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a WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

NEW YORK, DECEMBER 23 AND DECEMBER 30, 1876.


## the lomber trade in pennsylvania.

The timber or lumber trade of Pennsylvania is exceedingly extensive, and is increasing in such proportion that it is reckoned-at the present rate of cutting-that most of the white pine of the State will be exhausted in four or five years. This will give some idea of the enormous demand for lumber, particularly the white pine and the hemlock logs. The central depôt of the trade in Pennsylvania is logs. The central depot of city orade Susquehanna. The timber is cut in the autimber is cut in the au-
tumn and winter from tumn and winter from the huge forests on the slopes bordering the river for two to three hundred miles above Williamsport. The logs are slid down into the stream, and then, being formed into mighty rafts, are floated down to the city by the spring frêhets At Williamsport they are caught by a boom, which will hold 300,000,000 feet of wood at 000,000 feet of wood at
one time. The voyage one time. The voyage
sometimes occupies sesometimes occupies se-
veral days,and is someveral days, and is some-
what hazardous, as the what hazardous, as the
rafts are frequently wrecked-s fact rendered manifestly evi. dent to the visitor by the number of stranded logs left lying along the river shore when the floods subside.
Arrived at Williamsport, the timber is port, the in imbenense sonds until required ponds until required
for the sawmill, or un for the sawmill, or un til, once more formed into rafts, they are floated down the river to the millsmany miles below the town. These sawmills form one of the chiof features of Williamsport, where they number about thirty, and with an an. nual capacity for tarning out $225,000,000$ feet of lumber. The machnory in these mills chnery in these mills is most ingenious, and quickly converts the huge trunks into logs, cutting them into lengths for building or other parposes. The enormous piles of lumber awaiting a market seem almost incredible to the European visitors, says the London Graphic, who are accustomed to look upon timber as a somewhat expensive commodity. In the upper part of our engraving is shown the great dam at Wilthe great dam at Whliamsport above mentioned. In the middle is seen a raft of logs floating down stream and below is one of the lumber ponds, where the logs are stored till required for
use or for other markets.
Williamsport is situate on the west branch of the Susquehanna, and is a thriving city, rapidly growing in population and manufactures. Its prosperity is mainly due to the lumber trade, for which the river and the West Branch canal, which flows through the city, afford great facilities. It is surrounded, as our illustrations show, by lofty, well wooded hills, the scenery of which is of the greatest beauty. Of the extent of the trade which is its chief support, much has been written; but its rapid development is still going on,
the timber sawn in this country in 1870 being nearly three of steam as a pump, or, by a simple modification, may be times as much as that in 1860 . The demand is on the in- changed into a condensing steam engine. We learn that its crease, and there seems to be no possible check except the manufacture will be at once begun by Messis. Rumsey \& disforesting of the land adjacent to the lumber markets: an event which has long threatened us, and against which we have of ten warned our readers. When this comes to pass, prices of lumber will rise, and perhaps demand will fall off; and the planting of timber trees, now and for some years to for some years $t$ Co., of Seneca Falls, N. Y., under the superintendence of the inventor, Mr. E. G. Shortt. The promptitude with which this recent invention is thus to be brought into practical use shows commendable enterprise on the part of the above firm, while the fact of their undertaking the work is excel lent proof of the worth of the machine itself.


UMBER OPERATIONS ON THE SUSQUEHANNA
Bleaching Cotton, Some of our readers may find it a great con enience to be able to bleach a few hanks or short pattern warpe, in order to get samples round quickly; there fore, we give the fol lowing safe method:
Boil well your twist having first put in the water 2 ozs.of soda ash to the gallon of water wash off in cold we ar. Mix 1 lb , of fresh ter. Mix 1 lb . of fresh chloride of lime in 2 pints of water, crush ing all the lumps, and hen add 43 pints mor water. After allowing time for the lime to settle, pour off the clear chloride liquor, and immerse the yarn for about seven hours, in a cool place. Care must be taken to keep the chloride solution and the yarn from con tact with iron. Wring out and wash in cold water, and do not al ow the yarn to remai in the air very long Then immerse in a well mired solution composed of 26 drachms o double oil of vitriol to 45 pints of water. Al low the yarn to remain in this acid solution ten hours, then wring ou and wash off in cold water. In order to tho roughly remove the acid, work it well hrough a goed whit soap bath, and to this add a itttle marino blo to alive the yarn any give the yarn an wash through warm water to clear away the soap. These propor tions will do the least possible injury to the strength of the yarn The solutions may b used stronger if it is desired to shorten the length of time of the processes. If soft mule jarn has to be bleached he solution may be ased about one thir sed about one bhird jern, the if double the solutions must be increased, according to We have no doubt that steps will be taken to avert this the perfection required in bleaching.-Textile Manufacturer threatened damage; but the necessity cannot be too frequently brought before public attention. It is not the present that has to be provided for; it is the future, and the destroying ax may proceed, in the next few years, to work greater havoc than ever in our forests.

## The Mystic Pump.

The above name has been given to the novel steam pump ing engine which we illustrated on page 371 current vo lume, and which either operates through the condensation

## Bleaching Wool

MM. Daudier and Son thus describe a new process for bleaching wool. It consists in plunging the wool or vege table matters into a concentrated bath of chloride of calcium; and submitting them to prolonged boiling; to the bath may be added some hydrochloric acid, or compounds of that acid with metallic bases, such as aluminum, iron, zinc, cop per, or tin, which will then act energetically on vegetable matters, whileit will produce no alteration on wool.

## Srientitic gmmerican.

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NEW YORK, FOR THE WEEKS ENDING SATURDAYS DECEMBER 23 AND 30, 1876.

## THE END OF THE YEAR.

The present issue is the fifty-second and last number of the Screntific American for 1876.
Saturday is our usual dating day; and as there happen to be 53 Saturdays this year, we adjust them to the 52 weeks, by giving the double date of Saturday, December 23, and Saturday, December 30, to our present number, which finishes the year. No paper will therefore be issued next week.

Our next number, the first of the new year, will bear date Saturday, January 6, 1877. We hope that subscribers who have not already renewed will be prompt to send forward their subscriptions, and thus prevent loss or break in the continuity of their numbers.
We return our heartfelt thanks to the thousands of friends and patrons who have so generously encouraged our labors during the past. They are scattered far and wide throughout the world ; but we hold them in the closest esteem. To one and all, we send the kindliest greetings for the New Year, wishing them the largest measures of prosperity, health, and happiness.


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Some twenty thousand of the subscribers to the Scientific american and Scientific american Supplement will find, printed on the wrappers which envelope this week's papers, the information that their subscriptions expire with this number, coupled with a request that the same may be renewed for the coming year. Those desiring the weekly visits of our papers to continue without interruption will therefore serve themselves by remitting as soon as possible. At the same time they will, in so doing, greatly favor the publishers, as the latter are thus enabled to form proper estimates as to the magnitude of the edition which it will be necessary to print at the commencement of the year. The rates of subscription to either journal or to both combined remain as heretofore.
The saccess of the Scientific American Supplement has proved so genuine, and its circulation risen so greatly beyond our anticipations, that we shall continue its publication and use our best endeavors to increase its value.
Those who have taken the papers through newsdealers arerecommended to continue to do so, and those in the habit of procuring their papers weekly from the stands will find them there as of old; and those who neither subscribe for nor buy the Scientific American nor its Supplement may peruse them both on file in any working men's reading room in the country, or in thelibrary of any institution of learning in the world.
A handsome subscription list will be sent as usual on ap
plication by those desiring to form clubs.

## CITY SOBSCRIBERS.

Persons residing below 50th street, in this city, and in any part of Brooklyn, can receive the Scientific American or the Scientific American Supplement by carrier or by mail, as they may prefer, by sending their names to the office of publication. Persons residing above 50th street are supplied from this office by mail only. The price of the Scientific American by mail will be the same as heretofore $\$ 3.20$ per annum; or, if delivered flat and unfolded by spe cial carrier, \$3.50. The Scientific American Supple MENT will be deliverecl by carrier or by mail, as desired Price $\$ 5$ a year.
City subscribers ordering both papers will have them served at $\$ 7$ per annum, payable in advance. Either paper may be had at any of the news stores in this city or Brook lyn, and of periodical dealers throughout the country.

## the artist vs. THE ARTISAN.

An amusing objection was raised the other day by a lite rary paper, against Dr. Richardson's proposed City of Health The sanitary promise of Hygeia was not questioned, nor the desirability of easier and healthier ways of living; yet the utter failure of every attempt to realize such a scheme was confidently predicted, on the ground that evergthing about such a residence would be so new and matter of fact so utilitarian and unartistic, that nobody could be persuaded to live in it. Certainly no one of culture or refinement would be able to endure its brand-new sanitary and laborsaving devices, or the absence of all those time-honored customs and domestic surroundings which make the aver age old mansion at once so picturesque and so hazardous to
health.
No doubt the critic spoke from honest conviction. Much dwelling upon objects and opinions conventionally regarded as artistic has brought him and others like him to a frame of mind in which ugliness, if only ancient enough and sanctified by artistic associations, is positively cherished. Even squalor and wretchedness-in others-if picturesque, is more to be admired than any commonplace trimness, however wholesome. To minds of such artistic sensibility a laborer well fed and comfortably clad has no attractions the same man picturesquely gaunt and ragged is an object to look upon with rapture, to draw, or to paint. So a clus ter of shanties, perched on the rocks of Mackerelville or
huddled in one of its muddy hollows, and swarming with ragged and half-famished children and goats, is infinitely more pleasing to the artistic eye than the finest row of gar den-fronted model cottages ever occupied by a thrifty and comfortable community of New England operatives. It is one of the traditions of art to admire such things, and in admiring them artists and art critics are simply true to their calling and professional training
But where there is one who can legitimately look at life from that point of view, there are scores who pretend to do so because they think it essential to high breeding. culture and all that sort of thing. The artist delights in old things either from their intrinsic beauty or because from their ag they have acquired artistic associations; therefore those Who ape the artist think they too must declare " the old is better," and deplore the tendency of the age to depart from in a Dutch interior by . Who ever saw a sewing machine in a Dutch interior by one of the old masters? or a station ary washtub? or any other of the modern utilitarian de vices for the kitchen? How then can such things consist
with true artistic feeling? Away with them!

A pretty illustration of this sentimental reaction against modern improvements, and the eagerness with which it is caught up by certain would-be æsthetic people, appears innd in the circulation of an extract from-one of Clarence Cook's clever papers on furniture in Scribner's, just now going the rounds of the newspapers. We would be the last o depresiate the service which Mr. Cook is doing in these papers by directing the attention of furniture makers and buyers to simpler and at the same time more sensible and artistic styles of house furnishing and adornment than formerly prevailed, or to question the sincerity of his affection for the antique. Finding his models of excellence chiefly in old-time works of art, he has naturally come to look upon antiquity as almost in itself a certificate of merit. So when he finds in classic art representations of an abandoned arrangement for hand washing, he straightway falls in love with it and advocates its readoption.
The illustration he gives, from a woodcut by Albert Dürer-a trough attached to the wall and supplied with water from a metallic or earthen globe suspended above by a rod and chain, with an old style roller towel hanging beside rod and chain, with an old style roller towel hanging beside
it-is certainly ugly enough to delight any artist; but it it-is certainly ugly enough to delight any artist; but it
does not strike us as at all a contrivance calculated to supdoes not strike us as at all a contrivance calculated to sup-
plant anything now in use except it be the tin wash basin on plant anything now in use except it be the tin wash basin on
a stool, still to be seen in some back country kitchens. Mr. Cook thinks such an exposed cistern ever so much more convenient and pretty than the secluded marble basin in common use in our cities: but then Mr. Cook professes " such a dislike, to the whole of what are called in housekeeping ' modern improvements,' ' that his preference may be easily accounted for.
" I am well aware," he goes on to say in justification of this fancy, "that there is a sufficient reason for our American wholesale adoption of mechanical contrivances in the miserably inefficient character of our servants. In nine cases out of ten we use gas, furnaces, and plumbing, instead of lamps or candles, open fires, and movable washing apparatus, because it saves immensely in the labor and expense necessary to carry on a household. But now.a-days, when better servants are to be had, and 'service' is getting to be more and more a profession, we may reasonably plead for a more domestic and less hotel and steamboat way of living, knowing that in doing so we are pleading also for healthier ways of living, and not merely for picturesqueness."
True enough: we do need healthier and more domestic ways of living; but it seems to us that we are not so likely to get them by increasing the number of our '"domestics," or by a reaction against labor-saving contrivances, as by the increase and perfection of such household conveniences. The increasing intelligence of servants, so far from doing away with the need of mechanical helps, really adds im mensely to their practicability and usefulness. As every housekeeper knows, the chief objections to most " modern
convenicnces" have arisen from the ignorance and stupidity of servants with a genius for converting labor-saving and sanitary inventions into trouble breeders and traps for disease. What seems to be really wanted, therefore, is not fewer improvements, but more and better ones-devices so well contrived that stupid servants cannot easily make them go wrong: or better still, so automatic in their action that the mediation of human intelligence or stupidity, in their sphere of action, is unnecessary.
A trusty servant to call one in the morning, one not likely to forget or mistake the hour, is undoubtedly a great convenience. But after all, the best of servants may oversleep, or in a thousand ways fail to do one's bidding as surely as a clock, which costs less, takes up less room, never intrudes upon one's privacy, and never forgets to perform its allotted task. So in every department of household service, there is much to do which mechanism can do more cheaply and satisfactorily than muscle, and ultimately mechanism will get the work to do. And we have no fear that in course of time the artistic mind will become reconciled to the new order of things. The most venerable of our domestic surroundings was once an innovation, and the most modern of modern im provements will acquire with age the associations which artists delight in. But whether they hold their own or are supplanted by something newer will depend, not on the plaudits or protests of sentimentalists, but on the inventive skill of those who seek for something better.

## TRANSTUSION OF BLOOD.

About half a century ago, a great discovery was heralded in medical science, namely, the transfusion of blood from one individual to another, by which process, it was claimed, the sick and weak were at once to be made well and strong and even old people rejuvenated, by the tranzfer of youth ul blood into their veins and arteries. At that time the medical papers reported the most astounding results and prophecies of still more astounding realizations, which were, however, soon proved futile; and the excitement gradually died away, and before long the whole subject was almost forgotten. But it was too important to be neg ected by the medical profession, and it has been revived in Europe, notably in France and England. Recently at a linic in one of the Manchester (England) hospitals, the at ending surgeon came to the bed of a young patient who had lost so much blood by the amputation of a limb that he ecame moribund his death being momentarily expected The surgeon told his class that this was one of the rare cases in which the life of an individual could be saved by transfusion of blood, and at once a noble medical studen offered himself for the experiment, and allowed over six teen ounces of his blood to be transfused into the veins of the dying patient. The result was perfectly satisfactory;
the sufferer revived, in two hours afterwards he recognized people, and he was soon on the way to recovery. This incident, being published in the newspapers, has given occasion to the renewal of the discussion among semi-scientific and quasi medical editors; and, as in the beginning of this century, when the subject was first agitated, all kinds of absurd ideas are being promulgated,such as that the old can be made young again by the influence of the transfused blood: the weak can be made strong, the sick healthy: and even bad-tempered people can be made lamb-like by transeven bad-tempered people can ce made lamb-ike courageous by the in-
fusion of sheep's blood, and cowards cole fusion of sheep's blood, and cowards courageous by the in-
fusion of the blood of a dozen or so of game roosters. The fusion of the blood of a dozen or so of game roosters. The
conditions in every case are the draining of as much deconditions in every case are the draining of as much de-
fective blood as is to be replaced by the more perfect material. Of course such ideas are merely idle notions, and in no case can transfusion of blood do any good, except when a temporary relief is needed at a critical moment.
It should be remembered that old blood is always being onsumed, and new blood is continually being manufactured in the system, from the chyle into which the food eaten is first transformed. In this strange manufacturing process, spleen and lungs, continually takes part ; and if these organs spleen and lungs, continually takes part; and if these organs
act inefficiently, the blood is defective, and transfusion can act inefficiently, the blood is defective, and transfusion can only effect a temporary correction, because, as soon as the
transfused blood has been consumed by the continual wants transfused blood has been consumed by the continual wants of the system, it is again replaced by blood identical to that
manufactured by the defective organs which produced the original defective fluid.
Blood is a constantly and absolutely necessary fluid in the economy of any animal with a circulation; but this does not mean that it has a constantly unchanged nature. On the contrary, it is the universal material which is to furnish to every organ all the materials needed to replace the continual waste, of muscular tissue or fleshy fiber to the muscles, nervous matter to the brain and nerves, phosphate of lime to the bones, etc. Blood is therefore continually in the torrent of its circulation to the most remote parts of the body, being deprived of the most important constituents which it carries; and without an equally continual supply of these constituents, it is soon unfit for further use in repairing the bodily waste. It is thus seen that the cause of poor or diseased blood is not to be looked for in
the blood per se, but in the organs of which the function is blood making; and if these are defective, no transfusion can possibly be more than a transient benefit, and the attention of the rational physician should be directed to the defective organs in question and not to their result.
tHE PREVENTION OF FIRES IN THEATERS.
The recent burning of a theater in Brooklyn, N. Y., was attended with a loss of life under circumstances which ren the last act of the play under representation was in prothe last act of the play under representation was in pro-
gress, a border-as the hanging piece of scenery used to re gress, a border-as the hanging piece of scenery used to re
present sky, etc., is technically termed-was blown by a present sky, etc., is technically termed-was blown by a
chance draft into a gas light. The men stationed in the vichance draft into a gas light. The men stationed in the vi-
cinity saw the accident and quickly cut the burning portion away. They forgot, however, that over the stage below a canopy had been extended to represent the roof of a house, and therefore, instead of falling on the stage, where its burning would probably have done no harm, the ignited frag. ment fell on this light wooden and canvas framework, and in an instant set it in a blaze. The flames at once extended to the adjacent scenery; and before the audience had fairly become aware of the danger, the fire covered the whole stage.
ere were at the time about 1,000 persons in the build ing, 400 of whom were in the highest gallery. Those who had seats on the lower floors, despite the terriblepanic which arose, managed to gain the entrances; but the unfortunate
persons above, crazed by fear, blocked the narrow passages, filled the stairways, and then the latter gave way under the weight. The entire crowd was precipitated down into the lobby, and through the burning timbers into the cellar. Meanwhile the fire raged furiously, and in a very short time the walls fell, leaving the theater in a heap of ruins. Although the fire department was promptly on hand, and dozens of persons were fighting the conflagration, no one discovered the frightful loss of life until the following morning, when access to the interior became possible. Then b were exhumed in literal masses, packed together tier upon tier like cord wood. Over three hundred, as we write, have been removed, and it is believed that, when all the rubbish can be cleared away, but few of the four h
The reasons that made this disaster possible are threefold First, insufficient means of egress from the upper gallery ; second, absence, it is alleged, of fire-extinguishing appara tus behind the scenes; and third, neglect to render the highly inflammable canvas, etc., fireproof.
It appears that for all ordinary purposes the stairways leading from the gallery were ample. But, as must be the case with all such means of exit under like circumstances, they were quickly blocked by a frantic and struggling crowd. It is scarcely possible to suggest any mode of access
to lofty galleries which is not open to the same objection. The apparent remedy is to abolish high galleries altogether, and to allow but a single tier above the ground floor. While and to allow but a single tier above the ground floor. While
high galleries are in existence, however, it is clear that high galleries are in existence, howe
special fire escapes should be provided.
special fire escapes should be provided.
Regarding the second reason, nothing but the grossest negligence can suffice for its explanation. From all accounts a jet from a fire extinguisher, had one been handy, would have put out the incipient blaze. It seems to us that theaters would find a great safeguard in the system of per-
forated pipe fire extinguishers which we described some years
ago. They consist simply in a series of pipes which may ran ago. They consist simply in a series of pipes which may ran parallel with the gas tubes, occupying but little space and
being entirely out of the way. When the water is turned on, it escapes everywhere from the perforations made along the length of the pipes, and drenches the vicinity thoroughly. By this means, aided by some large tanks of water suitably disposed in the roof, a stage and all its appurtenances might rapidly be flooded.
Lastly, and with reference to the third reason, managers will find that they will consult their best interests if they adopt, or at least test, some of the suggestions which inventors have advanced for protection against fire. Canvas soaked in a solution of tungstate of soda will not burn even if held in a gaslight. We have saturated thin gauze with a solution of this salt and failed to make the fab-
ric blaze. This wash might probably be applied to scenery with no more difficulty than the sizing with which every artist covers his canvas before painting thereon in distemper colors. A strong wash of alum might likewise preven sudden ignition. For permanent hangings, such as are used about prosceniums, there is no reason why a canvas with which asbestos is interwoven should not be used. Asbestos ground fine and mixed with paint gives body to the pigment and, while not wholly fireproofing the material to which it is applied, might prevent ignition by a chance spark. It would probably be difficult to make canvas covered with a wash of silicate of soda (water glass) catch fire quickly. A wash of sincate of soda (water glass) catch hre quickly. A wash of
green vitriol and alum, applied hot, and covered with a second coat of green vitriol and pipe clay, is said to rende light wooden framework. fireproof; or instead of wooden rames, light iron frames might be made, which would take up less space, and would be of course uninflammable. Lastly, it is suggested that every theater should have a wire gauze drop curtain large enough to comp.etely cut off the stage and its appurtenances from the auditorium. Such a cur tain promptly lowered might effectually check the progress of flames toward the audience. In some theaters in this city, scenes are now painted on wire gauze when in tended to be transparent. If plaster were used to fill up the perforations, the gauze might be a valuable fireproof substance to replace canvas, for flats and other scenes attached to frames.
It is a sad task to suggest means of prevention after such errible damage has been accomplished: all the more so because such means might have been applied had ordinary forethought been exercised. It remains for the public to insist upon such safeguards so strongly that another such dreadful calamity will be effectually prevented. There is scarcely a theater in this city that is provided with sufficient means of egress from its gallery, and not one where just such a fire as lately took place might not occur behind the Wit
Within the last ten years, nine theatres have been de stroyed by fire in New York city alone. This puts the ave rage at about one a year. Meantime, in the other cities of the country, twenty-eight theatres and concert halls were burned. These facts suggest how great are the risks whic these structures run, and the need there is of better protec tion against fire.

## REMARKABLE CLOCKS.

We gave, on page 371 of this volume, a description of a clock, which has the odd feature that it oscillates while the pendulum is stationary. The novelty of this clock (the invention of $M$. Guilmet) is in the form; the principle is old, and clocks may be seen, suspended in shop windows, which oscillate like pendulums, while the escape wheel works on in anchor on the top of a pendulum rod, which, however clock, making it stationary ; while the escape wheel, by clock, making it stationary; while the escape wheel, by
the reaction of the pressure on its teeth upon the anchor, moves to the right and left, and communicates this move ment to the whole clock. Usually the suspension rods of these clocks are of such a length as to make the whole clock a seconds pendulum; and these rods are composed of bars of steel and brass, to compensate properly for changes of their length by temperature. In this case, these clocks are, if well made, excellent time pieces; and they are often used by watchmakers as regulators.

Another remarkable kind of clock which recently has been imported, and put on exposition in New York city, consists of a glass disk with the figures of the hours on it and hour and minute hands loosely slipped on a pivot in the center. The hands can be taken off, and no works whateve are visible, nor can any connection of the hands with any thing be seen, notwithstanding that the hands point al ways to the right hour and minute; and even when turned round or even whirled by hand they will, after some revolutions and oscillations, come back to the right place. They are well called mysterious clocks, and spectators are assured that they are not moved by electricity. This is true ; and the whole secret is in the counterpoise of the hands, each the short end a hollow round box. In this box are the works of a watch, which are so placed as to leave an annular space between them and the circumference of the box; and in this space is a counterpoise which is connected with the works so as to revolve once in 12 hours for the hour hand, and once in an hour for the minute hand; the revolu tion of the counterpoise inside the box shifts the center of
gravity of the hand, so as to give the hand, successively, the necessary direction. Thus, when the counterpoise is the furthest from the axis, it brings the center of gravity opposite the arrow point, and the hand will point upward to 12; when, on the contrary, the counterpoise is between the
axis and the arrow point, the center of gravity will be there and the arrow will point downward, to 6 . In the interm edi-
ate sideward position of this revolving counterpoise, the center of gravity of the whole will be displaced sideways and the hand point at $8,9,10$, or $2,3,4$, according to the shifting.
This clock was patented in this country on September 1 , 18i4, by Henry Robert, a clockmaker of Paris, France. Late ly Mr. Robert has considerably improved on the plan, especially by using very light and very heavy metals in combination, so as to have a sufficient contrast in weight for obtaining the right effect. The hidden counterpoise, moving in the hollow box, is of platinum, so as to take up as little room as possible, and the hand with its arrow point is of aluminum, the lightest known metal

## THE CREMATION OF BAROR DE PALM

It is not exactly clear what the gentlemen who invited a number of physicians and scientific men to visit an out-of the way little Pennsylvania town, and there to witness the burning of an embalmed corpse, expected to prove by the peration. The deceased, an eccentric person named Baro de Palm expressed, before dying, a desire to be cremated His equally eccentric executors felt morally bound to acced to his wishes; butinstead of quietly and decorously burning the body, say in any gas retort or puddling furnace, they used a special apparatus constructed in the village afore said, after lavishly advertising the show and themselves for several weeks in advance. In the presence of a crowd, num bering very few scientists but very many newspaper repor ters and morbid sight-seers, the withered corps was placed in an iron basket, shoved into a retort heated to $2,300^{\circ}$, and n three hours it was reduced to ashes. Cost, ten dollars.
We venture to think that most people, even before thi experiment took place, knew that a human body can be in inerated at the above high temperature in a brief space of time: and that it is no difficult matter to lead away evolved gases. Hence we fail to see wherein the much vaunted sci ontific interest of these crematory proceedings existed. So far as their effect upon the public mind is concerned, the sentiment left after the perusal of the published details of the burning and of the scenes attending it will savor strongly of disgust.

WHO DISCOVERED THE CIRCULATION OF THE BLOOD Strictly speaking, it was not one brilliant stroke of genius or good fortune, but a long series of investigations by dif ferent hands, which resulted in a true understanding of the ferent hands, which resulted in a true understanding of the
circulation of the blood. And as with most epoch-making arculation of the blood. And as with most epoch-makng in Science, so with this: while no one experi menter or thinker can certainly be credited with the first clear perception of the new truth, fame has given, and perhaps justly, the laurels to the man who was able to com pel its acceptance by an unwilling world.
For two centuries that credit has been given to Harvey, for his masterly demonstration of the mechanism of the veins and arteries, and his not less masterly advocacy of the new doctrine. It is not as clear, however, that he was ab solutely the first to detect and describe the true office and character of the circulatory system. It is certain that the nature of the pulmonary circulation was understood and taught by Italian and other physicians before Harvep's taught by Italian and other physicians before Harvey's
studies began; and more than a hundred years ago Moreri claimed that the honor of discovering and demonstrating, by experiment and reasoning, the nature of the greater or sys experiment and reasoning, the nature of the greater or sys
temic circulation was really due to the Italian physician temic circulation was really due to the Italian physician
and naturalist Andrea Cæsalpin, commonly called Cesal pinus, who published his "Exercitatio Anatomica de Cordis t Sanguinis Motu," in 1628.
Lately Professor Ceradini, of Genoa, has renewed the claim so successfully that a monument has been erected to his countryman's honor in Rome, and a tablet recording the discovery is to be fixed to the portals of the University of Pisa, where Cesalpinus taught before he removed to the neighborhood of the Vatican, as physician to Pope Clement VIII. There is no proof, however, that Harvíy knew anything about the work of his predecessor and rival, whose book does not appear to have received much attention even at home. And there is no question of the fact that the doc trine was first publicly discussed and combated as Harvey's, in Europe as well as in England. Within a century of the death of Harvey, it must be remembered, the father of modern physiology, Haller, revived the whole controversy, and gave a verdict in favor of the English physician. Holding that the true discoverer of any truth is he who draws it from its sources "at his own risk and by his own medita tions, and establishes it by arguments so forcible that they convince those who are longing for the truth," Haller de cided that " not to Cesalpinus, on account of a few utterances of obscure meaning, but to Harvey, the laborious author of numerous experiments and the expounder of all the arguments which, in his time, could be advanced, belongs the immortal glory of the discovery of the circulation of the blood." As Haller was not a countryman of either claim ant, there is no reason to suppose his decision other than impartial: and whatever Italian pride may lead to, it is al together likely that the rest of the world will continue in the belief, so long entertained, that Harvey's fame was fair ly won.

## BINDING OF NUMBERS.

Persons desiring their year's numbers of the Scientit Fic Ambrican bound may send them to this office for tha purpose. Price $\$ 1.50$ each volume, bound separately; or $\$ 2$ when both volumes are bound in one book. Prices for binding SUPPI EMENT numbers, same as above

タrientific gmericau.
IMPROVED SOLAR PHOTOGRAPHIC APPARATUS. In our recent aricles on the supposed planet Vulcan, we
noted the suggestion, made by the celebrated physical astronoted the suggestion, made by the celebrated physical astronomer, M. Janssen, that at certain observatories a continuous photographic record of the sun's face should be kept,
so that if by any possibility Vulcan should make a transit, the fact would be indelibly stamped on the record. For this purpose, the revolving photographic apparatus, formerly used during the transit of Venus, was proposed. This machine works automatically, and goes on taking dry plate photographs until it runs down. The apparatus is represented in use in Fig. 1, and its detailed parts use in Fig. 1, and its detailed parts are shown in Figs. 2, 3, and 4. It is fixed at the extremity of a long wooden telescope which serves as a dark chamber. The telescope is mounted on a heliostat, which is moved by clockwork so as to follow the sun.
The construction is as follows: On a common axis are mounted: 1st. A copper disk, C, Figs. 2 and 4, fixed on a wheel engaging with the pinion of a clockwork train, M. 2d. A large wheel, R, carrying a plate of silvered copper, $P$, which receives the images. On the disk, C, are made twelve openings, F, Figs. 2 and 4, equally spaced. This disk makes its complete revolution in 18 seconds, while the wheel carrying the Daguerrean plate turns with one fourth the ve-locity-that is, once in 72 seconds. In any photographic operation there are three processes: The opening of the light aperture, the posing, and the closing of the aperture. The disk, C , is the obturator, which opens and closes the tor, aperture, while the plate, $P$, comes in place to receive the image. The
three operations are accomplished
in one second and a half.
in one second and a half.
The plate wheel, R , is governed by a Maltese cross wheel, which allows it to move over a certain part of its revolu tion, and then permits it to stop for a brief period. This stoppage occurs just as one of the openings, $F$, in the disk, C, comes in focus of the dark chamber. The other details of the instrument are as follows: $\mathbf{O}$ is a square for mount ing the clock movement; $F$ is the passage of the luminous ray and focus of the telescope; M, Fig. 2, is the connection of the clockwork wheels with those carrying the photogra phic plates and obturator; $T$ and $D$ are drums and plates for closing the photographic chamber exactly, and $L$ is the tube of the telescope

## A Single Track Railroad.

The San Francisco Examiner of November 25 says: "Yes terday the steamer Sonoma conveyed to Norfolk, on Sonoma Creek, a number of our prominent citizens, who assembled to witness the opening of the Prismoidal Railroad. The road commences at Norfolk, on Sonoma Creek, and extends three and a half miles towards Sonoma. The steamer arrived in good season at Norfolk, on Sonoma Creek, the terminus of the Sonoma Valley Prismoidal Railroad, where the party landed, and at once proceeded to inspect the line and the works generally. The Prismoidal Rail road is laid upon a prism of wood built of beveled boards, forming a continuous prism 27 inches wide at the bese and 15 inches high with the single rail laid ong, with the single rail laid on the top. The whe the line supported by two wheels, one at the front and one at the rear. with independent revolving flanges. On arrival, the first thing to be done was to test the road, and in a few minutes platform cars, with a pris moidal railway locomotive between them, were at the stations. The locomotive is the first of its kind constructed in this State, and was built under the superintendence of George W Foga of the Pacific George W. Fogg, of the Pacific Iron Works. The party took thei places on seats which were ranged on each side of the car the passengers being face to face. The first impression sug gested was that which ordinarily fills the bosom of the no vice who makes his maiden effort to ride the uncertain bi cycle. A certain assurance that the whole thing would top ple over at the first movement was the general belief of the uninitiated. But the engineer sounded his whistle, the passengers gave their tremulous cheers, and the train moved o smoothly, and soon the pace was considerably augmented Wonderful to relate, the oscillation was scarcely perceptible and the locomotive and cars rode the single rail as firmly a the trains on the broadest of English solidly constructed broad gages. The faster the train proceeded, the smaller in number and extent became the lateral oscillations, beauti fully and practically exemplifying the great principles of
the whole prismoidal system, that the greater the speed, the less the liability to oscillate, a principle clearly demonstra ted by the gyroscope and velocipede. To those making them first trip on the new railroad, the ease and comfort of this mode of traveling suggested itself most strikingly. The train was run out to the end of the completed line, where forty-five men were found continuing the building of the prism onward. The construction of the road has cost, for the present three miles and a half, including the cost of the road bed over the marsh, about $\$ 4,500$ a mile, one half of the cost of the narrow gage railroad, the most economical of
water, 39 lbs of causticsoda of $60^{\circ}$ to $70^{\circ}$ Baumé, and the adding 22 lbs. of white resin or colophone, boiled for hal an hour. This must be done in an enameled metal or wood n ressel. The rest of the process is as usual, the wool be ing rinsed in water after cleansing. The quantities give bove are about sufficient for 2 tuns of wool, but this de pends upon the quality of the latter.

Musical Sand
On page 154 of our current volume, we should have said hat the microscopic examination of the sand was made by Professor Blake, and not Mr. Frink s stated. In a recent communica tion to us, Mr. Frink says: "I do not coincide with him (Professor Blake) as to the cause of the sound There are two ways in which the sound could be produced, which suggest themselves to me: 1. From the peculiar forms of the cavitie in these coral sands, each and eve cavity is sonorous like a hall and multiplication of these unnum bered millions of voices produce he imitation of the rumbling of distant thunder. Or, 2, that th passage of air through the cavities causes the walls to vibrate like th eeds in musical instruments." M rink brought with him from th anks in Ranai, Sandwich Islands wo closely pac ed bags of the sand each bag contakning 90 lbs. In Stn rancisco, the isand was apparentl s sonorous as when taken from it aative banks; but after a railroa ransit of two thousand miles, to llinois or Iowe, it seems to have wholly lost this property This is very probably due to the dampness of the elements. Mr. Frink con inues: "As to the origin of th and, none of it is sonorous excep the coral, and that is from a pecu
the two rail system. The road was commenced on the 16 t of August last by the building of the road bed.

## A New Rural Swindle

The "granger" is now the object of a new swindling dodge, which deserves the palm for ingenuity. $A$ substan tial looking person, perhaps with a companion or two, drives ip to the door and announces himself as a large butter deal or or agent of some large concern. He. inspects the gran ger's dairy and stock of butter critically, and finally enters into a contract to buy all the butter the farm can produce at some exorbitant figure, say fifty cents a pound. The reason he gives is that butter is on the rise, supply is limited, demand never so heavy, he is willing to pay to insure a good stock, etc., etc. Then he departs, and the granger revels in dreams of affiuence.
In about a week, along comes a herd of milch cows on their way to some other village. They stop to rest near the granger's house. He is especially interested in cows just a

Fig. 2.


Fig. 3

GNSSEN'S SOLAR PHOTOGRAPHIC APPARATUS. thers, but on the same island.' liar species. On the island of Nihau, twenty miles from Ranai, there is a similar bank. There is one bank near Kaou, on the island of Ranai, that is partially sonorous, but he sand is mixed with so much othor coral that the sound is very weak. This bank is more than thirty miles from the

Mr. Frink kindly offers to supply any one, wishing to in estigate the subject, with a suitable quantity of the sand On the Pacific coast, as has been stated, if a pint bottle, hal flled with the sand, or shaken rapidly up and down so o drive the contents quickly from one end to the other of the vessel, a distinct musical sound could be heard; but after ransportation to the inland States, the sand failed to re spond when similarly treated. Having received a portion o this sand, we subjected it to the following treatment: Whe haken in a bottle, as described, we could not detect an arked difference between the noise produced by it and tha of ordinary ocean sand, of the same sized grains, under the same conditions. Both kinds of sand were then dried in an vaporating dish at a temperature of $100^{\circ} \mathrm{C}$. $\left(212^{\circ} \mathrm{Fah}\right.$.), and

Fig. 4.

.
heen exaggerated.
Thegrains of the coral sand are somewhat larger than ordinary sea sand, their average dimensions being about one millimeter ( 0.039 inch). They consist principally of carbonate of lime, and of course dissolve almost completely in dilute acids. The little pebbles and variously colored shells form very interesting objects under a low power microscope.

Coal Tar a Pregervative of Wood.-We often notice that coal tar is named as a preservative of wood, and the comment is correct if those who advise would add that, in using, it must have the acid in it destroyed by mingling fresh quicklime with it. Half a bushel of lime, freshly dis solved and mingled with a barrel of tar, has kept posta, sa. turated with it and planted in clay ground, perfect over 20 allowed to cool in desiccators over sulphuric acid. When the experiment was repeated with the dry sand, we had no difficulty in recognizing the coral sand by the peculiar sound produced. A large bottle, with a long body and narrow neck, was employed, the open mouth being connected, by means of a piece of flexible rubber tubing, with a small funnel, which was placed to the ear when the bottle was shaken. The same experiment was tried with a wooden vessel in place of the bottle. The sound is without doubt produced, at least in part, by the reverbera tions from the walls of the little caverns and the vibrations produced in the air itself, as in an organ pipe. The accumulation of all these little echoes and pipings would, we think, in the aggrewould, we think, in the aggregate, amply suffice to produce the ubdued roar, the statements of hich, we are assured, have not
don't want to sell-these animals are choice stock-can com mand fancy prices-all butter cows, etc Grangerbidshigh -higher, and finally, as a great favor, is permitted to buy a few animals at an exorbitant figure. Then the herd moves on. After a while the granger discovers that he has purchased some very indifferent beasts. He also learns that veral of his neighbors have done likewise, under like mo butter dealer again.

## Cleansing wool.

M. C. Hammelrath announces that he has succeeded in making the following improvement in the process of woolmaking the following improvement in the process of wool-
cleaning, which consists in dissolving in 66 gallons of hot.
years.-FI. R. EE., in the Cultioator and Country Gentleman

## ENGLISH CHEEBE-IT8 TANUYACTORE

 Probably the best as well as the most famous English cheese is Cheddar, the excellence and sweetness of which depends as much upon the management of the processes ofmanufacture as upon the quality of the material used. It manufacture as upon the quality of the material used. It is made principally in Somersetshire, and is produced in the following manner: The evening's milk is placed in cooling vats so that it will be brought to a temperature of about $60^{\circ}$ by the following morning, when the morning's milk is added, and the temperature raised to about $80^{\circ}$. The large vat which contains the milk is gently heated in the water bath; and when the milk reaches the last mentioned temperature, sufficient rennet is added to cause coagulation in about forty minutes. Some whey is added to hasten the development of lactic acid, and finally, when the curd has become suff ciently firm, it is cut with curd knives. It then contracts rapidly, expressing the whey; and in about twenty minutes it pidly, expressing the whey; and
becomes quite firm, when it is broken into small pieces by a wroken into shovel breaker, and the wire shovel breaker, and the
temperature raised to $98^{\circ}$. The whey is now drawn off, and the curd left for about twenty minutes longer, when it becomes a coherent, partially solid mass.
When firm enough, it is removed, broken into thin fiakes, and spread out to cool. After the lapse of another twenty minutes, it is turned over and left until it attains a peculiar mellow and flaky condition, mell known to the condition, well known to the experienced cheose makor. By this time the tod to a $700^{\circ}$ reen reduced to about $70^{\circ}$. The curd is now put into a hoop and pressed gently for about fifteen minutes to drive out the whey, by which a too rapid fermentation is prevented. It is then taken out, cut into small bits by a curd mill, and then salted with 1 lb . of salt to 56 lbs . of curd.
The curd is now again placed in the hoops and kept under process for from 20 to 24 hours. It is then remored 24 hours. It is then removed and the sharp edges pared off, aftor which in in the ban daged, and put in the press again for a day or two longer. The temperature at which it goes to press is a matter of great importance, because, if too high, fermentation with evolution of gas is liable to take place and make the cheese porous. Cheddar goes to press at about $65^{\circ}$. While in the curing room, which is kept at $70^{\circ}$, the cheese is rubbed with melted butter and turned over daily.
Cheese is usually classified into cream, whole milk, skim milk, and sour milk cheese. To the first class belong Stilton, cream Cheddar, and Cotherstone. Whole milk cheeses are Cheddar such as above described, Cheshire, best Gloucester and Wiltshire. Some Gloucester and Wiltshire cheeses are made of skim milk. Sour milk cheese is principally Dutch.

A great cheese fair was re cently held in London, En gland, illustrations for which veral illustrations, for which Weare indebted tothe London Illustrated News A large cheese vat is represented, ca-
pable of holding 500 gallons of pable of holding 500 gallons of
milk. The men are engaged milk. The men are engaged
in what is technically termed in what is technically termed
rake. The steam required for heatited with a kind of The steel wire, which must be of excellent quality, being purposes connected with the manufacture was supplied by one of Burford \& Co.'s steam generators. Another illustra tion shows the curd mill at work; after which we have what is called the filling-in of the vats: that is to say, of the molds from which the cheese takes its particular form. The cheese presses, also shown in our engraving, are the same that the Aylesbury Dairy Company use in their factory at Swindon.
In the cream and butter section of the Company's stall three fifty-gallon creaming tins, of a special pattern and each giving a skimming surface of twenty square feet, were exhibited. Churns, too, were seen at work as represented in the engraving, which also shows the system of making up the butter in pats. Upwards of 300 lbs. of this butter and ormed either in bundles, by means of hand shears, or four worked by an eccentric while the wire is fed up to them. The two-length pieces of wire are then formed into bundles from three to five inches in diameter, according to the size of the wire, and held together loosely by a pair of iron rings, in which state they are annealed in a furnace heated by a wood fire. When sufficiently soft, the wires, still in bundles, are rolled over one another by the aid of what is termed the smooth file, and thus made to straighten each other.
The nert operation, that of pointing on grindstones, formerly involved greater loss of life than any otherindustrial occupation. The needles (twenty-five at a time) were made

Dairy Company's stall, during the few days the show con Dairy Company's stan, during the fows exhibited.
tinued open, from the milk of the cow

## Needle Making.

The Journal of the Society of Arti, London, gives the fol lowing account of the processes which every needle has to go through in its process of manufacture:
Redditch, in Worcestershire, England, and Aix-la-Chapelle, in Germany, it states, may be regarded as the seats of the needle trade of the whole world, comparatively few needles being made elsewhere; English needles are, however, more in request than those of any other country. As the needles andergo a considerable number of processes, from the rough steel wire to the highly polished hand instrument, which is not yet superseded by its machine competitor, perhaps some account of their manufacture may be found not uninteresting
to rotate against the stone between the fingers and thumb of the operator; and the subtle dust from the stone and the needles was inhaled with the breath, and found its way into the lungs, causing the malady known as grinders' asthma, to which all grinders succumbed at an early age. All this is now changed, however. The needles are made to rotate be tween two india rubber bands traveling over the concave face of the grindstone, of special quality, obtained from Frank fort; and the fine dust is carried off through a channel un der the grinder's seat, by an exhausting fan, which does duty for all the stones.
The middle portions of the wires, now pointed at both ends, are next brought under a falling die, worked by the foot, which stamps the gutter for the eye, roughs out the heads, and marks the position of the eyes. The fiattened portion has become hardened by the blow, and this hardness has to be removed in the annealing oven. The holes for the eyesare then punched out by a pair of small punches in a hand screw press; these puches require parsul work manship, both in making and adjusting, and employ specia peratives, who work with magnifying glasses like those of watchmakers. A numbe of the pairs of needles, stil united, are then threaded or spotted, as the term is, on pair of fine wires; and the burr or fin, made in stampin the heads, is then removed $\mathrm{b}_{\mathrm{y}}$ a file After the lengthshave been divided, by bending the wires backwards and forwards between the two spits, the rudely formed needles, now for the first time separate have their heads rounded of by filing, especial care being taken to avoid weakening the eyes.
n sme needlesare next heated in small iron trays, and then dropped separately into cold oil, which makes them very by being heated on a hot plate or in a charcoal stove, until a dark blue film forms ove them. These two operations cause some amount of warp ing, to counteract which the needles are straightened by hand hammers on small on vils. To ascertain if they are straight, the needles are rolled by the finger on a smooth steel plate, and such as do not run smoothly are again straightened with the hammer.
The next operation is scouring, to remove the black coating, and give the needle that high polish which is necessathrough the fabric. Formerly, from seven to eight days were frompied in the case of best occupied in thi case of best needles by this one process; but now the tim is considerably shortened, owing to improvements in the appliances.
The needles are weighed out into lots of from 400,000 to 500,000 each, according to size, and tied up with emery powder, oil, and soft soap, in a square piece of strong canvas, ls or bundles about two feet long and three inches in diameter. These bundles are rolled backwards and forwards in the scouring machine under a heavily weighted slab worked by cranks driven by the engine. This process is repeated from The steel wire, which must be of excellent quality, being | seven to eight times, according to the quality of theneedles, hand-drawn for best needles, is first cut into lengths capa- the needles being washed in soapsuds after each scouring. ble of making two needles each. This operation is per-
formed either in bundles, by means of hand shears, or four with putty powder, and the needles are then dried in ash
wood sawdust.
The needles are now highly polished and well tempered, but with the eyes not yet perfect. The heads are all arranged in the same direetion by gradually bringing them up to the odge of a board, and letting the heavier heads fall over, so that they may be taken up and turned the other way; this is done by means of a couple of metal plates, as touching the needles by the hand would cause them to rust. For picking out defective needles, which must be done by hand, an operative of the gentler sex is chosen, whose hand is cold and dry. Before the eyes are drilled, they are softened or blued, by being made to pass through a gas flame by means of a revolving wheel, which picks them up by an ingenious
arrangement. This seems to be the only process where any inconvenience is felt by the operatives, who complain of headache after remaining for any length of time in the room where several of these gas flames are burning. The withdrawal of the fumes from the gas by a hood and exhausting fan, like that used for the grindstones, would obviate this inconvenience. The eyes of the drilled eyed needles are smoothed by a fine countersunk drill of delicate workmanship, several drills being driven by one pulley. The eyes are polished by being again spitted on wires smeared with emery and oil, and hung in a frame made to travel backwards and forwards by the engine. As the wires are stretched in a direction oblique to the line of motion, the needles are shaken about in different directions so as to effectually round out the eye. Both heads and points are finished on small grindstones of very fine texture, a number of needles being rolled together between the finger and thumb, then polished in the same manner on emery buff rollers.
After passing through these multifarious operations the needles are at length quite finished, although some extra qualities now have their eyes gilt by the electrotype process all that remains to be done is to put them up in packets, ge nerally containing a quarter of a hundred, ready for sale. nerally containing a quarter of a hundred, ready for sale.
The better kinds are stuck through strips of cloth pasted o the paper; but even with the commoner kinds an improved wrapper has lately been devised, which enables one needle to be selected without the danger of all the rest falling out of the packet.

## How We Lived: 1861-1865

The following, under the above heading, in the Semi-Tropical-an excellent magazine, pullished at Jacksonville, Fla., devoted to the industrial resources of Florida-offers some striking exemplifications of the old saw: "Necessity is the mother of invention." It shows besides that, in point of ingenuity and fertility of resources, our Southern countrymen are not a whit behind their Yankee brethren. The period referred to is of course during the war, when the blockade had cut off supplies, and business in the Confederacy was practically at a standstill :
As time wore on (says the writer) and scarcity became absolute, people were forced to find substitutes in the articles produced here, for the then unobtainable things formerly used. But, with ingenuity and experiment, they suiceeded so well that most were able to get along comfortably. For coffee, wheat, rye, barley, corn, sweet potatoes, roasted and ground, were substituted; for tea, sassafras, sage and the leaves of the yupon were decocted. The ashes of corncobs dissolved in water made a firstrate soda or "sea foam" for baking; peanuts were used for coffee and pressed for sweet oil. The barks of trees and shrubs, the roots of sarsaparilla, ginsing, and other medicinal plants indigenous there furnished medicine. Nutgalls and pomegranate skins made a good dye or ink; the china berries a polish for leather; agricultural implements, harness and household furniture became of primitive make; wood plows, rawhide harness, bear grass lines and ropes, corn husk or moss collars, wooden pins for nails, cypress knees and gourds for buckets and smaller vessels, and hide-seated chairs were soon the generally used articles; rude spinning wheels and looms were common and were to be seen in every house almost, where the family spun, knit, wove, and colred cotlon and wool; many a new dress was woven former yads raveled from an old silk dress laid aside in ormer years; palmetto was readily appropriated for thatch-
ing or even constructing houses, and women's ingenuity ng or even constructing houses, and women's ingenuity braided ings genlementh hats, as also or a loce of a bonnet, field, the ladies were able to fashion their wear usefully and with taste. Lightwood was the ordinary light; tallow candles a grade higher, and the berry of the wild myrtle furnished way tapers for bridal and religious celebrations. Ashes furnished the potash for soap, and the palmetto stalk was excellent for scrubbing and washing; the coonta and arrowroot served for food, starch, and in sickness. The ladies were most ingenious in making their own shoes; taking an old, worn-out pair which had been cast aside in former days, they would pick out the threads of sole and op, and, using the latter for patterns, make a genteel boot; and when flour got scarce, with meal ground fine they would make fruit cake with home-preserved citron, dried grapes, and cane sirup.
Nor were these improvised novel industries confined to the wants of the household. A very palatable beer was made from corn, from cane and roots; even liquor was distilled from hitherto unusual materials. Oranges, blackberries, plums, peaches, persimmons, sugar cane, were easily procured, and rude, simple stills constructed, sometimes on the smallest scale: the writer remembers on one occasion, trav elling in Leon county, seeing a smoke on a small branch near the road; going to it, he found an old, one-eyed fellow, with his apparatus, consisting of a five-gallon pot with a wooden cap, which contained the mash of wild plums; three old musket barrels joined together conducted the vapor through a wooden trough filled with water, thus condensing it; from the end of the gun barrel slowly trickled the unrectified poison into a rude bucket-poison quite as destructive as the powder and ball which it originally carried. This crude liquor sold readily at one hundred dollars a quart; the daily product was some two quarts; the skim mings of boiling sirup were distilled into rum; the production of liquor, however, was very limited, the stuff mostly appropriated to the hospitals. Drinking intoxicating liquors almost entirely ceased, and the usual results of quarrels and disturbances were unknown.

The absence of the doctors in the army left the country without medical advice, and the scarcity of medicine afford ed no opportunity for people to be dosed or to drug themselves, except with simples and herbs; and though it may have been exceptional and providential, there was no contagion or epidemic and very little sickness of any kind, and the mortality was less than ever before or since; plain food, temperance in eating and drinking, exercise and industry no doubt assisted in causing general health.
Most of the newspapers were suspended: no news of the day, domestic or foreign, except occasionally when a return soldier or blockader brought papers. At first the want of salt was seriously felt, but soon salt works were established on the coast ; mill boilers and sugar kettles being used to boil the sea water, and a supply afforded.

In looking back to those days, one is surprised at the latent resources developed by the people of the South. Up to that period there was scarcely an article, even the most common and simple, that was not brought from abroad : the christening robe, the shroud, and the coffin were of foreign make; agricultural and mechanical implements, from the ax helve to the cotton gin, came from the North; even the peculiar staples, grown only there, first went abroad, and were then repurchased and returned for consumption. In all Florida there were no manufactures, except the most simple and rude, on plantations. The largest towns seldom had even a blacksmith shop; tailors, shoemakers, harness makers, and wagon makers were unknown.
Jacksonville, before the war, with twenty first-class saw mills and an abundance of good clay, imported laths, planed lumber, and bricks for building purposes. War closing our ports and stopping our intercourse with the North and foreign countries, the Southerners, with true American spirit went to work to put to use the hitherto dormant materials always present in the country; and if the war had been further protracted, they would bave cultivated and manufactured, no doubt, all articles needful for the most advanced nation. Nor was the lesson or experience of the war times lost, for since 1861 manufactures have increased rapidly; agriculture has become diversified, and the South self-sustaining in provisions, and she will soon be independent in all manufactured articles.

## M. PLANTE'S THEORY OF THE FORMATION OF HAIL.

M. Planté considers that atmospheric electricity, in th state of a discharge or dynamic flux, produces a powerful calorific action capable of vaporizing water in clouds rapidly , and of projecting the vapor so formed into the cold re gions of the atmosphere. In order to show the effect of the electricity in this phenomenon, it will suffice, he says, to mention the mechanical action which takes place on the passage of the electrical discharge through aqueous masses, and the projection into the air of liquid globules susceptible of becoming transformed into hailstones. With a source of intense voltaic electricity, the immersion of the positive wire into a conducting liquid, such as salted water, deter mines the aggregations of the aqueous molecules around the elecrrode, in the form of a luminous spheroid. This is due to the double simultaneous effect of scattering and aspira tion which appears to be peculiar to the electric discharge The appearance of the spheroid is clearly shown in Fig. 1.

Fig. 1.


If a more intense current be employed, coming from a bat tery of 400 secondary couples, instead of a single globule at the positive pole, a cluster of innumerable globules is obtained, which succeed each other with great rapidity, and which are projected for more than three feet from the vessel containing the water. The spark produced at the same time at the surface of the liquid appears as a corona or au reola of many points, from which the aqueous globules es cape. This phenomenon is represented in Fig. 2.

Fig. 2


To produce this effect the electrode need not be of metal. A piece of filtering paper, moistened with salt water, in com-
munication with the positive pole causes a like result, and munication with the positive pole causes a like result, and
constitutes a humid mass analogous, in certain measure, to
hat of a cloud whence an electric discharge escapes. If in place of meeting a deep layer of liquid, the current simply comes in contact with a damp surface, such as the sides or bottom of the vessel, the calorific effects predominate, the aureola is more brilliant, and the water is rapidly transformed into steam. This experiment is represented in Fig. 3.

Fig. 3.


It thus appears that the action of the current differs ac cording to the resistance opposed toit, and this here is found a new example of the reciprocal substitution of heat and me chanical work resulting from the electric shock. When the work represented by the violent projection of the liquid was visible, neither heat nor steam was developed; but when this does not take place, the powerful calorific effects at once are noticeable.
From these experiments M. Planté concludes

1. That electric discharges produced in clouds may, ac cording to the more or less great density of the moist con ductors, determine their reduction into vapor or their in stantaneous aggregation intoglobules of volume much large than the cloud globules themselves; and that the liquid bombs thus formed may be projected to great hights, where very low temperature prevails.
2. That the formation of hailstones, in cases where they do not presenta series of opaque and transparent layers, bu a radiating structure, is also explained by this mechanica action.
3. That the ovoidal or pyramidal form of the stones, as well as their protuberances, asperities, etc., are due to their electrical origin.
4. That the light sometimes emitted by hailstones is als dis electricity, the discharge prod

## (efurrespmatiduce.

## To the Editor ofthe Scientific American

For years I have noted very many valuable hints and sug. gestions in your paper as to how to work the above problem acal substance. Appreciating these, and having profited them, I wish to tell my own experience in the hope tha may help some poor unlucky mechanic over a rough place. Twelve or fifteen years ago, when I wanted cas steel for any purpose, I went to the hardware merchant and purchased a piece that would serve my purpose best, with the very least forging, that is, I got the nearest size, to the one I wanted, which I could find. If too small I coul "stove" it a little; if too large, it was drawn. But after while I found that some steel would make springs for gun locks, knife blades, surgical instruments, etc., with but a few failures, probably one in one hundred; while with othe pieces, I could not make one spring in a dozen stand. Th first fact I was able to discover was that every piece of steel that gave me trouble was clean and new. For a year or two after, I avoided this clean pigeon-blue colored article ; and bought anything that was rusty, regardless of size. This naturally led me to suppose that my trouble was all located in an article lately put upon the market. But as time cor rodes all things, all the pieces of steel kept by the dealers became more or less rusty, and I was no longer able to pick out the rusty steel that used to be good, or discard the clean and bright blue as bad : and so my rule, that had served me well, died a natural death. At last it occurred to me to ex amine the qualities of steel under a glass. This I did, and found the one that gave me trouble was coarse in grain showing large crystals, with spaces between (like those in burnt steel); while that which gave no trouble was fine in grain and seemingly perfectly homogeneous throughout.
When I go to buy steel now, I carry my little glass in my vest pocket. I don't know the power of it, but I do know that it saves me a power of work and vexation.
Minneapolis, Minn
G. W. Tinsley

## Ventilation.

To the Editor of the Scientific American
The want of ventilation in a superheated room is quickly noticed by those accustomed to the old-fashioned fireplace, and the accumulation of dust in such rooms is annoying. Having recently begun to use a stove, I made a sheet iron door, two feet wide and of the hight of the arch, which can be opened so that the draft up the chimney can readily clear the room of dust, smoke, or vitiated air. An ordinary stove flue might be built so as to have a similar opening at the floor; it would serve as a ventilator, and as a means of withdrawing dust, etc.
G. W. W.

Mr. Emil Brugsif, Chief Centennial Commissioner from Egypt, and Secretary of the Board of Awards on hydraulic apparatus, has recently purchased one of the Valley Machine Co.'s bucket plunger steam pumps for his own use, in Egypt

## IMPROVED SEMOLINA SEPARATOR.

This machine is of somewhat peculiar construction, and its action will be readily understood by reference to the annexed engraving, extracted from the English Miller. The apparatus is represented without the sizing sleeves. Th semolina enters the hopper, and falls upon the first incline shelf. In its passage down, the semolina is acted on by current of air, as indicated by the upper arrow; the light flocculent particles are carried up to the exhaust fan (see the large arrow), the intensity of the current being regulated by the adjustable slide. There are nine air inlets: the heaviest semolina will thus fall through no less than nine currents. The lighter and inferior semolina passes down to the next shelf, and is again subjected to a current of air, until the whole of the semolina passes down to the next shelf, and is again subjected to a current of air, until the whole of the semolina is separated and deposited in the respective spouts, according to its specific gravity; the dust and branny particles are drawn upwards by the fan, in the direction indicated by the points of the arrows. There are thus six separations made-two sorts of the heaviest and two of the lighter semolina, one of branny particles, and one of light dust. The apparatus shown in the engraving is 8 feet 3 inches in light, by 3 feet 3 inches wide, by 2 feet. The machine offers an interesting illustration of the adaptation of air to the automatic separation of such a delicate substance as semolina, so that every atom could be held in suspension, balanced, and finally deposited into the various divisions of the apparatus exactly in accordance with the respective specific gravities of the particles of semolina, etc., operated upon.

Why silks Erieak at the Folds.
Formerly the silk manufacturers used ungummed silk both for warp and weft. The ungumming softens the silk, and removes from it a resinous matter, but there is a great loss of weight : in French silks 25 per cent, but in Chinese silks sometimes 40 per cent. The manufacturers have, for some time past, ungummed merely the silk for the warp, leaving that for the weft raw, as the threads of the warp are not seen. In this manner a great loss of weight is avoided; but the goods, as soon as wetted, become uneven. This happoons especially where such tissues are dyed, when the weft is attacked by the color and the mordant, and becomes rough and broken. Like all other fibers, that of silk consists of a number of small particles linked together. These become prominent on ungumming ; so that when a silk fabric, consisting entirely of ungummed silk, is moistened, no alteration appears. But in common silk goods this only happens with the warp. The moistening, finishing, etc., of these goods occasions a difference between the threads of the warp and of the weft. This explains the distortion of such goods, and their tendency to break in the folds.-Moniteur de la T'einture.

A TASTEFUL FLOWER TRELLIS.
The annexed engraving represente a tasteful form of trel-

lis which may be used in gardens, or which, with ivy trailed
over it, would form a pretty ornament indoors. It consists
simply of a framework of pivoted strips, arranged in the nature of lazy tongs, and pivoted to one or more supporting stakes. It swings on a pivot point, $D$, and is fastened at another point by a detachable pin, $\mathrm{D}^{\prime}$. This allows the folding up of the framework on the stake into smaller space, for more convenient shipment, and the ready opening and adjustment when desired for use.


## HOERDE'S SEMOLINA SEPARATOR

The frame may be spread to varying width and hight on the supporting stake by providing a number of holes, into which the fastening pin may be placed.
This device was patented through the Scientific American Patent Agency, October 24, 1876, by Mr. Charles H. Westcott, of Seneca Falls, N. Y.

## Underground Photography.

At the Bradford Colliery, England, recently, accurate pictures of some underground workings in the mine were obtained by the oxyhydrogen light in combination with magnesium ribbon in combustion. The process occupied for each picture from twenty-five minutes to half an hour while the sensitive plate was under the action of light. The possibility of introducing a powerful and steady light completely under control, which may be fed from the surface by means of flexible tubing, and which admits of an illumination rivaling that of day to be sent into dangerous places from a convenient and safe distance, appears to open a pathway to very important practical applications. In any aspect, the demonstration that perfect lens pictures can be obtained, altogether independent of the sun, deserves attention.

Belladonna as a Cerebral Stimulant
Dr. Theodore H. Jewett, in a paper before the Maine Medical Association, maintains that belladonna is not a simple narcotic only, as has been generally supposed, but a brain stimulant and tonic of the first order. It is the special and appropriate remedy for congestion and inflammation of the brain, or for the debility of which they are the results. It is also the remedy for many affections, congestions, inflammations, and perverted action of many organs whose integ rity is dependent upon a normal condition of the brain.

## Novel Mode of Strengthening Cast Iron.

The President, Mr. R. M. Bancroft, and members of the Civil and Mechanical Engineers' Society, when visiting Kirkaldy's testing and experimental works the other day, were shown a cast iron bar which had been sent to him to test, as a sample that had been treated with mysterious chemical mixtures, which were said to increase its tensile strength over fifty per cent. But as Mr. Kirkaldy's rule is always to break the specimen, or else his machine, he found it con tained, upon being fractured, a center core of wrought iron about two inches in diameter, and six small ones of the same metal spaced around it. He thus exposed the secret. same metal spaced around it.
Mining and Scientific Press.

## Bastie Glass.

Mrs. Nassau Senior writes to the London Times on the cu rious behaviour of tempered glass. She furnished twelve gas burners with tempered glass globes purchased in London, and having the veritable label of M. de la Bastie affixed to each. On the night of October 6, after the gas had been extinguished for exactly an hour, one of the globes burst with a report and fell in pieces on the floor, leaving the bottom ring still on the burner. These pieces, which were, of course, perfectly cold, were some two or three inches long, and an inch or so wide. They continued for an hour or more splitting up and sub-dividing themselves into smaller and still smaller fragments, each split being accompanied by a slight report, until at length there was not a fragment larger than a hazel nut, and the greater part of the glass was in pieces of about the size of a pea, and of a crystalline form. In the morning it was found that the rim had fallen from the burner to the floor in atoms.

## Carbolic Acid Inlialations.

In a recent monograph of Dr. Lee, of the Hospital for Sick Children, London, the author states he has found marked benefit from the daily use of carbolic acid inhalations in whooping cough. The carbolic vapor ought to be diffused through the atmosphere of the room, in a certain proportion, and the patient must be confined to this atmosphere for several hours daily. Dr. Lee has had a vaporizing apparatus condaily. Dr. Leerpe his con structed on purpose, and he has exposed his patients (out-patients for the most part) to the vapor, in a little room adjoining his consulting room, for an hour or so once or twice a week. "Even under this limited use, there was undoubtedly an amelioration of the severe spasmodic cough."

## SIMPLE LABORATORY APPARATUS.

The following short description of an extremely ef fective, cheap, and cleanly substitute for crucible jackets, etc., says Mr. E. T. Hardman in the Chemical Nevry, may be useful, especially to those who have occasicn to shift their quarters often.
The ordinary crucible jacket is made of sheet iron, and the small concentration of heat which it affords may be regarded as nearly nil, since radiation takes place very freely. Another drawback is that it soon becomes rusty or coated with scale. It is not only dirty to handle, therefore, but al so presents the inconvenience to handle, therefore, but also presents the inconvenience
of dropping some of its scale into the crucible if not of dropping some of its scale into the crucible if not
carefully manipulated. Now an ordinary earthenware carefully manipulated. Now an ordinary earthenware
flower pot answers the purpose in every respect. It is of the proper shape, and being made of a non-conducting material it in a great measure prevents loss of heat from the burner. It is extremely cleanly to use, andit can be procured at the small cost of one cent or so. The bottom of the flower pothas a circular hole. This serves for the introduction of the Bunsen burner. As the supply of air would be insufficient otherwise, it will be necessary to enlarge the opening with a knife. The flower pot may be supported in the ring of a retort stand in the usual way. The chimney is a ring of flower pot inverted. To support it, the handiest way will be to make three $S$ hooks of stout wire, and, having passed the narrow end of the pot upward through the ring passed the rim within thehooks caught on the ring, as in Fig. 1. It will be found convenient to devote a small retort stand permanently to the purpose. The whole arrangement is shown in Fig. 2, and is very handy, as the upper part can be raised to any desired hight, regulating the heat and draft, and can be shifted from side to side.


The apparatus acts admirably as a small gas furnace for rucible operations, such as the fusion of silicates with caronates of soda-asin the analyses of rocks.
The support for the crucible may be either a triangle of wire covered with pipe shank, the end of the wire being bent upwards and formed into hooks so as to hang on the edge of the flower pot, Fig. 3, or three pipe-covered wires suspended in the position of the ribs of a crucible jacket. The former is necessary for small crucibles.
The flower pot also makes an excellent lamp screen, for steadying and concentrating the flame under evaporating ba sins, etc.; of course a sufficient interval must be kept be tween the pot and the basin, or the light will go out.

NEW COMBINATION HAND AND POWER FEED SURFACE PLANING MACHINE
The accompanying engravings represent some new and attractive features in a machine intended for surfacing and smoothing, and for many of the operations usually performed upon a hand planing machine. It is one of a new series of machines recently brought out by the extensive wood tool builders J. A. Fay \& Co., Cincinnati, Ohio, whose fine exhibit at the Centennial Exposition we recently illustrated. It combines facilities of adjustment for the processes of planing over the cylinder (Fig. 1) as in the ordinary hand planing machine, and for surfacing under the cylinder (Fig. 2) as in the power feed surfacing machine Provision is also made for the easy re moval of such parts as it may be neces sary to displace to enable the operator to perform any especial work.

The frame of the machine is heavy, be ing made of continuous cast iron plate sides and ends. The tables forming the bed have horizontal and vertical adjust ments, allowing them to be separated to let the cutter head pass between them as they are being raised or lowered. By means of the horizontal adjustment, the opening for the cutters is regulated, and by the vertical adjustment the thickness of cut is gaged, these adjustments gov erning the hand planing operations.
For surfacing, the tables are lowered until they are on a plane with the centra portion of the bed. A continuous solid bed is thus formed, adjustable, for the different thicknesses of surfacing, by be ing raised and lowered by two screws, operated by a hanđ̛ wheel and bevel gear ing. The cylinder is stationary, being fixed in boxes cast solid to the sides, has steel journals, and is lipped with steel It has three knives set on an angle to próduce a drawing cut, reducing the tenden cy to split out in cross-grained lumber. The feeding rolls are also set in bear ings in the sides, the pressure being pro duced by volute steel springs and gradu ated by screws to such pressureas desired bar, with the bonnet, is arranged to swing from the pressure edge of the cylinder and can be removed from the machine by detaching one bolt. When the bonnet is removed, the machine is ready to have the tables elevated, and thus a hand planing machine is obtained, suitable for the purpose of truing up, squaring, jointing, beveling, chamfering, and many other operations common to furniture, car, sash, and door manufactories, etc.
The surfacing or thicknessing is accomplished by the driven feeding rollers, operated by gearing, with such difference in the speed of the feed as the character of the work may demand. The feed is started or stopped by a belt tightener moved by a lever, and is under perfect and ready control of the operator. As will be seen by the engravings, the hand wheels and levers are convenient to the operator, and can be easily and quickly adjusted.
The capacity of the machine is for 24 inch surfacing, and up to 6 inches in thickress, and hand planing to 24 inches in width in addition to the other hand operations mentioned above. The apparatus as a whole is well adapted for rapid and accurate work, producing a smooth surface on all kinds of hard and soft wood. An application for patent is now pending. For further particulars, address J. A. Fay \& Co., Cincinnati, Ohio.

Nature of Electricity A new hypothesis as to the nature of electricity (we learn from Stum mer's Ingenieur) has been offered by Professor Rénard, of Nancy. He considers an electric current to be produced by longitudinal motion of the ether particles, which, at the same time, have a general forward motion. When the molecules of a body are surrounded by a greater ther atmosphere than the normal, the body is in the condition which we call positively electric; when the ther atmosphere about each molecule is less than the normal, the bory is negatively electric. He has sought to explain various electrical phenomena thus: for example, the magnetization of steel needles by electrical discharges; re garding which, Savary has shown that, according to the p sition of the needle, it acts in one direction or the other.

The Largest Sail in the World.
A monster sail, said to be the largest in the world, may now be seen at Verdon's sail manufactory, Dublin. It mea sures in a rectangular form 180 feet by 60 , and a cotempora y says of it: " The courses of a line of battle ship-the ta
ered ninety feet jib-the great awnings of the Crystal Pa ace, are simply pocket handkerchiefs when contrasted with his doubly stitched, powerfully roped sheet of canvas." Thi sail has been produced to aid, by a new method, the raisin f sunken vessels.

## Electrical Eubber

A curious phenomenon has been described to the Belgian Academy by M. Spring. A sheet of thin vulcanized rubber stretched to about six times its normal size, is rubbed with

J. A. FAY \& CO'S HAND AND POWER PLANER -Fig. 1.

Hollow Concrete Blocks for Building
A hollow concrete block for general buildingpurposes has been introduced by Mr. James Woodhouse, of Lambeth. It resembles a block of stone molded in such a form that a vertical and horizontal groove or cavity is retained, so that eally it possesses the advantages of a hollow brick. One o the single blocks is 2 feet long, 1 foot wide, and 9 inches high, in the center of which are apertures formed by groov ing the block all round and perforating the center; but the ed up into blocks of any size. Quoi blocks are also made for working at the angles of buildings, and ornamenta courses can be molded for corrices or string courses. When the blocks ar put together, the apertures, both vertica and horizontal, are continuous, allowin a free circulation of air throughout the entire woll ons venting dryness. The blocks are proposed to $b$ connected by cemented joggle ho joints, by which thented joggle holes o ith grea moved precision. The blocks can be aid aid by the ordinary bricklayer. A brick layer can lay about four hundred bricks per day, equal to 25 cubic feet; and, a wages of the bricklayer and labore $\$ 2.50$ gold, in England, per day, th cost of brickwork for labor is about 9 cents per cubic foot. It is stated tha any bricklayer can lay 50 of these con crete blocks a day, equal to 75 cubic feet thus showing a saving of over 200 pe cent in labor. The advantages claimed are: Greater strength, damp resistin qualities, resistance to fire, expedition in use, vermin expulsion, general applica bility, sanitary qualities, cheapness, ap pearance, facilities of manufacture, etc The author alludes to these advantage in order. Speaking of the strength of concrete, the author says concrete wall have withstood the most violent equi noctial hurricanes. The absorbency of brick and stone is well known. A com mon brick absorbs about a pint of water a cloth until it will attract light bodies. If, now, it be al and a small house of one brick walls, containing 12,000 lowed to contract the electrical attraction will diminish as the sheet becomes smaller, until it entirely disappears when the rubber has resumed its ordinary size. That the electric state is dependent to a certain extent on the molecular ar rangement of the rubber (or sulphur) would appear to be evident; but the phenomenon deserves the attention of physicists.

Crystalloid on Colloid.
Dr. Guthrie lately described some experiments he had made to determine the effect of a crystalloid on a colloid, when in the presence of water. Two or three lumps of rock salt having been added to a jelly of size, and the whole hermetically sealed in a glass tube, the colloid parted with its

J. A. FAY \& CO.'S HAND AND POWER PLANER-Fig. 2.
water readily, a saturated solution of the salt was obtained and the size became perfectly white and opaque, having un dergone a structural change.

Dyeing Saffranin Rose on Silk.-The silk is pre pared as for white, and, if it has a yellowish cast, stoved, rinsed, and washed twice in boiling soap lye. A fresh water at $122^{\circ} \mathrm{Fah}$. is made up with the needful quantity of saffranin, and scoured with a fresh solution of tartaric acid.
and a small house of one brick walls, containing 12,00 bricks, is capable of holding 1,500 gallons, or $6 \frac{1}{2}$ tuns of wa ter. Absorbent bricks also retain dirt and gases, but the concrete block insures dryness in walls, so essential to health; it is, in fact, nearly non absorbent. Of the fire
proof qualities of the concrete block, being composed of proof qualities of the concrete block, being composed of burnt clay, scoriæ, clinkers, shingle, etc., it is hardly necessary to dwell, as our readers know the refractory nature of these component materials. In gravel concrete, great heat would disintegrate the mass, and cause fractures; but with the burnt ballast, slags, etc., used in the patent block, the most intense heat would be powerless to destroy the mass.
Another advantage in favor of this block construction, from a sanitary point of view, is the absence of mortar joints, through which vermin and germs of animal life can pass. The author also considers the advantages of concrete block walls from an other point of view. By molded forms cheaper ornamentation can be obtained, and it is thought this will conduce to the adornment of our humble dwellings. The cost of this kind of walling in gold is stated comparatively as follows: 1 foot cubic plain faced masonry, built complete, 66 cents; 1 foot plain-faced brickwork, 24 cents; 1 foot plainfaced patent block. 18 cents; 1 foot molded masonry, $\$ 108 ; 1$ foot molded brickwork, 30 cents; 1 foot molded pateut block, 24 cents.
The author, in conclusion, believes the old-fashioned brick wall must give glace to this kind of walling. At all events, one great inducement is facility of manufacture The ingredients-pounded shingle, burnt clay, slag, etc., can be procured on any site, as most lands have gravel or clay, all that is required being the mold. We have long advocated concrete blocks for wall building; several kinds of blocks have been introduced at different times, and we believe Mr. Woodhouse's patent hollow concrete block is a simple and effectual mode obtaining the combined advantages of concrete-durability lightgess of walling, and damp , Lght lities Mr. James Le orough surveyor of Southampton, and some other authori ties, speak highly of the invention.-Building News.

No Connection with the Scientific American.-We learn that certain parties in Chicago have set up a soliciting business under the title of Munn \& Co
We beg to inform our patrons that the Chicago concern has no connection with the Scientific American or the publishers of this paper

## THE BRITISH ARCTIC EXPEDITION

We have already published a detailed account of the British Polar Expedition, which lately returned after severe but fruitless endeavors to reach the North Pole. We now present two interesting engravings, the one showing the Discovery steaming through the ice, with her consort, the Alert, following in her wake, and the other representing one of the tents of the sledge exploring parties, together with the sledges and dogs, the latter being secured as shown during the stay of their masters in camp.
The two ships, in making their way through the ice, assisted each other in the necessary manœuv. ring or forcing a passage through the heavy floes. The Discovery was placed ahead because her bows were the sharpest. Describing the process of breaking through the floes, Captain Nare says: "It will be difficult ever to efface from my mind the determined manner in which (when the Alert had become embedded in the ice, which, by her impetus against it, had accumulated round and sunk under her bows, and a great quantity, by floating to the surface again on her wake, had helplessly enclosed her abaft) the Discovery was handled in her advancing to our rescue. Having backed some distance astern, for the double purpose of allowing the débris ice from a former blow to float away, and for the vessel to attain a distance sufficient for the accumulation of momentum with which to strike a second blow, coming ahead at her utmost speed she would force her way into the ice, burying her bows in it as far aft as the foremast: the commanding officer on the bowsprit, carefully conning the ship to an inch, for had the ice not been struck fairly it would have caused her to From the moment of the first impact the overhanging stem necessarily caused the ship's bow to rise three or four feet as she advanced from twelve to twenty feet into the solid fion and here bere the fore floe, and expended; and as the ship's way was stopped, the overhang ing weight, by settling down, crushed the ice down still fur ther ahead. Frequently, on these occasions, her jibboom was within touching distance of the Alert's boats! But, after a little experience had been gained, such confidence had we in each other that there was not the slightest swerving in any one instance.'

Elasticity of 1 ce.
Professor Bianconi, of Bologna, Italy, has recently made a series of experiments with re. gard to the compressibility and plasticity of ice. Granite peb bles, placed on an ice surface were pressed with constant and measured pressure for six, eight, or ten hours, at a surrounding temperature of $34^{\circ}$ to $37^{\circ} \mathrm{Fah}$ The impression was deep, but it was surrounded by a raised brim, and this again by a slight exter nal cavity. M, Bianconi considers the central cavity to be the effect partly of strong compression, partly of fusion, produced by the heat proper of the pebble. The external cavity was probably due to initial calorific irradiation of the pebble; for, if the pebble had previously been placed in ice, this cavity became very small, or almost nil. The raised brim is the swelling of the ice, pro duced by the pressure, the ice being expelled in virtue of it plasticity. This appears vory clearly when, the pressure of the pebble coming obliquely on a point of the ice surface, a certain protuberance is seen at an oppo site point. Among other experi ments, an iron plate, with a squar
hole in it, was strongly pressed on
a plane surface of ice. After eight hours the ice had risen an inch or so through the hole, in the form of an unequal crest, and turned over on the plate, while the ice at the outer edges of the plate had similarly risen and turned over. Again, a bar of iron-plane below and convex above-was pressed for ten hours on a plane ice surface. The ice ex pelled below rose up on the sides, and became applied to the sloping surfaces. The experiments prove thatice has a manifest compressibility or plasticity, though slow and very limited.

## Crystalized Iron.

The well known phenomenon that iron, with long use in which it is subject to strains of the nature of shocks, ar sumes a coarsely granular structure has recently been illus-
trated by experiments made at the Friedens Hoffnung coal pit, near Waldenburg, on the hanging chain of the miner's cage, two years in use. A link of this chain broke, with
the first blow of an 11 lbs. hand hammer, into four pieces, the first blow of an 11 lbs . hand hammer, into four pieces, Another link of the same chain, after having been annealed at a red heat, only broke after 23 blows with the same hammer, and in such a way that the fracture on the one side of the ring went quite through, and on the other side only half through, and presented a fibrous struc ${ }^{\prime}$ ure. These facts in

Lace Making in England
Honiton lace is, without doubt, the best ever made in Eng and. Enormous prices were paid by the Houiton lace mak ers for Flemish thread, rising, it is said, to $\$ 500$ gold the lb. during the war with France. The workwomen were als well paid, their wages being calculated in this wise: the ace ground was spread out on the counter, and the worke herself desired to cover it with shillings; and as many coins as found place on her work she carried away as the fruit of her labor. Real Honiton ground went out of date with th invention of bobbin net, on which the sprigs were applied, unti hat form of lace went out of date altogether, being superse ded by the modern guipure th loniton of to day which posed the bridal dresses of th Crown Princess of Prusia th Princess Louis of Hesse, and the Princess of Wales.
A great deal of trouble ha been experienced in persuading the lace workers of Devonshir o adopt newer and better de signs. For a long while they in isted on sticking to their old patterns, but at last some im pression has been made on them y the authorities of South Ken sington, who have recently sup lied them with a large number f beautiful designs.
One effect, of the gradual de radation of taste which led to he fineness of the réseau bein ultimately considered of mor mportance than the beauty o the pattern, was one of those de

## THE ALERT AND THE DISCOVERY IN THE ICE

terminations of the human intel
dicate the importance, in the arrangements for the lowering |lect in one direction, which rarely fail to achieve success in and raising of miners, of very careful observation of those the end. After innumerable failures, bobbin net was at las changes of structure. They also appear to make desirable the introduction of spring boxes between the rope and the cage (so as to modify shocks), and the annealing, from time to time, of the connecting parts between the rope and the cage.

Nitroglycerin.
The following method has been recommended by M. Böttger (in the Frankfort Physical Society), for preparing nitro lycerin in small quantities, with a view to lecture experi ments. It is stated to be quite free from danger. A few grammes of perfectly pure glycerin, free of water, is put in o a test tube surrounded by a freezing mixture, and con taining a mixture of 1 volume of the most concentrated ni tric acid ( 1.52 specific gravity), and 2 volumes of the strong est sulphuric acid ( $1 \cdot 83$ specific gravity). Then, as quickly as possible, the whole is poured into a larger quantity of


ARCTIC SLEDGE-TRAVELING-THE ENCAMPMENT. ade by Heathcote's machine, and the value of the clea round was gone for ever. Bobbin net machines were no only set up in England, but in Brussels, for the purpose of making the double and triple twisted net upon which the pillow flowers are sewn, to produce the so-called point ap pliqué. This extra fine Brussels net has become deservedly elebrated and it consumes a very large quantity of cotto
 hread annuil Noon after the triumph of Englan ith bobbin net, the Jacquard system was tried at Lyons fo making lace by machinery, and no sooner were the experi ents successful than Nottingham began the manufacture of machine lace on a large scale. At the International Ex hibition of 1862, Nottingham exhibited Spanish laces, mos faithful copies of the costly pillow-made Barcelona, imita tions of Mechlin (the brode and picot executed by hand and Brussels needle-point, Caen blondes and Valenciennes, rivaling those of Calais, also the black laces of Chantill and Mirecourt. Machine lace ha had a curious effect. It has al most exterminated the inferio kinds of handmade lace, but it ha not diminished the demand fo the finer fabrics of the pillow and the needle. On the contrary th finest work of Alon and sels has been sought more eagerl than ever by the rich, since ma chinery has brought the wearing of lace within the reach of al classes.-Textile Manufacturer.

## Horticultural Hint

The Gardener's Monthly,amon other seasonable hints for horti culturists, points out that it is not so much severe frost tha hurts vegetation as it is the se vere thawings following the free zings. Everything therefore no matter how hardy will be bene matter how hardy, will be bene fited by having somethin thrown overit. Hardy horbaceou plants can be protected by a little earth, and the same, if sandy, is good for seed beds.
An occasional change of soil is highly beneficial to flowers in pots. There is nothing better than surface soil from an old pas ture, taken off about two inche cold water. One now sees the nitroglycerin, that has formed deep, and thrown into a heap with about one sixth part old like oil drops, sink to the bottom, being specifically the heavier liquid. You then soften it several times by decan tation with fresh water, and, lastly, with a weak soda solution; remove the water with a few pieces of fused chloride of calcium, and you have then the nitroglycerin in such purity that it may, without danger, be kept any length of time, for lecture experiments.

ONE of the most attractive features of the Exposition of 1878 will be a large aquarium capable of containing four hundred thousand gallons of water, affording tank room for four million pounds of fish. The estimated cost is abou wo hundred thousand dollars. We shall shortly publish an engraving of the aquarium.
deep, and thrown into a heap with about one sixth part old
hot bed dung to partially decay. In addition to this staple item, smaller quantities of different matters should be gath ered together for peculiar cases or particular plants. Peat for instance will be found very useful for planys. Peat, This is not is ften suppod minds of lants. This is mand but a spongy, fibrous substance from the suace of bogs and boggy wastes. Sand should be collected sharp and clean he washings from turnpike ditches are as good as anything Leaf mold is best got already well decayed from the woods That one makes for himself from rotten leaves is seldom good for anything; it is always sour, and seems indigestible to vegetation. A load or so of well decayed cow manure is a good thing for the gardener to have by him, as those plants that want cool soil prefer it to any other manure.

The Extinct Animals of North America.
At a recent meeting of the Leeds Philosophical and Literary Society, an interesting lecture on this subject was delivered by Professor W. H. Flower, F.R.S., who was introduced by the President (Rev. J. H. McCheane). The lecturer described some discoveries lately made in certain districts described some discoveries lately made in certain districts
of Noith America, which threw a great deal of new light of Noith America, which threw a great deal of new light
upon past living inhabitants of this world. When naturalupon past living inhabitants of this world. When natural-
ists attempted to reconstruct a history of extinct animals, they had to gather evidence from fossils in rocks or stones, and from deeply buried remains of the harder and more imperishable parts of these animals, such as their bones, teeth, shells, etc. Most wonderful deposits of this kind had lately been found in the western part of North America, especially between the river Mississippi and the Pacific-a wide region, which had only of late been opened up for scientific exploration. Although only three or four scientific men had yet
been laboring there, they had already discovered during the last five or six years almost as many strange kinds of fossil animals as all those put together which had previously been found in every other part of the world. The discoveries thus made included some which dated so far back as the ocene epoch of the tertiary period. At one place the deposits were found fully a mile in depth, upon what must have been in some remote age the bottom of a great fresh water lake. Common as we thought the horse, donkey, or ebra, this species was remarkably specialized-unlike all other animals now existing, and wonderfully adapted for its own particular functions. Amongst these North American remains, there were found traces of an animal which had in the course of ages apparently developed into the horse of our owa day. The earliest remains seem to represent an cipal anatomical characteristics of the horse, but with some differences in teeth and hoofs. The later remains of succeeding epochs appeared to show the same animal becoming larger, first growing to the size of a sheep, and then as larg which differentiated it from the horse of our own period gradually disappeared. The same explorations had shown that once upon a time there were in North America many curious kinds of rhinoceros, as well as in the southern parts of Africa and Asia, where alone these animals are now found.
There had also been found there the remains of some creatures, apparently intermediate in their character between the sheep and the pig-different as these two classes cialized animal, which seemed to have no relations now amongst existing creatures. These investigations into past life disclosed, however, that the elephant was not so isolated as we supposed, in illustration of which Professor ted as we supposed, in illustration of which Professor
Flower described the singular resemblances discovered in Flower described the singular resemblances discovered in
the now extinct uintatherium. Generally, there was scarcely the now extinct uintatherium. Generally, there was scarcely sentatives had not been found in these North American excavations, whilst there were likewise found many which we could not classify with any existing order. Of all birds at present existing, none were known to have teeth; but there had now been found, amongst the remains in the chalk formation, distinct traces of two or three kinds of large water birds which had long rows of true teeth. There had also been found, in the same productive field, an enormous and interesting fossil vegetation, opening up to the botanist as well as the naturalist something like a new world of past life.

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## DECISIONS OF THE COURTS.

frederici $\begin{aligned} & \text { Supreme Court of the United States. }\end{aligned}$





Gerent Americay and foreign watents.

## NEW WOODWORKING AND HOUSE AND CARRIAGE

 BUILDING INVENTIONS.IMPROVED COMBINED SASH LOCK AND HOLDER
Sylvester J. Tucker and Massena E. Gary, Richmond, Va.-The object of this invention is to provide an improved form of comtain the sash in any elevated position, holding the same at any desired hight without danger of falling, and which shall also be so to the building from the outside of the window. To this end the improvement consists in combining a rubber-faced cam-headed lever for supporting the sash by frictional contact, a spring for pressing the cam against the window frame, and a pivoted bar which, in one position, forms a bearing for the thumb or finger to rest upon while lifting the end of the cam-headed lever when arge with sash, or in the window frame when the sash is down, to lock the same against all efforts to raise it from the outside.

IMPROVED WOOD GRINDER FOR PAPER PULP.
Joseph O.Gregg, Elkhart, Ind.-The wood to be reduced to pulp is placed in guide boxes. Weighted followers force the wood as the stone is revolved the flber is separated, and washed away by a jet of water.

## mproved desk.

Olaus Hansen, Cedar Vale, Kan.-This is a vertical desk, ward obe, or other analogous article of household furniture, having the latter by flat hinges, whereby the said doors are adapted to wing around the posts and lie concealed in the recesses behind hem. The doors are thereby not in the way, occupy no space, arme.
MPROVED STAIR BUILDERS' TOOL
Theodore Simonson, Hillsborough, Ohio.-Thls invention relates
o the class of tools used by stair builders in getting the pitch, o the class of tools used by stair builders in getting the pitch, of two bars of wood hinged together, having at their free ends adjustable slotted pieces which are held in place by thumb screws. The instrument avoids the complication of geometric lines, usually resorted to, and accomplishes the desired result with two simple lines.

## NEW MISCELLANEOUS INVENTIONS.

IMPROVED bALE BAND STRETCHER.
Charles M Pearre, Galveston, Tex.-The object of the invention is to provide a convenient and easily handled bale band stretcher, to be used in baling cotton, hay, etc., for the purpose of taking
out the slack of the band that cannot be taken out by hand while out the slack of the band that cannot be taken out by hand while
the bale is under the press. To this end the improvement consists in a bar carrying at its end a gripping device for one end of the ted at its end to a slide bar moving through said guide socke and carrying also a gripping device for the other end of the band which two gripping devices are adapted to be brought together by bringing the handles of the elbow lever and bar togethar, and tilting the elbow lever upon its angle, at which point it is attached same upon rollers.
impRoved bale tie.
Joseph C. DuBois, Tuscaloosa, Ala.-The invention relates to to corm a tie without bending either end. It consists of a band whose one end is slotted while the other is perforated, the two secured together by a wire. Its construction is such that the cost of manufacture is very trifling, while it possesses efficiency and durability.
mael b inproved argand gas burner. Samuel B. H. Vance, New York city, assignor to Mitchell, Vance,
Co., of same place.-This is so constructed as to prevent the hissing noise of the gas, and to enable the flow of gas, and, consequently, the amount of light, to be regulated as desired. There is a new valve which may be adjusted to admit of the passage of any unt of gas
IMPROVED REIN-SUPPORTING ATTACIMENT FOR NECK YOKES. Charles R. Hicks, Mount Sterling, Ill.-This invention consists in attaching to the upper part of the neck yoke a supportiog plate with raised center part, having screw holes with different in-
clination, into which an arm with pivoted end link and swiveled clination, into which an arm with pivoted end link and swiveled
ring is secured, to secure the lines at their point of crossing. This prevents the lines from becoming entangled beneath the tongue. IMPROVED CURRY COMB.
Giles H. Hawrican, North Hero, Vt.-This implement is formed of a straight blade, convexo-convex in cross section, and provi-
ded on one side with beveled teeth having their points adjusted in line. This construction adapts the comb to be used equally well
upon those parts of the body of the horse or other animal which upon those parts of the body of the horse or other animal which
are sinuous or angular as upon those which are smooth or gently are sinuou
rounded.

MPROVED RULER.
Charles M. Hayes, Silver City, Idaho Tcr.-The invention relates to parallel rulers, and consists in making a slotlongitudinally -in the wood, metal, gutta percha or other material of which it may be made-in order to enable the user to sitat a table or desk, and without rising, stooping, or changing his position, to see the being thus readily accomplished without the least danger of a blot.

## improved lamp.

David Sanford, Ashton, Ill.-The burning apparatus bere consists of an ordinary wick which passes through a long tube, and is tightly packed therein with cotton. At the summit is a piece
of incombustible material, such as porous stone, which absorbs of incombustible material, such as porous stone, which absorbs
the oil drawn up by the wick, and so supports the flame. The adthe oil drawn up by the wick, and so supports the flame. The adthe proper shape has been obtained, it will always remain the same; so that the flame can be arranged at such a distance above the oil reservoir that the oil cannot be heated; that burning.vapor will now pass down to the oil; and that the light may be regulated as desired.
NEW MECHANICAL AND ENGINEERING INVENTIONS. IMPROVED JIGGER.
Anthony Rowse, Nesquehoning, Pa.-This invention consists in
causing the scraper of an ore separator to move down into the jig causing the scraper of an ore separator to move down into the jig
as the latter moves up, and the reverse, so as completely to sepaas the latter moves up, and the reverse, so as completely to sepa-
rate the ore at a single operation. When used for separating coal rate the ore at a single operation. When used for separating coal
from slate, the slate, being the heaviest, passes through the bottom from slate, the slate, being the heaviest, passes through the bottom but in separating iron ore, the ore, being the heaviest, passes the screen, while the refuse matters are scraped off into the pit.
impioved machine for finishing buttons.
Marcus M. Rhodes, Taunton, Mass., assignor to M. M. Rhodes \& for flisishing buttons, including a combination of a feeding and holding device with a revolving mandrel carrying a cutter or finisher. The whole is arranged so that buttons that are placed in bulk in a receptacle in the machine are automatically placed in a holding device to be operated on by the rotating cutter or flnishing tool. The object is to rapidly finish the edges of buttons. The machine is m
shoe buttons.
improved sewing machine shuttle
William Gillett, Madison, Wis.-This consists in a support for the bobbin, which also carries the tension and thread slide, that
can be readily attached to or removed from the shuttle. The object is to provide a reliable support for the bobbin, and an even and smooth tension on the thread, while all the parts are retained armly in their places.

IMPROVED PAPER-FEEDING MACHINE
Socrates Schofleld, Providence, R. I., and Charles E. Baker, Montclair, N. J., assignors to themselves and Charles E. Johnson, Philadelphia, Pa.-This consists in arranging a pin in a paper feeder. tory to entering the same on the backward movement, preparais to cause the penetrating instrument more surely to penetrate the top sheet and notaffect the sheet below.

## NEW HOUSEHOLD INVENTIONS.

IMPROVED JELLY JAR.
Nicholas P. Todd, Shamong, N. J.-This jelly jar is designed to orm the jelly directly into molded shape when filling the jars for nient manner, being specially adapted for hotel, restaurant, and family use. The jar has a number of interior compartments of
suitable shape, and a rim that extends to a suitable hight above suitable shape, and a rim that extends to a suitable hight above
the compartments, for the purpose of containing a portion of jelhe compartments, for the purpose of containing a portion of jel1 y additional to that required to fill the compartments, and which
will form the base of the molded jelly when the same is inverted. The jars may be made of larger size and arranged with suitable ornamentation in the molding compartmentsand on the top parts, so that the jelly presents, on being taken out, an elegant and attractive appearance.

## NEW AGRICULTURAL INVENTIONS

## mpRoved plow fender.

 Andrew C. McLeary, Humboldt, Tenn., assignor of one half hisight to James H. Hamon and Samuel McLeary, of same place.This is an improved fender attachment, by which the plowing of young corn, cotton, etc., may be accomplished without stopping to uncover and take off clods from the young plants. The clods The fender piece is secured by curved rods and braces to the plow stock, and a swinging and adjustable harrow is applied to the fender piece.
inproved seed planter.
Lycurgus J. Bosworth, Monmouth, Ill.-This machine has expansion spoke wheels, the spokes of which may be made to project more or less to cause the wheels to measure off more or less
ground at each revorution, and plant the hills at a greater or less distance apart, as may be desired. The spoke wheels may also be turned to bring them into p
the hills previously planted.
IMPROVED SEED-DROPPING PLATE FOR GRAIN DRILLS. Ephraim B. Null, Oxford, Ohio.-This consists in a seed-dropping plate, in which the holesare notched around their periphery,
or are made star-shaped, to adapt them to receive large or small kernels. It is thus adap ted to drop but one grain at a time, regardless of the size of the kernels.

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## Watios Whenies

It has been our custom for thirty years past to
devote a considerable space to the answering of devote a considerable space to the answering of
questions by correspondents; so useful have questions by correspondents; so useful have CAN office has become the factotum, or headquarters to which everybody sends,who wants special
information upon any particular subject. So large information upon any particular subject. So large is the number of our correspondents, so wide the
range of their inquiries, so desirous are we to meet their wants and supply correct information, that we are obliged to employ the constant assis-
tance of a considerable staff of experienced writers, who have the requisite knowledge or access to the latest and best sources of information.
For example, questions relating to steam engines, boilers, boats, locomotives, railways, etc. are considered and answered by a professional
engineer of distinguished ability and extensive practical experience. Enquiries relating to elecprominent practical electricians in this country. Astronomical queries by a practical astronomer Chemical enquiries by one of our most eminent
and experienced professors of chemistry; and so and experienced professors of chemistry; and so way we are enabled to answer the thousancs of questions and furnish the large mass of informa-
tion which these correspondence columns present.

The large number of questions sent-they pour in mposs from all parts of the world-renders it lects from the mass those that he thinks most likely to be of general interest to the readers of
the Scientific American. These, with the replies, the SCIENTIFIC AMERICAN. These, with the replies, basket. Many of the rejeoted questions are of a swered by mail; in fact hundreds of corresspondents desire a special reply by post, but very
few of them are thoughtful enough to enclose so much as a postage stamp. We could in many cases send a brief reply by mail if the writer were to enclose a small fee, a dollar or more, accord-
ing to the nature or importance of the case. ing to the nature or importance of the case.
When we cannot furnish the information, the money is promptly returned to the sender.
R. J. will find a description of the physio ogical and pathological properties of alcohol on
p. 91. vol. 31.-F. D. will find a recipe for blacking or patterns on p. 409, vol. 33.-F. N. T. will find a prescription for boils on p. 379, vol. 24.-B. J. will
find on p. 337, vol. 33 , directions for s'aining white wood in imitation of black walnut.-H. G. M., T.W., G. H. C., H. E. K., W.W. O., J. G. M., D. A.s.,
E. P. N., W. W. Y., C. E. G., and others who ask us to recommendbooks on industrial and scientific
subjects. should address the booksellers who ad vertise in our columns, all
worthy firms, far catalogues.
(1) T. S. asks: How can I separate gold
and platinum fllings? A. Dissolve the flings in nd platinum fllings? A. Dissolve the fllings in trong aqua regia ( 3 parts hydrochloric acid to
of nitric acid), dilute with water,and filter. Evaporate the flltrate to dryness over a water bath, with a little chlorine, rater the evaporating dish quantity as possible) and add the rinsings to the main solution. Add to the solution chloride of ammonium until no further precipitate forms; allow to stand in a warm place for several hours,
with occasional stirring. Remove the precipiwith occasional stirring. Remove the precipi-
tate, which consists of the double chloride of platinum and ammonium, by filtration, and to protosulphate of iron; heat nearly to the boiling point,and allow to stand in a warm place for several hours, and filter. This last precipitate con-
tains the gold ; dry it on the fllter paper, mix it tains the gold; dry it on the filter paper, mix it
with a little carbonate of soda (anhydrous) and a with a little carbonate of soda (anhydrous) and a
small fragment of rosin, place it in a small black small fragment of rosin, place it in a small black
lead crucible and heat strongly in a fnrnace or lead crucible and heat strongly in a fnrnace or
blacksmith's forge. If the amount of gold is small, it may be reduced on a piece of charcoal
by means of a blowpipe and a good spirit lamp. If it is desired to reduce the platinum salt to the metallic form, it will be necessary to use the compound (oxyhydrogen) blowpipe and a small
lime crucible : the substance should be mixed lime crucible: the substance should be mixed
thoroughly with carbonate of soda, and the flame thoroughly with carbonate of soda, and the flame till it is fused to a clear button. The platinum large dealer in fine chemicals or to manufacturers of platinum utensils.
(2) A. P. says: I notice that in several in stances you recommend 70 per cent alcohol for making shellac varnish. Is it better than 95 per
cent, and why? A. The chief recommendations cent, and why? A. The chief recommendations
are that it is much cheaper and does not evaporare that it is much cheaper and does not evapor-
ate quite as rapidly as $s$ ronger alcohol. The proportions of ingredients in the varnish depend which it is to be employed.
(3) J. C. K. asks. How is marking ink in black, lamplack, gum arabic, molasses, and vin egar. The quantities of the two latter ingrediuite small.
(4) F. B. H. asks: 1. How can I tan or treat A. We know of no such tanning soft, pliant? have not seen bladders treated so as to retain hese properties.
Is there a machine by which a penman can pro-
duce one or more facsimile copies of a duce one or more facsimile copies of a letter or instrument upon writing paper by the same op-
eration that produces the original? A. The Edison electric writing pen allows any number of duplicates of a writing to be rapidly made. But this does not make the impression at the same
time as the original. The manifold writer, contime as the original. The manifold writer, con-
sisting of alternate sheets of colored paper (see sisting of alternate sheets of colored paper (see
p. 378, vol. 28) and prepared tissue paper, the whole p. 378 , vol. 28) and prepared tissue paper, the whole
being written upon with a blunt point, comes the being written upon with a b
nearest to your description.
(5) A. G. S. asks: Is it a good plan to wash are of good material, the vinegar should not hurt them,and would help to wash off insoluble earthy matters. Other very dilute acids would probably
(6) W. asks: Has the lost art of coloring
glass ever been rediscovered ? Last June I resolved to make a preparation of paint to put on put on one coat. Not content with that, I went to work, put two other ingredients into a we beated them to boiling, put them into the pain pot, and gave the roof another coat of these four ingredients. It was very early in the morning,
and the sun rose directly opposite the window, causing a very hot vapor to rise and settle on th second story window over the roof of the bay
window. The rays of the sun were so powerful on these four panes of glass over the roof of the took place. Any one, standing on the ground and looking up, can see 4 lights of glass over the said roof containing the most beautif ul colors that eye ver beheld, arranged as complementaries, in
more graceful style than any artist could do it he colors cannot be rubbed nor washed off, and the glass being quite clearand transparent. A.The
art of staining glass has never been lost. Some When the cient pigments cannot now be made. of colored glass, it is said to be flashed glass. When che coloring matter is spread through the entire material, it is said to be ruby, or green, or
canary glass, according as it is stained with the canades of copper, or oxide of uranium, etc. There is no difflculty in doing it. The appearances you mention are known in optics as the "interference colors of thin films," and are produced by a transparent film on the glass.
(7) P. L. G. asks: How may a dentist deter mine the fineness of a gold plate brought to him
for repair, so that he may know what fineness of for repair, so that he may know what fineness of
solder to use? A. Try it upon a touchstone and solder to use? A. Try it upon a touchstone and
compare the streak with the streak of gold of a compare the streak with the
known degree of fineness.
(8) W. S. asks: 1. What are the relative volumes of 1 cubicinch of bisulphide of carbon,
and 1 inch of its vapor at a tension of 15 lbs per square inch? What is the wefight of 1 cubic inch of bisulphide of carbon? $A$. The density of bisulphide of carbon at $60^{\circ}$ is $1 \cdot 27$; a cubic inch would thereforc weigh $252 \cdot 5 \times 1 \cdot 27=320 \cdot 6$ grains. The
density of the vapor of bisulphide of carbon is density of the vapor of bisulphide of carbon is
$2 \cdot 67$; a cubic inch would therefore weigh $2 \cdot 67 \times$ $0 \cdot 30335=0.826 \mathrm{grains}$. A cubicinch of bisulphide of carbon converted into vapor at $60^{\circ}$ and 15 lbs. In whessure wourtion must the vapor of a hydrocarbon, like benzine, be mixed with atmospheric air for perfect combustion? A. No general proportion can be given, the amount depending up-
on the relative proportion of the carbon and hyon the relative proportion of the carbon and hy-
drogen in the compound. In the case of benzine $\mathbf{C}_{0} \mathbf{H}_{0}$, about $71 / 2$ times its. volume, in the state of combustion. 3. Can such a mixture be lighted by a platinum wire heated by an electric current, the same as carbureted hydrogen gas? $\Lambda$. Yes
What paint or composition for iron will with What paint or composition for iron will with-
stand great heat without burning or scaling off stand great heat without burning or scaling off
soon? It is intended for boiler fronts and fursoon? It is intended for boile
nace doors. A. There is none.
(9) W. H. W. asks : How can I make a m cilage such as is used on postage stamp
Use a strong aqueous solution of dextrin.
(10) D. W. S. asks: 1. IIas iodoform ev orm was first employed as a remedy by Aouchardet of Paris in 1836. He recommended it as an alterative in scrofulous affections, etc. It soon
fell into disuse. In 1848 it was again brought forfell into disuse. In 1848 it was again brought for-
ward. At present it is not much employed as an ward. At present it is not much employed as an
internal remedy. 2. What is its effect on the human system? A. It has been refect on the huuse in scrofula, goitre, rickets, syphilis, consumption, and some diseases of the skin. Iodine is also used in the same conditions,and many believe that the good effects which have been obtained
from the use of iodoform result from the iodine from the use of iodoform result from the iodine
which it contains, and which is set free when it is which it contains, and which is set free when it
decomposed in the human body. It is usually decomposed in the human body. It is usually
given in doses of $3 / 4$ to $11 / 2$ grains, in pill form. Iodoform is used as an external application to a considerable extent in cancer of the womb and breast, and as a dressing to certain forms of ul-
ceration. Excellent effects are obtained from it when used in this way. It is applied either in Sowders, as an ointment, or in ethereal solution sometimes it is used as a suppository in the rec
tum or vagina. 3. Is it poisonous in any degree tum or vagina. 3. Is it poisonous in any degree? it does not usually produce any irritating effects. In overdoses it occasions intoxication, great ne vous excitement, acceleration of the pulse, stag gering gait,and convulsions resembling those pro-
duced by strychnin. The breath gives off the char duced by strychnin. The breath gives off the char will produce these effects and occasion death in the human being is not stated. In deaxperi ment, upon a large dog, fifty grains proved fatal One of the chief effects of iodoform is its anæs thetic power. This is very marked when it is used upon sores (not intlamed), and when applied to the mucous membrane. In the throat and nasal passagees, thed.
ten very decided.
What is meant by stanJard copies of the ohm in speaking of electrical measurements? A. Fo description of the ohm, which is a
electrical resistance, see p. 117, vol. 30 .
(11) B. says: I have thousands of tuns o sea kelp, not available for agricultural purpos Can one suggest a method of utilizing it ohiefly employed as a source of iodine. The pro cess for extracting the iodine is very long an
tedious, and it requires considerable chemical kill to carry on the business successfully. There is no work of this kind in this country.
(12) E. S. T. says: I claim that, the larger the surface of a lightning rod is, the heavier is
the charge it could conduct. A friend averred that it is the solid contents that must be considand on not the amount of surface presented. and on reading your journal that I am wrong the surface area does not add to the conductibil I find in Silliman's " Philosophy," edition 1859, p. 923: " Electricity resides only on the outer surmay be regarded in two lights, the results o which are very different. For instance, we know metal is capable of transmitting the charge from a large plate electrical machine, giving a flash of perhaps several inches in length, while the same foil would be deflagrated by the currentfrom one or two cells of battery. This apparent anomaly is not so dincult of explanation as might at firs appear. 1n the former case, the electricity ha ficient in quantity; in the latter, the quantity, on which the heating effects depend, is very great

Again all conductors take what is called a charge, circumstances, and a certain time is consumed in the charging. Now, as regards comparatively short conductors at least, little or no heating ef-
fect is produced until the latter becomes charged fect is produced until the latter becomes charged throughout, in other words, until the current be-
comes uniform in the different sections of the comes uniform in the different sections of the
conductor. If, then, but a fractional part of the time required to charge a conductor is occupied in communicating electricity to it, the latter is would be melted were a current of equal strength maintained through it for even a few scconds. Wo would conclude from the above, then, when dis discharge is all but instantaneous, that con-
ductors possessing considerable surface are most desirable; butwhen it is remembered that lightning flashes, besides combining great quantity with high potential, sometimes succeed each other so as to produce a veritable current, that, and a marginal allowance for safety, suggest thr with large mass of metal, with large mass of metal, censiderable develop-
ment of surface. The item from Silliman's "Philosophy", refers to the static charge: that alone resides on the surface, whereas, on the other hand, the whole mass of the conductor is concerned in transmitting a current after tho harge has been once effected.
(13) J. H. B. asks: What kind of paint is ost for painting galvanized iron exposed to the the paint and the iron, and then peels off, when lead or common paint is used. A. One of the
best paints we know of for this purpose, where a dark color is not objectionable, is common asdark color is not objectionable, is common as-
phalt dissolved in turpentine or benzine. It is
extremely tenacious, dries soon, and becomes extremely tenacious, dries soon, and becomes
very hard and insoluble by the action of sunvery hard and insoluble by the action of sun-
light. It is flexible and very durable. Do not light. It is flexible a
mistake it for coal tar.
(14) E. I. W. says: I have a solution of ni trate of silver precipitated with cyanide of potassium, also a gold solution done in the spme
way. What cheap chemical could $I$ add to let the work, in coming from the bath, need no burnishing? The bath is: 1 oz. silver, cut in 8 ozs. nitric
acid and 2 ozs. water ; and I add that to 5 ozs cyacid and 2 ozs. water; and $I$ add that to 5 ozs cy-
anide of potassium in 32 ozs . water. A. There is anide of
nothing. nothing.

1. Is the
2. Is there a soft soldering fluid that will not niac added, but muriate of zinc, with sal ammoacid (crude). 2. There is a solution sold named anti-oxidizer, which is clear as water, tastes similar to borax, and is used to preserve the color of gold and silver while being heated. The fluid is undoubtedly water and some chemical dissolved
in it. I tricd borax, but it does not seem to be in it. I tricd borax, but it does not seem to be
that. It docs not answer the purposc. Have you any idea what it is? A. Itis probably chloride of ammonium (sal ammoniac).
Minerals, etc.-Specimens have been received from the following correspondents,and oxamined, with the results stated
N. F. R.-It is beautifully crystallized sulphide of iron in gneis rock. The outer shell is com-
posed of sesquioxide of iron from the decomposition of the sulphide.-Two specimens in a needle box, with no name on it, have bcen received. No.
is chalcopyrite-sulphide of copper-and car1 is chalcopyrite-sulphide of copper-and car-
bonate of copper. No. 2 is clay discolored by oxide of iron.-S. N.-No. 1 is a silicate containing ron, alumina, soda, lime, and magnesia. The nodular piece of stone is marcasite. No. 2 is sul-
phide of iron with clay. No. 3 is a piece of shale with crystals of carbonate of lime in the crevices. J. N. C.-It is a variety of infusorial earth. Sec
p. 240 ,vol. 35 .-G. W.S.-It is micaceous sand from decomposed and disintegrated granitiferous rock. It does not contain any precious metal. Other than the attraction of gravitation, which acts tive influence whatever between the metals and peach trec limbs (or limbs of other trees). The peach trec rining is not a scientific instrument ; and aside from its employment in sensational tales,
its wonderful attributes, like those of the philoits wonderful attributes, like those of the
sopher's stone, are merely delusive fancies.

## COMMUNICATIONS RECEIVED.

The Editor of the SCLENTIFIC AMERICAN ac-
knowledges, with much pleasure, the receipt of riginal papers and contributions upon the following subjects:
On the Mississippi Jetties. By A. S.
On Binocular Vision. By J. H. H.
. By S.T.
Also inquiries and answers from the following:
F. o. H.-C.A. C.-J. A. McN.-J. L. R.-C.w. J.
A. J. B.-E. B.-H. R. S.-W.C. F.-E.G.-J. T.
HINTS TO CORRESPONDENTS.
Correspondents whose inquiries fail to appear
hould repeat them. If not then published. they should repeat them. If not then published. they
may conclude that, for good reasons, the: Editor may conclude that, for good reasons, the Edito
declines them. The address of the writer should

Enqu Enquiries relating to patenters, etc., will not be published here. All such questions, when initial nly are given, are thrown into the waste baske as it would fill half of our paper to prirt them all by mail, if the writer's address is given.
Hundreds wing address is given. re sent Whose is the best form of steam engine Whe sells electric telegraph wire? Whose are the best headlights for locomotives ?" Al such personal inquiries are printed, as will be
observed,in the column of " Business and Personabserved,in the column of "Business and Person "." Which is specially set apart for that purpose,
subject to the charge mentioned at the head of hat column. Almost any desired information can in this way be expeditiously obtained.

UP to the hour of going to press, the list of pa1, and bearing that date, had not arrived from Washington.

## VALUE OF PATEITMS

How to Obtain Them.
Practical Hints to Inventors.

星Rum of no investment of a smal than the expense incurred in obtaining a patent, even when the invention is but a small one. Large inventions are found of Blanchard, Morse, Bigelow, Colt, Ericsson, Howe, McCormick, Hoe, and others, who have amassed immense fortunes
from their inventions, are well known And there are thousands of others who have real ized large sums from their patents.
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availed themselves of the services of Munn \& Co during the THIRTY years they have acted as so licitors and publishers of the SCIENTIFTC AMERICAN. They stand at the head in this class of business; and their large corps of assistants, mostly se lected from the ranks of the Patent Office : men ca pable of rendering the best service to the inventor from the experience practically obtained while ex
aminers in the Patent Office: enables MUNN $\& C O$ to do everything appertaining to patents CHEAPE than any other reliable agency.

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 thise to this office. A positive answer can only be had by presenting a complete application for a patent to sists of a Model, Drawings, Petition,Oath,' andfull Specification. Various official rulesand formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After great perplexity and delay, he is usually glad to seek the aid of personsexperienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning. If the parties consulted are honorable men, the inventor may safely confide his ideas to them; they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his right.
How Can I Best Secure My Invention? This is an inquiry which one inventor naturally
asks another, who has had some experience in obtaining patents. His answer generally is as follows, and correct:
Construct a neat model, not over a foot in any dimension-smaller if possible-and send by express, prepaid, addressed to MUNN \& Co., 37 Park Row, together with a description of its operation and merits. On receipt thereof, they will examine
the invention carefully, and advise you as to its patentability, free of charge. Or, if you have not time, or the means at hand, to construct a model, make as good a pen and ink sketch of the improvement as possible and send by mail. An answer as to the prospect of a patent will be received, usually by return of mail. It is sometimes best to have a search made at the Patent Omce; such a measure often saves the cost of an applica
a patent.
Preliminary Examination.
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words, and a pencil, or pen and ink sketch. Send words, and a pencil, or pen and ink sketch. Send
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will receive an acknowledgment thereof, followed by a written report in regard to the patentability of vour improvement. This special search is made witı great care, among the models and pat-
ents at Washington, to ascertain whether the improvement presented is patentable.
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VII-THE FAIR CORRESPONDENT W
hord that vibrates in The conacousess of every intelilgent individual, when he sald he thourping touched

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