of the herring family, as is also the anchovy; and, like menhaden, or mossbunker, which, in the spring and fall, is Bay of Biscay and the Mediterranean is known everywhere, all the species, is generally found in shoals. The sardine is found ingreat numbers along our coasts. it is slightly spot abling it to be transported for an indefinite distance. It has bers on much in common with the sprat in flavor, but also reminds the mature fish, while the smaller fry are largely preyed very bony, The American Sardine Company, says Harpers the epicure of the anchovi, which, we believe, is peculiar to upon by cannibal foes, especially the cod and the sturgeon. Weekly, from which we select the engraving, by a mechani-

cal process known only by themselves, have removed this objection.
Our illustrations show the several processes through which the fish are passed after being taken. They are first brought to the scaler, which consists of a long shaft, on which are twelve wheels filled with long blunt teeth, which revolve very rapidly, and take off every scale in an incredibly short space of time. From the scalers they are passed to hands who chop off the heads and cut out the entrails. They are then placed in the washing troughs, above which are a number of revolving circular brushes, by contact with which the insides are thoroughly cleaned. They are then placed in pickle vats, where they remain for a few hours, until they are sufficiently salted; after which they are spread upon large tables, where they are placed in the cooking cans. They are then taken to the steaming tanks, of which there are seven, each having a capacity for holding 1,000 boxes. From the steaming cans, they are again taken to the tables and transferred to the permanent cans, when they are oiled and spiced, and then handed over to the tinsmiths to be soldered. The time from the fish being brought to the factory until they are boxed and labeled, is three days
These fish are shipped in large quantities to every part of the country, and by many are considered quite equal in flavor to the sardines imported from France and Italy.

## ASTRONOMICAL NOTES.

Observatory of Vassar College.
For the computations of the following notes (which are approximate only) and for most of the observations, I am indebted to students.

## Positions of Planets for February, 1875.

Mercury.
Mercury is at its greatest elongation from the sun on the 13 th of February, when it sets at 6 h .10 m. P. M., and should be seen in the twilight, north of the point at which the sun disappeared. On the 28th of February, Mercury sets at 6 h. disappeare
3 m . P M.

## Venus

Venus was at its greatest brilliancy on the 12 th of January and must have attracted the attention of all observers during the whole month. Its meridian passage being near 9 A. M., it could be followed with the naked eye during the morning, and for some time after it passed the south point. Its crescent shape could be seen with a small telescope.
On the 1st of February, Venus rises at 4 h .13 m . A. M., and sets at 1 h .48 m. P. M. On the 28 th of February, Venus rises at 4 h .18 m . A. M., and sets at 1 h .54 m . P. M. If its motion is watched among the stars, it will be seen to be mov ing rapidly toward the east.

Mars.
Mars is coming into a better position as to time of meridian passage, but is lower and lower in the south. It rises at 1 h . $50 \mathrm{~m} . \mathrm{A}$. M., of the 1 st , and sets at 11 h .36 m . A. M. On the 28th it rises at 1 h .16 m . A. M., and sets at 10 h .36 m . A. M. Jupiter.
We are coming into better position relatively to Jupiter, but it is still best seen in the early morning hours.
On the 1st of February, Jupiter rises at 11 h .49 m. P. M., and sets at 10 h .31 m . the next morning. On the 28 th, Jupiter rises at $10 \mathrm{~h} .3 \mathrm{~m} . \mathrm{P}$. M., and sets at 8 h .45 m . A. M. the next day. Early in the month Jupiter is directly south near 5 A . M., in the middle of the month at 4 A. M., and near $3 \mathrm{~A} . \mathrm{M}$. at the last of the month.

## Saturn.

On the 1st of February, Saturn rises at 7 h .32 m . A. M., and sets at $5 \mathrm{~h} .26 \mathrm{~m} . \mathrm{P}$. M. On the 28 th , Saturn rises at 5 h .56 m . A. M., and setsat 3 h .58 m . P. M.

## Uranus.

Uranus is in a good position, as it comes to meridian at midnight and at a high altitude.
On the 1st, Uranus rises at 5 h .10 m . P. M., and sets at 7 h . 20 m . in the morning. On the 28 th , Uranus rises at 3 h .18 m . P. M., and sets at 5 h .32 m . the nest morning. An ordinary telescope will show the disk of Uranus, so that it can be known from a star.

## Neptune

Neptune rises on the 1 st at 10 h .27 m . A. M., and sets at 11 h .33 m. P. M. On the 28 th Neptune rises at $8 \mathrm{~h} .42 \mathrm{~m} . A . M .$, and sets at $9 \mathrm{~h} .50 \mathrm{~m} . \mathrm{P} . \mathrm{M}$.

## Sun Spots.

Photograpling has been interrupted since the last report by the holidays, and later by clouds and wind. From January 7 to January 16, the sun was observed with a small telescope nearly every day, and the spots were very few and small.

## How to Grow Lean.

From a quotation in the London Medical Record, we learn that M. Philbert states that the principal measures for reducing obesity come under four heads:-1. Régime; 2. Hygiene; 3. Exercise and Gymnastics ; 4. Waters with sulphate of soda. The basis of the régime rests on the prevention of the introduction of carbon into the system, or on favoring its transformation, and augmenting the amount of oxygen. The food must, therefore, be non-nitrogenous,
varied with a few vegetables containing no starch, and some varied with a few vegetables containing no starch, and some raw fruit. But the temperament of the patient must be kep in view. The lymphatic should have a red diet, beef, mut ton, venison, hare, pheasant, partridge, etc., and the san guine should have a white diet, veal, fowl, pigeons, oysters,
etc. Vegetables, not sweet or farinaceous, may be allowed: etc. Vegetables, not sweet or farinaceous, may be allowed:
grapes, gooseberries, apples, etc. Café noir, tea with little sugar and the addition of a little cognac, may be used. We
must forbid sug
beans, peas, etc.
The hygiene
The hygiene consists in favoring the action of the skin, in wearing a tight roller to support the walls of the abdomen in taking plenty of exercise on foot or on horseback, playing at billiards, fencing, swimming, gymnastics, etc.
The Banting treatment is not very different. It consists in abstaining from bread, butter, milk, leeer, potatoes, pudding, and from sugar in every shape. It allows some biscuit or dry bread, every kind of fish except salmon, and every kind of meat except pork, all regetables except potatoes.
Purgatives have a good deal to do with the success of treatment of cases of obesity, and some have thought scammony as effective as sulphate of soda.

## Useful Recipes for the Shop, the Household, and the Farm.

Water containing lime compounds-very common in country wells-may be rendered fit for use, for many purposes in the arts, by the addition of a little chloride of ammonium.
Glycerin added to paper stock increases the flexibility of the paper.
Copper and brass articles may be coated with zinc, by dipping them into a boiling concentrated solution of sal ammoniac containing finely divided zinc
Platinum bronze, said to be entirely unoxidizable and es. pecially adapted to the manufacture of cooking utensils, is made of nickel 100 parts; tin 10: platinum 1.
A mixture of 358 parts phosphate of soda and 124 parts boracic acid is mentioned as another good copper-welding compound.
Pure glycerin may be tested as follows: When treated slowly with sulphuric acid,it should not turn brown; with nitric acia and nitrate of silver, it should not become cloudy; and when rubbed between the fingers it does not emit a fatty smell.
Silicate of soda (water glass) stops fermentation.
Adulteration of soap by starch is shown by dissolving the soap in alcohol, which leaves the starch behind
Anhydrous phosphoric acid is the most perfect known subtance for drying gases.
Never allow drinking water to be drawn from a cistern sup plying a water closet.
Extend pipes from water closet traps or one (larger) from the main waste pipe into the nearest chimneys. The pestilent gases will thus be carried off, instead of being allowed o escape into the house.
To make artificial veneer, soak the wood for 24 hours and boil for half an hour in a ten per cent solution of caustic soda. Then wash outthe alkali, when the wood will be elastic, leather-like, and ready to absorb the desired color. After immersion in the color bath, dry between sheets of paper under sufficient pressure to preserve the shape.
Dry furnace heat, productive of throat and lung diseases, may be moistened by hanging a wet towel in front of the register, the lower edge of the towel being allowed to dip in a shallow vessel of water.
After taking up a carpet, sprinkle the floor with very dilute carbolic acid, before sweeping
Avoid wearing heavy overcoats or furs for hours in succession ; the tendency is to weaken the powers of resistance of the wearer leaving him liable to inflammation of the throat and lungs.
'To cut india rubber, dip the knife blade in a solution of caustic potash.
A wall of soft burned bricks built up within a cistern makes an excellent filter.
Never store any articles of food or drink in old petroleum barrels. They are poisonous even after being cleaned.
To mold figures in paste, take the crumb of a new drawn white loaf, mold in a mass until the whole becomes as close as wax and very pliable. Then heat and roll with a rolling pin. Mold it to the required shape, and dry in a stove.

Frozen potatoes can be cured by soaking in water three ays before cooking.
In drilling wrought iron, use one pound of soft soap mixed with a gallon of boiling water. This is a cheap lubricator, and insures clean cutting by the drill.
To cure scratches on horses, wash the legs with warm strong soap suds and then with beef brine.
To remove paintsplashed upon window panes, use a hot solution of soda and soft flannel.
Frosted feet may be relieved of soreness by bathing in a weak solution of alum.
Never use glazed earthenware pipes for upward flues

## - Effects of Copper and Brass on the Color of Vermilion.

It has often been observed that, when vermilion inks are employed for printing from copper plates or copper-faced types and electrotypes, the color changed to a dirty brown or black. In the manufacture of playing cards, it was impossible to use brass stencils without injury to the color. Karmarsch has been studying this subject for a number of years, and some of his exporiments and results, having been made public, have been repeated by Heumann.
Karmarsch at once recognized the fact that the change of color was due to the formation of sulphide of copper, but he supposed that the sulphur necessary to produce this came from impurities in the vermilion. For, said he, it is highly improbable that the vermilion is decomposed at ordinary temperatures, and the text books in chemistry point to no such facts.
Heumann, of Darmstadt, however, has recently proved that this highly improbable decomposition does nevertheless
in a solution of purified potash seemed to Heumann rather useless, still he followed his plan. He took very pure vermilion, perfectly free from metallic mercury, which did not discolor the potash solution when boiled in it, nor could a trace of sulphur be detected in it. Nevertheless, when a strip of bright copper or brass foil was placed in it,it immediately became covered with a film of black sulphide of copper. When the vermilion, that had been boiled three times in fresh potash lye and washed, was rubbed on the strips of metal with a cork, they were blackened. Perfectly dry vermilion requires to be rubbed with some pressure; but when stirred up with a little water, it suffices to merely rub it on the metal with the finger. When rubbed quite hard with the cork, a part of the film separates from the metal, and, mixing with the vermilion, imparts to it an almost black color; while the copper, at the point where it was in contact with the vermilion, looks as if it had been amalgamated. It is even possible to write on copper and brass with a piece of sublimed vermilion; and after rinsing with lydrochloric acid,the writing appears in silver-colored characters.
The ease with which vermilion is decomposed is shown by this experiment, and, of course, that property cannot be removed by boiling with potash solution. Karmarsch, however, states that there are two ways of frecing commercial vermilion from those sulphur compounds which alone effect the formation of sulphide of copper: First, that already mentioned of boiling in potash, and second, mixing the ver milion to a paste with water, and patting in strips of copper, which take up all the free sulphur, and take away from th vermilion that property of blackening copper. This result can only be explained on the supposition that the vermilion employed for the experiment actually contained sulphur which could be removed, and by which the copper was changed, while the vermilion itself was not in sufficiently intimate contact to suffer decomposition.
Heumann, following Karmarsch's example, placed a bright copper coin for some time in a paste of vermilion and water, and found on rinsing the coin off that the metal had remained almost unaltered. Only on those spots which had accident ally been rubbed with a glass rod,used to stir up the precipi tate, was the metal blackened. Wherever the copper coin lay against the side of the vessel beneath the paste, so that the metal came more intimately in contact with the vermilion, amalgamation and blackening took place at once.
The results obtained by Karmarsch are, according to this, only possible when the copper coin lay perfectly quiet in the pigment, and so was able to take up only the free or dissolved sulphur.

Since in printing with vermilion, or in rolling or brush ing it through stencils, the contact is sufficiently intimate in many places at least, to decompose the pigment, it is evi dent that boiling the vermilion in potash solution cannot prevent the injury to its color, although this may perhaps be reduced. Moreover, when rubbed up with oil, the pigment is not so strongly attacked as when dry or wet with water. Iron decomposes vermilion only at a high temperature, and hence may be rubbed with it without injury to the color. Zinc only decomposes it slightly when rubbed with the wet color; and as the sulphide of zinc produced is white, the change of shade is scarcely perceptible. Nickel, too, we believe, does not act upon vermilion, and hence the advantage of nickel-faced type over copper-faced for use with ver milion ink.

## British Telegraphic Progress in 1874.

The most important telegraphic improvements in the British system of Telegraphy, consist in the extended use of American inventions, that have been employed here for years. For example, Engineering says:
An important change has been effected during the year by the more complete adoption of the "Sounder." This is a step in the right direction. and the "Sounder" will eventu ally become the principal instrument in use by the depart ment. Its introduction will be slow and gradual, but unques tionably its use will be found attended with the greatest suc cess. The Duplex system has peen found to answer admirably, and where business had increased to such an extent as to require extra accommodation, it has been at once introduced to the improvement of the working. On short circuits the ordinary Duplex system has been used, but in longer circuits the system known as "Stearns'" has been adopted. At the present time the total mileage of wire working on the Duplex principle is over 12,000 miles, the largest circuit being 450 miles.

The King of Belgium has established an annual prize of $\$ 5,000$ to be awarded for the best works or investigations upon certained determined subjects. The competition is con fined exclusively to Belgians, except in every fourth year, when the citizens of any nation may compete. The first general concourse takes place in 1881, when the above mentioned sum will be awarded for the best work on methods of improving harbors on low and sandy coasts, similar to those of Belgium.

## Gas Dangers.

Too much care cannot be exercised in seeing that leaks do not exist in the gas pipes or that burners in unoccupied rooms are not left partially turned on. Ordinary illuminating gas, when mixed in certain proportion with air, forms a dangerous explosive mixture, liable to blow up on contact with flame. A fearful explosion occurred almost under our windows recently, and three people were injured, through a girl entering, with a lighted lamp, an apartment which received the escape from a leak in the gas main.
catent gateritay and forsign eatents.
Improved Vibrating. Propeller.
Charles P. Macowitzky, Corpus Christi, Tex.-This invention is an Charles P. Macowitzky, Corpus Christi, Tex.-This invention is an
mprovement on the propellersfor which the same inventor obtained previous letters patent, and it relates to the arrangement of the previous letters patent, and it relates to the arrangement of the
sliding frame, to which the paddles are pivoted, with relation to the
side or shell of the boat or other vessel, and to the rack bar by which side or shell of the boat or other vessel, and to the rack bar by which
the paddles are vibrated. By reversing the paddles upon one side, the paddles are vibrated. By reversing the paddles upon one side,
the vessel may be turned in a very small space-almost upon her axis. A vessel with this system of propulsion will be enabled
avail herself of winds, and go under sail entirely, if so desired.

Improved Wheel Plow.
William Dickie, Gillespie, Ill.-This invention is a wheel plow in
which novel devices are provided to allow of its being easily raised which novel devices are provided to allow of its being easily raised from and lowered to the ground, adjusted to work at any desired
depth in tho ground, and to run level whatever may be the denth of the furrow being plowed, and when both wheels are running upo the urrow being plowed land.

## Improved Cooking Stove.

Edwin O. Brinckerhoff, New York city.-In this stove, by suitable arrangements of flues and dampers, the products of combustion are
caused to pass over the top, back, bottom, front, and sides of the oven, so that the said oven will be heated evenly and thoroughly with the least possible amount of fuel.

Improved Car Coupling.
Charles Surplice, Ludington, Micl.-Levers are provided by means
of which the drawheads are moved laterally, and there are scroll of which the drawheads are moved laterally, and there are scroll
springs at the back ends of the drawheads, which give them flexisprings at the back ends of the drawheads, which give them dexi-
bility. The drawheads are allowed to rise by means of wedge-
shaped keys, which are operated by levers. The other ends of these shaped keys, which are operated by levers. The other ends of these
levers work beneath the horizontal bars and on horizontal levers, and are so held in any position. The keys work under angular
plates which limit the lateral movement of the drawhead. Arms on the ends of shafts raise the hooks by levers at the front ends of
the coupling. The coupling bar is made to engage with the hooks. the coupling. The coupling bar is made to engage with the hooks. This coupling bar is retained in a horizontal position by the shape of the cavity in the drawhead and the form of the hook, so that the cars will couple automatically when they come together.

Improved Wood Sawing Machine.
Henry Filley and Alanson D. Wood, Hersey, Mich.-By an ingenlous application of cams, arranged alternately with reversed curves
on the driving pulley, two double motions of the saw are made to one revolution of the driving pulley. The cross head is connected to an endless rope, which passes over pulleys and is connected to a hand lever, which is used to raise and lower the saw by moving the
cord up and down. This lever is also used to press the saw into the work, and is provided with a cord and weight for applying the pres-

## sure.

Improved Vibrating Propeller.
Clement Theobald, Elliston Station, Ky.-This is a submerged in-
cased propeller, consisting of reciprocating bars arranged under the cased propeller, consisting of reciprocating bars arranged under the
water on each side of boat, and provided with a series of short water on each side of boat, and provided with a series of short
hinged side paddles. The forward stroke of the slide boards throws to offer hardly a resistance to the water while the return stro as throws them on the braces into position for producing the propulsion of the boat.

Improved Auger.
Charles F. King, Covington, Pa.-This auger has a detachable cutter head, which may be readily replaced when injured, and which
allows the use of the auger with cutters of various sizes. The detachable cutter head is placed over the screw point, and connected
by grooves with dovetailed side recesses, fastening the screws to the lips of the auger.

Improved Automatic Pumping Engine. Hiram S. Maxim, New York city.-The construction of the tire
chamber is such as to leave a thin stratum of water all around the sides, so that the formation of steam will begin very soon after the
fire has been started. The fire pot is made in the shape of a short fire has been started. The fire pot is made in the shape of a short
tube open at both ends, and in its lower part is placed the perforated burner, which is secured to the end of a supply pipe, through which creases, a diaphragm is raised against the weight of a block, and the force of a spring closes a valve more or less, according to the amount
of pressure in the boiler and vessel. A small hole is drilled through of pressure in the boiler and vessel. A small hole is drilled through
the valve to enabie enough of the combustible to always pass through to support a small flame, and thus prevent the flame from
being extinguished by the closing of the valve, so that, as the valve being extinguished by the closing of the valve, so that, as the valve
again opens upon the diminution of the pressure, the flame will imagain opens upon the diminution of the pressure, the flame will immediately increase, the for. With the steam pipe is connected a
diminished automatically.
four-way casting, with the inlet and outlet arms of which are con-four-way casting, with the inlet and outlet arms of which are con-
nected the parts of the said steam pipe. With the upper arm of the casting is connected a safety valve. With the fourth arm of the
casting is connected the throttle valve. The pump is attached to the frame work upon the side opposite to the engine, is single-acting, and the water escapes from it through the valve chamber into the
four-way casting, with one arm of which the discharge pipe is connected. Other ingenious devices are provided to ensure constant nected. Other ingenious devices are provided to ensure
oiling and a steady flow of water, and to regulate the feed.

Improved Railway Switch.
Samuel T. Dutton, Worcester, England.-This invention provides
means for rigidly securing the facing points of switches, to premeans for rigidly securing the facing points of switches, to pre-
vent the possibility of the points being fouled by the opening of both vent the possibility of the points being fouled by the opening of both
tongues at one time. The switches are made from twenty to twentytwo feet in length, and are connected and moved separately, in such
manner that only one tongue can be moved at a time. The switch is manner that only one tongue can be moved at a time. The switch is
connected to the single rod by cranks at two or more places in its length, thereby holding the switch firmly and equally against the stock rail at different points. To secure the facing tongue close up stud on the point chair, each cam being connected to and moved by the opposite switch. It follows that, when either of the switch
tongues is opened, it will cause the other tongue, which then becomes the facing switch, to be secured in its place, and, as the open or free switch cannot be closed while a train is passing or standing in them, the facing switch thereby remains secured.

## Improved Well Drilling Machine.

John E. B. Morgan and Henry Kelly, Osage, Iowa.-The mast orer
which the rope for working the drill rod goes can be readily folded down on the frame, for convenience in storing and moving. Devices are provided, so contrived that the rope can be let out at any time,
as the drill descends, without stopping the machine. Whenever it is required to raise the drill rod out of the well for pumping it out, the power employed for working it may be employed therefor
merely by throwing in the clutch ; and when the clutch is thrown in gear, the stop lever arrests the drill-operating lever and holds it, so that the drill ceases working while being raised.

## Improved Combined Roller and Harrow

William W. Anderson, Wartrace, Tenn.-When the machine is drawn forward, cutters cut in pieces stalks and weeds and cultivate
the wheat, while rollers will roll it, leaving the ground smooth for he harvester. When only a roller is required, the machine is turned, so that only the rollers will touch the ground

Improved Lawn Mower.
Leonard G. Youngs, Morris, Ill., assignor to himself and Richard Hughes, same place.-This invention relates particularly to the con-
struction of the axle and ratchet lever for vertically adjusting the struction of the axle and ratchet lever for vertically adjusting the
frame and hand guide bar of the machine, and also to the connection frame and hand guide bar of the machine, and also to the connection
of the finger bar with the frame, to adapt the former to be raised of the finger bar with the frame, to adapt the former to be raised
entirely off the ground when the machine is to be moved from one entirely off the ground
point or place to another.

Improved Railway Axle Boxes.
C. A. Hussey, New York city.-The first invention is designed to pre-
vent the entrance of dust and sand into the axle boxes vent the entrance of dust and sand into the axle boxes of railroad nals and brasses over them. This is accomplished by means of leather packing, arranged to form a tight connection from the box against the wheel, so that the lubricating fluid may be poured into
the box, to allow the journal to run in oil. The invention does away the box, to allow the journal to run in oil. The invention does away
with the old dust plateand the cotton waste packed in beneath the with the old dust plateand the cotton waste packed in beneath the
journal. The axle box is made shorter, smaller, and consequently lighter and cheaper than the common box, while it accomplishes the object in the most perfect manner, that is, the complete lubrication
of the journal and its consequent protection from heating and wearof the journal and its consequent protection from heating and wear-
ing. Mr. Hussey has also another invention, which is an improved method of preserving the journals and brasses of railroad axle bearings from heating and wearing. This is accomplished by pro-
ducing a circulation of water or other liguid through the brass or ducing a circulation of water or other liquid through the brass or
box, which receives all the friction of the journal. The brass of the axle is chambered out in any suitable manner, and elastic tubes are
and connected therewith for conducting and discharging the water to and from the brass. A lively current of water is produced from an
elevated reservoir, which keeps the brass and journal at a low temelevated reservoir, which keeps the brass and journal at a low tem-
perature. The ordinary absorbent (cotton waste) may be used in perature. The ordinary absorbent (cotton waste) may be used in
axle boxes having this cooling current applied to the brasses with safety from heating and wearing. Both inventions have been patented through the Scientific American Patent Agency in Canada,
England, and most of the countries on the continent, and one of England, and most of the countries on the continent, and one of
our leading railroads is about to adopt one or both improvements in our leading
their cars.

Improved Dravivbar and Buffer.
Charles Yillmeyer, York, Pa.-'Chis invention relates to novel means for reinforcing and sustaining the ordinary transverse car
springs to which the drawbars are attached, and consists in combinsprings to which the drawbars are attached, and consi.
ing three springs with the same beam, bolt, and nut.

Improved Gin Saw Sharpener.
Josiah Mizell and John Revell, Colerain, N. C.-This invention relates to machines for sharpening the teeth of a series of saws
arranged upon the same shaft, the object being to direct the feed of arranged upon the same shaft, the object being to direct the feed of
the rotary file from one tooth to another while the same sharpener is thus adapted to saws of different diameter, and the saw that is being sharpened is steadily centered between the legs.

## Improved Vapor Bath.

John Becker and William D. Hoffman, Sigourney, Iowa.-This nection with steam, for the introduction of medical remedies through the pores of the skin. The invention consists in arranging the evaporation pan in such a way as to afford a general or special
delivery of the vapor; in the use of doubly adjustable electrodes, delivery of the vapor; in the use of doubly adjustable electrodes,
and in providing the bath closet with a tube that has an internal and in providing the bath closet with a tube that has an internal
conductor and biading screw.

Improved Gas Cooking Apparatus.
Thomas Peacock, of Wood Green, and John C. Peacock, of Finzbury Park Road, England.-This is a simple arrangement of metallic
casings, in which the air necessary to support combustion, after casings, in which the air necessary to support combustion, after
passing through holes in the internal casing of the door, is conveyed to gas jets, and the heated products circulate all around the oven, into the flue to the chimney. The as they descend, through holes into the flue to the chimney. The back of the apparatus is formed
with a double casing, with intermediate space forming the flue. The gas jets in the door are enclosed in a small separate case, which
Jmproved Cart Brake.
brakes for the wheels of a two-wheeled vehicle, arranged on the box independently of the shafts, so that they will turn around with the wheels and be utilized for tilting the box when the cart is backing up to the place to dump. The invention also consists of the brakes
pivoted to the sides of the box, one to each wheel, and connected in a peculiar manner to one lever, whereby both may be operated

Improved Extension Ladder and Fire Escape.
Abraham Oberndorf, Jr., and Ernest Frank, Baltimore, Md.-This invention relates to certain improvements in fire escapes, and it and guide blocks, with the four corner posts of separate and independent stories, which slide into each other after the manner of a telescope. It also consists in the combination of horizontal swinging
bars and vertical rods, with detents which fit in the ratchet teeth and support the stories, for the purpose of affording means for operating
the storics. The invention also further consists in the combination with hoisting pulleys of a windlass consisting of separate and independent barrels, corresponding in number to the number of the movable stories, which rest upon a core or shaft, or revolve with the
same by means of a clutch wheel and spline, as may be desired.

Improved Hay and Cotton Press.
William C. Banks, Como, Miss.-This invention relates to certain
mprovements in cotton presses, and it consists in the peculiar con mprovements in cotton presses, and it consists in the peculiar con-
struction and arrangement of the devices for adjusting the follower block and its pivoted supporting bar in its position to one side of the box, for the purpose of obviating the obstruction usually afforded
by the same when the box is being filled. It also consists in the peculiar form of the box, which has increasing transverse dimensions as tape
Improved Safety Catch for Elevating Carriages.
Henry Opperman and Alexander Black, Steubenville, Ohic.-This ferred to relates to the cages in which men and materials are transa safety attachment by which danger from the bject being to provide other part of the holding device will be surely and effectually prevented.
M. H. Mendenhall, Wabash, Ind.-The object of this invention is to provide an improved device for use in reading by the aid of artificial light. The same consists in a lamp-containing box, or case,
cut away at one side and provided with a pivoted or binged plate for deflecting the light, the latter being adjustable and adapted to be clamped or secured at various angles. The rays of light may be and direction may be varied at will, by changing the position of the pivoted deflector. The eyes of the reader are at the same time protec ted from light and heat. The device is adapted for general use and particularly with sewing machines.

Improved Shingle-Dressing Machine.
Samuel M. King, Lancaster, Pa.-This invention consists in novel
and very effectual means whereby both sides of a shingle may be planed and faced smooth by a single operation, thus greatly lessen-

Improved Wash Stand.
William Schwarz, New York city.-This wash stand has a lid to basin, a blacking looking glass. There is also a water receptacle and venient drawer. The whole, when closed up, presents the appearance of a bureau.

Improved Sail for Vessels.
James C. Nichols, New York city.-This invention consists in combining, with the gaff of a fore-and-aft sail, an independent sail, con-
nected with the mast by means of a jackstay and rings, and to be furled to the gaff.
Improved Engine for Rock Drills.
James Brandon and Albert W. Trankle, New York city.-Steam passages connect each end of the cylinder with the steam chest, and
enable the piston to be reciprocated. This piston has annular enable the piston to be reciprocated. This piston has annular
grooves cencted by longitudinal grooves. The channel ways thus formed between these heads connect with channels and with the live steam chamber. There is, in consequence of this relative
construction, an equilibrium of steam pressure always maintained on both sides of the pistons, except just before the heads reach the limit of their throw. The steam is momentarily cut off and serves
se the position of the pistons and the valve.
Improved Alarm Combination Loc
Henry W. Dilg, Portland, Oregon, assignor to himself and Willian Zimmerman, same place.-In this loek, the tumblers are provided with false and true slots, which are not radial to the center, but in
line with a prolongation of the pins or tongues of the main bolt. A spring hammer with alarm bell is connected with the tumbler wheel, and set by a stud, in connection with alarm tumblers, so that any attempt at opening the lock without setting them to their combination will be indicated by the continued ringing of the bell.

Improved Medicated Bath Apparatus.
Jean Joseph Louis Brémond and Paul Alexis Ernest Brémond, Paris, France.-The object of this invention is to provide a means
for the cutaneous application of medicines for the purpose of healfor the cutaneous application of medicines for the purpose of heal-
ing diseases. It consists in an airtight chamber, provided with means of ingress and egress, and having a hole through the top, through which the patient's head protrudes, the said chamber being lined with such material as is not likely to be affected by the corro-
sive action of the medicines. At one end of the chamber near the top, istion of the medic pre top, is an enclosed place, provided with sliding doors, in which rests said vessel rests one leg of a glass siphon, about one sixteenth of an inch in diameter. The other leg passes down theinside of the cham-
ber, and communicates inside with a funnel-shaped mouth, at right ber, and communicates inside with a funnel-shaped mouth,
angles with a steam pipe, after the manner of an atomizer.

## IImproved Clevis.

Leander Ellsworth Smith, Dixon, Ill., assignor to Theron Cumins, Henry T. Noble, and Orris B. Dodge, of same place.-This is a simple double hook and cast stud which serves to brace the plow clevis

Improved Locking Latch
Henry Rogers, Eureka, Cal., assignor of one half his right to Hiram Allen Haskins.-The novel feature in this lock is that the simor locks the main bolt, which is still farther secured, without any possibility of being tampered with from the outside, by a knob bolt, which slides in a slot of the inner face plate, and enters a recess of
the eccentric, when the same is thrown into position for locking the main bolt.

Improved 1 Table Hinge.
Andrew Grimm, Union Hill, N. J.-This is a novel combination, with a table having a hinged leaf, of a hinge having its pintle directly under the leaf joint. One wing is screwed to the leaf, while the
other is formed in the shape of a slide piece, which moves in a recessed casing screwed to the table. This is acted on by chambered springs of a suitable strength, while the leaf is rested on a projecting he casing.
Improved Wagon Spring Scat.
John Griffith, Bellefonte, Pa.-This consists in the attachment of strong' supporting standards to the sides of the wagon, and the consprings that are securely applied to the seat by central and side socket clamps.

Improved Stop Valve.
John Demarest, Mott Haven, N. Y., assignor to the J. L. Mott iron works of New York city.-This is a combination of annularlygrooved valve and pipe, the former having a large upper and a com-
paratively small lower flange, while the latter has an enlargement or parat with a packing ring. By this relative construction of pipe and
seat valve the ring is carried down by the piston, so that it remains beween the valve body and the pipe, making a perfectly watertight
joint. When, however, the piston is withdrawn, the lower flange joint. then, however, the piston is withaw, the lower tang

> Improved Car Ventilator.

Franklin N. Clark, Wellington, Qhio.-This ventilator is attached o a plate of metal which is fitted into the window, and inside the placed outside a water reservoir. An expansible air receiver is the air receiver tube, and discharges the same by an inside pipe, the latter having an annular funnel-shaped orifice. The effect is to purify the air admitted.

Improved Tongue Ring for Neck Yokes. Seth D. Bingham, Maumee City, Ohio.- The invention consists in
tongue ring for neck yokes formed of the leather covers and a metal plate. The upper ends of the plate and of one part of the cover are left free to be passed around the neck yoke and to be se-
cured by rivets. By this construction the rings may be made and

## Improved Plow.

Chauncey M. Van Every, Bronson, Mich.-There is a horizontal plate on the top of the plow standard, and a plate attached to the being turned horizontally on the beam, and it has near one end a concave and under-cut flange with vertical notches, in which cor-
responding points on the end of the standard plate responding points on the end of the standard plate fit. The beam plate is rounded and fitted in a concave and under-cut shoulder of
the standard plate, all so that, when both plates are attached to the beam by a single bolt, the plow will be firmly but detachably secured beam.

Improved Leather-Scalloping Machinc.
Isaac P. Hall, Miamisburg, Ohio.-A roller is made of a length equal to the breadth of the strip of leather to be operated upon, and in its face are formed scallop, and in which are placed two small blocks, which is revolved the other ends of which receive pins attached to a bracket, which is secured to the bench. To the sliding blocks are attached knives which project upward, so as to enter zigzag grooves in another roller, which is made to overlap the ends of the roller first men-
tioned. The rollers may be made of various lengths, according to the breadth of the leather strips to be operated upon.

## Wusiness and sersamal.

 The Charge for Insertion under this headi is 81 a Line Agrileultural Implements. Farm Machinery Seeds
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ree. Goodnow \& Wightman, 23 Cornhill, Boston, Mass. Hotchkiss Air Spring Forge Hammer, best in the
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## Sugar from Sorghum

In reply to a correspondent who asked for the best process for causing sorghum sirup to crystaline so as to make sugar, we give the following by
Stewart: "At the close of the boiling, transfer the cooler to the crystalizing room. Here two modes of reatment are to be pursued to suit the kind of pro
duct to be obtained. By the first method, a fair, yel low sugar, of a quality equal to that of the ordinary brown sugar of commerce, is the result. By the second, white sugar, or any grade intervening be tween it and the crude article, may be obtained. As a pre-requisite to success by either method, the
crystallizing and draining rooms should be uniformly heated to a temperature of not less than $80^{\circ}$ Fah. To secure this, a close room is needed of by an outside door. The crystallizing vessel should be roughed along the sides and a stove placed in the center. Crystallization and drainage shou.d be performed in the same vessels, and their ends. 1. Crude sugar of good quality and large grain will uniformly result from well defecated
sirup of the proper density, sirup of the proper density, at a temperature of
$80^{\circ}$ to $90^{\circ}$ Fah.,by means of slow crystallization and natural drainage. The vessels should be shallow to admit of the speedy downward passage of the molasses through the crystallized mass, and their bottoms should be inclined sufficiently to secure
its rapid transmission to a common outlet. The should be of a uniform size, and, in order to secur a large grained crystallization, should be made moderately large. Vessels conforming to these re-
quirements may be of various forms; but for convenience and general efficiency I give the prefer ence to a form of vessel which the experience of nearly a century has not modified for the better I refer to Dutrone's crystallizing box, thus de
scribed by himself: ' Experience has proved to me that the quantity of matter which combines the greatest number of advantages in the crystallization of cane sugar is fifteen or sixteen cubic feet fallizing vessels are five feet in length by three feet in breadth. The bottom is formed of two planes nclined six inches, the intersection of which forms groove in the middle. If this groove are twelve or fifteen holes of an inch in diameter, to permit the sirup to flow out. The depth is nine inches a he sides and fifteen inches at the center. The ves els should be made of boards one inch thick, an ined with lead' (or better, coated heavily with
iron paint). 'Before lining it, the holes should be bon paint). 'Before lining it, the holes should be from the inside, so as to form a small cavity sur ounding the hole, in consequence of which not a drop of sirup will remain after draining.' Such allizing and purging with the requisite strength. The crystallizing vessels rest upon strips of wood two inches thick and three inches broad, which ight or ten inches high, at the distance, laterally of ten inches from the middle line. Troughs connecting with a cistern on a lower level receive the when filled to within 3 inches of the top, will hold nearly 75 gallons lofs., of which one half, or 500 lbs., will be good dry sugar. The depth of the crystallizing 3 inches at the sides, where the bottom is most ele vated, and 9 inches in the center, when there is reason to apprehend any difficulty of drainage by reaon of the presence of an undue amount of grape drained or otherwise. After the molasses has all and the large surface of sugar much diminished, to dry speedily. The number of these boxes that will be required will of course depend upon the ime that must elapse before they can be reflled and used again. Two weeks is as shorta time as can be reckoned upon for the completion of the crystallization and drainage. It will be found that 500 gallons of juice delivered by the mill during that period. Close the openings in the bottom of
the box with long, smooth, wooden plugs, abruptly
the holes into the inside of the box two or three ing rack, around the side of the room and over the dripping troughs, which are so arranged as to convey the molasses into a pointed wooden or tin gutter, and thence into a cistern. The dripping troughs may be simply short open conductors of
the same materials. In twenty-four hours after the thick sirup has been passed into the crystalliz ing box from the cooler, the formation of crys-
tals of small size will generally have commenced. They may then be seen along the edges of the yet will be found in the greatest abundance, and may he detached and brought to the surface at the shall 3 w sides of the box, by means of a knife blade or the wooden scraper, which should always
be at hand. The last-named implement is simply long paddle of ash or hickory wood, with a stou handle and thin blade. With this the fine crystals stirred into the mass so as to distribute them as equally as possible through it, that they may actas nuclei for the formation of larger crystals. Geneally in twenty-four hours after this operation, and often in less time, the crystallization will have per-
vaded the entire, mass. When this is found to be so, then gently withdraw the stoppers and permit the molasses to drain. The sugar will be dry in ten
days or less thereafter. It may then be shoveled into boxes or barrels, and the crystallizing boxes refilled."

##  <br> H. C. S. will find directions for molding

 rubber on p. 283, vol. 29.-E. M. G. will find a re-cipe for soldering brass on p. 364, vol. 29.-F. W. Z. cipe for soldering brass on p. 364, vol. 29.-F. W. Z.
can find a recipe for a copper dip for iron on p. can find a recipe for a copper dip for iron on $p$.
90 , vol. $31 .-$ C. C. can cement glass to tin by using the preparation described on p. 298, vol. 30.-J. B mula given on p. 16, vol. 29 , and by that on p. 54 , vol. 30.-R. H. H. can fasten rubber to rubber by using the cement described on p. 203, vol. 30.-J.J. ool. 30 .-M. W. H. will find a description of mica on p. 88, vol. 24.-C. E. G. will find directions for stereotyping on p. 363, vol. 30.-N. L. F. can re-
move paint from window panes by the method demove paint from window panes by the method de-
scribed on p. 88, vol. 32.-T. J. C. can blue guns by the process given on p. 123, vol. 31.-F. W. Will find directions
58 , vol. 24 .
(1) J.E.E.asks: What degree of heat will a diamond bear without injury? Diamonds are said
o be destroyed at about $14^{\circ}$ Wedgewood or $1,820^{\circ}$ Fahrenheit,but they vary in hardness. What would be the effect of a cherry red heat upon a very hard aiamond? Would it have a tendency to soften it What heat will cause a diamond to crack and chip off on the outer surface? A. Heat would not atextremely high temperature. Heated intensely, textremely high temperature. Heated intensely be converted into carbonic acid gas, an exceedingly small residue being left behind
(2) J. J. asks: Will a slit extending from top to bottom in the glass chimney of a lamp be a prion or contraction? A.Yes. 2 Do you think a slit would impair combustion? A. No. 3. Does glass factory ? A. Yes
(3) A. A. F. says : I have tried your recipe ows: Water 1 gallon, washing soda $1 / \mathrm{oz}$ chromate of potash $1 / 4 \mathrm{oz}$. This will not make a stain It settles at the bottom; and after standing a few moments the water becomes almost clear. A. We have tried this stain and had nodifficulty in obtaining a very fine stain, perfectly counterfeiting the color of black walnut. The settling or precipitation of your solution is due probably to impurities
in the chemicals or water used. Separate your wa ter into two portions, in one of which dissolve the soda and in the other the bichromate of potash. The solution of sodashould be perfectly clear; and when added to the other solution, it should impart a bright yellow color to it. The wood should be steeped in this solution for about one hour, or un-
til the desired shade is obtained. A gentle heat ill hasten the process.
(4) M. H. K. asks: What is the kind and character of change that takes place in white of
egg when beaten from the shell into a stiff froth ? A. The continued beating causes the albumen to become aerated, or mixed with a large quantity of

## air bubbles. How can

How can I make a stamp or press, out of othe ump of butter to fill the table butter dish? Thereis no material, to our knowledge, that will 1. How can I polish a pearl, found in an oyster A. Try rouge powder. 2. Have such pearls any
value compared with others? A. They have no commercial value.
(5) F. W. H. asks: Is rottenstone and linseed oil good for repolishing a piano? A. The rot tenstone is used as a polishing powder, the linseed ished. They are not mixed together.
How can I prepare glue, so as to use without heating? A. Dissolve the
strongest (glacial) acetic acid.
(6) C. R. S. B. says : I curl my hair with a
thin gum arabic water. Is it injurious? A. It is of no benefit, and probably of no more injury to the hair than the use of too much water, rendervent the hair from falling out? A. Sce p. 363,
(7) E. B. eays: I have some elder wine which last summer turned sour, but not sour
nough for vinegar. I added $1 / 2$ pint alcohol to the nough for vinegar. I added $1 / 2$ pint alcohol to the
gallon when made. How can I make vinegar of gallon when made. How can I make vinegar of
it, fit for the table? A. Add to it a little yeast, or tion.
(8) W. C. says: I have a lot of molded andstone, saturated with coal oil. How shall I ake the oil out? A. Heating to a moderate temperature might be tried, if practicable. Sometimes chalk and magnesia are used to absorb and exract oil stains.
(9) A. M. F. asks: How can a harmless subtance be magnetically polarized, to convey into the human system the positive or negative forces,
oo as to circulate in the blood and so through every part and atom of the body? A. There is not, to magnetic polarization that may be takeninto the system in the way you describe.
(10) E. B. J. asks: 1. What can be added to tobac co that will cause the odor of the smoke to
smell sweet? A. Try lavender. 2. Can it be made pleasant by passing the smoke through perfumed (11) B. S. asks: What is the behavior of
(1). No. potassium and sodium, and similar metals, in abso-
lute or nearly absolute ( $95^{\circ}$ ) alcohol? A. When sodium or potassium is added gradually to absolute rises rapidly, and the metal is dissolved; while an rises rapidly, and the metal is dissolved; while an fusible, crystalizable, deliquescent compound formed, which has received the name of sodium alcohol (or potassium alcohol) or of ethylate of soda (or of potash].
(12) W. E. says: I have tried many recipes for tinning articles made of cast iron, some of which are malleable; the last I tried was: "Cover
the articles in a solution of sal ammoniac, then dip them in melted tin," but it would not work. A The nperation only succeeds well when the surface of the metal to be tinned is quite free from oxide, and when during the operation the oxidation of
the molten tin is prevented. The former requisite is attained by the use of dilute acids, rubbing and scouring with sand, pumicestone, etc. the latte condition, by the use of either rosin or sal ammoniac, both of which cause the reduction of any oxide that may be formed. The objects intended to
be tinned are heated nearly to the melting point be tinned are heated nearly to the melting point
of tin; they are then dipped into a vessel containof tin; they are then dipped into a vessel contain-
ing the molten metal, and rubbed with a piece of hemp over which some sal ammoniac is strewn. Pins, hooks and eyes, small buttons, and simia
objects are tinned by being boiled in a tinned boiler filled with water, granulated tin, and some cream of tartar. The tinned objects are dried by being rubbed with sawdust or bran. In the manufacture of tinned sheet iron, technically termed tin plate, the iron must first be thoroughly scoured, so as to in baths of molten tin covered by a layer of molten tallow to prevent the oxidation of the metal On being removed from the tin bath the sheets are immersed in a bath of molten tallow to remove any excess of tin, wiped with a brush made of hemp, next cleaned with bran, and packed.
(13) S. N. M. says, in reply to O. H., who asks: What is the force of blow of the pile of a
pile driver, whose weight is 100 lbs ., falling 20 feet ? "Force is any cause which moves or tends to move a body. Weight is the measure of the force of gravity. Momentum is the quantity of motion, the impetus, the force with which one body strikes an-
other, and is equal to the weight $\times$ velocity." This other, and is equal to the weight $\times$ velocity." This
must be the force of the blow of the pile driver. To find the time of falling, equal tc $V \overline{20 \text { feet }+166_{1} \frac{1}{2}}=$ $1 \cdot 115$ seconds. To find the velccity $=1 \cdot 115 \times 32 \frac{1}{6}=$
$35 \cdot 861$ feet per second. Therefore, $35 \cdot 861 \times 100=3586 \cdot 1$ lbs.=the force of theblow. If there be any demonstrable error in the above,I shall be pleased to learn it. I conceive it possible that it may be said that the
momentum innot the same as the force of the blow, estimated in pounds. A. The definition of momentum,given above, that it is theforce with which one definition is ordinarilygiven incorrectly, in elementary workson mechanics. The force of the blow of pile driver, as we understand it, is a certain weight which would produce, by steady pressure, the same effect as the falling body. The amount of the (14) C J L asks. How can I electro from an ironsolution instead of copper? A. Use the protosulphate or neutral chloride of iron,
single battery cell, and an iron positive pole.
(15) J. C. C. asks: Have dispatches been successfully transmitted on the same wire in both directions at the same time? A. Yes. The
Western Union Telegraph Company has been successfully using Stearns' method of sending two meseral years past. (16) C. A. C. asks: Will you please explain the process of electrotyping, and the kind of metal
sed? A. An impression of the objects which you esire to reproduce is first taken in gutta percha or ax, which is then covered with plumbago by
brushing with a camel hair brush. The impression is then attached by a wire to the zinc pole of a weakly charged Daniell cell, and a copper plate is attached by a wire to the copper pole of a battery. The impression and copper plate are then dipped opper of the solution will begin to deposit itself on the impression, first at the black-leaded surface the vicinity of the connehing wre, then it will tis usual to keep the impression in the solution for about 24 hours, when the copper deposited on it will have formed a tolerably strong plate, which can be easily removed from the wax. On the
side of the plate next the matrix, will be found side of the plate next the matrix, will
a perfect copy of the original object.
(17) L.W asks: In a galvanic pile composed of copper and zinc plates, 4 inches square, how
many pairs would it take to produce a shock that many pairs would it take to produce a shock that
would be felt? A. One hundred pairs would produce a perceptible shock.
(18) T. J. W. asks: Is it twelve o'clock when the clock strikes the firststroke, or when it strikes
the twelfth? A. As a general thing, a clock indithe twelfth? A. As a general thing, a cloc
cates the hour of twelve at the first stroke.
(19) R. K. asks: What is the objection to driving ferrules in biiler tubes, or to caulking the
tubes, when the boiler is full of water tubes, when the boiler is full of water? A. It can
not be ordinarily done with safety and conveninot be
(20) C. R. asks: Which is the most power-
ful wheel, the overshot or the turbine? following data may be accepted as generally correct following data may be accepted as generally correct of wheels: Percentage of the power of the water
that is utilized by the wheels: Overshot and breast wheels from 75 to 80 , undershot wheels from 40 to
(21) E. E. E. asks : Will cast iron make a safe head on which to put four cutters for a wood
molding machine, the heads to be from 2 to 6 inches across and 6 inches square, with $13 / 4$ holes in center for shaft? The shaft is to revolve at the rate of
from four to six thousand per minute. A. Possibly, but wrought iron or steel would be preferable.
(22) W. H. F. asks: Can you give me the sary to overcome a a given resistance? For instance,
on a line of say 100 miles on a ine of say 100 miles, having a resistance of
about 1,500 ohms, how many Daniell's cells would be required to operate it satisfactorily? A. Much
depends upon the size of the wire, its insulation, depends upon the size of the wire, its insulation,
and the delicaey of the reeceiving instruments used. Assuming the wire to be of No. 8 gage, the insulaMorse relays of 150 ohms resistance, 50 cells would be sufficient.
(23) J. C. G. asks: What tools and materials would a person need to make small working
models of steam engines? A. A lathe, a small maner, and a good vise bench, with hammer, fles, chisels, center punch, scribers, etc.
(24) W. P. says: I inclose some indicator in a flour mill. What do you think of them in a flour mill. What do you think of them?
A. They appear to be very fair. We would be
glad to receive from you a brief account of the glad to reeeive from you a brief account of the
performance of the engine, giving average power exerted, consumption of fuel, water, oil, and an
other matters of interest that you can furnish.
(25) S. B. H. says: You recommend heatin wire ropes. All the wire rope that I ever saw had a small piece of rope in the middle, for the pur-
pose of making it pliable. as I suppose. Would not the heating of the rope red hot injure the hemp?
A. Wire rope is made with either a wire or hemp A. Wire rope is made with either a wire or hemp
center, according to the wishes of the purchaser. Our correspondent's question implied that his rope had an iron center.
(26) J. D. asks: Will it add to the power of an engine to increase the length of cylinder from
12 to is inches, and proportion all other parts to
the increased length of cylinder, the number of revolutions and the oressure of steam remaining
the same as it did on the 12 inch cylinder? A. The the same as it did on the 12 inch cylinder? A. The
power will be increased if the alteration is made.
(27) R. M. R. says: On p. 27, wol. 32, I find
is question (No. 64 ): "At what speed would an engine, having 2 inches bore and $41 / 2$ inches stroke drive a boat 18 feet long, 5 feet wide, and drawing
6 inches of water? The engine will have 100 revo 6 inches of water? The engine will have 100 revo-
lutions per minute and 5 C lbs. steam." You reply lutions per minute and sc libs. steam." You reply:
"The engine would be entirely too small to give a of stea Would not such power under the conditions named? If so, the engine ought to be able to do as much work as a
boy of fourteen could do : pull such a boat with a pair of oars at about 3 miles an hour. I have often done this when I was about fourteen. If a screw
loses so much of the power as to make the engine less powerful than a
advise F. C. R. to connect a long cylinder with pair of oars, or construct a machine to work oars? A. As you surmise, one man power applied to the
screw of a small boat would be entirely too small, on account of the loss from friction and slip. If you have any plan for a boat with steam oars,
which you have proved by experiment to be more which you have proved by experiment to be more
economical and satisfactory than the ordinary economica propulsion, we will be glad to hear from
modes of
(28) W. \& B. ask: Is tannate of soda safe to
se in all cases, for removing scales from boilers? use in all
A: Try it.
is
Is superheating of steam any advantage in econ the manner in which you are using your steam. It is safe, if properly done
(29) A. F. A. asks: Has the coefficient o expansion of hard rubber been determined? A.
We do not remember ever having seen it, and would be glad to hear from any of our
may have information on the subject.
(30) J. G. says: I have just set an 8 foot by 34 inches tubular steam boiler for running engine
and heating building. The inspector says that it top (over 3 solid 1 water within 6 nches of the top (over 3 solid gages to save the tubes from un-
equal expansion, while I contend that there
should be at least 16 inches steam space, $21 /$ gages should be at leastr 16 incheses steam space, 21/2 gages
water, to have dry steam and work to the best advantage. Which is right? A. It it common to
carry water in such boilers from 2 to 4 inches above carry water in such bes.
the top row of tubes.
(31) C. S. D. asks: Does a column of water flowing to a hydraulic ram through a pipe twenty
feet long, inclined at an angle, with a vertical fall
of ten feet,give more force than flowing through a ten foot pipe att
sition? A. No.
(32) J. H. P. says: A bell has been placed n a church spire, but only a heavy and strong man can ring it. A. says that if the bell be hung higher will strike heavier and louder. B admits the former but mantains that the tongue will strike with less power and consequently emit less sound. Which is correct? A. The question cannot be answered,
positively, without more data. If the bell is raised positively, without more data. If the bell is raised
in the yoke, it can be moved more easily, but it will be necessary to swing the yoke through a reater angle in the same time as before to produce
the same sound. Hence the ringer will have to work more quickly than before.
What should be the length and width of an iron wedge two inches thick, to be used for splitting
vood? If it be too long, it will bend in crooked wood? If it be too long, , tt will bend in crooked-
rained wood. If too short, it will fly back when driven into frozen wood. If too wide, it will drive hard. If too narrow, it will merely displace the
wood without splitting. Should the faces of the wedge be plane surfaces with sharp corners, or val, like those of an ax with rounded corners
A. It would seem to be better to have different wedges for the several kinds of wood. They are
commonly forged, not finished, with sharp corcomm.
ners.
(33)
(33) H. A. H. asks: Would a wire, cut or grooved out like the threads of a bolt, cut wood
readily? A. Not unless it was tempered and had a cutter at the $e$
common auger.
(34) K. asks: If steam at 100 lbs . per inch do condined in a certain area and the area be
doubled, what will be the pressure in the enlarged area? In other words, what is the elasticity of steam? A. The pressure varies nearly inversely
sthe volume. You will find precise formulas
and $s$ the volume. You will find precise formulas,
which are somewhat complicated, in any good reatise on heat.
(35) T. E. L. says: I notice that you state reatest at the bottom of a boiler. This being the case, why in it buat an injector will supply a boiler?
A. On account of the difference in area of the A. On account of the difference in area of the
steam pipe and orifice through which the water is forced, the relocity of the steam is greater than hat of the water; ; tho that steam at boiler press-
ure, moving at a high velocity, can overcome a less velocity. Simile if the resistance moves at case of a lever where a small weight moving fast raises a large one moving slow. It can also be ob-
served in an ordinary system of ropes and pulleys, served in an ordinary system of ropes and pulleys,
and in numerousother instances, which will doubtand in numerous 0
(i36) W. C. R. asks: If I take a cylinder with an outlet and stopocok toit, and compress air put it on a small boat, and then open the stopcock, letting the air escape, the air on the outside travel-
ing in the same direction, and at the same speed as ing in the same direction, and at the same speed as
that coming out of the cylinder, will it propel the riend of mine claims that it will. Which is right? A. Your friend.
(37) J. A. H. says : 1. T. L. maintains that the pump (if any be attached) and heat up to 130 thes. pressure, all the water will be turned into
stean, in other words, there will be no water in the steam, in other words, there will be no water in the
boiler by the the it reches 130 lbs pressure. I say boiner by the time it reaches 1301 lbs. pressure. 1 sas of the water will be turned into steam, which steam occupiest hat portion of the boiler not occupied by
the water. Which is right? A.You are. 2.T. L. says that if you take a hollow cylinder or other vessel of sufficient size to contain 1,000 gallons gas in
liquid state (not 1,000 gallons liquid), force gas into it under proper conditions until it is full of liquefied gas, then draw off 500 gallons gas, that the re-
maining 500 gallons dess the quantity evolved into maining 500 gallons (less the quantity evolved into
gas to full space above liquid) in the vessel will not as to full space above liquid) in the vessel will not nd cannot be in the liquid state. I say it can be he in such an instance,provided the exhaustion of 500 he pressur at which the gas liquefles. Who is right? A. You are. 3. He further maintains that if you take any vessel, half fill it with fluid and
raise the internal pressure to 150 lbs. per square raise the internal pressure to 150 lbs. per square
inch (either by heat, pumping in air, or the efforts nch (either by heat, pumping in air, or the efforts
of a liquefied gas to reassume the gaseous condiof a liquefied gas to reassume the gaseous condi-
tion) you cannot hear such fluid shake and gurgle if you agitate or shake the vessel; in other words位e be any fluid in such veser under such ressure, it will not change position by turning the vessel upside down and other movemen
he is wrong. Who is right? A. You are.
(38) J. G. P. asks: Is there any invention to acilitate the safety of treasure in case of fire or
oundering of a vessel at sea? Could not a large floating preserver be made and placed in the ship
with the treasure enclosed, and, when found necessary, be given to the waves with better hopes o recovery than if it went down with the ship? The idea is quite practicable, and is, we think,pr
tised. Your turbine device would not work.
(39) W. A. N. asks : How is linseed oil mantimest the seed is roasted first to destroy a gummy imes the seed is roasted ifss to destroy a gums rom mucilage, but renders it more acrid and ever, should be used in preparing oil for medicinal purposes. The residue (oil cake) is a most valuable ood for cattle.
(40) J. S. B. says: The following is a good saltpeter 1 oz., common salt 6 ozs., black oxide of manganese 1 oz, prussiate of potash 1 oz, pulver-
ize and mix with welding sand, 3 lbs. Use it in the ize and mix with welding sand, 3 lbs. Use it in the
ame way as you would sand.
(41) C. F. asks: 1. From what substance is methylic ether made? A. Methylic ether or ox-
ide of methyl is obtained by distilling 1 part de of methyl is obtained by distilling 1 part of red gas (homologous with ethylic ether) is disenbaged. It is accompanied with carbonic and sulhe gaseous mis, which may be removed by allowing with slacked lime. The gas is liquefiable at a tem perature of -33 , and boils at $-6^{\circ}$ (Berthelot). 2 What ether is mostly used in the manufacture of
artificial ice? A. Ethylic or rinic ether, sometimes called sulphuric ether.
(42) F. G. H. asks: 1 . What is nitroglycerin
ade of? A. Nitroglycerin is a compound formed made of? A. Nitroglycerin is a compound formed
by the action of a mixture of highly concentrated by the action of a mixture of highly concentrated
nitric and sulphuric acids for a few minutes on glycerin. 2. Can the ingredients be mixed in one or two seconds, so as to be ready for use? A. No;
the manufacture requires great care and careful watching.
(43) J. H. asks: How can I make distilled water? A.By boil-
ing water and condensing the steam of block tin pipe surrounded by
cold water. An-
An other way is by
using the little de viee shown in the which the steam
condenses inside
the conical cover, and descends the same, being caught by a projecting gutter and conveyed to
the spout. A cloth kept wet with cold water on the top will facilitate the condensation.
(44) W. R. B. says: 1. In your issue of August 28, 1874, I see a description of a new light for photographers, which is produced by passing hy-
drogen through iodide of ethyl in which zinc has been digested. Will you explain what iodide of ethyl is? A. In order to prepare this ether, 100 parts of alcohol are placed in a retort, and a small
amount of iodine is introduced; phosphorus is added in small quantities until the liquid become colorless ; a fresh portion of iodine is then added and then a fresh quantity of phosphorus, unt1 phorus have been added. The mixture thus ob tained must be cooled by immersing the bulb of the retort after each addition in cold water, otherwise a large proportion of the phosphorus will become
converted into the red variety, which is not susceptible of being attacked by iodine at low temperatures. After the reaction has terminated, the liquid is distilled by the heat of a water bath, ta
king care that the iodine (as shown by its brown king care that the iodine (as shown by its brown
color) is in slight excess. The distillate should be washed with water, digested on chloride of calcium, and redistilled. 2. Is metallic zinc meant? A. Yes. 3. Is there anything dange
this light in careful hands? A. No.
(45) P. D. asks: Is there any process by
which an amethyst can be restored to its original color after being heated? A. Not if the color has
(46) E. B. G. says: In drilling into rock which forms the pavement of coal, I struck a vein of water, which soon turned to a deep red color,and
tasted strongly of alum. Is there probably alum tasted strongly of alum. Is there probably alum
in it? A. It was probably colored by suspended oxide of iron, and contained compounds derive contained in alum.
(47) A. T. asks: How can I take impres sions rrom sunk lines on copper plates? A. Obdab on the (warm) plate with a rolled flannel, wipe the plate quickly with a soft leather and then with the palm of the hand. The ink should be stiff enough to remain in the engraved lines, although
the surface of plate is perfectly cleaned as de-
(48) W. J. L. asks: Can carbon gas be liquefied by any known process, and what are the means? A. Carbon gas is rather an indefinite
term; carbonic acid gas can be liquefied. Take biterm; carbonic acid gas can be liqueneed. Take bistrong wrought iron bottle, together with a narrow pot nearly full of sulphuric acid. The bottle is closed by a screw plug, and then agitated so as to
shake the acid out of its pot, and bring it in con shake the acid out of its pot, and bring it in con-
tact with the carbonate. The great pressure produced by the evolving gas condenses the carbonic has resisted all forts. Carbonic oxide, lowever, has resisted all efforts for its liquefaction. Marsh
gas (C $\mathbf{H}_{4}$ ) a combination of carbon and hydrogen, is, next to hydrogen, the lightest of known sub stances. It has resisted all efforts of cold and pressure to liquefy it. Ethylene Col $_{2} \mathrm{C}_{4}$ ) was con-
densed to a liquid by Faraday. Coal gas is a mix ture of gaseous compounds given off by coals. It
consists of, in 100 parts: Hydrogen $45-58$ (cannot be liquefied), marsh gas 3490 (cannot be liquefied), $4 \cdot 08$ (can be liquefied), butylene $\%: 38$ (can be ligue $4: 08$ (can be liquefied), butylene $: 3.3$ (can be lique-
fied), sulphuretted hydrogen $0: 29$ (can be liquefied ata pressure of 17atmospheres), nitrogen $2 \cdot 46$ (cannot be liquefied), carbonic acid 3 367 (can be lique
fied). This analysis is of the gas supplied to the city of Manchester, England.
(49) O. L. asks: 1. Is aluminum worked in this country? A. It is not. The metal which comes into this country is mostly manufactured in
France. There have been several manufactories in France, namely, at Salyndres and Amfreville, ham. 2. Can you give the process of extracting it from clay? A. The metal has not as yet bee profitably extracted from ordinary clay (silicate of aluminum); the nearest approach to it has been the process of Professor Rose, of Berlin, who first
used cryolite, which is a compound of the double used cryolite, which is a compound of the double
fluorides ofaluminum and sodium. This mineral,
being treated at a high temperature with sodium, atter, treated with quicklime, yields coustic soda and fluoride of calcium. Aluminum is also obtained from bauxite, native hydrate of alumina, which, having been previously mixed with common salt and coal tar, is next heated in an iron etort with chlorine gas, the result being the formtion of carbonic oxide, and the double chloride of aluminum and sodium, which volatilizes, and is The salt so obtained contained iron, and consehe salt so obtained contained iron, and conse-
uently the aluminum derived from it is alloyed with that metal. The double chloride of aluminum nd sodium is converted into metallic aluminum by being heated in a reverberatory furnace with
odium, while the aluminum is set free. A slag is formed, consisting of the douthe salt with excess of chloride of sodium. 3. If aluminum can be readily workea, why sit not in common use A. introduced, aluminum jewelry was much emloyed. The metal is at present more usefully instruments, and to some extent for surgical instruments. The price, however, of this metal
$(\$ 1.50$ per oz) is too high to admit of its extended $\$ 1.50$ per oz.) is too high to admit of its extended
(50) W. G. C. asks: 1. What kind of ink used for machine ruling? A. Any good fluidink
will do. Dilute with water to the required tint, and add ox gall to prevent the ink running, and to asten drying. 2. What kind of pens are used?
A. They are cut out of yery thin brass by a tool constructed for the purpose. 3. Is a blotting roller used after the paper passes from the pens or (51) P. O. T. asks: What is the nature of xygen, $36 \cdot 7$ per cent, with metallic manganesese 63.3 per cent. It usually occurs in deposits, being freuently associated with ores of iron. If the ore is good, it is fit for use directly. It is extensively nined in Thuringia, Moravia, and Prussia. It is common in Devonshire, Somersetshire, and Aber-
deenshire in Great Dritain. It is found in various parts of Vermont, also in Massachusetts, ConnecBrunswick other parts of the United States, Brunswick and Nova Scotia. The pure article
sold in New York at from 10 to 15 cents per lb.
(52) A. B. P. asks: How can I prepare pawlll ignite the powder without first opening the cartridge? A. Cartridges of this kind are made by enclosing the fulminating powder between
disks of hard, stiff paper in the head of the cartridges
(53) J. H. K. asks: How can mildew, stains, etct, be removed from gold lace? A. For this pur-
pose, no alkaline liquors are to be used; for while they clean the gold, they corrode the silk, and change or discharge its color. Soap also alters But spirite, and even the co with colors. danger of its injuring either color or quality, and, in many cases, proves as effectual for restoring the luster of the gold as the corrosive detergents. But
though the spirit of wine is the mostinnocent mathough the spirit of wine is the mostinnocent ma-
terial employed for this purpose, it is not in all cases proper. The golden covering may be in some laces worn off, or the base metal, with which it
has been alloyed, may be corroded by the air, so as to have the particles of gold disunited, while the silver underneath, tarnished to a yellow hue, may ontinue of a tolerable color; so it is apparent that
he removal of the tarnish would be prejudicial, he removal of the tarnish would be prejudicial,
(54) N. J. P. asks: What is bleaching powIt is made by passing chlorine gas over moistened ime. It is a moist grayish powder, and is soluble
in 10 parts of water, any excess of hydrate of lime emaining undissolved. It deteriorates by keeping; when freshly made, it may contain 30 per cent
of chlorine, but often has less than 10 per cent. It is decomposed by acids, yielding chlorine. It conm , with wpochlorite of lime and chloride of calcibeaching, and as a disinfectant. We do not understand your other question.
(55) J. G. C. says: I doubt very much if A. w. B. ever kept cider sweet in the way he mentions. If the fermentation is not checked, it will o strain the cider through sand, as it comes from the press into the barrel, so as to get it free from
as much impurity as possible; put the barrel in a ool place, taking care not to freeze it, leave the ung out a few days till the most violent of the fermentation has taken place, then bung it up tight a spile ; watch it closely, and once in three or four ays draw the spile, so as to $r$ elieve the pressure on the cask, otherwise it may burst. Judgment must
be used in the matter, and the time must be lengthned gradually for giving vent; finally leave it to itself; and in the following February, if you wish to bottle it, take a clear, cool day for the operation,
se good strong bottles and the best of corks, and drive them in with a wooden mallet, first softening them with a cork squeezer. By putting a moderate sized lump of the best white sugar into each bottle, it will tend to make it more sprightly. The bottled cider must be kept in a cool place. The
later in the year that eider is made, the better it will keep.
(56) A. K. says, in reply to J. C. \& Co., who
ask as to why millers steam their wheat before ask as to why millers steam their wheat before The firstreason is that it improves the quality of he flour and increases the yield. It also makes a or if you can make a broad bran, you will evidently have less of it to contend with in your bolts. In fact, it puts the whole system of milling in a superior sondition for manufacturing a choice ar-
icle of flour. Some millers object to steaming

stones, and they have ample reason for making this their standpoint. In very dry and cold weath er, when there is trouble in keeping up the grade of flour, steaming serves instead of rain or thaw We can do b.
( 5 r) $)$ W. T. B. says, in reply to H. D., who sect known to florists as red spider is usually of bright red color, though some are brown and others almost green. They seem to increase most rapidly in a dry, hot atmosphere, and upon plants that are not growing well, or that have been al
lowed to suffer for lack of water at the roots They infest the under side of the leaves, and ap parently shun the light; but when very numerous,
they may be found upon all parts of the leaves and stem. The upper part of the leaf, opposite where the insects are at work, becomes light colored and dusty looking. In greenhouses, they are most troublesomein the warmest part of the house; but I have seen them in a house where the temperature was allowed to fall to $40^{\circ}$ at night, and also on plants growing in the garden. I would suggest the following treatment: Syringe the plants freely
with water once or twice a day, taking care to wet the under side of the leaves. Keep the air of the room moist, by setting pans of water on the thues heating pipes, or register; give all the light possible, and ventilate freely whenever the weather will permit. When the soil is dry, give sufficient water to moisten all the soil in the pot; and water no more until the surface is dry again. If plants seem stunted or sickly, re-pot them in fresh, rich rowth. The red spider is anything but an aquatic nsect, and will yield to the hydropathic treat ment, if it is persisted in.
(58) A. H. says: E. S. S. can season his cro quet balls after they are turned by brushing them oven (slowly at first) to get the oil into the pores of the wood, repeating the oil coating three or four times, and then storing them away for the oil to dry. This will not only keep them from checking, from rotting. Last winter I made some plane liameter, those treated with oil stood the sun' rass without the least check; the others, not oiled checked so as to make them useless.
Minerals, etc.-Specimens have been re ceived from the following correspondents,and examined, with the results stated:
H. D. P.-Having subjected your sample of pa-
per to the usual tests, we failed to discover the per to the usual tests, we failed to discover the
presence of arsenic.-J. T.-Your box contained presence of arsenic.-J. T.-Your box contained
but one specimen, a piece of basaltic rock, the only but one specimen, a piece of basaltic rock, the only
value of which would be in building.-W.M. I.is a fossil coral.-A. B. H.It is quartz grains, yellow mica, black mica, and fragments of augite, which is a silicate of lime, magnesia, iron, and alumina, but is of no value in the arts.-P. B.-It is a superior red oxide of iron. We have known several specimens to contain as high as 00 per cent of iron. It will make red paint re of iron-H. P. E-No 1 is quartz arous, col ored red with oxide of iron, and mixed with small orystals of black mica. No. 2 is the same as No 1, but with yellowish mica also. No. 3 is quartz rock with yellow mica. No. 4 is the same as No. 2,
with more quartz. No. is similar to No.3.-R. E.M. with more quartz. No.5 is similar to No.3.-R. E.M.
-It is asphalt. You have already a knowledge -It is asphalt. You have already a knowledge
of its valuable qualities. It is a highly bituminous of its valuable qualities. It is a highly bituminous
asphalt, capable of yielding illuminating gases ard oils, and of being used as a paint. You have only
to develop the deposit.-E. I. D.-It is garnet in mica schist.-N. S. S.-It is garnet. The crystaline form is the rhombic dodecahedron, and belongs to the variety of garnet called the iron-alumina gar net, which is common.-A. J. R.-It is difficult to determine the value of stones from such small pecimens. If you will send us a stone of the proper aurface, we will piveit a practical trial -H. L. H. -No. 1 is a quartzrock containing scales of yellow mica, of no value. No. 2 is quartz rock with some iron, but too little to be worth working. No. 3 is a crystal of aragonite, which is carbonate of lime

## COMMUNICATIONS RECEIVED.

The Editor of the Scientific American ac
knowledges, with much pleasure, the receipt of or ginal papers and contributions upon the following subjects:
On Canal Towage. By R. B. C., and by W. R. W. On Filling Teeth. By A. H. B., and by J. G. C. On Springs as Motors. By M. W. P On the Patent Office. By O. P. S. On Furnaces and Flues. By H. M. S.
On Anointing in Cases of Fever. Br R. On a New Lamp. By D. D. N.
On Spiritualism. By H. M., and by F. S. On Lacing Belts. By R. G
J. P wiries and answers from the following: J. P. W.-N. C. P.-J. H. K.-J. S. B.-W. X. Y.-
H. M.-T. F.M.-J.S.E.-T.-W. S. D.-H.-F. G.S.
-E. A.-S.-J. E.E. - W. C. B.-S. D.

HINTS TO CORRESPONDENTS Correspondents whose inquirres fail to appear should repeat them. If not then published, they
may conclude that, for good reasons, the Editor de may conclude that, for good reasons, the Editor de
clines them. The address of the writer should al clines them. Then be given.

## ways be given.

cilituiries relating to patents, or to the patenta published here. All such questions, when initials only are given, are thrown into the waste basket, a it would fill half of our paper to print them all by mail, if the writer's address is given.
re sent: "Who makes steam cracker-making machinery? Who deals in old coins? Who makes ample trunks? Who publishes works on the conthe best or lights for lighthouses? Where are uch personal enquuries are printed as will be bsserved, in the column of "Business and Personl." which is specially set apart for that purpose, ubject to the charge mentioned at the head of hat column. Almost any desired information can in this way be expeditiously obtained.
[OFFICIAL.]
INDEX OF INVENTIONS

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## nted in the Week ending

January 5, 1875,
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,n each Trade mark.
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## CANADIAN PATENTS.

## ist of patents granted in <br> Janeary 7 to Janeary 8 , 1874

,iri-H. J. Wattles, Toronto City, Onc. Improve. ments on a machine for washing vegetables, called
"Wattles' Vegetable washer." Jan. $i, 18 i 5$. ,218.-.J. IR. Smith, Brockville, Leeds and Grenville
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,219.-C. A. Terrey, Southwark, surrey county, Englap 219.-C. A. Terrey, Southwark, surf in drills aud cutting
Improvements on setting diamonds
 Improvements on boots and shoes, called "Stock well's
Combined Toe Guard and Half sole for Boots and Shoors.', Jan. 7, 1875.
$221 .-$ J. C. and C. J. Sturgeon, Erie, Erie county, Pa. V. s. Improvements in lawn mowers and harvesters
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rester." Jan. 7 , 1855 .
,22.-J. Lennerton, Prin
scotla. Machine for making tree nail wedges, called

 cout-J. Vessot and \& Vessot, Jr., Johiette, Jonet
county. P. Q. Améliorations an sémoir et herse co:n-
binés, dits "LLe sémoir, herse, et rouleau combines J. \& S. Vessot." Jan. 5,1875 . Improvement in combined harrow and sowing machine. Brunswick, Canada. Improvement on yentleman's searf, cal
Holder." 226.-G. W. McNeil, Akron, Summit county, Ohto, L.S.
Improvements on wheat scourers, called "McNcil'? Wheat Scourer.'" Jan. '7, 1875.
22i,-R. Cobleigh, Chestcr, Windsor county, Vt., "I.
Improvements in carriages for children, called "C leigh's Improved Children's Carriage.".Jan. 7, $18 \pi \%$.
,23.-J. Telfer, Toronto City, Ont. Improvements on
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all of Indianapolis, Marion county, Ind., U. S. Im-
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,231.-R. M. Wanzer, Hamiltoin county, assignee of J.
 232.-Wm. Cochrane, La Fayette, Tippecanoe counts.
Ind.. I. S. Inprovements on harvesting machines,
called "Cochrane's Harvester." Jan. i, 1875 .
 dow Blind." Jaling, Woodstock, Oxford county, Ont. 2 d ex-
dat.-S. Paling tension, No.598, on "'The Ontario Balanced
Mlind.'. Jan. 9 , 1875.
,235.-H. A. Dierkes, New York city, N. y., C. S. Im $235-$ H. A. Dierkes, New York city, N. Y.. C.S. Im
provements in hanging and operating bells, called
'Dierke's Improvements in Hanging and Operating "Dierke's Improvem.
IBells.". Jan. 8, 1875.
236.-J. M. and C. T. Scliramm, Pontousuc, Hancock county, M. and., U. ©. T. Schprovements in the shligling of
roofs, called "Schramun \& Sons' Improvement in the Shingling of Roors.', Jan. S. 18:3. Mmprovements in heaters, called "Massie's Improved
Heater." Jan. 8 , 1sĩ. Heater." Jan., $18 \pi 5$. Improvements
Improved Wooden Pavement. $\because$, Jan. 8, 1875 ,239.-J. C. Codyé, WIndsor, Essex county, Mass.. C.S
Improvements in water filters, called "Codyés Excel sior Viater Filter.*.Jan. 8. 1855.
s. $240 .-$ L. A. Powers, Meriden, Sew

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,2.41.-W. S. Von Lissen. Hamburgh, Germany. Im.
provements on apparatus for cleaning boiler tubes ligy
steam, callect "W. Von Essen's Steam Boiler Tube
(leaner.". Jan. s. 18 in. on - W. A. Martin, London, England. Improvewents
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American.
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