Beck's New Improved Self-Adjusting Vise
Mechanics are generally aware that vises with parallel jaws, are a source of great perplexity and loss of time when they are used in finishing anything but plain, parallel work. If the faces of the piece to be clamped incline towards each other at all, the piece-if wood--becomes badly defaced; ond--if metal-while it is more or less defaced, according to its quality, it is also submitted to unequal side strain, which readers the danger of breakage much more imminent.
To obviate these difficulties it has been customary in times past to employ clumsy make-shifts extemporized for emergencies as they gencies as they arise, such as angular blocks of wood or met al, lead plates, etc., familiar to all machinists. These facts are fustly held by the inventor of thedevice which forms the subject of the pres $s: n t$ article, as demonstrating the faulty character of the principle of uni principle of uniform parallel ism in the jaws of vises, and suf ficient to entitle it to be called mnphilosophica and. mumechani eaĩ,
This faet has long been ad mitted by oth ers, as the numerousattempts which have been made to produce a good vise with jaws adjustable to any ordinary to any ordinary amply prove. amply prove.
Our engrav
ings show distinctly an improved construction of this essential implement, which, it is claimed, is free from the numerous defects which have hitherto prevented the general adoption of vises with adjustable jaws. These defects have been, for the most part, loss of leverage, unequal strain, and undue complication, which rendered them expensive to manufacture or repair.
We may mention as tending to establish the claims of this inventor, that on pages 175 and 221, Vol. XXI., of this jour ual, were published advertisements challenging a competi tive trial of these vises with any other whatsoever at the National Fair of the Maryland Institute held at Baltimore ast fall, and that the judges awarded the highest premium o the cxlibitor of these vises. The inventor is satisfied that these vises, if left on trial (as he is willing to do where any doubt exists as to their merits), will secure preference from practical mechanics over any others in market.
Fig. 1 is a perspective view of the Machinists' Vise adapted not only to their use, but to the needs of metalworkers in general. Fig. 2 is a sectional view of the outer jaw of the same vise, and its attachments.
A, Fig. 1, is the bed-plate of the vise, in which the extension bar, B, Figs. 1 and 2, slides. C, Fig. 1, is a movable jaw, operated by the screw, D. The screw, $D$ is swiveled to the ends of the shield, E Figs 1 and 2 which ends are turned down at right anes, serving to keep the screw clean. The parts, A C. B are held together by parts, A, C, B, are h ing flanges. The bed-plate, A, Fig. 1, has a socket shown in dotted outline, cast solid with it, which enters the bench, and is connected with the clamping bar, $\mathbf{Q}$, by a pivot bolt. This bolt has a side partly flattened, as a vearing for a key which enters the clamping bar, Q ; this prevents the nut from working loose.
S is an eccentric of chilled iron, having a socket for the lever, T, S is connected with the clamping bar, Q , by a
bolt and washer, R, the bolt being held by a keyed nut not hown.
W is a metallic plate secured to the bench upon which the eccentric, S , works. It may in most cases be desirable to use the adjustable lever, L, shown in Figs. 4 and 5, instcad of the lever and eccentric, S and T , and the bar, Q.
M, Fig, 1, is a corrugated steel key shown removed from an inclined bearing plate, X, Fig. 1, which has a projection dovetailed into A. The key, M, is kept from working out of place
by a pin shown in the small end. By elevating the cam
the lower part of which is drilled or reamed out with the bar, B, which strengthens the head; and also by its par tially clasping the screw shaft, it is prevented from turning The upper part of J, which passes through the front of the jaw, H, has a slot through which a steel key passes and rests upon a washer
This construction secures the jaw against lateral strain, and if the vise be forced to a breaking point, the key in the pivot, J, will break before any other parts can yield, and can be casily replaced at a trifling expense. A number of these

## keys also accompany each vise.



## BECK'S NATIONAL SELF-ADJUSTING VISE

and positions, and clamped therein by pressing the key, $\mathbf{M}$ with the thumb, and depressing the lever, T ', to the position shown by the dotted line ; the parts, $A$ and $B$, being simul aneously clamped, and the whole held with great firmness. In heavy chipping, the post $N$, is employed to strengthen and support the other parts of the vise, it being attached to the extension bar, $B$, by a socket and clutch, $P$, aid adjusted to rest upon the floor by a tapered key, O. This key is also se cured by a small pin placed near its point. The post, N, may be metal, but is preferably made of wood, which answers all purposes and is much cheaper.
 K, Fig. 1 , is an adjustable semi.collar, fitted to a cirrolar metal working; and Fig. 4 is a longitudinal section of t is instantly adjusted to take up the wear of the screw. H, Figs. 1 and 2, is a horizontally or laterally adjustable jaw, having a semi-circular shoulder fitted into a corresponding recess of the extension bar, B, shown in section in Fig. 2. It is held down by a pivot stud, J, Figs. 1 and 2, which is
crewed into the bar B, as shown in Fig. 2 by the dotted lines
latter whe jaw, B, and clamping plate, A. The latter, which is securely bolted to the bench, has a circular conical flange, in which the base of the jaw, B, revolves. It has also a projecting flange, which forms a solid support for the nut, and also for the extension bar, C, which slides on a shoulder of the same, as shown in Fig. 4, and in dotted out, line in Fig. 3. As the screw, D, passes through this flange,

This mode of attachment also allows of com pensation for such wear as
may occur
 ase, and allows the jaw, H, to be lowered or tightened at pleasure, and turned at will about the pivot, J, to any reI, Figs. 1 and 2 , is a stcel pin, , is a stcel pin, which holds the aw, I , in a par allel position, when parallel work is clamp. cd. It has a block placed in a hole at ins owerend which keeps it from slipping down while the work man is adjustng the jaw II. Chis rubber is 2. $F$ is a verti2. F is a vertijaw, having a slot in which a connecting pin, G, Figs. 1 and 2, is secured. The latter is pointed, and it is flattened near its head, and forced tightly hrough the slot, so that it has no play. This jaw, F, is quickly attached to the jaw, C, by means of the connecting. pin, G, similar to the one shown in the jaw H, Fig. 2. It is held from working loose by a block of leather placed tightly in a vertical hole in the jaw, and compressed by a screw, as at Z, Fig. 2. The lower part of the jaw F, is notched as shown in Fig. 1, to slide on the slield, E, and its rear side which rests against the jaw C, has the form of a segment of a cylinof a being alled piece, and the jaw, $H$, the whole forms a universally adjustable vise, by which any plain tapering or beveled piece of work may be securely held in any position for facility and convenience in working without defacing it or subjecting the vise to injurious side strains, resulting from clamping angular work in parallel vises.
The
The movement of the jaws may be reversed by loosening the key, M, and placing the key, L, Fig. 1, in the notch of the plate, A, and the jaw, C; which then becomes fixed, and the jaw, H , movable.
The post, N, can be readily attached to A, by means of a hook not shown, and instantly adjusted to any point and desired. Fig. 3 represents a vise
it may be made into a nut with a screw tap, and when worn out, a new nut may be substituted.
C is the extension bar, cast hollow to receive the nut, flange, and screw. It slides through the jaw, B. H is the adjustable and movable jaw. Its front part is secured to the bar, C by a pivot bolt to which a nut is securely locked, which can be loosened or tightened at pleasure to compensate for wear.
This bolt, when properly made, breaks before any other part, and it may be easily replaced, thus insuring more expensive parts against breakage.
The rear part of the jaw H, rests against a segmental shoulder, cast solid with the bar, C, by which leverage is gained and the durability of the jaw, H , is increased. This jaw may also be held in a parallel position by the pin, I, as in the Machinists' Vise.
K, Fig. 4, is a stud secured to the base of the jaw, B, and it passes through the center of the clamping plate, A, and bench, into the nut $\mathrm{K}^{\prime}$,Figs. 4 and 5 . This nut is cast with a flange, on which the adjustable wrench or lever is supported This lever is easily adjusted to any side of the nut by pulling it so that the nut will be in the circular part of the aperture as shown in Fig. 5. When turned for a new grip, it is pushed so that the nut will be in the angular part of the by first taking off the nut.
The vise may be firmly and easily clamped at any desired angle with the edge of the bench. The rear part of the vise is held down by three segmental shoulders or projections cast solid with the flange of the clamping plate, A ; and can only be placed in, or taken out, when turned to a position where places in the jaw correspond to the projections de scribed.
This vise is the subject of several patents. For further particulars, rights, etc., address J. D. Beck, patentee, Liberty Tioga county, Pa.

## ON THE CONDITIONS AND LIMITS WHICH GOVERN THE <br> PROPORTIONS OF ROTARY FANS

Mr. Robert Briggs, in a paper recently read before the In stitution of Civil Engineers, stated that, by the theoretica investigations of Redtenbacher and Rittinger, of MM Combes and Peclet, and of Mr. Appold, as well as by the recent practice of constructors of fans, the conditions and the limits that would be attempted to be established were more or less acknowledged.
A rotary fan might be said to consist, primarily, of a certain number of tubular passages, which were rotated about a lineal axis at right angles to the direction of the passages, whereby a given volume of air, impelled either by centrifuga force, or by the shape given to the tubular passages radially was moved at a determined pressure. In other words, it might be conceived that a shaft revolved, upon which was placed a disk or set of arms, to which disk or arms some
blades or vanes were attached, the zone of blades or vanes blades or vanes were attached, the zone of blades or vanes
having sides or a casing, either in close proximity to the edges of the blades or vanes, or attached to and made to re volve with them : and then the area inclosed between any two blades or vanes and the sides or casing might be consid ered as a tubular passage, with an entrance at the center of the fan and an exit at the periphery. Theconclusions drawn by M. Péclet, from a course of reasoning based upon the tube example, were at variance with the experience of the author of the paper, and might be extended, first, to a tube closed at the axial end and open at the periphery, when the partial vacuum would correspond to that due from the velocity of a body of the density of the atmosphere at the time, falling with the velocity at which the extremity moved; and, sec ondly, to a tube closed at both ends, when, whatever might be the density of the inclosed atmosphere, the pressure on
the axial end would be less than that on the outer end by the axial end would be less than that on the outer end by
that due from the volocity of a body of the density of the in closed air, falling with the velocity at which the extremity moved. Heace, whatever the shape of the vanes of a fan, its maximum pressure or suction involved no delivery what ever, and if the fan were so proportioned that no regurgita tions took place as the blades passed any point in the case such a fan would consume no power when it was closed, either at the inlet or the outiet, or both, for it was performing no work. The condition was that of a fly-wheel at a uni form velocity, or a ball-governor with the balls spread to a running position. Now the pressure attainable by any rotary fan was an exceedingly low one, when considered in pound per square inch ; thus a column of water of 14 inches or 16 nches gave velocities dangerously near the strength of ma terials of which fans were constructed, in resisting centrifuga force, and a column of water of 7 inches or 8 inches was at tainable only by very high speeds. In fact, a pressure or suction of 3 inches or 4 inches was nearly as large as could
be economically attained, in delivering a quantity of air, when the friction of machinery at high velocities, the wan of adhesion of belts, and certain other considerations of the friction of air on the vanes, were accounted for. Thus, the largest differences of pressure were less than the ordinar atmospheric disturbances, as indicated by the barometer.
It was possible to construct a series of fans, following from one to the other, and to increase the pressure by repeated efforts; and this method was applicable to many purposes where the volumes to be moved were beyond the scope of a pump, and the pressure was relatively low to that ob tained from pumps. So far as volume was concerned, a very
small fan represented the largest blowing engines at blast small fan represented the largest blowing engines at blast
furnaces. This limit of efficiency, as regarded pressure, was furnaces. This limit of efficie
Since the terms, pressure on the one hand and suction on the other, were interchangeable, and did not vary so much as
the atmosphere, it happened that the suction fan of the most economic proportions was identical with the blast fan best adapted for the performance of duty. This cendition was regarded as of the highest importance in simplifying the study of the fan question.
But the propositions, that the fan of suction was that of blast, and that suction and pressure were interchangeable, implied and carried with them the conclusion, that the action derived from the shape of the blade should be the same on the entering air as on that leaving the fan. This condition, however, was only incident to one particular shape of blade, that was one where the angle of the blade at any point was constant with any radial line at that point-in other words, was a logarithmic spiral. This angle might be from $0^{\circ}$ to $90^{\circ}$, that was, from a straight line to the impossi ble case of a series of concentric circles, but the shape would insure each part of the blade giving an impulse to the air in contact with it proportionate to the velocity of that point round the axis. Taking this form of blade, and supposing the air to be impelled with velocities proportionate to the radial distances from the axis, then the area of each concentric ring should diminish as the length of the radii increased The calculations and the formula for determining the section of the cone of the fan from the mouth to the periphery were hen given.
At the entrance of a fan, the direction of the currents of ir was at right angles with the plane of rotation; and, in the case of the ordinary fan, taking in air at both sides, the wo entering currents were directly opposed to each other In the center between the currents there might be inserted a onoid, so shaped that each particle of air should preserve its uniform velocity, and be cradually diverted into the dir ion desired. The conoidal mouth of the fan should be of such a shape as to give a constant area to the passage formed between a newel, or corner round the mouth, and the surface of the conoid. The calculations and the formula demon-
strating the outline of the conoid then were given. With this section of mouth, and that previously described for the zone of the blades (supposing them to be a logarithmic siral), and with the supply of air which the velocity of the ips of the blades demanded, the air would enter with the hilst was accelerated, and be discharged with maximum effect.
In a fan 10 feet in diameter, and only 2 feet in width at the circumference, and having $62 \cdot 83$ square feet of area of discharge, the openings on both sides should be $7 \cdot 42$ feet in dimeter and $3 \cdot 63$ feet wide at the inner edge of the zone of blade. This left only $1 \cdot 22$ feet for the width of the zone of lades from the opening to the periphery. But the zone of lades was made as wide as two feet at the disk, so that the average width of the zone was $1 \cdot 65$ feet. Attention was di-
rected to this departure from the usual proportions, to indiate the advantage of more than the ordinary number of lades, and t'e discussion would fail to be understood unless the opportunity, if not the necessity, of so doing were demonstrated.
After it was ascertained that any particular form and num er of blades would produce the highest useful effect, at the pressure related to the velocity of the periphery of the fan, if it was desirable to have a higher pressure, it would be best obtained by giving a greater velocity to the fan, and not by altering the shape of the blades to a form of less efficiency unless when the desired pressure approached the strength of the parts of the fan to resist centrifugal force, and it was advisable not to employ a fan of repeated effort, when the lades became beyond question radial, and the useful effect as secondary.
In the year 1856 and 1857, the author, who was then em ployed as one of the principal assistants upon the works of the United States Capitol Extension and the Washington Aqueduct, under the engineering charge of Captain (now
Major-General) M. C. Meigs, had delegated to him the inves Major-General) M. C. Meigs, had delegated to him the inves tigation of what form of fans should be employed in ventila ting the buildings of the Capitol. A series of experiments with models, based on the reasoning adduced in the paper, Gave as the best shape or curvature to the blades, that which had been indicated, a logarithmic spiral of $45^{\circ}$, and showed a loss of mechanical effect when, within the zone of blades, the number of blades employed exceeded that which allowed the heel or inner edge of one blade to much more than pass the point or outer edge of the next in a radial direction, or in the direction in which the current of air, when the maximum ischarge was occurring, passed.
The same rule would hold good with fans having radial ades; for as then the direction of the current was at an angle of $45^{\circ}$ to the radius vector, the overlapping of the opposite ends of the two contiguous blades in relation to the current would take place in the same way. Taking a fan of 10 feet n diameter of the proportions assumed, where the zone of
blades had been stated to be 1.65 feet average width, about blades had been stated to be 1.65 feet average width, about neen blades would be required for a fan with blades a radial blades. The fan here described was narrow, with a large opening on both sides, and numerous blades, as com pared with the usual practice; but it possessed the merit of eing the smallest in external diameter, of having the larges capacity, and the least surface friction compatible with the contact of the air with the blades.
It was not pretended that a fan of the usual proportions, with the diameter three or four times the opening at the side or mouth, and the relative width mnch greater than had been assumed, was radially inefficient; nor that even in such
a case, if the number of blades were limited to four, six, or eight, or where the case was composed of flat plates, there was a total loss of efficiency. So far as the extremity of th
blades merely rotated a mass of air which was not passed forward, no power was consumed, upon the principle of the tube closed at the inner end. The air could only be delivered so fast as, by the action of some part of the blade of a fan thus constructed, it could be induced to enter at the restricted openings at the side. But the rolling of compressed air, intercepted by the outer ends of the blades and the friction upon the enlarged surfaces, must consume more or less power. A table was next given of the proportions of fans with less bades than had been assumed, showing that eight blades of $45^{\circ}$, or twelve radial ones, were the least number desirable, as , or twelve radial ones, were the least number desirable, as t the tips of the blades.
The reasoning was adduced on which the calculations of quantities and pressures were based. It was urged that when quantities and pressures were based. It was urged that when
all the resistances of the fans were considered, the unreall the resistances of the fans were considered, the unre-
stricted discharge with unrestricted supply would occur at stricted discharge with unrestricted supply would occur at
one-half the velocity of the tips of the blades and the pressure one-half the velocity of the tips of the blades and the pressure
to correspond, while the quantity would equal a discharge at that velocity through eighteenths the area of the fans at the tips.
Up to this point it had been possible to demonstrate by rea soning, or with the modification of some co-efficients, the proportions enumerated. But there were no accurately deter mined figures to show the relationship between the quantities of air discharged and the increased resistances. The instances in use, although numerous, about a hundred in fact, had been restricted to cases where ducts were employed, some or all of which had been closed off at one time, no regularity of working having been adopted; nor were there any experiments to show the variations of pressure, when the quantities were increased or diminished. The author had assumed, in giving the performance of fans, that double the unrestricted pressure could be got with half the quantity of air. This relationship seemed to be warranted by many results, where the quantity of air had been measured by an anemometer, and the pressur registered by a gage simultaneously; but the law of the relation of variation of quantity with pressure to this limit, or further limits, had not been determined. The ultimate press ure attainable for the discharge was four times, less 10 per cent, or 3.6 times the pressure of unrestricted discharge. The assumption that half the quantity would be delivered under double the pressure involved the passage of the current of air in a radial direction through the blade at half its unrestricted velocity, and the rotation of the air with the fan at such a rate that its centrifugal force should equal the double press ure assumed.

It should be borne in mind that this double pressure fol lowed when the air was impelled tangentially at 0.707 the velocity of the tips of the blades, and that this was the speed which would be given to the current outwards, when there was an infinite number of frictionless blades, with the logarwas an infinite number of frictionless blades, with the logar-
ithmic curve of $45^{\circ}$. That there would be discharged quantities of air up to the limit of pressure was certain, but the economic effect of the fan fell off rapidly, as the blades were only moved at high velocities through a bath of air without producing proportionate results. With these estimates of unrestricted discharge and pressure, and the modification of a certain pressure up to double the unrestricted pressure, the limits of fans of proper proportions were brought to definite conclusions.
The general dimensions and description next followed of a 10 -feet fan. It was stated that this construction of fan was also adapted to the ventilation of public buildings and to the supply of air for puddling and heating furnaces, for all o which purposes they were in common use in the United States.
In conclusion, tables were given of the presumed duty o fans for different uses, admitting of practical application to many purposes ; including the capacities of a 10 -fect fan, with an unrestricted discharge, and a discharge restricted to hal the quantity, of fans to be used for the ventilation of public buildings or mines, for the sapply of air under grates of pud dling or heating furnaces, and to tweers, or cupolas, smiths' forges, hollow furnaces, etc. In each case the tables embraced the following particulars: The number of revolutions and the quantity of air delivered per minute, the pressure, the proper dimensions of the pulleys, and the horse-power required for the several conditions.

The Effect of Temperature on Coal Gas.
Of the many experiments which have from time to time been made on the illuminating power of coal gas under dif ferent conditions, very few, we believe, have been conducted with a view of ascertaining the extent to which that powe is affected by the tempcrature to which the gas is exposed, and for this reason some experiments of this kind, which were not long ago carried out in the laboratory of the Uni versity of Munich, possess a special interest. In these ex periments the illuminating power of the gas at the normal temperature of $641_{2}^{\circ}$ Fah. was taken as the standard, and the object was to compare, by means of a Bunsen's photome ter, this illuminating power with that obtainable when the gas was burnt in the same burner at a higher or lower temperature. In order that this might be done the burner was attached to a U-tube, which could be immersed either in cooling mixture or in a liquid at an elevated temperature. The illuminating power at the normal temperature being represented by 100 , it was found that when the U-tube was immersed in snow, so as to bring the temperature of the gas down to $32^{\circ}$, the illuminating power was reduced to from 76 85 ; while when a mixture of salt and snow was used to give a temperature of $-4^{\circ}$, the illuminating power of the
gas was reduced to from 33 to 40 , or, in other words, it was gas was reduced to from 33 to 40 , or, in other words, it was
only equal to about $\frac{1}{8}$ of that which it possessed at the normal temperature. Of course such a temperature as-4 ${ }^{\circ}$ is
one to which gas is never practically exposed, at all events, in this country; but the fact that even at a temperature of $32^{\circ}$ there was found to be an average diminution of the illuminating power to the extent of about 20 per cent is an important one, well deserving of attention.
Heating the gas above its normal temperature was found to have far less influence upon its illuminating power than cool ing it below that temperature, and this was a result which might have been expected, for reasons which we shall point out presently. By immersing the U-tube in boiling water, and thus raising the temperature of the gas to $212^{\circ}$, it was found that the illuminating power was increased to 104 (the illuminating power at the normal temperature being, as be fore, represented by 100 ), while when melted paraffine was substituted for the water, and the temperature thus increased to $288^{\circ}$, the illuminating power became 118 . Thus while a reduction of temperature of about $32^{\circ}$ lessened the illumina ting power by about 20 per cent, an increase of temperature
of $224^{\circ}$ raised that power by about 18 per cent only. This state of affairs is readily explicable if we suppose the reduction of temperature in the former case to have been sufficient to cause the liquefaction of a portion of the hydrocarbons associated with the gas, as in that case the total amount of sensible and latent heat abstracted from the gas by the reduction of temperarure of $32^{\circ}$ might even be greater than that im-
parted to it when its temperature was raised to $288^{\circ}$. In all parted to it when its temperature was raised to $288^{\circ}$. In all believe, supplied at the normal temperature; but it would have been interesting if, in the case where the gas was cooled to $32^{\circ}$ Fah., the light had been supplied with air at that temperature also, and notice taken of the effect.
In the course of the experiments it was found that, after the gas had for some time traversed the tube immersed in the cooling mixture, a thick coating of ice was deposited on the interior of the tube. The water resulting from the melting of this ice had a strong smell, was neutral to test papers, but when exposed to suitable tests gave a feeble reaction, showing the presence of cyanogen. With indigo carmine (sulphindigotate of potass) and sulphuric acid, it developed the blue color of indigo, and evolved the odor of nitro-benzine. To determine the amount of water carried by the gas a large quantity of the latter was caused to pass very slowly through a drying tube charged with pieces of pumice-stone soaked in way on the ordinary gas supplied to Munich showed the quantity to average about $1 \cdot 6$ grains per cubic foot.-Engineering.

## The New Anesthetic Chloral.

Professor John Darby, writing for the American Grocer anticipates that not long hence, the vial of chloral will take its place beside the camphor bottle and other household rem edies, displacing to a great degree, the paregoric and laudan um. Opium and its derivatives häve held a high place in the esteem of mankind ; and, after centuries of use, is to-day
more highly prized than ever before. We have felt consoled that in our extremest agonies, we had within our reach an agent that could arrest or mitigate our sufferings, and give us ease and quiet. But, connected with the use of opium,
there are sequelæ that are disagreeable. Headache, sickness there are sequelæ that are disagreeable. Headache, sickness
of the stomach, loss of appetite, and other unpleasant results of the stomach, loss of appetite, and other unpleasant results are sure to follow its administration. How much more highly should we esteem opium if these unpleasant consequences on waking, as the price forld command sleep pains could be relieved, and our deliverer would leave no sting behind.
Chloral seems to fulfill these conditions. It produces re freshing sleep from the most excruciating pains, and the freshing sleep from the most excruciating pains, and the
sleeper awakes as from a natural sleep, witl no unpleasant sleeper awakes as from a natural sleep, w
symptoms from the action of the chloral.
Chloral was discovered by Liebig, in 1832, and stood more than thirty years in the list of recorded discoveries, exciting no interest outside the field of chemistry. On the 2 d of June, 1869 , it was brouglit before the Medical Society of Berlin, Prussia, as a now hypnotic (producer of sleep) and anæsthetic, by Dr. Otto Liebreich. Pure chloral is a colorless fluid, with a sharp, pungent taste and odor, not disagreeable. When united with one atom of water it becomes a white solid, retaining its odor and taste. It is in this form that it occurs for use. It dissolves rapidly in water. It is not an anæsthetic as chloroform, protoxide of nitrogen, and ether are, as it does not usually produce insensibility when it produces sleep, unlcss given in large quantities. Its true infuenceis a prot
duce sleep. When given to animals they go to sleep as nat urally as though they bad taken nothing. The cat is said to urally as though they bad taken nothing. The cat is said to
lic down, adjust her paws, and with her accustomed low purr, lic down, adjust her paws, and with her accustomed low purr,
pass into the state of sleep, and after five or six hours, wake pass into the state of sleep, and atter five or sis hours, wake
up naturally, as from her accustomed slumber. So in the human subject, ii produces a peaceful sleep of any length of time, depending on the dose given.
The following points have been well established in regard to efficient doses of the lydrate of chloral:

1. It produces deep sleep quickly after administration.
2. The action produces no excitement.
3. No bad effects result from its action.
4. The brain is first affected, then the lungs, and lastly the heart. The heart is said to beat, when fatal doses have been taken, after all the other functions have ceased.
Extensiveexperimentshave been made on the lower animals to develop the properties of chloral, and they bave all been in conformity with the above principles. We select the foling cases reported in European journals: An insane person, in a state of high excitement, was put to sleep in a few minutes by twenty grains of chloral and slept five hours. A woman
with a very painful inflammation of the wrist-joint, was put with a very painful inflammation of the wrist-joint, was put
to quiet sleep by forty grains of chloral. A lady, suffering in-
ternally from an intractable attack of sciatica, could not be
relieved by morphine and atropa, took thirty graius of chloral, relieved by morphine and atropa, took thirty grains of chloral, which she awoke fresh and as well as from a natural slumber A lady suffering from prolonged neuralgia, and all ordinary sedatives proved unavailing, when forty grains of chloral produced immediate relief.
In a case of comminuted fracture of the humerus, the patient became furiously maniacal, and every attempt to fix the limb Sisty grains of chloral were given, and in a quarter of an hour the patient was fast asleep and continued to sleep quietly until the next morning.
A woman who had been ill and without more than five winutes'sleep at a time for five weeks, who had been treated with opium and morphine without benefit, and who, after
taking twenty-five grains of hydrate of chloral in two ounces taking twenty-five grains of hydrate of chloral in two ounces
oi water at bedtime for three consecutive nights, completely recovered. Sound sleep was produced and her pulse, which
at the beginning was 130 , fell to 90 . She did not complain of at the beginning was 130 , fell to 90 . She did not complain of
nausea or headache, or any other unpleasant feeling during the time she was taking the chloral.
In nervous excitement, preventing sleep, chloral acts with promptness and with no evil results. It is evidently indicated in a severe pain resulting from rheumatism, neuralgia, sprains, or dislocation. It reduces the animal temperature and affords relief in cases of fever attended with restlessness and excitement. It produces muscular relaxation, and must afford relief in the horrid torture produced by the passage of gall-stones or the gravel from the kidneys.
The action of chlorai on the system is supposed to depend on the chemical fact that alkalies decompose it and produce chloroform and formic acid. The blood is alkaline, and as the chloral comes in contact with it chloroform is produced, and its appropriate effects follow. This takes place throughout the system, thus producing a universal effect, and not a local one, as when chloroform itself is taken.

## Solar motive Power.

We hear nothing further from Captain Ericsson's experiments in converting the sun's rays directly into motive power and whatever results he has been able to obtain are, as yet,
unpublished by that investicator. But public attention once unpublished by that investigator. But public attention once
roused to the importance of the subject, does not seem likcly aroused to the importance of the subject, does not seem likely
to let it drop. A writer in the British Quarterly Review has taken it up, and states some very interesting facts relating to the general consideration of the subject in connection with the experiments of Mouchot
The sun's issue of caloric has been varionsly represented. According to Sir J. Herschel, it would melt a pillar of ice 1,590 square miles at its base ancl 194,626 miles in hight in shell of ice ten and a lalf miles thick in a single day, though shell of ice ten and a half miks thick in a single day, though
it encompassed the entire orb. According to Professor Tyndall, it is equal to the heat which vould be yielded by a seam of coal sisteon and a half miles in dopth were it fired and re duced to ashes. Large figures are generally very bewilder
ing and when M. Guillemin expresses the sum's deliveries of ing, and when M. Guillemin expresses the sun's deliveries of
caloric by a row of twenty-five ciphers, preceded ly 4,847 , the caloric by a row of twenty-five ciphers, preceded by 4,847 , the
effect upon the imagination is behumbing rather than exeffect upon the imagination is behumbing rather than ex
But the matter may be put in a more simple and accessible form. Calculating the caloric yillded by each square foot of the sun's surface every hour, as equivalent to that which would be given out by the combustion of $1,500 \mathrm{lbs}$. of coal, this would accomplish the work of upwards of 7,000 horses There is something overpowering in this conception, when we consider that it applies to the entire superficies of an enormous globe of more than 880,000 miles in diameter, and not to a
few selected spots. We may have here and there on our own few selected spots. We may have here and there or our own
planet, steam engines doing the work of innumerable quadrupeds, but the idea of several thousands clustered-concen trated, we may say-on each square foot of the sun's area,and
exerting their energies incessantly, is one which wo cannot ompass with much sense of success.
Let us, however, transfer the question of solar power to the surface of the earth. Our globe, of course, intercepts but a
fractional part of these burning emanations-only about T $\frac{1}{1}$ th of the whole, according to Herschel. But, rel atively small, they are intrinsically enormous, for M. Guille min observes that the quantity poured upon a single hectare of ground ( $2 \cdot 47$ acres) develops, under a thousand various forms, as much force as is equivalent to the continued labor of 4,163 horses. The vast amount of work our luminary could, herefore, execute as a mechanical agent, by means of his planet, has not failed to attract the attention of curious inquirers. Indeed, we might say, that the waste of valuable sun shine, which might do the duty of all the steam engines in
the world, has excited the displeasure (wrath might be a bet ter word) of more than one scientific economist. There are people who will always be indignant to think that Niagara cannot be employed to turn mills for grinding our corn, and Vesuvius converted into a forge to melt metal on the most stupendous scale. We plead guilty to a touch of co same ness, is it not distressing to know that the beams which play so unprofitally, in some respects, on many parts of our arth, might, if properly impounded and harnessed to cun in a very useful and lucrative capacity?
So, at least, thinks Monsieur Mouchot
On a fineday, at Paris, it was found that the sun's rays, playing upon a surface of one square meter ( $1 \cdot 190$ yards) comat least one liter ( 1.76 piuts) of ice-cold water to the boiling
point. In other words, says our Frenchman, its effect wa nearly equal to the theoretical duty of a single horse-powe steam engine. There are places, however,on our globe where
the sky is clearer, and the soil more arid and where, the sky is clearer, and the soil more arid, and where, conse quently, the Lord of Day is known to stalk in burning splendor. Could not some of this radiance be captured by means of what M. Mouchot calls solar receivers? He announces that he has taken some practical steps toward the solution of this question. So far back as 1861 le showed the possibility of working a hot-air engine by the instrumentality of the sun's rays. Subsequently, having ascertained that he could generate siventeen liters of vapor in a minute by the use of a silver reflector, he attempted to drive a small steam engine by the agency of arrested sunshine. In 1860 he sacceeded. Since, however, his experiments were made upon a restricted scale, this ingenious Frenchman recommends that they should be repeated in tropical countries, and with receivers of more magnificent dimensions. In his enthusiasm, he even indulges the hope that, some day, the invention will be transferred to the deserts, where industry will settle down, and establish impor tant works, for the sake of the superior sunshine which those
glowing tracts afford. Who will not sympathize with M. Mouchot, on learning that, according to his experiments, it would be practicable to collect, in an inexpensive way, fully three-fifths of the solar heat which falls upon our earth? Is it not a matter for many groans that, while the sum of the sun's influence upon our planet las been computed as equivalent to the labor of $217,316,000,000,000$ horses, toiling day and night, not a single patent, so far as we know, has been taken out for an engine to be directly worked by sunbeams. Ours is certainly a wasteful world. A large portion of the warmth we might extract from our coal, goes idly up our chimneys ; and it seems that the cheaper caloric which is sent us from our luminary is allowed to flow back into space without driv ing (by its immediate action) so much as a coffeemill, or per forming any artificial mechanical duty for mankind.

## Ivory Carving.

Thiose who are familiar with the working of this exquisite material, says the London Builder, are aware that no other substance lends itself with such facility to the highest skill of the artist. Capable, on the one hand, of a breadth and largeness of treatment equal to that to be attained by such a wood carver as Grinling Gibbons himself, it is susceptible, on the other hand, of a microscopic delicacy of finish equal to that of the Greek gem-cutters, which may be combined with a boldness of relief and shadow of undercutting equal to those of the modeling of Ghiberti.
The chief defect of ivory as a material is its loss of color by exposure to dirt or damp. This may be entirely prevented by proper care, and by exposure to light under glass. Under these conditions, ivory is inferior to gems alone in durabitity, as metals are subject to oxidation, and wood to cracking by
change of hygrometric condition. The most delicate camei of Wedgwood are coarse, when viewed under the magnifying glass, in comparison with camei in ivory. Nor is shell capa ble of equal finish.
Ivory carving is not to be judged of by such productions as the rude little figures, the execution of which forms an industry at Dieppe. These are essentially wood toys, executed in a better material. Neither are the brooches, ear-rings,and other ornaments, now executed in London, to be considered as specimens of artistic work in ivory. The price at which they are sold is too low to allow of the exertion of artistic skill and taste worthy of the beauty of the material. A case of modern English carvings, exhibited at South Kensington, may be re ferred to as another example of inferior modern work in ivory
On the other hand, the well-known set of six plaques, rep resenting amorini, goats, satyrs, and vintage scenes, attributed
to Il Fiamingo, may be cited as an example of the bold, broad style of carving for which ivory is eminently suitable. Of the cameo, or gem-like style of work, it difficult to name any publicly accessible example. Exquisite statuettes were pro duced, some thirty years ago, by machinery invented by Mr Cheverton. But, in this case, the reduction, which made no allowance for the diminution of scale, revealed its merely mechanical mode of execution to the critical and educated eye. Very recently, a few modern French carvings of great beauty have been added to the collections at South Kensington.
The importance of offering some encouragement for the r vival of one of the most charming branches of the sculptor's art, will become apparent to any one who should wish to sell, or in any to bring before public notice, a modern ivory carving, even if of a thoroughly artistic character. The first ques tion with which he will be met is "Is it antique?" The second, "I it foreign?" If neither of these questions is an-
swered in the affirmative, neither dealer nor consoisseur will swered in the affirmative, neither dealer nor convoisseur will
glace further at the object. Grace of design, purity of renderglace further at the object. Grace of design, purity of render-
ing, boldness or delicacy of touch, attract no admiration, if ing, boldness or delicacy of touch, attract no admiration,
the work confess a modern English origin. "There is no sale for objects of that kind," says the dealer. "I take no inter est in any but antique," says the connoisseur. A hideous triptych, boasting a consular date, or a clumsy Lot, embracing a one-legged damsel, but attributed to a Flemish chisel, may command a hundred guineas, while an English work of artdeserving the title-attracts no attention whatever.
A Rain of Sand.-A curious shower of sand took place in some parts of Italy on February 13th and 14th last, and has been described in the Comptes Rendus, by M. P. Denza This memoir, says the Chemical News, contains the account of very curious phenomenon-viz., rain in the southern part of Italy, accompanied by a fall of a fine reddish sand, while in the northern parts of that kingdom,snow fell, accompanied in the northern parts of
by the same substance.

For the Scientific American,

## the cockchafer and its ravages.

By Edward C. H. Day, of the School of Mines, Columbia College.]

## (Concluded from page 362)

France and Germany suffer equally with Great Britain from the injuries of the cockchater, and numerous have been the attempts made of late years to check an evil which had been allowed for centuries pieviously to grow upon the communi ty. One plan followed is to select the perfect insects and de stroy them ; but even in this it seems that ignorance must have prevailed in some cases, as we find it suggested, that the beetles should not be buried as had been done-a course of proceeding that, as the slightest knowledge of their habits would show, would only have the result of considerately sav would show, would only have the result of considerately sav
ing the pregnant females from the trouble of burying themselves! Of course the only way to be rid of them with cer tainty is to burn them as soon as caught. This hint applies equally to several American pests. In other cases the grubs have been collected, and it shows that the evil is still in the ascendant, and at the same time to what a really fearful extent it reaches, that,according to Prof. E. Blanchard, as late as 1866, a M. Jules Reiset caused to be collected, in only two Arrondissements of the Department of the "Seine-Inferieure," 160,000 kilogrammes of these vers blancs, as they are called in France. Nearly eighteen tuns, representing eighty millions of grubs! But do not rest here. As each worm before it was captured had consumed many times its
own weight of food, this total weight repreown weight of food, this tntal weight represents many times eighteen tuns of roots consumed and injured; and each of these tuns of roots represents who shall say how many tuns of grass, of straw, and of grain destroyed? And how many hours of anxious labor wasted by the patient husbandman? And all this havoc, mark you! only in one year, in two small districts, in one region.
"Bugs" are not such trifles after all! It will at once occur to the thoughtful mind-Was there any one else, while $M$. mind-Was there any one else, while M .
Reiset was so patriotically engaged in his Reiset was so patriotically engaged in his
two Arrondissements, similarly oscupied in two Arrondissements, similarly oscupied in
the adjoining districts? Because, if not, it the adjoining districts? Because, if not, it
is but too certain that in the course of time is but too certain that in the course of time
some one will most assuredly have to do all some one will most assuredly have to do al!
his work over again. Just so! this is exhis work over again. Just so! this is ex-
actly what we wish you to realize. Thank heaven! we have not, as wes said before, the Melolontha vulgaris in America; but we have hosts of insects almost as destructive in the same or in a multitude of other ways, and it is no use for Ezra Wideawake to keep his trees free from insects, if Micky Doolan, on the next lot, "just lets the nasty craythures alone," because he doesn't know any better: it
is no use for Mr. Brown to encourage the birds to breed in his boxes in the spring, if the sons of MaxMüller come over his land to "hunt" them with powder and shot in the fall. If insect pests are to be kept under, all hands must pull together ; but the trouble is, that ninety-nine hands out of one hundred know notbing about the ropes; and this though there are numbers of books and periodicals written on the subject. People do not care to read such books-des pise them-because, in fact, they do not know how to read
them, simply because they have not received that trifling them, simply because they have not received that trifling
amount of elementary instruction in natural history that would enable them to understand them without the trouble of some little extra thought ; and that would give them a zest for, and a due appreciation of, the value of such natural knowledge. The remedy is obvious, and it is the sole remedy sufficiently general to meet the case as it should be met. Let practical, well-digested instruction in the elements of natural science form part of the course of every school-public or pri-vate-so that every school boy and school girl may be led to take a pleasure in learning something lesides empty words concerning the wisdom and beauty of Nature. They will then realize the nature and the importance of the part that insects play here beneficially, there injuriously, in the economy of mankind, and be energetic in taking measures to protect or destroy them, as the case may require. Do not, good reader, say you have read all this of insoct as Reaumur ; it is quite probable that you have done so, as Reaumur, Huber, Kirby, Harris, Packard, Walsh, Blanchard, and a host of others, have been drumming away on this tune to the community for years and years, and so far from endeavoring to give any novelties about insects, we are only stealing a little of their thunder wherewith to re-stimulate the readers of the Scientific American. Neither cry out "Pshaw! I have no garden and no fields; let the farmer and the entomologist settle this between them." If the farmer's crops are destroyed you will have to pay more for your bread; if the curculio gets to the plums first, you will not be able to buy them at all. You have, therefore, an interest in this great case of "the community versus cockchafers and others." As was done in the most recent cause celebre, engage the best of private counsel for the prosecution, retain your own plead energetically for the spread of knowledge in natural science among all classes.
The American species of Melolonthians, more or less closely allied to the common cockchafer, are very numerous; the
several kinds of pine bugs, the vine-chafer, and the rose-chafer several kinds of pine bugs, the vine-chafer, and the rose-chafer
or rose bug, being perhaps the most familiar of these allies,

. It is one of the cariosities of insect history that attempts have been made in France to turn the cockchafers, when collected, to account, by extracting an oil from them. The oil manufacture, as might have been expected from the uncer tainty of the supply, seems to have proved unsuccessiful. Pertainty of the supply, seems to have proved unsuccessiul. Per
haps, according to the Rev. Henry Ward Beecher's seemingly haps, according to the Rev. Henry Ward Beecher's seemingly
paradoxical suggestion, that the Canada thistle would be paradoxical suggestion, that the Canada thistle would be easiest extirpated by cultivation, it may be advisable to at-
tempt to raise June bugs for oil! Doubtless a host of their natural enemies would at once multiply indefinitely, and, combining with diseases as fatal as that of the silkworm, soon put a stop to our oil works and effectually abolish the Melolonthians!

## THE ROLLER BARROW.

The peculiarity of this ingenious English invention is, that it causes no unsightly scores or marks upon lawns or walks
in wet weather, when the use of the ordinary wheelbarrow is a source of constant disfigurement. The Ironmonger, from which we copy the engraving, states that as a roller it is

easily worked by a boy, though it can be rendered of any weight desired by filling it up with ballast, the load being discharged at once by tipping the handle. It is very serviceable for bedding out plants, carrying away cut grass or turf, gathering up leaves, or when manuring the ground. The roller barrow is equally adapted for grass lands where horses and carts cannot be employed, and for croquet lawns, being al ways sufficiently light to be managed in case of need by a lady. It is in use at the Crystal Palace, Kensington, and other gardens, where its handy qualities have rendered it a permanent favorite.

DUbuque, Iowa, is very proud over the new cave recently discovered in its suburbs. This hole in the earth has stalactites and stalagmites, and all the modern improvements in
the cave line.

## THE COCKCHAFER.-Melolontha fullo.

though not the most closely related. In their habits, however, the June bugs closely resemble the cockchafers, and they have at times proved very destructive to vegetation, and probably much of their underground destruction is attributed to other causes. There is, however, a species of Melolontha,
the M. variolosa or "scarred chafer" (so calied from its color tion), which is a nearer relative of the European insect. It resembles the insect figured in our present engraving, which is the large and handsome M. fullo, in the very large leaf-like expansions at the ends of the antennæ, or feelers, of the males. In each of these expansions there are seven leaves, while in our common June bugs the observers will only find three. The "scarred chater," according to Harris, is confined to the coast and the islands in the vicinity. It is singular that the M. fullo is similarly restricted in Europe, not being dis tributed, like the common form, over the interior, but occur-
ring only near the coasts of the English Channel, the Baltic Sea, rous of ascertaining to what extent the principle admitted of development, had given him an order to construct the apparatus now before the society
The conclusions arrived at were, that with suitable apparatus and accommodation, and electrical machines of adequate power,the arrangement might be almost indefinitely extended, and that sparks of fifteen or twenty feet in length, in free air would be by no means difficult of attainment. The present apparatus originally consisted of fifteen jars, which gave sparks five feet in free air. In conclusion, Mr. Hearder remarked that this apparatus opened a new field for electrical investigation in connection with the effects of quantity and intensity in relation to statical electricity, a subject never yet attempted for want of suitable apparatus, and he was bound to say that the results of the few experiments he had been able to make are such as could hardly have been predicated with our present notions of the action of the Leyden jar.

## Protection of Lead Water Pipes.

A paragraph is going the rounds of the scientific journals and the newspapers generally, to the effect that Dr. Schwarz, of Breslau, has found a simple way of protecting lead pipes from the action of water, by forming on their inner surface an insoluble sulphide of lead. This is done by filling the pipes with a warm and concentrated solution of sulphide of potassium or of sodium, which is left in contact with the lead potassium or of sodium, w
for about fifteen minutes.
This, says the Boston Journal of Chemistry, may be a new This, says the Boston Journal of Chemistry, may be a new
thing in Breslau, but more than two years ago we sugthing in Breslau, but more than two years ago we sug-
gested a similar process as, on the whole, the best that we gested a similar process as, on the whole, the best that we
knew for the purpose. The directions we gave were as folknew for the purpose. The directions we gave were as fol-
lows : Dissolve 1 pound of sulphide of potassium in two gallons of water, and let it remain in the pipe twelve hours, or until the inside is thoroughly blackened. The same recipe was given in Rolfe and Gillet's " Hand-book of Chemistry," published in 1868. The use of a warm saturated solution, as Dr. Schwarz directs, would do the work in shorter time, which might be more convenient in some cases.

Boiler Test Wanted.-A correspondent suggests that all patent or non-patent boilers be tested publicly to ascertain their evaporative power, and thinks the Brooklyn Navy Yard would be a good place to do it. This suggestion supposes a state of willingness upon the part of everybody who has ever invented a boiler, and also on the part of the United States authorities, rather difficult we think to be realized.

Bridge of the Western Line of Railroad in Paris. de l'Europe, in Paris, upon which several streets cross between et de Saint Petersbourg. The bridge spreads out at each end We give our readers, in the present number, an engraving thirty and forty rails of the Western line (la ligne de l'Ouest). in a fan-like form, but is wide enough at the center or be of an important work which considerably interested us when Under the Place de l'Europe formerly passed two arched tun- tween the two central abutments not only to give abundant we were in Paris. As the subject of the intersection of streets nels of stone; but to make room for passenger depots or plat- room for the passage of the numerous vehicles which have by railways is one of great, and, in view of the rapid develop- forms capable of recejving full trains, that is to say, trains of occasion to cross it from the several converging streets, but to ment of railway travel in and through cities, increasing im- twenty-four cars, these tunnels have been removed and stone allow of the establishment of two circular open spaces for portance, a brief description of this work, which the engrav- abutments erected, upon which are placed an iron trestle- foot passengers similar to those found in several of the mos ing will enable the reader easily to comprehend it, may be
both useful and interesting.
both useful and interesting. $\quad$ three grand passages, and serves for the crossing of les rues Instead of a trestle bridge, one of great arches of stone
We refer to the iron bridge upon the site of the old Placel de Madrid, de Berlin, de Constantinople, de Londres, de Vienne would have been preferred on the ground of more economical

construction and more imposing, or, as the French term it, more monumental appearance ; but this preference could not be gratified, for the reason that the lowering of the Place de $l^{\prime}$ Europe had not left the hight at which the bridge must be constructed, sufficient with such a structure for the passage underneath of the engines and cars.
The depot forms a junction for seven railroad lines, and receives on the average over two hundred trains per day. On Sundays and fête days the number of trains frequently rises to over four hundred.
A feature of the bridge is its adornment at the ends with miniature gardens, a thing which will seem superfluous to the utilitarian minds of most Americans, but which to a Parisian is an appropriate and tasteful decoration.

## Curxenumdente.

## The Eaiurs are

## First Attempt to Make oxygen Gas.

Messrs. Editors:--Having seen it frequently stated that it is an easy thing to make oxygen. Three of us boys who are at school in the town of - Connecticut, decided to try the experiment. We saved of our weekly allowance of spending money until we had enough to set up in business under the firm name of Acid, Base $\&$ Salt. Acid is a sharp fellow, and to him was intrusted the duty of making the necessary purchases for the firm. He went down town and bought some bottles, some manganese, some chlorate of potash, and a piece of india-rubber tubing, and came home quite triumphant.

We soon rigged a stand for heating the bottles, bored holes through some corks that had been smuggled into the school, with bottles attached, by some of the larger boys, put on the tubing, and hung it into a pail of water which we had converted into a pneumatic trough, and everything being properly adjusted, the signal was given by Salt to fire up.
Breathlessexcitement, wonder if the thing would blow up; fi $\%$, smoke, bottle cracks, bad smell-end of experiment one Observations in note book-"Mistake of text-book, oxygen gas has a decided odor." The failure of the first experiment was attributed to Acid's ignorant purchase of a common glass bottle instead of the Florence flask mentioned in the books, and Base agreed to try his luck. He brought a green bottle, and we thought this a good omen, as it was a capital likeness of ourselves-verdant people always want sympathy. The green bottle was soon filled with the black mixture, and we again fired up. This time the stopper flew out and scattered agaiber up to the ceiling and into our faces, and Salt lost the powder up to the ceing and use of his eyes for sus. Wo bos to abandon what the teacher called inorganic chenistry for the present,
and try our hand at the manufacture of organic compounds, such as nicotine.
In this department we are happy to say that we met with eminent success, and had no difficulty in inducing neighboring boys to assist at the experiments. Our success in organic work gave us considerable courage, and we resolved to make another trial of oxygen. This time we made use of a small covered tin pail. It is hardly necessary to remark that the pail soon leaked, and an ugly semi fluid mass ran out on to the stove, and confirmed our previous notions about the bad smell of oxygen.
The firm then went in a body to wait on a traveling photographer who lived in a big van on the village green, and he generously sold us a broken retort for two dollars. Armed with this, we made another attack upon the manganese and chlorate, and this time had the satisfaction of seeing a few bubbles of air collect in a jar over the water. This we carefully treasured for future experiment, and then wound up that day's work with a little additional manufacture of nicotine.
The first holiday afternoon the small boys of the school were invited to witness experiments with oxygen. A piece of phosphorus was procured and lighted with a match, and plunged into the jar-result, a brilliant light, a puff of smoke, strong smell of phosphorus, a loud explosion, and a heavy invoice of broken glass.
This was as far as we got with the experimental illustraion of the properties of oxygen, and as soon as the smoke was cleared up, and the small boys had disappeared through the windows, it was resolved to settle up accounts and see how we stood previous to a dissociation of the association and a consequent liquidation of the firm.
The following is a copy of the balance sheet :
Acid, Rase, \& Salt in account with Chemistry :



Respecfully yours,
Acid, Base \& Sait.
P.S.-VVe are willing to part with our retort at half price
A., B. \& S.

Curions Associations Among Animals.
Messrs Edirons:-You willing, under the head of "Curious Associations of Animale," I will offer an instance or two. The first was of a young gray squirrel, captured to make a pet of, and brought home and put down on the ground near a house. In the twinkling of an eye an old cat emerged from under the floor, where she had young kittens, stole the pet, and returned under the floor, where there was no access; in fact,
from her looks and peculiar growl, no one thought it worth while to attempt the recovery of the squirrel. But the sur prise was some two weeks afterward, when on a fine sunny morning she brought out her little family to play, and lo one had a bushy tail. She was very partial to it in attention, allowing it to suckle when she would not her kittens. The following spring the same cat, with kittens as betore, had young rabbits given to her, and the kittens killed, unknown to her. On examination each morning there would be one less; on the fourth morning she was found devouring one, and she suckled them the same, and to all appearance thought as much of them as if they were her kittens, but ate them al up.

Cleveland, Tenn.
John Mitchell.
Cleveland, Tenn.

## scraped Surfaces.

Messrs. Editors:-I would like to have a few words to sa in regard to scraping as practiced in machine shops.
The subject has been opened in your columns. I would not have it stop just where it is, for the matter is very import ant to machinists generally.
Mr. Wm. P. Cowan knows something about scraping. His observations are correct in regard to valves ; it insures a good urface for valves to start with. Whoever has had much to do with steam engines is aware how important it is to have some joints iron and iron in absolute contact, to stay the wasting away of important parts.
I have practiced scraping more generally than I know of others doing $\checkmark r$ the last twenty years, and I have to say the practice will discontinue the use of fine-cut files used in finishing; to me it is painful to see a man wasting time in trying to finish a piece of work with a fine file worked with oil. I will do his work better with a scraper in one fourth the I time.
I know some experienced workmen will object to my statements, which I will prove true to any one who may test them. I scrape cast steel as well as other metals.
To make a good scraper, an extra piece of steel must be

used, as it will scratch; and it should bo very carefully forged, plated out very thin, and tempered as high as can be used without breaking.
The above sketch will show forms which can be used most generally. I never could use a three-cornered scraper, except on lead and the like.
I. E. Barber.

Norwich, Conn

## The Sun-flower as a Prophylactic.

Messrs. Editors :--I noticed an editorial in your paper ridiculing the idea of the sunflower having any influence in purifying malarious air, and you were no doubt right so far as regards the manner in which it was then supposed-by some ignorant philosopher cited-to act, namel
ing deleterious, and giving off healthful, gases
In the ScIentific American of May 21, page 335, you speak of the benefits of Professor Tyndall's discovery: that malaria may be strained out of the air we breatce, it being
nothing more or less than germs or sporules floating therein, which enter into our circulation, and either by growing into multiplied numbers clog up the pores of the system or act as direct poisons on the blood.
Now if you were living in a shanty on a Mississippi bottom, and wished to strain all the air coming to it from the swamps around, can you think of any more effectual device for that purpose than a thick grove of tall sunflowers planted on every side? The leaves of this plant are the "perfection of nature" as adapted to this purpose; large, on long petioles which allow them to wave in the breeze, thickly set on the stalk, covered on both sides with minute hairy hooks that catch every little impinging particle, and also viscid to the purpose what more perfect machine could be could hardly purpose desired? I think that a breeze could hardly ge having come in contact with the surfaces of the leave having come in contact with the surfaces of the leaves, Planted at the proper season, they attain their best growth for the purpose just at the time when malaria is most prevalent, and are of more certain growth in a rich malarious soil than any other cultivated plant within my knowledge. If this vegetable only produced fruit like the banana, it would be the glory of the middle zones.
Speaking of this matter reminds me that as a general rule hose household plants which have a reputation for being healthy " are all of this character-rough-leaved, like the
geranium, for instance, while the glabrous-leaved plants, like live-forever, are said to be unhealthy
This is not the first
This is not the first example in which the "old woman philosophy" has outstripped the advance of science, nor in which a strong popular faith, based on observation, has proved to be the forerunner of valuable discovery.
Memphis, Tenn.
Chas. Boynton.

## Curious Electric Phenomenon.

Messrs. Editors:-In No. 22 of the present volume of the Scientific American my attention was directed to a communication on a "Curious Electrical Phenomenon." I have observed, in testing the American oil feeders in an hydromete glass, as the oil dropped from the end of the feeder into the glass vessel below, that by rubbing the glass vessel on the outside with dry papers so as to produce friction, the oil will fly off at right angles, or in a horizontal line, from the point of the feeder direct to the inside of the glass vessel in small streams fine as the strands of a spider's web. I use this me thod to test the electrical condition of the atmosphere, and have noticed that if a thunder-storm is likely to occur through out the day or night, or if the weather is warm and humid, it will show that the electric condition of the atmosphere is deficient in the locality. If the experiment is made and it fails to act as above stated-showing that clouds draw the electricity in the direction of the storm or the winds that carry it-will this not account for the phenomenon produced by the running belt referred to?
By standing under a large belt which is running at a fast peed, a very singular sensation is produced-it makes the hair of one's head feel as if it were crawling, or about lifting person off his feet.
T. B. Wickersham.

Philadelphia, Pa.
Messrs. Editors:-In your issue of May 28th, I observed communication over the signature of Sereno S. Lukens, of a ery curious electrical phenomenon.
This same phenomenon came under my notice a few weeks since, and I observed that after a few moments the oil cease to flow from the can.
The explanation which first presented itself to me was that the air became rarefied about the oil can, consequently the air contained in the can, being at a greater pressure, forced the oil out.

I also observed that the hand held near the belt diminishes the flow of oil. The reason of this I assign to the breaking up of this vacuum by the hand coming in contact with the currents of air which produces this partial vacuum.
Hopkinton, Mass.
A. Gleason.

## First Artificial Fire.

Messrs. Editors:-An article on page 316, present volme, on " The First Artificial Fire," leads me to say that I have seen the experiment of producing fire from two sticks a success, the method being as follows: A bed piece an inch thick, notched in $\frac{1}{4}$ to $\frac{8}{8}$ of an inch on one edge, and the other piece a smooth, round stick, 12 or 15 inches long, from $\frac{1}{4}$ to $\frac{3}{8}$ of an inch in diameter. A drill hole above the notch is started $\frac{5}{s}$ of an inch indiameter. Adrin hol fall out of the notch.
so that the powder produced will
so that the powder produced will fall out of the notch.
In this experiment a knife blade was put under to catch the powder. The stick used as a drill was moved rapidly with powder. The stick used as a drill was moved rapidly with
the hands both ways, in the manner of a drill, commencing the hands both ways, in the manner of a drill, commencing
at the top until the pressure brought the hands to the bed at the top until the pressure brought the hands to the bed
piece, when they were shifted to the top again. The blackpiece, when they were shifted to the top again. The black-
ened, charred dust rolled out from the notch and smoked. ened, charred dust rolled out from the notch and smoked.
A few very light shavings were added, and with a light A few very light shavings
breath the thing was done.
In the tropics some kinds of wood are sharper grained than here, and as dry as perhaps can only be made here by baking. That it can be done I have seen, but those with tender hands had better not attempt it, for blisters will surely bo the result.
There is some experience needed after the dust is ignited. Dr. Collas or any other learned gentleman cannot argue way a fact.
A. G. Willey.

Murfreesboro, Tenn.
Wear of Front wheels on Locomotives.
Messrs. Editors:-In reply to the question "Why do the fore wheels of locomotives wear more than the hind ones?" I would suggest the constant jarring or thumping to which they are subjected. It is well known that the fore wheels of locomotives do not hug the track, but advance by a series of jumps, caused by the jerk of the piston rod at the commence ment of each stroke. This being communicated to the driv ing wheel seeks the point of least resistance, which is upward. With long and heary trains the jarring becomes a ource of great annoyance to engineers.
Jersey City, N. J.
F. P. DODGE.

## How to Kill Currant worms.

Messrs. Editors:-On page 332 of present volume of your paper appears a communication, signed J. H. P., giving a description of the currant worm, and his manner of destroying them, which requires considerable time and patience. If J. H. P. will try the following plan, I think he will throw away his tin pan, or use it for some other purpose. Keep watch of the bushes, and as soon as you find the eggs all hatched and the worms fairly at work, dust the bushes thoroughly when wet with dew or rain with powdered hellebore, using for the purpose a common flour dredging box or pepper box. That will be the end of that brood of worms. Should another brood appear in the course of the season, repeat the operation. It has been an infallible preventive with me for five years.
Rochester, N. Y.
A. G. B.

# a chapter on cockroaches. 

## $\overline{\text { tory r. gordon. }}$

'There is a tribe of very disagreeable little individuals of a class of insects belonging to the order Orthoptera, to which is given the appellation cockroaches. These abominable creatures abound in the West Indies. They are of the tribe called Blatta. Several species are found, the most common, however, being the Blatta gigantea, and B. Americana. The B. gigantea is termed by the natives, the drummer cockroach; and the $B$. Americana, the common cockroach. The former makes a most remarkable noise when excluded from light This noise is similar to that caused by a person rapping on any sonorous object with the fingers, hence its cognomen of drummer
The drummer is considerably larger than the common cockroach, it being about two inches, while the latter is only about an inch and a half in length. The former has a skin of a dusky brown color, sometimes inclining to an olive tinge, and the latter is of a chestnut color, inclining to red. The antennæ of the common cockroach are more delicately formcd than those of the drummer. Both of these species exclude themselves from the light when they can, and prefer the abode of man for the place of their habitation, hence which are not frequently removed. When roused they emit a very disagreeable odor, not unlike that arising from asafoctida. They are predaceous, and are very destructive, eating alinost anything that comes in their way-apparel, provender, all household articles that can be gnawed by their delicate mouths; and even men's fingers and toes do they nibble. Like most others, they have wings, which are mostly employed at night. They may be heard whizzing over one's head in their nocturnal gyrations, particularly during the rainy reasons, which seem to be propitious to their peregrinations.

The earth is not their element, for there are too many enemies to be met with there, principally in the poultry yard Woe betide the poor roach who setteth foot within the domains of Chanticlecr, he is not sooner there than he is gulped down by some greedy denizen of the hen coop.
Cockroaches increase very rapidly, and gather in such clus ters that they necessitate frequent cleaning of the habitations of mankind ; and it is a source of amusement to the native children at such times to get hold of some fowl, tie a string
to its foot by which to hold it, and set it to catch these insects.

Besides being offensive in their predaceousness, they are very objectionable on account of the filth which they deposit in their track. The cockroach brings forth its young by eggs, which it deposits all about. The eggs are inclosed in a horny case, which is gencrally placed within the angles of any regular-sided object. The case is attached by means of a sort of glutinous matter, which holds it so firmly that if an attempt be made to detach it, the case will be frequently broken befure it can be separated from the place where it is fastened.
One night I heard a peculiar grating noise in my bed room Desirous to ascertain the cause, I jumped up and struck a light when, to my disgust, I saw one of these creatures gnawing away at my sperm candle. He had actually climbed up the side of a highly polished china candlestick, and was as busy pin and a piece of pine board, I killed and pinned him to the board, laid him aside till next day, and took his portrait which I added to my collection of others I had taken.
I have occasionally heard strangers remark, when rising o a morning, that they could not think what was the matte with the tips of their fingers, they were so sore, little imagining that these greedy things were the sole cause, and being informed, they would hardly believe the assertion that the cockroaches had done the mischief.
Various means are adopted for destroying cockroaches, but there are none so effective as the broom, fire, and fowls for exterminating them.
The common house spider is great enemy to the roach, but it very often finds its match when it meets in combat with some tough-skinned Blatta Americana. Although the $B$ gigantea is so much larger than the former, it is not so form idable, as its skin is less hard, and therefore more liable to njury
I have often stood and watched a combat between a cock roach and a spider. Upon a certain occasion one of these flew right into the web of a huge spider. He watched it for a while, then advanced and placed a foot upon it. The roach immediately turned round and charged at him, turning him over ; but, by so doing, it became entangled in the spider's web, which the spider perceiving, made haste to take advan tage of the opportunity, and, springing upon the inverted roach, sank his fangs into its stomach. After having accom plished this feat, he bore it off to the center of the web, there to terminate its sufferings by sucking it to death.
Beneath a spider's web may frequently be seen the skin of some unfortunates who have perished in this way.
It would be thought that the formidable sting of the $A p i$ mellifica, or honey bee, would deter the cockroach from going into its hive, but by some means or other these bugs man age to gain admission to a place to which not many other in sects have entrance. Often, in cleaning my hives, have I dis-
covered these demon-like creatures secreted therein, although covered these demon-like creatures secreted therein, although
not in great numbers, for they would then be detected and not in great numbers, for they
expelled by the revengeful bees.
I suppose that the honey was the cause of their congrega ting in the hives. I did not much like these incursions on my bees, and being informed that corn meal saturated with laud anum placed where the roaches could eat it, would destroy
them. I tried it, but it was useless. To introduce a fowl to them. I tried it, but it was useless. To introduce a fowl to
the realms of the queon bee would be disastrous, so I had no the realms of the quen bee would be disastrous, so I had no
other alternative but to sweep them out and exterminate them.
It is impossible to keep cockroaches out of any piece of furniture, unless it be made very tight. Book cases, chiffonniers, escritoires are all infested. Even pianos are not free from their inroads. The backs of upright pianos are generally covered with a light quality of merino, or something of the kind, when purchased. They eat through this and enter the instrument, doing it considerable injury. I had recourse to insect powder, but found it useless, and after trying various dodges to put a stop to the incursions of these voracious things, I bought some wire gauze and placed it on the back of my piano, and likewise bencath the silk of the front; I also made a pedal box to prevent entrance through the apertures below the pedals.

The name of the drummer roach in the Creole patois is, Tucko-tusko, applied to it as characteristic of the noise which it makes. The common roach is termed, Cacka-lacka. Whence this term, I know not
The noise occasioned by the drummer cockroach is consid ered by persons wha incline to superstition, as token of the death of some acquaintance of those who happen to hear it, and it is held in almost the same awe as is the insect known in northern countries as the death watch-Atropos pulsatorius.
The cockroach has ascribed to it by the negroes, medicinal qualities ; and, indeed, if an asthmatic person should turn up his nose on finding one of these disgusting creatures in his cup of tea or coffee, he is very coolly informed by his servant who is standing awaiting his call that it will no harm, it is good for the asthma.
The Croton, or water bugs, which resort to American kit hens, bear a strong resemblance to a small roach called the Spanish cockroach in the West Indies. It is of the same size shape, and color. These are not so numerous as the Blatt Americana, nor are they so destructive

## For the Scientific American. <br> by Joun wise.

There are two ways of preparing linseed oil for balloon varnish. The quick and the slow process. The first is by heating the oil up to a temperature at which it will ignite pontaneously. In order to secure it from burning up it must be heated in an iron or copper vessel, with a lid that can be
closed when it begins to emit dense white vapor. If it is delosed when it begins to emit dense white vapor. If it is desired to have it fast drying, from four to six ounces of litharge
per gallon should be boiled in it. This process takes about per gallon should be boiled in it. This process takes about
one hour, and renders the oil thick and tough, giving a good bedy and glossy surface to the cloth.
The slow process is to boil the oil from twelve to twenty hours, keeping it at a temperature of about $200^{\circ}$ Fah., incor porating with it while boiling half an ounce of sulphate of manganese to each gallon of oll. These varnishes shou'd be applied to the cloth tolerably hot.
There are other formularies, such as the incorporation with the oil of some bird-lime, a gelatinous substance made from the inner bark of the white holly. Gum elastic is also used to give the oil body and elasticity. When I desire to make a balloon extraordinarily close, I give it a first coating of compound varnish, made of equal parts of white glue and gly erin.
I filled a balloon last October on the " Union Fair Ground," of Orrville, Ohio, with pure hydrogen, on Wednesday, and scended with it on Friday following, after it had stood rain and wind, and sailed over a hundred miles with it. This balloon was varnished with the slow process oil, over a first light dressing of glycerin and glue.
Coal gas, or tecbnically, carbureted hydrogen, does not exosmose from the balloon nearly so fast as pure hydrogen. By coating a balloon heavily with either of the above var ishes, it will retain its buoyarcy with a loss of about one pe 30,000 cubic feet. When larger, the exosmose is comparatively ess ; when smaller, comparatively greater, owing, of course to the disparity of cubic contents to surface.

## SCIENTIFIC PERIODICALS FOUND IN NEW YORK

 LIBRARIES.by h. carrington bolton
The following list of the principal scientific journals found in the libraries of this city was compiled for private use, but may prove of value to the readers of the Scientific Ameri an. It by no means pretends to be a complete catalogue of eriodicals in all our libraries, but comprises those most usefu or reference in the five libraries mentioncd, especially jour
als relating to chemistry, physics, technology, and natural nals rela
The abbreviations used are as follows
A.-Astor Library.
L.-Lyceum of Natural History.
M.-Mercantile Library
S.-Society Library.

SM.-School of Mines, Columbia College
When a letter is inclosed in brackets, the sets of journals in the library indicated are not complete. american and british.
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Annals and Magazine of Natural History (See Magazine
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London Journal of Arts and Sciences. 1820 Magazine of Natural History (See Annals idem). 1829-36....A Mechanics' Magazine. 1823-70......
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Bulletin de la Société Chimique de Paris. 1861-70................... [SM.]
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## Inventions Patented in England by Americang.

[Compiled from the "Journal of the Commissioners of Paten 1,032.-Means for binding Music, Pampiliets, etc.-A. M. Crowhurst 1,022.-MEnNs April 13, 1870
1.163.-Stoves or Furnaces.-M. C. Hull, New York city. April 21,
180.
$1,170 .-$ Mowinct and Reaping Machines. - R. Eickemeyer, Yonkers, N.Y.
aprii 22,1870 . 1,219.-Process for Cleaning Woot and Hatr.-C. F. A. Sin
Philadelphaa, Pa., and E. W. Cofln, Glendale, N. J. April 27,1870 . 1,266.-Apparatus for starting Treadle motions, applicable to Sewing Machings, mtc.-O. H. Needham and C. N. Brainerd, New York




Keables, Improved Sewing Machine.
Of all the labor-saving machines produced during the last half century, none has worked a greater revolution in the arts than the sewing machine. Its influence is directly or indirectly felt in almost every branch of the mechanic arts, and it has opened up new avenues for the employment of millions of operatives.
We never witness the operation of one of these useful little workers, without a feeling of admiration and pleasure, and we confess to a real delight in personally putting them through their various movements, and watching them as they rain stitches upon the texture they are designed to sew. It is, therefore, a pleasant task we perform in presenting to our readers an illustrated description of a new member of this now large family of labor savers. large family of labor savers. The machine under consideration single thread machine, its principal and most important feature being the looper hook, which is constructed in a novel manner.
The needle bar has a parallel vertical motion, imparted to it by a crank and slotted cross-head, the crank wheel shaft being driven by a gear and pinion. The feed mction is obtained by a small eccen tric on the crank wheel shaft connected with a rock-shaft underneath the table of the machine by a connecting rod.
The looper hook upon which the interest of the invention chiefly interest of the invention chiefly centers is shown in detail at the
left of the engraving, and also at left of the engraving, and also at
$A$, in the principal engraving, in which latter it is shown in conjunction with the point of the needle.
The swinging arm, $A$, in the detail which carries the hook, B, has a slot in which a part of the hook commonly rigidly connected to the arm, is pivoted at C , and a spring, D , is introduced between the end of the hook projecting rearward of the pivot and the bottom of the slot, to support the said rear end at slot, to support the said rear end at the requ pois in the true the point of the hook in the true position, and to yield and allow the working thread to draw the point upward, at the time the loop is escaping, and at the moment the point moves back to the needle to facilitate and insure the escape of the loop.
Any suitable stopmay be provided to prevent the spring from forcing the point of the hook down too low. The spring may be attached in a different way, for instance, it may be attached to the arm at the bottom of the slot, and connected to the hook at the front of the pivot, so as to draw it downward thereat, or a spiral spring may be substituted for it and placed either side of the pivot, in the one case forcing upward, and in the other pulling downward. The arrange ment first described is however preferred
It is claimed that the following advantages have been demonstrated for this form of construction by ample tests, and that those who have tried the machine are unanimous in their indorsement of the value of the improvement. We will add our own opinion, based on a personal trial of the machine, that the ad vantages claimed are secured. The hook being elastic it is less liable than others to break thread, allows the drawing up of the stitch more regularly and perfectly obviates the possiblity perfectly, obviates the possiblity
of catching the loop a second of catching the loop a second time, and therefore prevents tangling or leaving loose open loops on the under side of the seam. In a word it surmounts difficulties that have hitherto been considered insurmountable, and enables it to do perfect sewing with any kind of thread or any description of goods. It is easily managed and adjusted, running from one to many thicknesses of goods, or over any irregularity of seams or otherwise, perfectly without change of ten. sion.
 sion.

Patented, through the Scien tific American Patent Agency, May 17th, 1870, by Michae] Ash Keables, of Brattleboro', Vt. For further information ad dress Keables, Osborn \& Co., Guelph, Ontario county, Can
ada West.

Among some of the most interesting and practical inven-
tions we have of late been called upon to illustrate and describe are those pertaining to draft vehicles. We this week present still another, which we regard as combining the essentials of a good wheel in a high degree. It is light, strong, and graceful in appearance, while it also provides for convenient and constant lubrication, and the exclusion of dust from the journals of the axle.
The improved construction is confined principally to the central part of the wheel, and Fig. 1 is a perspective view of so much of a wheel as is necessary for purposes of description; Fig. 2 being a secional view of the same, and Fig. 3 a detail, showi
spokes.


KEABLES, OSBORN \& CO'S SEWING MACHINE. ppearance. The hub, A, is of metal, and has the form shown in Figs. known substance within the popular reach, isclear, white, and 1 and 2. The journal of the axle, B, Fig. 2, has two collars burns with perfect steadiness. In these regards nothing betformed at the part where it joins the body of the axle, and ter could be devised, especially when the tiame is properly the hub, A, has also a collar formed upon its inner end. A shaded, and the light cast only on the work. But the introclutch C, Figs. 1 and 2, clasps both the collar on the hub and duction of kerosene has brought in a history of fearful de one of the coilars on the axle, thus preventing the wheel from struction to life. Much of this has been due to most recklipping off An il nd and provied whe in place of what is harm

ADAMS' IMPROVED CARRIAGE WHEEL.
oiling. The spokes are inserted, as shown in Figs. 1 and 3, the tenons being shown at F, Fig. 3. The shoulders, G, are beveled, as shown, so that the spoke has two points of support where it meets the hub, and one at the bcttom of the mortise. They rest against each other at the botiom, as shown, and are supported latterly by radial projections, H, Figs. 1 and 2, which branch from the body of the hub, and which give great
lateral strength to the wheel when subjected to side strains. The hub can be made very light for light carriagos, and when plated or handsomely painted, is quite ornamental in

The invention is covered by two patents, obtained, through the Scientific American Patent Agency, by Levi Adams They are respectively dated February 18 and March 31, 1868. For further information address $\mathrm{J} \cdot$ Adams \& Sons, manufac turers of wagons, carts, and wheels, Amherst, Mass.

## Wanted--Better Mrtificial Lights.

Civilization, says the Christian Union, often brings in ne cessities, which art is backward in properly providing for. A good artificial light for commo use is still to be sought, the my riad advertisements of eurekas which promise to perfectly replace trary notwithstanding. A very lary notwithstanding. A ver. large share of ing, and writing, must be done af ter the sun has set, and the de mand, on sanitary grounds, is for a light that will be bright, that will not flicker, that will not emit nauseous odors, and, finally, that will not keep the nerves in a con tinual state of tension for fear there will be an explosion and a conflagration, to say nothing of the direful results when such an accident does happen. In brightness of indoor illumination we have greatly advanced on our forefath ers For cities, gas has ore piaced candles, whale ill, and oth piaced candles, whale oil, and oth er materials, whe to have but a sickly burning to our eyes, an more recently petroleum has bee joyfully welcomed as a blessing where gas is not available, and travels all over the world to chcer dark places with its unrivaled bril liance.
For a general lighting up of buildings coal gas has much to commend it ; for closer use, where the tyes are intently fixed upon any book or work, it is about as bad for these organs as anything that could be devised. The inevit that couid be devised. The inevit able flickering, except where it is used in a very expensive manner strains the nerves to the ruin of the eyes. As contrasted with gas for those who have to task thei eyes severely, kerosene is pre eminently superior. It has a. il luminating power beyond any less in this respect. People are so stupid or ignorant that the will fill burning lamps, or throw kerosene into the kitcl en fire. Perhaps the number of such is overrated. Kerosene is in use everywhere through our vast population.Every accident by it, from Maine to Texas, is telegraphed by the Associated Press, and, perhaps, if comparisons were made, it would be found that disasters through its careless use are not so out of proportion to disasters from many other articles in common use as would seem
For illumination and for the safety of the eyesight it is by far the best material within reach of the public ; and it. is worth a great deal of pains to learn how to use it with safety. The glass lamp needs care to prevent breakage when lit, though in most cases the flame will be harmlessly extinguished by a fall; on the other hand, a metal lamp is more likely to heat, and raise gases from

The student's lamp is very near the ideal, only it requires more careful cleaning than most domestics bestow, and should be generally under the immediate care of master or mistress Some gentlemen consider it a nuisance to have anything to do with a lamp, but we like to see such enthusiasm for a good fight as will lead a person to keep his lamp under his own charge, just as he does any other appurtenances of his study.

## Snentifir Ameriam,

# MUNN \& COMPANY, Editors and Proprietors. 

NO. 37 PARE ROW (PARK BUILDING), NEW YORK
o. D. MUNN. S. H. WALES, A. E. BEACE.


## To Advertisers,

The circulation of the SCIENTIFIC American is from 25,000 to 30,000
copies per week larger than any other journal of the same class in the copies per week larger than any other journal of the same class in the
world. Indeed, there are but few papers whose weekly circulation equals that of the Scientific American, which establishes the fact now generally in the country.

## THE METROPOLITAN MUSEUM OF ART

This institution was incorporated on the 13 th of April, 1870, and has now been fully organized according to law, and is ready to enter into active operations. The great difficulty the corporators encounter at the outset is to prepare a plan that can be accepted by unanimous consent, as thoroughly practical. We have had so many futile schemes proposed during the last twenty years that the public has grown suspicious, and no one is willing to give money until all objections on the score of practicability have been removed. The high character and powerful influence of the gentlemen who have thus far taken part in the movement are the best guar antee of the sincerity of motive and determination to succeed that the public could demand for the Metropolitan Museum
What we now want is a well devised scheme that will strike everybody as feasible, and at once elicit general sympathy and practical aid.
The officers consist of such men as John Taylor Johnson, Wm. Callen Bryant, John A. Dix, Robert Gordon, Wm. T. Blodgett, S. L. M. Barlow, Joseph H. Choate, John F. Ken sett, Robert Hoe, Jr., Samuei G. Ward, W. J. Hoppin, J. Q A. Ward, Geo. P. Putnam, C. E. Detmold, and other well known citizens.
In addition to the Art Museum we now hear of a somewhat analogous enterprise, called the American Exposition Company, with a capital on paper of $\$ 7,000,000$, and we must not lose sight of the Historizal Society, who have the great advantage of a site accorded to them in the Central Park by the Legislature. The American Institute, with its models, library, annual fairs, and interesting scientific meetings, also occupies some of the ground proposed to be covered by the occupies some of the ground proposed to be covered by the
Art Museum; and there is the Mechanics' Library AssociaArt Museum; and there is the Mechanics' Library Ass
tion, which ought not to be forgotten in this connection.

What we evidently want is a scheme that will unite all of these conflicting interests under one head, and thus insure the hearty co-operation of all who have thought upon the subject, and are earnestly engaged in the work.
The committee of the Metropolitan Museum of Art who have the matter in charge, will naturally refer to European models for illustration and for the suggestion of ideas; but after all, they must create something conforming to the wants of this country, and comprehensive enough to anticipate the great future that is before us. The new plan ought to be adapted to the genius of our institutions, and while it borrows from the past, it must not be unmindful of the pres ent, nor fail to look at the future.

Let us discuss a few of the most famous existing models, and then see how they can be altered to suit American ideas The Palace of Industry, in Paris, has many good features. I somprises a permanent exhibition of mechanical contrivances and at stated periods the building can be used for art collections. In the details of its management are many features that can be copied with advantage by us. In Turin the Ital ian Government has founded a grand technological collec tion upon a comprehensive and well digested plan, from which we can borrow some good ideas.
All over Germany are art collections, historical museums,
technological institutes, and schools for the training of pupils in all of the fine arts; and the field is very rich for any one who is in search of information. Lastly, we come to England where the Kensington Museum and the Crystal Palace stand out prominently as the creations of modern times, and nat urally appear to be within the reach of America.
Kensington Museum was first formed with special refer ence to ornamental manufactures and schools of design ; but
it has since been greatly expanded, and is now one of the it has since been greatly expanded, and is now one of the most interesting and instructive places in the world. On peculiar feature of that museum can be copied to some exten this country, and that inare worts of art that they world be willing to loan to a responsible corporation, as has been abundantly proved by their generosity on the occasion of charitable fairs in this city. Mang specimens they loaned would be apt to remain indefinitely, and they eventually become the property of the association. The question is, how can all of these models be worked up to suit our wants? It is not an easy problem to solve, and we can only approach the subject with such suggestions as occur to our minds without attempting to pronounce a final decision uponit.
It is doubtful if an art museum, pure and simple, can be maintained in the city of New York, while a place for the exhibition of machinery would be apt to fell into the hand of persons who had certain inventions to sell, and would thus become a large bazar.
If a School of Design be attached to the Museum, or school for any other kind of training, then we bring in othe elements and greatly add to the expense.
It would be very graceful, very beautiful, and very refined to keep the museum sacred from the touch of manufacture and trades, but in this conntry, and in times like the present nd in a country like ours, it it a question whether it is ex our cont and wise to follow European nations on this poin Our country is great in consequence of its commerce, its
manufactures, its inventions, its labor-saving and humaniz ing improvements in every department of society, and any plan that omits these things will lose the sympathy of the people, and be wanting in the distinguishing features of our civilization
We therefore suggest that the Metropolitan Museum of Art must show theory and practice combined to secure success. If there are architectural models and drawings in on tion of the buiding, there ought to be machinery used in construction. Designs for calico printing may well be flanked by the goods and the raw material, and the machinery to make them. Fine photographs suggest the camera, the chemicals, the laws of light, and diagrams explanatory of e whole operation. A section devoted to agriculture ma emade very-comprehensive, so as to include the works of rt that ought to adorn a country home, and thus afford an pportunity for the display of imagination. We could fur ther explain our idea by drawing numerous illustrations from all of the decorative and formative arts, but enough has been said to elucidate our meaning, and to offer some sug gestions to the committee who have the onerous duty of pre senting a comprehensive plan to the corporation. It is to be ooped that the scheme for a Metropolitan Museum of Art will not fall through, but that it will be pushed to a successfu termination.

## THE ORIGIN OF THE RELUCTANCE WITH WHICH MANKIND RECEIVE NEW IDEASAND INVENTIONS.

A correspondent who has met with disappointment and rouble in introducing a valuable invention, anxiously in uires why it is "that mechanics and even some scientific men oppose any new invention which differs from their ex-
periences and previous teachings, and which seems to show periences and previous teachings, and which seems to show that something can be a
This correspondent has been surprised to hear men who pretend to be mechanics and engineers condemn an invention without even becoming acquainted with its construction. He has heard people say that the results claimed were every way desirable, but fortunes had been expended in the pur suit of the same objects without success, and therefore they were impossible. He thinks this kind of proceeding very illogical and unjust, and wonders why men thus judge prematurely and without evidence upon subjects presented o their consideration.
We do not deem this a matter of surprise. That is only urprising which is unusual. The course pursued by the majority of mankind is precisely that of which our corre spondent complains, and this, whether they be mechanics, en gineers, theologians, lawyers, or so-called social reformers.
How often have theologians denied demonstrated facts imply because they feared that some remote-and at the time dimly conceived-conclusion possible to be derived from its admission, would sap the foundations of some favorite dogma, and, reasoning precisely as our correspondent de scribes, "It conflicts (or may be found to conflict) with ou belief, therefore it is impossible it should be true," hav ought to erect barriers against the advance of
How often has the medical profession committed the same in against reason. How frequently have political econo mists, legislators, and reformers manifested the same blind igotry.
Prejudice sways far more minds than reason, and this is why there is such an extensive market for ready-made opin. ion; why doctrines and creeds are put up in assorted
packages, like flower seeds, the selection being left to the salesman, who is supposed to know more about the matte than the purchaser.

The anticipation of temporary personal inconvenience redrom any innovation, prevents many from cordially mbracing improvements, which, adopted, would benefit the entire race. Every new improvement limits the application of old things, while it increases the market for labor in it department of industry. But the men accustomed to the old order of things find themselves compelled to suffer some convenience in learning the new routine, and they car Fittle for the general benefit, so long as they cannot see tha heir individual interests will be materially advanced. I hey cannot see this, they are indisposed to accept the tem porary inconvenience, no matter how much good may resul to others. This is profoundly selfish ; but, sad as is the ad o others. This is profoundly selfish ; but, sad as is the ad
mission, selfishness is a universal vice. "What's the odds so long as l'm happy," is oftener the rule of life than the sw ee ule of "Love thy neighbor as thyself."
Then again, the world is full of powerful vested interests hich universally revolt against all advances which do not trengthen their hold upon the consciences and opinions, and therefore the purses of mankind. Few of these organiza tions have much in common; so that what one supports the thers generally oppose. Thus opposition to advancemen all kinds, in all fields of science or art, is and must be the niversal rule until man himself has advanced far beyond is present moral standard.
The work of any man then who would benefit himself by the introduction of any improvernent must be a sharp war are. He must make up his mind to suffer misrepresenta tion, insidious attacks from unknown quarters, open ridicule, and perhaps attempts to defraud him of his just legal rights. This opposition cannot be met and combated by all men, an here are instances on record of such organized opposition as ven the stoutest would shrink to encounter; in which the liberty and even the lives of innovators have been jeopard zed or sacrificed. Thank God! it is not quite so bad as tha in our own land and time, but reports reach us that in England, whose boast is that every rative-born son is entitled to the protection of the Government, and which sends expen ve expeditions to barbarous lands to rescue a few citizen from confinement, even life is not at this moment secure to the man who dares even adopt an improvement, against the will of organized bands, sworn to oppose such improvement A correspondent of the Times writes

Rattening has recommenced at Sheffield, and at Manchester; a master builder has been dogged, watched, warned, so that he dared not sleep in his own house ; his coachman did not dare to drive him ; his premises have been set on fire, and ttempts made to blow them up with gunpowder because he fused to comply with some trade regulation-using ston at the quarry or brick made by machinery. Ever nglishman is taxed, if not otherwise outraged, by thes ade regulations, which cover the island like a net
This is a sad state of affairs to exist in a highly civilized land, and in the nineteenth century, but it shows that ou resent civilization is merely a crude experiment, and that un careful and well conducted experiment has been substituted for the belief that a large number of sections in our socia code have been permanently settled by divine edict, it is gregious folly to talk about such a thing as social science.

## NEW SUGAR REFINING PROCESS.

In the sugar house of Messrs. A. Sommier \& Co., of Paris, 200,000 pounds of raw sugar have for a year past been daily refined according to a process invented by Boivin and Loiseau The process is founded upon the use of a new body, the crate of the hydrocarbonate of lime, which the inveuto mploys for the purification of raw sugar instead of blood, one-black, etc. For the preparation of this compound milk of lime is made from the waste sweet liquors of the efinery, and enough sirup added to give the mixture 20 Baumé. This is well agitated and run through a cooler un til the temperature sinks to $68^{\circ}$ Fah. From the agitator the liquid flows into vats, where it is partially saturated with arbonic acid-the gas is passed through until the desired precipitate of sugar, lime, and carbonate of lime settles as a relatinpus mass. After the purifying agent has be n thus prepared, it is applied in the following manner
The raw sugar is dissolved in a cylindrical pan, similar to a vacuum pan, under diminished pressure. Revolving bucks ets carry it into receivers over the boilers, and from these it is permitted to flow into the boilers, where it comes in contact with the sucro-carbonate of lime previously introduced, in uantity proportional to the percentage of raw sugar. They enerally take about 650 gallons of the gelatinous sucro-car onate to $8,000 \mathrm{lbs}$. of sugar. Water is added if necessary the whole is boiled, and in this way the solution and clarifi ation are simultaneously accomplished. One great advan age of the operation is that when sirup is boiled in pres nce of lime, ammonia is evolved, all glucose is decomposed, nd anything likely to produce fermentation is destroyed.
The sirup from the boilers is filtered, the excess of lime separated by carbonic acid, and it is further concentrated and finished in the usual manner. The slimy residues and pre cipitates are squeezed out in filter presses until they contain no trace of sugar, and can be thrown away. The wash wate is used in the preparation of new material. The advantage of this new process are that it does away with the use of blood, which is offensiye, difficult to obtain, and the soluble constituents of which are finally concentrated in the mo asses
It also yields greatly improved products, which are brighte in color and better in grain. The third crystallization of thi process is better than the second in the old way. The ex pense is if anything less, certainly not more. The process has been patented in the United States.

## the question of city transit.

Having given the views of several prominent citizens upon this question in recent issues, which views we think fairly represent the various opinions prevailing upon the several projects lately urged as being each a solution of the question of rapid transit in the city of New York, we will add in brie our own opinion, and drop the present discussion of the sub ject.

First, in regard to the Pneumatic Tunnel, we would say that its projectors regard the question of the practicability of pneumatic propulsion as settled. If, however, they should be able to obtain a charter, and upon the completion of the work the pneumatic system should fail, as some predict, the main thing, an avenue for transit, the tunnel, will be secured, and it can be worked by lo

## found most desirable

We believe tunnels afford the most practicable means for effecting the desired object without interference with property, or obstructing the streets; and if the Pneumatic Railway Company have done nothing else, they are entitled to the gratitude of the public for demonstrating that such tunnels can be built and operated without even temporary inconvenience to surface travel.
We prefer that such tunnels should be constructed under other strects than Broadway, although, as Mr. Martin stated in our last issue, the business of upper Broadway will be, in our opinion, increased by a tunnel under it.
We do not regard with favor elevated railways of any kind. The Arcade plan is, we think, a wildly visionary scheme, one that never can and never will be carried to completion.
The tunnel system has more to support it than any other, and we have no doubt of its ultimate adoption. But wolen, is a question more easily asked than answered. So long as a question more easily anked so long will capitalists hesiBroadway remains unturnelea, so long wilo capitalists hesi-
tate about building parallel lines, liable to be subsequently tate about building paralle lines, liable to be subsequently
placed in competition with that more popular route. So placed in competition with that more popular route. So
either by some legislative enactment (which seems impossieither by some legislative enactment (which seems inpossi
ble) any tunnel under Broadway must be prohibited forever or it were best to grant some good company a charter to push such a tunnel to speedy completion.
While this state of hesitation prevails the city is suffering untold loss from the removal of its citizens to neighboring towns, and the patient public groans, and "grins and bears" a state of things, which disgraces the enterprise and liberality of the American metropolis.

## SOMETHING ABOUT HORSESHOES.

IIistory does not reach back to a period when the horse was not a companion and servant of mankind ; and in the carliest periods of which we have any reliable record, the ingenuity of men was taxed to invent trappings for the decoration, and armor for the protection of this noble animal, whose services in war are no less conspicuons than his patient labor in peaceful avocations is indispensable alike to civilized and barbarous races.
Precisely when the foot of the horse began to be protected by some form of shoe is unknown, but the necessity for it must have arisen with artificial roads, or when it was found necessary to employ the animal in traversing rocky wastes.
'The anatomy of the horse indicates that his natural haunts are broad and grassy plains, where his fleet foot may spurn the yielding turf without injury, and where an ample supply of his favorite forage may be found.
In this state he may now be found on the extensive tablelands of Texas, and the pampas of Mexico, where his feet need not the assistance of veterinary art.
The Greeks and Egyptians practiced horse-shoeing in a manner which, so far as can be ascertained, consisted of applying a kind of sock or sandal, fastened about the leg with straps, and shod with iron or other metal, for strength and extra wear. These were probably not generally employed,
but were used only in cases of disease or injury. It is highly but were used only in cases of disease or injury. It is highly probable that the primitive horseshoes were made of raw hide, stitched or laced upon the foot.
The ancient Britons do not seem to have known the art of horse-shocing. The first indications of this practice, so far as archæologists have been able to discover in England, belong to what is known as the Romano-British period. There is, therefore, little doubt that horseshoes were introduced into England by the Romans.
Specimens of these horseshoes, more or less preserved, have been uncarthed in various localities. They appear to lave been without toe-calks, but have heel-calks like our modern horseshocs. They have mostly three nail holes in cach brancl of the shoe, and instead of a groove in each brancl, like the shoos of the present day, have large oval
depressions for the heads of the nails. These depressions depressions for the heads of the nails. These depressions
were evidently stamped in while the iron was hot, which were evidently stamped in while the iron was hot, which operation spread the metal so as to form three distinct scallops
on each side of the shoe.
The Anglo Saxon horseshloe was in its earlier forms a cumbrous and ill-shaped affair, not comparable in regularity of form to the Roman shoe
loped like the Roman shoe.
loped like the Roman shoe.
tance by the Normans, and thas considered of the first impor tance ly the Normans, and those who excelled were employed in the royal establishment, and endowed with landed estates
and titles of honor. and titles of honor
The efflciency of the horse in battle and his usefulness in
times of peace, depending as they do in so great measure times of peace, depending as they do in so great measure
upon his being properly shod, justify the importance attached upon his being properly shod, justify the importance attached
to this art in medieval as well as modern times. The saying to this art in medieval as well as modern times. The saying
of "Poor Richard," "For want of a nail the shoe was lost; for want of a shoe the horse was lost ; for want of a horse the rider was lost;" has been verified in many a retreat, and
many a traveler has been exposed to imminent peril by the loss of a shoe from the foot of his horse.
That interest in the further improvement of the horseshoo is not yet extinct is proved by the fact that we have illus trated and described within the past year or two several improvements of this kind, and a glance through the records of the Patent Office will show that nearly every year brings forth something of this sort. It is within the last quarter of a century that the extensive manufacture of horseshoe by machinery has been originated and developed, and the article has been much cheapened thereby. Thus this ancien device has probably not yot reached a point beyond the scope
of inventive genius and skill, and the time may even come of inventive genius and skill, and the time may even come
when the manufacture of malleable cast iron may be so perwhen the manufacture of malleable cast iron may be so per
fected as to enable them to be cast at much less than their present cost, and of as grood quality as those now made of wrought iron by machinery.

## RECENT FOREIGN IMPROVEMENTS.

The removal of the dangers which attend the work of miners has given rise to many recent improvements in ventilating apparatus, safety lamps, etc. Among these we notice an English invention, in the application of which the gas is drawn off by fans, turbines, exhaust pumps, heat, or other taps, or drills holes in the wall, and connects pipes to the holes, and then exhausts the gas by means before mentioned. He taps known blowers with a large hole either in the solid or at the fracture, but prefers the solid, as there is more certainty in governing the escape, and when it is unsafe for the gas to enter the ordinary air courses he provides pipes, sewers, or passages to allow it to flow away to a safe place, or to be collected in chambers and then drained off in non working hours or otherwise, as convenient.
A firm in Bristol, England, have invented an improvement in fire-boxes for locomotives, whereby liquid hydrocarbons may be used as fuel. They construct a closed fire-box, or furnace, lined, by preference, with fire-brick or ganister, into which atmospheric air and liquid hydrocarbon are forced by a pump worked by the engine, for which purpose the hydro carbons may be made to issue from a small pipe situated cen
trally inside the air pipe, the air and hydrocarbon being made to pass into one or more perforated tubes in the bottom lining into the furnace, from the perforations of which tube, or tubes, they issue through corresponding perforations in the lining into the furnace, where they enter into combustion. or the air and hydrocarbon may be forced through separate
the lining into Or the air and hydrocarbon may be forced through separate
pipes and apertures into the furnace. In the furnace are arpipes and apertures into the furnace. In the furnace are arstices between them, into which the flames and hot gases resulting from the combustion rise, so as to heat the fire brick to a high degree, and thus produce a reservoir of
heat. A Vienna inventor has made a novel improvement in feed ing boilers which consists in forming the water nozzle of in jectors at that part immediately preceding and following the steam outlet with spiral grooves like the grooves of a rifle, but running out plain.
A curious English device is a wire packing for glands. The inventor constructs gland packing by coiling, rolling up, or $t$ wisting woven wire, such as wire gauze, upon a core, or
or otherwise, until the coil or roll becomes of such a diamete that when bent in the form of a ring and passed around a rod into the gland it will fill up the space between the two. The sheet of woven wire may be coiled, rolled, or twisted either by hand or machinery and either in the direction in which the wires in the sheet are or in an angular direction, or the wire may be at once woven into a coil, roll, or rope, either
in the form of rings of the required size or io lengths to be in the form of rings of the required size or in lengths to be
afterwards bent into the required form and size ; the fibers of the wire gauze acting against the rod intercepts a certain portion of the steam, which condensing, remains there, and in that condition serves to lubricate the rod in its reciprocatory or rotary motion.
An invention in pulley blocks made in Sheffield, England, is worthy of notice. The inventor makes use of the wellwheel, principle of the endless screw or worm and worm applicable to the purpose for which pulley blocks are ordinarily used, that is, for the purpose of moving or raising heavy weights; thus he makes by casting in malleable, or cast iron, or other metal, a worm wheel of the size required, and then
by cutting or casting makes a worm or endless screw to correspond with and work into such wheel. He then makes either in cast or malleable iron, or by forging, a frame which shall contain the hook from which the whole is to be suspended, and likewise the above worm and wheel, the worm being carried in suitable bearings, either in the top or bottom of the frame, and the axis of the worm wheel in bearings in the side cheeks thereof.
An English improvement in dock gates is the formation of the caisson or dock gate in such a manner as to be able to admit water through holes or through a valve or cock in the bottom or lower part of the caisson or dock. The upper part of the same above the water is made air-tight, so that as the
water is admitted the air in this upper part or chamber bewater is admitted the air in this upper part or chamber be-
comes compressed, or by opening a cock is allowed to escape. When it is desired to regulate the buoyancy of the caisson or gate, or empty it of water, the inventor closes this cock
and opens another, or he uses a three-way cock, which answers the purposes of the two cocks, which shall be connected by pipes or flexible hose to a chamber of compressed air, or an air pump, and by either of these means compresses
air into the space above the water, and thus drives or forces out the water through the holes, cock, or valve through
which it entered at the bottom, and thus regulates the depth of immersion of the dock gate or caisson in the wate or, if need be, drives out the whole of the water.

## scientific intelligence.

alumina salts from cryolite.
One hundred parts of finely pulverized cryolite are mixed with eighty-eight parts of quicklimo stirred up to a thin liquid, and the whole is brought to boiling by steam in wate tubs. As soon as the fluor-spar has settled, the clear lye is decanted and afterwards neatralized with commercial acetic acid, which operation will require about 236 parts of $6^{\circ} \mathrm{B}$. After this has become entirely clear, two thirds of the solution (about 807 parts by weight) are drawn off, and when evaporated will yield pure acetate of soda. With the remaining mass is now one atom soda and one atom alumina this is decomposed by one equivalent acetic acid and two equivalents sulphuric acid (46 parts of 1.83 specific gravity), and after thorough mixing the salt will form a soda alum and atter thorough mixing the salt will form a soda a
with the formula $\mathrm{NaO}, \mathrm{SO}_{3}+\mathrm{Al}_{2} \mathrm{O}_{3}, \mathrm{SO}_{3}+$ acetic acid.

## to bleach straw.

After soaking in water, boil in a soda solution not so strong as to attack the fiber and bleach by immersion in Javelle water (solution of chloride of potassa-"U. S. Dispensato ry)." Remove the smell of chloriue by sulpharous acid. The straw is sad
bleached.
rolling mill slag.
This often contains as much as 51 per cent of iron, which is usually wasted. It is proposed to pulverize it, mix it with quicklime, and slake it ; the silicic acid, it is thought, would combine with the lime and be liberated in this way, and the iron could be reduced in a furnace. The theory of the opera tion appears to be all right, and it only remains to prove it by experiment.
by-products of chloral.
It is less than a year since chloral was proposed as an annesthetic and hypnotic agent, and previous to that time a pound of it could not have been found in the world. Since its introduction in medicine, thousands of pounds of it lave been manufactured, and the attention of chemists has naturally been called to the incidental products. Some of these are of a purely scientific character, while others can be used in well established industries. Chloral is made by passing cllorine gas for many hours through absolute alcohol ; during the operation much hydrochloric acid is given off. This is such a cheap article that it is hardly worth saving, but there are certain ethers formed which can be converted into valuable certain ethers formed which can be converted into valuable
colors analogous to the much-prized aniline tints made from benzole. The rapid way in which scientific discoveries are now spread abroad is nowhere better illustrated than in the way in which chloral was introduced and everything relating to it made known. There is probably no part of the civilized world in which this valualle medicine cannot now be obtained.
detection of logwood color in wines by means of neutral acetate of copper.
J. Lapeyrere states that, while studying some of the properties of the coloring prince of og oolor withand that the hematine it contains yields a sky-blue color with salts of cop-
per. In order to apply this test to wines for detecting if per. In order to apply this test to wines for detecting if
they are doctored with logwood, it is only necessary to place they are doctored with logwood, it it only necessary to place
strips of good filtering paper, Swedish being preferred, into an aqueous solution of neutral acetate of copper, and, after drying, use one of these slips to test the wine suspected to be adulterated with logwood color, by dipping the paper into the wine ; and, on removing it from that fluid, care should be taken to cause the adhering drop of wine to flow backwards and forwards over the paper, which is next rapidly but carefully dried. If the wine be as it naturally ought to be, the color exhibited after drying will be gray or rose-red grayish ; but, if logwood is present, the tinge will be distinctly sky-blue.
artificial production of ice in india.
Dr. Janssen relates that, in many parts of the Indian Con. tinent, the natives dig shallow pits in such localities which are quite freely open to the sky and distant from trees. The pits are lincd with straw, and upon the straw are placed dishes (made of a very porous earthenware) filled with water. During the calm and clear nights prevailing during the period from November to the end of February, the water placed in the dishes freezes, yielding a solid cake of ice, while the temperature of the air is $+10^{\circ}$. Dr. Janssen has investigated this curious subject experimentally, and has found that the freezing is principally due to the radiation during the night; but the evaporation of the water, aided by the porosity of the earthenware employed, is not to be overlooked, at the same time.-Cosmos.

Tobaces and its Adulterations.
According to John C. Draper, who contributes an alle ar ticle, against the use of tobacco, to the Galaxy, for June, the adulteration of tobacco varies greatly with the character of the preparation. In that intended for chewing, it consists chiefly of molasses or common salt, rarely of leaves of other plants. In cigars and cut tobacco for smoking, it is by no means common, and consists usually of hay, paper, or leaves of the dock, rhubarb, cabbage, elm, and oak, all of which are, comparatively speaking, harmless. In snuff, on the contrary, adulteration is very common, and the substances used are, in many cases, exceedingly injurious, including such articles as chromate of lead, bichromate of potash, powdered glass, and different kinds of ochers or oxides of iron. The latter are nearly always found in the Scotch snuffs, and rarely occur in the Welsh and Irish.

According to Hassal, out of forty-three specimens, chromate of lead occurred in nine, nearly all of which were Scotch red lead or oxide of lead in three; and bichromate of potash, which is very poisonous, in three, two of which were Scotch. The presence of the lead compounds mentioned has not unfrequently produced lead palsy in those who have used them, and it is of interest to the snuffing tobaccophagoi to note that these poisonous adulterations occur more frequently in Scotch snuffs
The substances that give its active properties to tobacco are nicotine and nicotianine. The first is a colorless liquid alkaloid, soluble in water, ether, alcohol, and many oils, and possessing an offensive odor and an acrid, burning taste. It is a very dangerous poison, being almost as energetic as prussic acid, and destroying lite in equally small doses, single drop sufficing in the experiments of Dr. Taylor to kil a rabbit in three minutes and a half. In the well known case of the Count and Countess Bocarmé, this poison was administered by force to the brother of the Countess while dining with them a.t their château. In this instance death occurred in less than five minutes; and though attempts were made to remove the odor and traces of the poison, by pouring strong acetic acid or vinegar down the throat of the victim, and on his person, the possession of the poison and the circumstan tial evidence indicated the guilt of the Count so strongly that he was exccuted for murder.
The proportion of nicotine in 100 parts of different kinds of tobacco dried at $212^{\circ}$ Fah. is as follows
部
Nicotianine is a concrete volatile oil, sometimes spoken of as tobacco camphor. It is obtained by the distillation of the leaves, six pounds yielding about eleven grains of the oil. It has a bitter taste and the odor of tobacco, and produces the same effect on the tongue and throat as tobacco smoke. It is almost as deadly when applied externally as nicotine is when taken internally, its action being nowhere better describ.od than in "Hamlet" when the ghost tells of the

## uice of cursed hebanon,

## The leprous distilment, whose effect

Holds such an enmity with blood of man,
That, swift as quicksilver, it courses throngl
The natural gate and alleys of the body,
And with a sudden vigor it doth posset
And curd, like eager droppings i
The thin and wholesome blood.
Landerer states that this oil does not exist in the fresh leaves, and Pereira remarks that it is probably formed by the action of the air in the process of drying. There is but little satisfaction to be drawn by the tobaccophagoi from these statements, even if they are admitted to be true, since the plant is invariably dried before it is used, and must therefore always contain the oil.
Tobacco smoke being the most common form under whic the system is exposed to the action of this plant, it is neces sary that we should examine into its composition. The re sults of many analyses show that while the alkaloid disap pears almost entirely in the smoke, the oil is increased; i therefore follows that in chewing, the effects will be chiefly those produced by nicotine, while in smoking nicotianine will be the more active ingredient. In addition to the oil, it has been recently stated that prussic or hydrocyanic acid exists to an appreciable extent in tobacco smoke. This is a possible but probably exceptional product, its presence being depend ent upon some peculiarity in the manner of combustion

## Poisonous Cosmetics.

[Condensed from the American supplement of the Chemical News].
In December last Dr. Lewis A. Sayre inclosed to Dr. Harris Sanitary Superintendent of the Metropolitan District, a pam phlet in which he described three cases of lead palsy produced by Laird's Bloom of Youth. 'This communication was laid be fore the Board of Health, together with notes from Dr. Har ris and Sanitary Inspector Dr. Janes, in which attention was called to the great variety and large quantities of poisonou hair dyes, commonly called hair restoratives, etc., consisting essentially of acetate of lead, and enamels consisting of car bonate of lead, which were sold in the Metropolitan Dis trict.

The Board at once directed the chemist, Dr. C. F. Chandler to investigate the subject, and his report, which is here pre sented, fully confirms the opinions of the physicians. It was found, however, in the course of the investigation, that Laird's Bloom of Youth, the original cause of the investiga tion, no longer consisted of carbonate of lead, but was com posed of oxide of zinc. As soon as this was established by the report, the proprietor, who had admitted to the writer that his preparation had formerly consisted of a lead com pound, complained with an air of injured innocence that the Board of Health had inflicted a great worong upon him, had almost ruined his business. Articles have been inserted in the daily papers, in the interest of the Bloom of Youth, which reflect upon the chemist to the Board, as though he had wan tonly, or by mistake, attacked an innocent citizen, and inter fered with an honest business. We hold that inasmuch as the Bloom of Youth has been for years composed of carbonate of lead, and we know this of our own knowledge, as a bottl was purchased about two years ago, at a drug store on Broadway, and tested at the School of Mines, when this omposition, and as, according to Dr. Sayre and Dr. Ham mond, this preparation had produced lead palsy, the proprie tor of the article has no just claim for sympathy, even though he has finally, after so much harm has been done, changed its poisonous character.
In response to the resolution of the Board, directing " the chemist to examine the various hair tonics, washes, cosmetic
and other toilet preparations in general use, and report what ingredients, if any, they contain of a character injurious or
dangerous to those who use them," examined and reported upon various hair tonics, washes, and restoratives; lotions fo the skin; enamels ; white powders for the skin.
Sixteen were examined, and, with but one exception, all were found to contain lead, generally in the form of acetate or sugar of lead, which metal seems indeed to be the essential constituent in most cases. Most of the sediments observed in the bottles, and which require that the bottle "be well shaken," etc., consist of sulphur, which is intended shall ulti mately unite with the lead, to produce the dark-colored sul phide of lead, or, as one of the manufacturers has it, " the or ginal youthful beauty and color." The following tabular atement shows how the poisonous hair nostrums compar mong themselves
grains of lead in one fluid ounce.
. Clark's Distilled Restorative for the Hair
Chevalier's Life for the Hair.
3. Circassian Hair Rejuvenator.

## 4. Ayer's Hair Vigor...............

5. Prof. Wood's Hair Restorative.................
6. Gray's Celebrated Hair Restorative
7. Phalon's Vitalia.

Mrs. S. A. Allen's W World's Hair Restorer
L. Knittel's Indian Hair 'Tonique

Hall's Vegetable Sicilian Hair R
13. Dr. 'Tebbett's Physiological Hair Regenerato 15. Singer's Hair Testorative Restorative

With the exception of Perry's Moth and Frect...16.39 otions for the skin were found entirely free from lead or ther injurious metals.
Seven enamels for the skin consist of white powders sus pended in clear liquids; on standing the powders subside but agitation quickly incorporates them with the liquids again. The following contain lead, mostly, if not entirely in the form of carbonate ; they are therefore simply " white lead " ground in water.
grains of lead in one fluid ounce, after shaking.
Fugenie's Favorite $.108 \cdot 94$ grains Phalon's Snow-White Enamel .146 .28
.190 .99
white Oriental Cream
Seven white powders consist of carbonate of lime, carbo nate of magnesia, clay, or "French chalk," either singly or mixed. Nothing injurious was detected in any one of them It appears therefore that the hair tonics, washes, and re-
storatives contain lead in considerable quantities ; that they storatives contain lead in considerable quantities ; that they
owe their action to this metal, and that they are consequently highly dangerous to the health of persons using them.
Tkat with a single exception, Perry's Moth and Freckle Lotion, which contains corrosive sublimate, the lotions for the skin are free from lead and other injurious metals.
That the enamels are composed of either carbonate of lime, oxide of zinc, or carbonate of lead, suspended in water. The first two classes of enamels are comparatively harmless, as harmless as any other white dirt when plastered over the skin to cluse the pores and prevent its healthy action. On the other hand, the enamels composed of carbonate of lead re highly dangerous, and their use is very certain to pro duce disastrous results to those who patronize them.
The white powders for the skin are harmless, except in so far as their application may interfere with the healthy action of the skin.

## A Huge Mastodon.

A correspondent informs us that a huge mastodon has been found four miles from Tecumseh, Mich., on the farm of Mr Wells Goheen. The tusks were exhumed first, but like some of the bones, were too much decayed to be kept whole; but he forms were perfect in the clay, so that the size and shape were taken perfectly
The tusks are ten feet long, besides two or more feet that entered the skull, which was detached. Their diameter at base was $9 \frac{1}{2}$ inches, sections of skull are 2 inches thick, a sec ion of the vertebræ measured 18 by 10 inches, but a portion was decayed and crumbled off, so that a full measurement ould not be had, but it was originally 24 inches across. One tooth measures 8 by 4 l inches, and weighs 6 pounds. The thigh bones are 3 feet, 10 inches long, $11 \frac{1}{2}$ inches wide at the
upper, and 10 inches at the lower end. Ribs 6 feet in length. upper, and 10 inches at the lower end. Ribs 6 feet in length.
A tooth, all perfect, in a section of the lower jaw, was found tooth, all perfect, The circumference of the tree was five feet. Tibia, 2 feet, 6 inches long; the bones are much scat tered, only about half are yet found, but Dr. E. Hause, who has the matter in charge, is determined to get all that he can of the monster and send it to the Siate University of Ann Arbor, Mich.
It is supposed by some scientific men that, as the ground around where the bones were found ascends or rises 1 foot to the hundred with soil heavy, and with $2 . \frac{1}{2}$ feet of clay and muck over the bones, that the animal died two thousand years ago. As the bones are much broken, they evidently lay ncovered many years.
By the bones found our correspondent judges the mastodon to have been very large, perhaps the largest yet found. The length 30 feet, hight from 13 to 15 feet, and very old, as some of the five teeth found are much worn. A portion of one task is 4 feet long; the balance (one or two bushels) is in small pieces.
Says Max Müller " for the discovery of truth there is noth ing so useful as the study of errors, and we know that in al chemy there lay the seed of chemistry, and that astrology was more or less a yearning and groping after the true science of astronomy.

## GEORGIA STATE FAIR

We are indebted to Messrs. Glenn, Wright \& Co., Commis ion Merchants and Manufacturers of Agricultural Machinery at Atlanta, Georgia, for the premium list of the State Agri cultural Society of Georgia, with regulations, special notices, tc. The fair will commence October 19, and close Octobe 6 , of the present year. A fine list of premiums is offered in he department of Mechanics' and Farming Implements, as also in Chemical Manufactures and Minerals. Competition is estricted on some articles to Georgia, but on most it is open to all the States. Those desiring to avail themselves of thi pportunity to introduce improvements adapted to Southern griculture, would do well to communicate with the Assist ant Secretary, Thomas C. Howard of Atlanta, Ga.
The manufacturers of machines, implements, instruments, tools, etc., are requested to send their latest published illus trated catalogues and price lists. The Secretary requests the contribution of specimens of their machines, etc., for preser vation and permanent exhibition in the Museum, upon such terms as to expense of thus advertising for the manufacturers as may be agreed upon with the Secretary. The arrange ment of the office and museum will be designed for the exhibition and advertisement to the best advantage of all articles thus intrusted to it. The Secretary will send on order to the manufacturers for all articles sold by this means of ad vertisement without commission charged either to the manufacturer or the purchaser. The intention being to mako the office and museum a convenience to the members of the S 0 ciety in making examination and purchase of all articles sub mitted to it.

## A PNEUMATIC TUBE FOUR HUNDRED MILES LONG

Under this heading a statement is going the rounds of the Uwspapers, purporting to come from a correspondent of the Boston Transcript, relative to a pneumatic tube, said to extend rom Glasgow to London, the operation of which was witnesse by the correspondent. He says:-"I inquired if I might see a message sent. 'Oh yes, come round here.' He slipped a number of messages into the pasteboard scroll, popped it int he tube and made a signal. I put my ear to the tube, and heard a slight rumbling noise for seventeen seconds, when a bell rang beside me, indicating that the scroll had arrived at he General Postoffice, four hundred miles off! It almost took y breath away to think of it.
We are sorry to be obliged to take the breath out of this tory, which seems to be very popular, and everybody wishes t were true.
But, in the first place, there is no pneumatic tube between Glasgow and London. Second, if there were one it would be mpossible, by any known means, to cause air to pass through t, at anything like the velocity above stated. Four hundred miles in seventeen seconds, is at the rate of over eighty-four housand miles an hour. This is a hundred and forty times aster than a cannon ball, which flies 600 miles per hour.

## vational exhibition of the argentine republic

We are in receipt from Mr. Henry I. Zimmermann, one of he directors of the National Exhibition, to be held at the city of Cordova, Argentine Republic, commencing on the 15th o October next-of several copies of the regulations and in structions for foreign exhibitors.
It is hoped that United States manufacturers will be wel represented, as there is a probability that from European states there will be a considerable display.
Mr. Zimmermann suggests that all kinds of agricultural nstruments of the most improved patterns, as also brick ma chines, locomotive engines, fire engines, enameled slate manels, etc., be sent
Mr. Evans, C. E., Exchange Buildings, New York, who has had much experience in locomotives on the west coast, will be able to furnish any information required respecting the lass of engines most suited for the country.
Further information may be obtained Edward F. Davison, Argentine Consul, New York.

## REDUCTION OF THE PUBLIC DEBT.

The report comes from headquarters that during the month May the public debt of the United States was reduced fourteen million dollars. The Secretary of the Treasury eems determinrd to expend if not exhaust the energics of he country in the payment of the debt. On general princi ples we doubt the wisdom of this policy, and its justice is, to say the least, very questionable. The present generation has already borne its share of the great burden imposed by the recent war. Some regard ought to be shown to the interests of the people at the present time, and a portion of the burden transmitted to posterity.

The Industrial Classes of the United States have been the subject of a long and interesting report by Mr. Francis Clare Ford, Secretary of the English Legation, at Washington This report was made in pursuance of a circular addressed by Lord Clarendon, in April, 1869, to the diplomatic and consula genis of Great Britain, instructing them to report upon the condition of the industrial classes in the countries to which hey were accredited. Mr. Ford says that the American sys tem of common school education has elevated the condition of the native-born working man, and has disposed him to prefer occupations in which the exercise of the brain is in greater demand than those of the elbow, and asserts that the steady influx of immigrants for the last twenty years ha created a disinclination on the part of American workmen to engage in the rough toil of purely muscular labor which the newly-arrived foreigner is ready to exert for his support.

## PATENT OFFICE AFFAIRS.

The business of the Patent Office is now in a flourishing condition, and the present is a favorable time to enter applications. Inventors will find the Scientific American Patent Agency ready to attend to the prosecution of claims with the greatest dispatch. By reference to our register, we find that we have made upwards of twenty-four thousand prelim inary examinations into the novelty of alleged new inventions. This great experience, together with the fact that a large proportion of all the business with the Patent Office, for the past twenty years, has been conducted through this Agency, suggests to inventors the surest and best means to secure their rights.
We give opinions free, and all we require is a rough sketch and description of the invention.
Inventions patented through this Agency receive notice in the Scientific American.
Models.-In order to apply for a patent the law requires that a model shall be furnished, not over a foot in any of its dimensions, neatly and substantially made. Send the model by express, prepaid, addressed to Munn \& Co., 37 Park RowNew York, together with a description of the operation and merits of the invention.
Caveats.-Whenever an inventor is engaged in working out a new improvement, and is fearful that some other party may anticipate him in applying for a patent, it is desirable, under such circumstances, to file a caveat, which is good for one year, and, during that time, will operate to prevent the issue of a patent to other parties for the same invention. The nature of a caveat is fully explained in our pamphlet, which we mail free of charge.
European Patents.-Probably three-fourths of all the patents taken by American citizens in Europe have been secured through the Scientific American Patent Agency. Inventors should be careful to put their cases in the hands of responsible agents, as in England, for example, the first introducer can take the patent, and the rightful inventor has no remedy. We have recently issued a new edition of our Synopsis of European Patent Laws.
All communications and inquiries addressed to Munn \& Co., respecting patent business, are considered as strictly confidential.

## A Shower of Shell-Fish.

Our authority for the following account is a recent number of the American Naturalist. Mr. John Ford exhibited to the Conchological Section, Academy of Natural Sciences, Philadelphia specimens of Gemma gemma, remarkable as having fallen, accompanied by rain, in a storm which occurred at Chester, Pennsylvania, on the afternoon of June 6, 1869. The specimens were perfect, but very minute, measuring one eighth inch in length by three-sixteenths of an inch in breadth. Though most of the specimens which fell were broken, yet
many perfect ones were collected in various places, sheltered many perfect ones were collected in various places, sheltered
from the heavy. rain which followed their descent. A witness of the storm, Mr. Y. S. Walter, editor of the Delaware County Republican, assured Mr. F. that he noticed the singular character of the storm at its very commencement, and, to use his
own words, "it seemed like a storm within a storm." A very fine rain fell rapidly, veiled by the shells, which fell slower and with a whirling motion. Judging from the remains of animal matter attached to some of the specimens, together with the fresh appearance of the epidermis, it is highly probthat many of them were living at the moment of transition. This minute species resembles a quahaug shell, and is common on the seashore between tide marks.

The imperial printing office at Constantinople is becoming an important institution. The "Arabian Nights" can now be printed amidst the scenes they describe. What genii ever accomplished more? At this office sixteen steam printing presses are now employed, besides several excellent lithographic presses, and a correspondingly large staff of compos-
itors. In addition to the official paper, the Takvimi Vaki, and all the government work, it prints a number of commentaries on the Koran and other religious publications, as also general job work for the public. It has recently published two works of special interest, the Arab text of "Abulfeda's History of the Caliphs."

A NUGGET of pure copper, weighing 117 pounds, was discovered in an Iowa field the other day. It had been kicked about for years, under the supposition that it was a stone. Finally, the tooth of a harrow scraped against it, making a bright streak, which revealed its true nature. It is pure metal without the least alloy, stone, or quartz. The locality where discovered is in Cedar township, Monroe county, and hopes are entertained that extensive deposits may underlie the whole region.

Steel needles first came into England from Spain and Germany. They were first manufactured in London by a German, in 1565.

Violins were invented in 1477, and introduced into England by Charles II.

The Universal Wringer-It gives us pleasure to call special attentio the "Universal Cothes Wringer." We have had it fairly tested, and are therefore, able to speak of it with confidence, as an article of real and sub
stantial merit, which only needs to be known to become what its name imports, "Universal," in its use, and in the approval with which it shall be re ceived.-[New York Christian Advocate.

## Facts for the Ladies.

On the 14th of February, 1854, , my husband made me a present of a Wheeler
Wilson Sewing Machine. Eior nearly fifteen years it has done its wor Wilson Sewing Machine. Lior nearly fifteen years it has done its work (hundreds, yes, thousands of dollars' worth), and is this day as perfect sewer as when I first got it. It has never been the least out of repair. Dur-
ing the war I kept one needle in constant use, and I have more than half the original dozen of needles given with the machine on its purchase.

## Wusints and qersmal

## exceed Four Lines. One Dollar and a Half per line will be charged.

The paper that meets the eye of manufacturers throughout the为 Situation Wanted, by a sober, steady man, in a Petroleum Oil Refinery. Understands repairing and keeping machinery in good work-
ing order. Address A. Hall, P. O., Williamsburgh, L. I.
For Sale Cheap-1 set Hamilton's Patent Muley Hangings address Morrison \& Harms, No. 386 River ave. Allegheny City, Pa.
For Fourneyron and Jonval Turbine Water Wheels, Mill-work, Shafting, Pulleys and Hangers, apply to J. Cornell \& Co., Sandy Hill, N.Y For the best Upright Saw Mill, in the world, address Morrison Harms No. 389,
Everybody who uses the Broughton Oil Cups speak of them very highly. They are manufactured only by H. Moore, 41 Center st.,N.Y. A valuable patent for cutting files. A Machine in operation. and catalogue. Goodnow \& Wightman, 23 Cornhill, send
Rawhide Carriage Washers are cheaper than leather, and run with less noise than any other. Darrow Manufacturing Co., Bristol,Conn. Manufacturers of Galvanized Wrought Iron Pipe, and of Rub ber Hose, send price lists to A. P. Smith, Rock Falls, Ill.
Parties wishing to manufacture a good article, which will find ready sale, at good profit. should address N. Evinger, Sai:dford, Ind. See advertisement on an other page.
Scientific American.—Back Nos., Vols., and Sets for sale. Address Theo. Tusch, City Agent, ${ }^{7 \%}$ Park Row, New York.
Owners of Patents address circulars to Robinson \& Beard Kaufman, Texas.
$\$ 100$ a day can be made by selling Lloyd's new dollar double maps of Ameriea and Europe. See advertisemet on last page.
Pictures tor the Sitting Room.-Prang's latest Chromos," Flowers of Hope," and "Flowers of Memory." Sold in all Art and Book Stores throughout the world.
Tempered Steel Spiral Springs for machinists and manufacturess. John Chatillon, 91 and 93 Cliff st., New York.
Shop, Town, County, or State Rights for sale, for Patent Coal Scutule. For circter
Philadelphia, Pa.
Galvanized iron ventilating skylights, straight and curved extension lights,conservatories,etc.,under patentsdated 1869-70,are approved pools of all kinds, and spiral shade tassel molds made by H . H. Frary, Jonesville, Vt.

Dickinson's Patent Shaped Carbon Points and adjustable holder for dressing emery wheels, grindstones, etc. See Sci
can, July 24 th, and Nov. 20, 1869. 64 Nassau st., New York.
Peck's patent drop press. Milo Peck \& Co., New Haven, Ct.
L. L. Smith, 6 Howard st., N. Y., Nickel Plater. First Premi um a warded at the late Fair of the American
by the United Co.,17 Warren st., New York.
One 60 -Horse Locomotive Boiler, used 5 mos., $\$ 1,200$. Ma chinery from two 500 -tun propellers, and two Ma
Wm . D. Andrews \& Bro..414 Water st., New York.
Kidder's Pastilles.-A sure reliet for Asthma. Price 40 cents by mail. Stowell \& Co., Charlestown, Mass.
Pat. paper for buildings, inside \& out, C. J. Fay, Camden, N. IT Stiff, heavy, powerful lathes, planers, shapers, slotters, and radial drills, in stock. E. \& A. Betts, Wilmington, De1.
Second-hand donkey pumps, 12, 25, and $35-\mathrm{H}$. engines, leathe hose, old style blowers, co
414 Water st., New York.
Steel Makers' Materials-Wolfram ore, oxide manganese Speigel iron, borax, titanium, chrome, lubricating black lead, for sale be
L. \& J. W. Feuchtwanger, 55 Cedar st.,New York.

An experienced mechanical and railway engineer wishes a po sition as Master of Machinery, or M
" $G$," Philadelphia, Pa., Postofice.
For solid wrought-iron beams, etc., see advertisement. Addresp Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.
Keuffel \& Esser, 71 Nassau st.,N.Y.,the best place to get 1st-class Drawing Materials, Swiss Instruments, and Rubber Triangles and Curves For tinmans' tools, presses, etc., apply to Mays \& Bliss, Brooklyn, N. Y
tlynn's Anti-Incrustator for Steam Boiler-The only reliable preventative. No foaming, and does not attack metals of boiler. Liberal terms to Agents. C. D. Fredricks, 587 Broadway, New York.
To ascertain where there will be a demand for new machinery or manufacturers'supplies read Boston Commercial Bulletin's manufacturing news of the United States. Terms $\$ 400$ a year.
Cold Rolled—Shafting,piston rods,pump rods,Collins pat.double compression couplings,,manufactured by Jones \& Laughlins,Pittsburgh,Pa For mining, wrecking, pumping, drainage, and irrigating machinery, see advertisement or Andrells Dryer dries Brick, Fire Brick, Tile, Peat, Whiting, etc., as fast as made. J. K. Caldwell \& Co., Philadelphia.
Winans' boiler powder, 11 Wall st., N. Y., removes Incrusta tions without injury or foaming; 12 years in use. Beware of Imitations.

## guturrs to Cortefumdents.



All reference to back numbersshould be by volume and page.
T. K. P., of Mass.-A steel horseshoe magnet may be charged by drawing the poles of another magnet from the poles of the first mag
net to the bend, first connecting the poles of the magnet to be charge by its keeper or armature. Or place the poles of the magnet to b charged in contact with one already charged, laying both on a flat sur face, and draw a bar of soft iron from the poles of the magnet to be
charged toward the bend, keeping the barin contact with both legs of charged toward the bend, keeping the barin contact with both legs of the magnet, and repeating the process several times, after which turn
over the magnet and perform the same operation on the other side. The latter process makes the strongest magnet. There are several other way besides those described.
T. F.S., of N. Y.-The horse power of boilers depends upon the proportion of grate to heating surface, upon the heating surface, and the efficiency of draft. Assuming all these to be correctly proportioned, it is common to estimate 10 square fect of heating surface as being equal to the development of a horse power in land boilers. But when steam is used expansively, in the best engines this estimate will be found too
large in a well constructed boiler. You will see that you have given no data whereby the horse power of your boiler can be estimated.
c. B., of Tenn.-We think an ice machine of the construction you propose might work, but how economically is a question which experi Please state it more specifically. We think iron and steel might be mad in the manner proposed, but there are no doubt practical difficultic which would need to be surmounted, and which only an experiment on a full scan determin
0. C., of Tenn.-Whether it will injure a steam boiler to let water stand in it a month when not in use, depends upon the character of
the water. More or less rusting would take place with most kinds of water used in boilers. Your second query cannot be answered from the
data given. S. H., of N. Y.-The substance which collects about the man hole of your boiler is scale of carbonate of lime with organic matter.
The substance collected from the wall appears to be nitrate of soda. Its The substance collected from the wall appears to be nis.
exact composition can only be determined by analysis.
S. G., of N. Y.-A letter addressed to P. M. Parsons, in care of the editor of Engineering, London, England, will probably secure an further information you
H. M. C., of Cal.-The table referred to is probably founded upon the law of falling bodies as mentioned in Bourne's Handbook of the See Silliman's Physics, page 481.
G. E., of Stuttgart.-It is not uncommon in this country to raise and move brick houses of even larger dimensions than the one you ame, the occupants mean while remaining in the building, and attendin
. M. H., of N. Y.-It we understand your query and diagram there would be more power obtained by exposing the sides of the col-
lapsing cylinder as well as the piston, than by simply submitting the piston to pressure.
E. P. W., of Me.-Apothecaries generally use a paste made of gum tragacanth diosolved in water. Book-binders make
made of gum dextrine (British gum) dissolved in water
J. F. K., of Pa.-You should send to some book store and pro cure a work on taxidermy, which will furnish you the information you desire.
C. C. B., of Pa.-The mineral you send is sulphuret of iron, of

## Gecrat Amerian and farcigy equtents.

Under this heading we shall publish weekly notes of some of the more prom
inent home and foreign patents. inent home and foreign patent

Dredge.-Andrew M. Hansen, Stockton, Cal.-The invention consists in cutting plates, placed at the ends of a revolving drum or chain whell, or it
journal, located at the lower extremity ot thiedredge frame ; and cutting point or plows placed between the cutting plates, and attached to plates that are secured to the endless chain which revolves around said frame when said cutting plates and points are arranged to throw earth inward di rectly in the path of the buckets attached to the endless chains. intermedi
tely with the plates that bear the cutting points, in order that such buck ets may have only loose earth to scoop up. This invention may be found advertised on another page.
Seed Sower.-Samuel A. Scott, Griffin, Ga.-This invention consists in the combination of a box for containing seed, guano, etc., with a rock shaf furnished with pins and working in the slot in the bottom of the box, so as
to keep the passage open, a shovel plow, for running furrows, in which the seed may drop, and hoes, for covering the seed after it has fallen into th furrow.
Fruit Dryer.-John Hildebrand, Taneytown, Md.-This invention con sists mainly in the combination of pans for holding fruit, wh ose bottoms are
perforated, with drums which communicate with the pipe by which the perforated, with drums which communicate with the pipe by which th
products of combustion are conveyed away from a furnace,when the drums are so located as to radiate heat into the pans for the purpose of drying the fruit-the pans, drums, and furnace being inclosed within a suitable case. Siate Fastening.-Moses Kinsey, Newark, N. J.-This invention has for
for its object to provide a simple and reliable means for operating the toe for its object to provide a simple and reliable means for operating the toc
lamps of skates, and consists in the peculiar arrangement of two pairs of clamps of skates, and consists in the peculiar arrangement of two pairs
pivoted levers, and in the combination therewith of the sliding clamps.

Lock Nut.-Ulysses B. Vidal Philadelphia, Pa.-This invention has for it object to so construct nuts that the sa e may be readily locked, to preven their working loose on the bolts. For railroad rails and cars, the invention
is particularly applicable, as the jar of the moving trains is apt to work the nuts loose.
Shuttle Thread-guide and Tension.-M. C. Hawkins, Edinboro, Pa.shuttles, for guiding the thread, and regulating the tension thereof, an consists in the application to a barset in the shuttle at the top, near on side, and parallel therewith, and hinged or pivoted at one end, of a curve
thread guide, arranged to cause the thread to be delivered from the bobbi in lines perpendicular to the axis; and a spring tension plate and adjusting screw, so arranged that the tension may be adjusted without removing the shuttle from the race.
Friction Clutch.-Orrin Lull, Rochester, N. Y.-The object of this in vention is to provide suitable means for throwing in and out of gear variou kinds of machinery by means of friction, and it consists in moving laterally
(by means of proper connections) a friction disk so that an annular ring (by means of proper connections) a friction disk, so that an annular ring,
attached to the pulley or gear wheel, is griped, tor forming the connection or throwing machinery into gear.

Metal Tipfor Shoes and Boors.-M. Pettingill, Le Roy, Minn.-This in-
vention relates to a new and improved method of constructing copper and vention relates to a new and improved method of constructing copper and
other metal tips for the toes of shoes and boots, and it consists in constructing the tip with tough malleable wires attached to its ends, and fastening the tip to the shoe or boot thereby.
STRAW Stacker.-O. Farrall, Daniels \& Co., Piqua, Ohio.-This invention consists in the attachment of a straw stacker to a thrashing machine, in such a manner that it may be transported from place to place without being
detached from the machine. It also consists in a straw stacker made in two or more sections, hinged together in such a manner, that the upper section or more sections, hinged together in such a manner, that the upper section
or sections may be extended in line with the lower one, for use in connecor sections may axe exenchine, or may be folded under the lower section,
tion with a thrashinz mach
and secured there safely for transportation without being detached from and secured th
the machine.
Bolt Threader.-G. W. Mingus, Pomeroy, Ohio.-This invention relates o an improved screw-thread cutter for threading holts, and consists in a pair of die-carrying pieces. hinged to a hollow mandrel, near one end. and
arranged for their free ends, which project beyond the end of the mandrel, to work in a slotted transverse bar, or it may be a disk, having a set screw at one end of the slot, and an cecentric bar at the other, working against the outer faces of the die-carrying jaws, to hold them up to the work. The set screw makes the adjustment for the size of the bolt, and the eccentric
releases the jaws to discharge the finished bolt; a solid die or wrench may be applied in place of the screw-cutting die, to turn a tap for tapping nuts. manufacture of Gloves.-John L. Whitten, Essex, Vt.-This invention elates to improvements in the manufacture of gloves, the backs of which relates made of woven stuff, and the fronts of leather, the leather also covering the sides, and, partially, the backs of the fingers; and it consists in aranging the leather, which partially covers the backs, and covers the sides
of the fingers. so as to tip the fingers, at the ends, with leather, extending over the back of the finger in a manner to better protect the woven stuff of the back, and to avoid the converging of the seams by which the stuif of the back, and to avoid the converging of the seams or or sides, and the woven stuff backs are joincd, at the tips of the fingers, which are greatly exposed to wear, and soon rip and fray out, spoiling the glove, while the other parts are good. It also consists in im-
proved patternsfor cutting these leather parts for the sides, and for partially covering the backs of the fingers. It also consists in cutting the leather side or back for the fis st finger, together with the leather front, for the same, and is an improved pattern for the same
Medicine Case--Alphonzo Button, Dunkirk, N. Y.-This invention re
ates to improvements in the construction of medicine cases of that clas ates to improvements in the construction of medicine cases of that class
wherein a web of canvas, leather, or other substance for the attachment wheren a web of canvas, leather, or other substance for the attachment
of the vials, papers, or other things to be carried in the case, is attached to sists in the application to either one or both of the heads of the spools, in recesses in the said heads, of coiled springs, for winding up the web, and ratelet wheels and spring pawls to hold the springs when the webs are
drawn out. It also consists in the arrangement of the web for holding small medicine vials, to be wound up with it on the reel ; and 'the application thereto of a pocket-book.
Hawse-Hole Cover.-R. Liston, Albany, N. Y.-This invention relates the water from beating upon the deck; and consists in the arrangement upon the inside of the bulwarks, of a circular, or other shaped cover, composed of two equal parts, hinged at the opposite sides, and meeting at the center, where recesses are formed in the edges for illing snugly around the two parts of the link of the cable when closed. One part is provided with
latch which swings down into catches on both parts to hold them closed and both are provided with packing substance on the side towards the hole, also with hinge points which may be readily disconnected in cases of emergency
Ore Separator.-Geo. Copeland, Denver, Colorado.-This invention re lates to improvements in an ore separating apparatus, and consists in new and improved means for subjecting the pulverized ore to the action of dis-
tributed gusts of air, as it falls from a sieve to a hopper below, by which the gangue is prevented from falling with the heavier particles, and is thrown back to be thrown off by skimmers, and the dust is caused to be taken up by suckers and delivered to water spray for being
Hemmers.-M. C. Hawkins, Edinboro, Pa.-This inventon relates to im provements in hemmersfor sewing machines, and consists in an improved
arrangement on a notched plate, of the folder and tongue, whereby the arrangement on a notched plate, of the folder and tongue, whereby th
cloth may be inserted more easily at the beginning, and without requiring the corner to be trimmed off; also, whereby a greater number of folds of the hem may be made. The invention also comprises an improved arrange ment of the hem guide, whereby the hemming in circular lines is facili
tated. Mode of Forming Glass Insulators.-J. M. Brookfield, Brooklyn, N. Y.-This invention relates to an improved mode of constructing glas
insulators with internal screw threads for screwing them to their support on the telegraph poles, and consists in forming the said threads by screwing a screw threaded former into the glass while in the mold, by which the exterior shape is formed, and while the glass is in a plastic state; the said former at the same time either wholly forming the socket in the glass, o giving the finishing shape to a socket previously partly formed, by
smooth plunger forced into the glass and withdrawn. The invention also comprises the combination with the former of a follower for pressin down into the top of the mold to prevent the overflow of the glass, and to ive form to the bottom of the insulator.
Combined Saw Set, and Cow's Tail holder.-J. Knight, Whitestown, N. Y.-This invention has for its object to furnish a simple and convenien
device for holding a cow's tail while she is being milked, and which shall be so constructed as to be readily adjusted for use as a saw set.
Steam Plows, etc.-William Beckett, Kingston, Jamaica.-This inven tion has for its object to furnish an improved steam plowing apparatus,
which shall be so constructed as to doitswork thoroughly and well, and which shall be so constructed that it may be used as a power for variou cultural and mechanical purposes,
Platform : Scale-Albert Assmann, Rahway, N. J.-This invention re lates to a self-indicating platform scale, which is made to operate entirely
without the use of springs, and which is sufficiently simple to be sensitive to small weights.
Tar Resinate.-F. M. Hillstream, Lawrence, Kansas.-The object of this vention is to prepare coal tar in such manner that it may be used fo building, and for mow
Siphov.-Seth C. Catlin, Cleveland, Ohio.-This invention relates to
new and useful improvement in siphons for drawing or transferring liquid new and useful improvement in siphons for drawing or transferring liquid from one vessel to another, and for an the purposes for which siphons are sod, and it consists
Door Knobs.-George Jones, Peekskill, N.Y.-This invention relates to w and useful improvement in knobs for doors, and consists in an exte ior open work, metallic, hemisoherical outer end, and an interior hemis
sphere or plate of other forms of metal or other material, and in making the bulb or knob of two hollow he
Steam Plow.-M. N. Lynn, New Albany, Ind.-This invention relates to consists, first in an improved construction of the frames, mainly of tubing or the purpose of providing the greatest amount of strength with the least weight of metal; also for utilizing the space within the main tube
of the frame for water tanks, for containing the supply water for the boiler econd, in an improved arrangement of the engines, propelling shafts, and sears with the frame and driving wheels, having for tts object to work an in the combination with the traction wheels of a series of pushing legs of peculiar construction and arrangement, as auxilliary to the said traction heels or use in soft ground, or at any time when the said wheels fail for

Rectifying Apparatus.-Luke S. Snediker, New York city.-This in-
ention relates to a new apparatus for disturbing and heating the alcoholic iquors and the coai in rectifying machinery, so that thereby the absorption of the fusel oil will be more rapidly and thoroughly produced. The invention consists in constructing the agitating machinery with hollow arms,
hrough which steam is conducted into the liquor, so that thereby both heating and the agitating device will be most intimately connected.
Conl Scurtue.-Charles Hodgetts, Williamsburgh, N. Y.-This invention part, and a convenient fastening for the bottom and foot. The invention consists in fitting the bottom with an upward projecting flange into the scuttle and upon the supporting base, and in riveting it to the said base. Hoisting Jack.-Edwin A. Castellaw, Savannah, Ga.-This invention re heavy bodies
Can-Soldering Apparatus.--Jacob Gulden, Keyport, N. J.-This inven cans, and consists in the usatatus for soldering the seams of sheet metal sliding soldering irons that work in the tubes for the purpose of being heated therein. The invention consists also in the application to the apparatus of a set of springs for holding the c
pared for them on the sides of the furnace.
Needle Thread Tension.-M. C. Hawkins, Edinboro, Pa.-This inven on relates to improvements in needle-thread tension devices for sewing ably constructed and arranged for attachment to the needle-supporting arm
 ension plates or disks at one end of the tube, and having within the tub which has a milled head at the ends supporting the tension plates, the ten sion may be varied as required, the said nut being capable of moving along the screw in the tube, but incapable of turning with it. The tube is also provided with a guide arm through which the thread passes to the said
tension plates. LoG Loader.-John Harvey, Chanticleer, Ohio.-The object of this in ention is to provide efficient means for loading or rolling logs or other
eavy weights (more especially saw log.), but applicable to other pur

Seat Holder.-Johiel Jackson, Columbus, Wis.-This invention has for object to furnish an improved holder for holding the rails of a sea hile being made, and wh
huring Apparats.-Nathan S. Hazen, La Fayette, Ind.-This invenon has for its object to furnish an improved churning apparatus, which
all be simple in construction, and effective in operation, doing its wor uickly and thoroughly.
Combinatton Tooo.-George W. Stockwell, Natchez, Miss.-This inven
ion relates to a new housenold tool, which contains a majority of the de ices generally required for domestic purposes. The invention of the dethe combination of a handle, hammer, and clarping screw with severa ther useful instruments.
Wheels for Tinners' Beading Machinks. - Benjamin S. Partridge,
Pilatka, Fla.-This invention has for its object to provide machinery b hich the shoulder required at the lower part of a coffee machine drippe n be formed: and also, the lower edge turned in, without requiring th Life boats
LIfe Boats.-Theophile Masac, Good Hope Plantation, La.-This inven
ton has for its object to farnish an improved life boat, strong, simple in construction, and effective in use, and which shall be so constructed that it may be closed up into small compass, adapting it to be taken by the passen er into his private cabin, and kept stacked, ready for an emergency
Pony Carriage Phaeton.-John C. Ham, New York city.-This invenons, so that the rumble, or servant's seat may be removed from its plac the rear of the carriage body, and placed beneath said body in such way that when thus placed it may not disfigure the carriage, but rather in mathe beauty of the lines of the carriage Ohio.-This invention has for its object to furnish an improved machin hich shallbe so constructed and arranged that it may be used for engray les, and for various other uses.
Pipe Joint.-Robert B. Coar, Jersey City, N. J.-This invention has fo
its object to furnish an improved pipe joint, which shall be so constructe竍 oint packed with soft metal from the inside of the pipe.
NUT Lock.-Henry Beagle, Jr., Philadelphia, Pa.-This invention has fo its object to furnish an improved nut lock, designed more especially for laces where the bolts and nuts are eet equaly applicable for use Blast Furnaces.-James Thomas, Parryville, Pa.-This invention h or its object to provide an improved apparatus for automatically raisin tock, so that it will be raised to close the furnace when the pressure o the blast is on, and be lowered when the pressure of the blast is off, thu suarding against danger from explosion when the blast is off the furnac Automatic boiler Feeder.-Valerius D. Anderson, Kewanee, Ill.-Thi team boilers used for heating buildings, steaming feed for stock, an ,
Medical Compound.-Philip Becker, South Bethlehem, Pa.-This inve ion consists in a new compound of medicin.
ever and ague, and other kindred diseases.
machinery for towing canal boats and other vessels on Max Eyth, Stuttgart, würtemberg.- This invention has for its object to provide simple means, whereby canal tug boats and other vessels can be moved forward along a fixed rope or chain, by the aid of machinery pro

## (Official elist of eatents.

Issued by the United States Patent Office. for the week ending May 31, 1870 Reported offlcially for the Scientific American

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 103,536.-Composition Felting for Covering Roof SHIPs' BortoMs, ETc.-Thomas R. Abbott, Lowell, Mass.
103,537.-CULTIVATOR.-Henry A. Adams, Sandwich, Ill.

103,538.-Binding Attachment for Sewing Machines.

 103,541 .-WEIGHING
 Me.
M3.54.-NUT Lock.-Henry Beagle, Jr., Philadelphia, Pa.
103,545.-MEDICAL COMPOUND.-Philip Becker, South Beth
 103,547.-Sash Holder and balance.-George W. Bishop, Saratoga Springs, N. Y.
$103,548 .-$ SPRINQ BED Botrom.-Orris Blake, Peru. Ind. 103.549.-Needle for Sewing Machine.-J. B. Blanchard 103,550.- MIGHTENING Wheel Tire.-Simeon R. Bolton Presoott, Wis
103,51.
REFRGERATIN Oyster Can.-Alfred Booth, Chi cano. ill
10. 5.52 .-Hay and Straw Cotter.-Adolph C. Both, Hesse 103 Cassol, Germany. Crisivas Roors, , RTc.-Gabriel Charles Bozziat, Vincennes, France.
103,554.-COMPOSTION FOR COATING SHINGLES AND CLAP 103.55T.-MODE OF FOMMING INSULATOR.-James M. Brook 103 field. Brooklyn, N. Y. Y. Corsec 103,557.-Hayand Cotton Press.-B. R. Brown and James 103 Trjone, JI, JJackson, Tenn. 103.559.-BELL Aras For Clocks.-Leonard C. Butch, Lancaster, 103,560.-Molding Pit for Castina Cylinders and Pipes.
 103,562, Treadle for Sewing Machine.-Henry J. Case, 103,56burn, - Noristing Jack.-Edwin A. Castellaw, Savannah 103,564.-Siphon.-Seth C. Catlin, Cleveland, Ohio
103,565.-Stand and Clothes Dryir.-M. C. Charles, Hope, Ind.
103.566.-Sire
Clarke, Pliiladelphitia, Pa. 103,567 Che Philidelphia, Pa. 103,568.-RESA WING MACHINE.-Lucius J. Cobb, Chicago 103,569.-Machinery for Calendering and Poinishing Pa-



 103, F. Cooper, San Francisco, Cal.-Geore 103 rado Territory. 103,576.-Engraving Machine.-Chas. J. Coulter, Seville 103,577.-Manufacture of Sheet Iron.-Isaac E. Craig,





 103,584- PREVENTING REVERSE MOTION IN SEWING MA 103,5855.-TONGS FOR RIGGING.-George Dohn, Sacramento 103.586.-LATCH.-Thomas Dolan, Albany, N. Y. Antedated 103,587.-BEaring For Sheaves.-W. W. Eastman Mead 103,588). Revevolving Back band for Harness Saddies. $103,5899 .-$ BRITK C C A RT. - James Evans, Philadelphia, Pa . 103,j90.-ATtaching Door Knobs to their Spindles.-

 103,533.-READING STAND.-Andrew C. Flint, Chelsea, Mass
103,594.-TAP For RUBER Boors.- Francis Flynn, Smith-
 103,596.-Exhaust Nozzle.-Charles H. Frisbie, Chicago, 103.597.-Нот Blast Oven -Job Froggett, Youngstown 103,598.-Lamp Burner.-Jim B. Fuller, Norwich, Conn. 103,599.-Percussion Fuse.-William Gardner, San Francis 103,600.-Loom.- Charles W. Gilbert, Worcester, Mass.
103.601.-BREAD CUTTER.-George D. Goodsell 103.601.-BREAD CUTTER.-George D. Goodsell and Noyes E.
Bibcol, Rectror, IIl
103,602. APPARATUS FOR Evaporating Liquids.-George F. Grey, Rrooklyn, N. Y.
03 , 603 . - SOLDERING APPARATUS.-Jacob Gulden, Key Port,

 York city.
103,606 . Door Borr.-William H. Hart, New Britain, Conn.
103 . 60 . 03,607.-Coal Barge.- Roger Hartley, Pittsburgh, Pa., as-
 103,609-TENSION DEVICE FOR NEEDLE THREAD IN SEWING
MAMHES. Moses hampero Hawkins, Einborough. Pa.


 103 county, Ky. 103 Hillstream, Lawrence, Kansas. 103. N . F . ib .-Temple for Loom.-William H. Howard, Media,
 $\underset{\text { N. J. }}{103.618 \text { - Rallway-Car Coupling.-George C. Hugg, Berlin, }}$ 103,6.69.-Chatn-Pump Bucket.-F. P. Hunt, Northborough,
Mas.
103,620.—Seat Holder.-Johiel Jackson, Columbus, Wis.

103,621.-Cooking Stove. - Benjamin F. Johnson, Troy 103,62. Y2.-Dryer.-I. B. Kinkead, Watertown, Ohio. 103,623.-Sinate-Fastening.-Moses Kinsey, Newark, N. J
 103 Lower St. Clair Township. Pa. ${ }^{103,626.6-G r i n d i n g ~ M i l L}$--Philip Kraus, Augusta, Ga. 103,627.-PICTURE HaNeER.-George Lamb, Boston, Mass. May 24, 1870.
10,, $669 .-$ FAStening For Gates.--John Lintner, Indianapolis, Ind. 103,63i.-Head Rest.-Caleb V. Littlepage, Austin, Texas. , Locke, Pleasant

 103,635--STEAM Plow.-M. N. Lynn, New Albany, Ind. 103,637.-Life boat.-Theophile Masac, Good Hope Planta-
 Tenn.
T0,639.-Farmers'
Boiler.-Aallen N. Merrill, Batavia, Ill 103,640.-Apraratus for Painting.-Asa P. Merritt, Char-
 fiecidilli. Conn.
103.642.-BoLT Threader.-Gideon W. Mingus, Pomeroy, 103,643.-Tension Wheel for Sewing Machine.-J. H. 103,644.- OIL.CAN Srout.-Samuel Moyle, Jr. (assignor to limseif and A.J.J. Carrier), Bridgeport, Conn.
103,645.-SSPIRAL FASTENING.-Chas. S. Muscroft, Cincinnati, 103 Ohio.-St.-Spring Bed Bottom.-Charles W. Mutell, Springfield. Mass.
103,647 - VIVE-GEAR For Locomotives.-Adolph Onslow,



 103.65e. Hitor-idast Oven. A. A. A. Player and Henry McAl 10, ill
103,653.-Wrench.-T. C. Purington, Lincoln, Cal., assignor 103, 6 inime
 103,656.-W WRENCII.-Mathias Redlinger, Freeport, Ill.-Ante 10, tedated May, 19 , 1870. 103,658.-Spring Bed Bottom. - Gideon B. Richmond,
 103,660.-Hismmer.-Oliver Rock, Hudson, Mass. 103,661.-COMPOSITTON FOR PREVENTING Inclust ition in STRM Boikers. -J. G. Rogers, yadison, Ind. Steam Boilers.
 103,64.-SEWING MacHNTES, NEEDEY, N.C.

 103,666.-SEED Sower.-S. A. Scott, Griflin, Ga.
103,667.-Hydraulic Housing For RoLs. $-G$.
103,667-Hydraulic Housing for Rolls.-G. H. Sellers,


 Weston, Mass.
103,671.-W WSHING MACHINE.-John Sirrine, Trumansburg, ${ }^{103,67 .} \mathrm{F}$. - S SAFETY STove.-Charles J. Smith, Norfolk, $\mathrm{Va}_{\text {a }}$. ${ }^{103}$ ${ }_{10}^{103.674 .-M i t c a}$ Frame for Stoves.-Gaylord S. Stanard,

 10, ford. Conn. Si Wing Machine.-Nicholas Stilwell, Newark,
 103,679 . M iss .-SAfety Whifiletree.-Melvin Stone, Vermillion, 103,6800.-Grain Seperator.-Orrin Stone, Ionia, Mich. 103,681.-Machine for Making horseshoes,-J. G. Stowe
 103,683.-SAFE AND VAULI:-Timothy J. Sullivan, Albany, 103, isi.-Rowary Pump.-Thomas Swan, Manlius, N. Y. 103, 685. - DEvICE FOR CUTTIXG OFF METALLIC TUBES. S

 10:3,688.-CORN AND Cotton Planter, Fertirzer Dis


 103, Ind.92.-Railway Rail Chair.-J. s. Weimer, Pleasant



 103,697-BEE Hrve.-J. W. Winder, Cincinnati, Ohio. 103,698.-Reversing and CUT-OFF, Apparatus For Stean
 10,3,700.-Siom Frame.-Emanuel Andrews, Williamsport,
 Coysins. L. F. Arson, Aaris, France Pittsburgh, Pa .
103,703.-VENTILATOR For Hats.-Samuel Beatty, Norwalk,
Conu. Conn.
103,704.-STEAA PLow.—William Beckett, Kingston, Jamaica.

103,705.-Scissors Sharpener.- Nathaniel Belcher, Bosto 103,766.-Dental Mallet.-J. A. Bidwell, Chicago, Ill. 103,707.-Artificial Teeth.-J. A. Bidwell, Chicago, ill.
 103,709.- H Ore $\mathrm{S} \Lambda$ WING MACHINE.-George W. Boll, Columbus, 10, Ind.-SAWing Machine.-George W. Boll, Columbus,
103,710.-RAilizoad-Tie Lifter.-W.C. Bomarand Anderson 103,711.-Lock For Sex Seuring Revenue Stamps on Beel
 103, $\mathrm{N} \cdot \mathrm{H} .13$-Wood Pavement.-J. W. Brocklebank, New York
 MOines, 1 lowa.
103.75.-COOKING Stove.-Edward Buys, New York city. 103,716.-Portable Fence-post Driver.-Wm. Carns, New Cinbirland oniog for Sandeapering Moldings.-F. G
 103,719.-Wheel-carriage Seed Sower.-J. H. Cole, Vaca 103,7ille. Cal. Blachsmitris' bellows. - J. F. Cory and H. C. 103,721.-WATELE-CLOSET VALVE.-H. H. Craigie, New Yor
 103,ㅇnㅇ․, -O. 103,Z24--MACHINERY FOR TOWING CANAL BOATS.-OSca
 103,726.- him AW GUMMMER.-A. A. B. Douglass, Clyde, Ohio. 103,727-RATCHET PowER.-W. T. Elliott (assignor for on
 103,729.- Door Sork Sitop.-W. H. Fahrney (assignor to himsel

 Pat Payton Macon, Ga. Antedated April 11 18io. Furbish, Augusta,
103,7z2.-WASHING MACHINE.-ISaial M. 103,733.-BLiower.-J. N. Gilchrist, Connersville, Ind., assign or to himsiff and J. L. Gilchrist.
103,734.-MACHINE YOR HEELING Boots AND Shoes.-John

 103,737. Mi.-Fountain Pen.-Thomas W. Grinter, Russellville
 103,739.-TooL Holden. - O. Hanks, Cincinnati, Ohio 103,740.-Excavating Machine.-A. W. Hansen, Stockton,
cal 103, Call 41 -apparatus for Enameling Sifeet Iron.-Wm.
 103,743.-Ruling Machine.-William O. Hickok, Harrisburg,

 son Brobly , N. Y.
103 , 46 .
MIACHNE

 103,749.-Door Knob.-Geo. Jones (assignor to Eliza Jones)
 Haven, Conn.
103,, 511 - - Towel or Clothes Rack.--J. M. Keep, New York

 and M. C. Brown), Whitestown, N. Y.
103.754.-CRICKET AND COMMODE.-J. C. Knowles, New Bed

 Ne, Fivt. Yor city 10hinself and S.s. Cook), Wonsooket. R. I. 103,759.-Cotton-SEed Planter.-James Lytch, Laurinburg 103, F © $\mathrm{C} 0 .-$ Seed Sower.-F. H. Manny, Rockford, Ill.
103,761.- Compound for Cattle Food.-W. Marsden, New burg, N. Yi minnery for Making Barrei Heads.-Wm
 103,763.-Ratchet Lever.-Henry W. Miller, Utica, N. Y.
103, 764 -HAND PUNCHING MAchine.-G. C. Miller, Rockford...II.
103, , 765 .-Tubular Arch Bridate.-T. W. H. Moseley, Bos 103,766.-Shutter Fastener.-Charles K. Osborn, Dixon 103,767.-Animal Trap.-D. J. Owen, Springville, Pa.
103,7/78.- SECCTR ELECTRO-MAGNET. M. H. M. Paine, Newark, N. J. assignor for one half to M. S. Frost, New York city

 103,7tion -METAL TIP For Boots and Shoes.-Manasseh Pet
 103,774.-Apparatus for Playing Games.-Hiram Plumb
 103,776.-SCREW-THIEADING MaCHine.-T. T. Prosser, Chi
 103,7778.-CALi SPRING.-Frederic W. Rhinelander, New York 103,ryity.-Corn Harvester.-J. E. Rice, Moline, assignor to

 103 Haven, Conn.

 Tirihin, Oliio.
103, 785 . -Hose Couplinc.-George Sewell, Brooklyn, N. Y.

103,780.-Construction of Cinairs.-H. I. Seymour, Troy 103, $\frac{\mathrm{F}}{\mathrm{F}} \mathrm{F}$ i.-Hat Blocking Machine.-Julius Sheldon, New 103, York8. city $\dot{W}_{\text {eather }}$ Strip. - Miles H. Skiff, Westfield, 103,ㄱ.79.-Horse Hay Rake.-Solomon P. Smith, Waterford, 103,f90-APparatus For Rectifyiva Sprirtss.-Luke S. Snediker (assignor to himself, wm. Banzecti, and James sharkey), New
Yorrk city. 03,791.-Broom Head.—William C. Spellman, Providence, 103,792.-Boot and Shee-Herding Machine.-W. F. Spin-
 103 and Andren Spring, weston, Mass.

 103,79io.-Sinuttle foir Sewing Maciinnes.-W.H. Thayer
 103, tovn, assignor to $\mathrm{H} A$. Clark, Boston, Mass.


 103,803.-Churn.-I. E. Weston and Alvin Streeter, Winch
 Mass.
103,805.-Brick Machine.-Franklin Whitcomb, Chicago,
, 103,806.-Clover Machine. - David Whiting, Ashland, 103,80\% Oin -Hand Toilet Mirror Frames.-E. P. Williams,

 Williams, Eliza beth, N. J., and Geo. H. Cliinnock, New York citv,
103,810.-CANDLE LAMP.-T. S. Williams and F. A. Taber, 103,811.-EGG Beater.-Turner Williams, Providence, R. I.,

 103,8i4.-Fountain--A. P. Yates, Syracuse, N. Y 103.815.-Honse HAY RAкE.-Eli Zimmerman. Pamelia Four

 103,818.-Spring Whighirng Apraratus.-Andrew Morse,


## REISSUES.

3,998.-Macuine for Forandive or liolliva Screw Threads














## DEsigns.

4,075.-LABEL_-G. F. Gantz, New York city
4,076.-SChool SEAT AND DESK.-C. G. Harrington, North4,077. $\begin{aligned} & \text { ville, Mich. } \\ & \text { METALLIC } \\ & \text { Bracket.-Albert D. Judd, New Haven, }\end{aligned}$ 4,078 and 4,079.-Trape Mark.-G. W. Langhorne, John D. 4, ISnghorne, and N. B. Johnston, Lyyncliburry, Va. Two Patents. 4,0881 to 4, 4,
 , © Hubard), West Meriden, ©ona. Cin 4,08\%:-MTCA CHIMMNYY FOİ LAMIPs.-Calvin Colt and C. II ${ }^{4}, \mathbf{O} 88$. 4,089.- Lamp.-R. S. Merrill, Hyde Park, Mass.
 EXTENSIONS.
Saw Mili Dogs-G. W. Hill, of Olean, N. Y.-Letters Pat







ters ratent No. 14,933, dated May 20, 1850.





## PATENTEES.

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