Improved Cotton and Hay Press.

A notice of this press was given in an article on the Exhibition of the American Institute, published on page 217, current volume of this journal. It may now be seen at the fair exhibited by Mr. Champman, the patentee. It was there stated to have been manufactured and exhibited by Whitney & Co., instead of which the name should have been Campbell, Whittier & Co. We herewith give an illustration and brief description of this press, which will give a general idea of its form and operation.

By the engraving it will be seen that the bale is made at the bottom, and that the side and end doors are easily removed, thus giving free access to the bale from all sides.

The follower block, shown as at the top, may be swung over to one side when the press is to be filled, leaving the top of the press perfectly open to receive the material to be pressed. When full the follower is returned to its place, shown by the dotted lines, and worked down. The levers are compound, and also adjustable, so that the fulcrum may be altered to make a short stroke, when the article is loose and little power is needed, or a long stroke, as it becomes more compressed and great force is obtained.

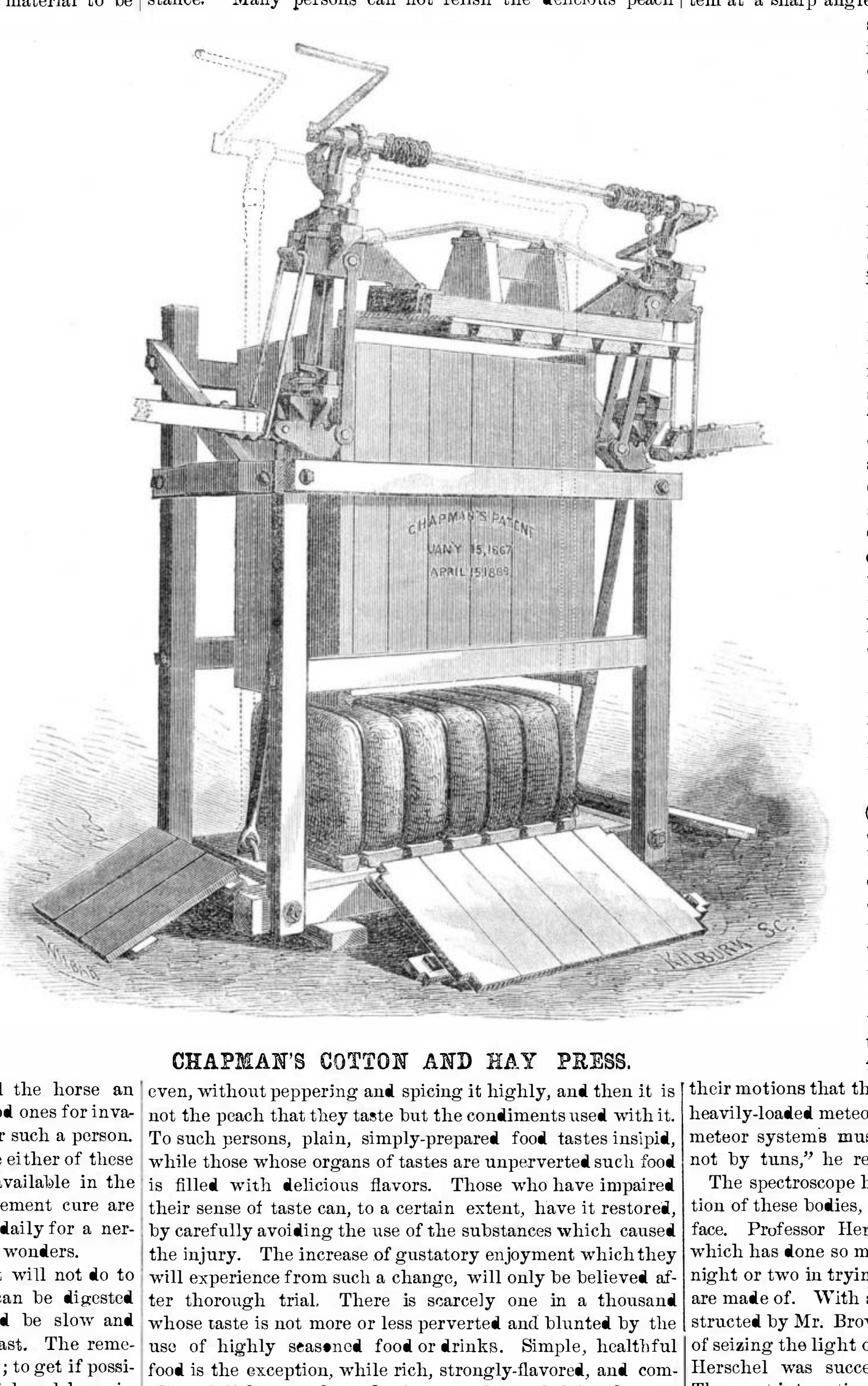
By the peculiar arrangement of the levers and clutches, the follower may be raised very quickly and independently of the levers. In most other presses it requires as much, or nearly as much time to raise the follower block as it does to compress the cotton.

In this the follower is run up quickly and swung over to one side, thus being entirely out of the way for refilling.

These presses are sold cheap, and are durable and substantially made, and from the construction we judge them to be very effective.

Patented January 15, 1867.

For further particulars address Campbell, Whittier & Co., Manufacturers, Boston, Mass.



CHAPMAN'S COTTON AND HAY PRESS.

Nervous Dyspepsia.

Those persons who use their brains much, and who have but little tone or power to their stomachs, should above all things avoid purgatives. So says the *The Herald of Health*, and adds that very much of the natural distress which this class of dyspeptics feel, is caused by the large intestine becoming weakened, dislocated, and filled up with offending matters which there is not strength to remove. In such cases, it is important that the patient do less work with his head, and more with his muscles. If there is strength enough, the daily use of ax or hoe for three or four hours will prove highly beneficial. Riding on horseback is an excellent exercise, providing the saddle is a comfortable one and the horse an easy goer. Hard-trotting horses are not good ones for invalids to ride. A galloping horse is the best for such a person. Those who live in the country can easily take either of these forms of exercise, but they are not always available in the city. In such cases the gymnasium or movement cure are valuable means of treatment. Half an hour daily for a nervous dyspeptic in a movement cure will work wonders.

The diet should be plain and nutritious. It will not do to overload the stomach, yet as much food as can be digested well should be taken. Mastication should be slow and thorough. Such invalids are apt to eat too fast. The remedy for this is to talk a great deal at the table ; to get if possible into a good humor before taking a mouthful, and keep in it to the end of the meal. It is generally best to omit the dessert. Fruit is often condemned by the nervous dyspeptic. We are sure, however, that it is not always the fruit which is at fault, but the way of using it. Let it be taken in the morning, and before anything else is eaten, if possible ; at first, take small quantities to accustom the stomach to it. Avoid fine bread, vegetables, and pastry ; also tea, coffee, and tobacco. Omit the supper, or at least, let conversation at the table be much and eating little.

It is often advisable to cover the abdomen with the wet compress in this disease for an hour or two daily. The compress should be covered with a dry one. A sitz bath at bed time is very serviceable if there is a disposition to sleeplessness, as sleep is very necessary. Patients can not have too much sleep. If mental labor is performed, let it be done between 9 in the morning and 1 P. M. After this, dine and recreate, or perform light physical labor. The after-dinner nap may be useful, providing it does not not interfere with sleep at night, in which case an hour of quiet and rest is better.

The habit of drugging for this disease with all sorts of quack nostrums is very absurd. Hygiene medications will do all that can be done much better. The grand rule should be to live naturally and happily, and throw medicines to the dogs, and nine cases out of ten the sufferer will get well.

Impaired Taste.

Of all the senses, that of taste is the worst treated, the most perverted. The delicate little nervous fibers which are distributed to the minute papillæ that cover the surface of the tongue, soft palate, and fauces, and which constitute the organ of taste, are boiled by hot tea and coffee, burned by hot food, and irritated and inflamed by salt, pepper, spices, vinegar, liquors, etc., until it is a wonder that they can distinguish a peach from a potato. That these things *do* blunt and injure the finer susceptibilities of the nerves of taste, there is not a shadow of doubt. The only wonder is that they do not destroy the sense of taste entirely. Persons accustomed to using these things freely can not distinguish the delicate natural flavors of food, and therefore lose a large share of that gustatory enjoyment which they should experience, and which those who still possess a healthy taste do experience. To an unperverted taste water is the sweetest and most agreeable of drinks, while to many it is scarcely endurable, unless it has mingled with it some sharp, strong-flavored substance. Many persons can not relish the delicious peach even, without peppering and spicing it highly, and then it is not the peach that they taste but the condiments used with it. To such persons, plain, simply-prepared food tastes insipid, while those whose organs of tastes are unperverted such food is filled with delicious flavors. Those who have impaired their sense of taste can, to a certain extent, have it restored, by carefully avoiding the use of the substances which caused the injury. The increase of gustatory enjoyment which they will experience from such a change, will only be believed after thorough trial. There is scarcely one in a thousand whose taste is not more or less perverted and blunted by the use of highly seasoned food or drinks. Simple, healthful food is the exception, while rich, strongly-flavored, and complicated dishes are the rule, because demanded by the perverted tastes of the people.—*Herald of Health.*

THE AUGUST METEORS.

From the Spectator.

A very ancient tradition prevails in the mountain districts which surround Mount Pelion, that during the night of the Feast of the Transfiguration (August 6) the heavens open, and lights, such as those which surround the altar during the solemn festivals of the Greek Church, appear in the midst of the opening. It has been thought by Quetelet, and Humboldt considered the opinion probable, that this tradition had its origin in the successive apparition of several well-marked displays of the August meteors. If this be so, the date of the shower has slowly shifted—as that of the November shower is known to have done—until now another holiday is associated with it, and the simple peasants of Southern Europe recognize in the falling stars of August the " fiery tears of good St. Lawrence the Martyr."

It is wonderful to contemplate the change which in a few short years has come over all our views respecting these meteors. Ten years ago it was considered sufficiently daring to regard the August system as part of a zone of cosmical bodies traveling in an orbit as large perhaps as that of our own earth. Now, the distance even of Neptune seems small in comparison with that from which those bodies have come to us, which flash athwart our skies in momentary splendor, and then vanish forever, dissipated into thinnest dust by the seemingly feeble resistance of our atmosphere. Accustomed to associate only such giant orbs as Saturn and Jupiter, Uranus and Neptune, with orbits which must be measured by hundreds of millions of miles, the astronomer sees with wonder these tiny and fragile bodies traversing paths yet vaster than those of the outer planets. And even more remarkable, perhaps, is the immensity of the period which the August shooting star has occupied in circling around the central orb of our system. Each one of these bodies has been in the neighborhood of the earth's orbit many times ; yet the last visit made by them took place years before the birth of any person now living, since the period of meteoric revolution has been proved to be upwards of 118 years.

Another strange feature of the August meteor system is the enormous volume of the space through which, even in our neighborhood, the meteor stratum extends. The famous November system is puny by comparison. Striking that system at a sharp angle, the earth traverses it in a few hours, so that if the earth went squarely through it the passage would occupy, it has been estimated, less than a hundred minutes. Thus the depth of the November meteor bed has been calculated to be but a hundred thousand miles or so. But the earth takes nearly three days in passing through the August meteor system, although the passage is much more direct. For the August meteors come pouring down upon our earth almost from above, insomuch that the radiant point on the heavens whence the shower seems to proceed is not very far from the North Pole ; whereas the November meteors meet the earth almost full front, as a rain storm blown by a head wind drifts in the face of the traveler. Thus the depth of the August system has been estimated at three millions of miles ; and this depth seems tolerably uniform, so that along the whole of that enormous range (to be counted, as we have said, by hundreds of millions of miles), through which the August ring extends, the system has a depth exceeding some four hundred times the diameter of the earth on which we live.

Yet it is probable that the whole weight of the August system, vast as are its dimensions, is infinitely less than that of many a hill upon the earth's surface. For the weight of the separate falling stars of the system has been determined (by one of the wondrously subtile applications of modern scientific processes) to be but a few ounces at the outside ; and even during the most splendid exhibition of falling stars the bodies which seemed to crowd our skies are many miles apart, while under ordinary circumstances thousands of miles separate the successively-appearing meteors. Indeed, it is well remarked by an eminent member of the Greenwich corps of astronomers, that the planets tell us by the steadiness of their motions that they are swayed by no such attractions as heavily-loaded meteor systems would exert. " The weight of meteor systems must be estimated by pounds and ounces, not by tuns," he remarked.

The spectroscope has taught us something of the constitution of these bodies, though they never reach the earth's surface. Professor Herschel, third in that line of astronomers which has done so much for science, has employed an August night or two in trying to find out what the August meteors are made of. With a spectroscope of ingenious device, constructed by Mr. Browning, F.R.A.S., for the special purpose of seizing the light of these swiftly-moving bodies, Professor Herschel was successful in analyzing seventeen meteors. The most interesting of his results is his discovery that the yellow light of the August meteors is due to the presence of metal sodium in combustion. This metal has a very striking and characteristic spectrum, consisting of two bright orange yellow lines very close together; and this double line was unmistakably recognized in the spectrum of the August meteors. To use the words of the observer, " their condition (when rendered visible to us by their combustion) is exactly that of a flame of gas in a Bunsen's burner, freely charged with the vapor of burning sodium ; or of the flame of a spirit lamp newly trimmed, and largely dosed with a supply of moistened salt.

It is strange to consider what becomes of all the sodium thus dispersed throughout the upper regions of the air. There can be no doubt that in some form or other—mixed or in combination—it reaches the earth. The very air we breathe must at all times contain, in however minute a proportion, the cosmical dust thus brought to us from out the interplanetary spaces. Nay, for aught we know, purposes of the utmost importance in the economy of our earth, and affecting largely the welfare of the creatures which subsist upon its surface, may be subserved by this continual downpour of meteoric matter. We know already that the different meteor systems are differently constituted. For instance, the white November stars are much less rich in sodium than the yellow August ones. Each system, doubtless, has its special constitution, and thus the air we breathe is continually being dosed with different forms of metallic dust—now one metal, now another, being added, with results in which did we but know it, we are doubtless largely interested. Nor is it certain that deleterious results do not occasionally flow from an overdose of some of the elements contained in meteors. It might be plausibly maintained on evidence drawn from known facts and dates, that occasionally a meteoric system has brought a plague and pestilence with it. The "sweating sickness" even has been associated (though, we admit, not very satisfactorily) with the 33-year returns of great displays of November shooting stars. Without insisting on such hypotheses as these, which scarcely rest on stronger evidence than the notion that the destruction of Sodom and Gomorrah was brought about by an unusually heavy downfall of sodium-laden (that is, salt-laden) meteors, we may content ourselves by pointing out that the labors of eminent chemists have shown that the air is actually loaded at times with precisely such forms of metallic dust as the theories of astronomers respecting meteors would lead us to look for.

THE MANUFACTURE OF SULPHURIC ACID.

From the Report of J. Lawrence Smith, United States Commissioner to Paris Exposition.

I.—APPLICATION AND PROGRESS OF THE MANUFACTURE.

When we glance over the chemical products that influence to the greatest extent the useful arts of society, we find them among the acids and alkalies; for by the chemical reaction of these compounds, furnished by nature or art, the manufacturing and domestic arts generally obtain a multitude of useful compounds. But of all substances that have made their imprint on the modern progress of the arts, there is no one approaching sulphuric acid in importance, produced as it is from the cheapest materials furnished by nature, and of which there seem to be inexhaustible supplies. Glass making, soap making, bleaching, calico printing, dyeing, etc., are all debtors to sulphuric acid.

It is said that the consumption of sulphuric acid in any country will show, with that of iron, its industrial activity. The low price of the acid is one of its great merits; the ordinary form known as oil of vitriol, being the most concentrated form in ordinary use, is now made in France at a cost of about one and a quarter cent per pound, and in England for a shade less; in this country ill-advised legislation makes a much higher and fluctuating price.

No material change has taken place in the last ten years or more in the manufacture of sulphuric acid. The well-known method of converting sulphur into sulphurous acid, and completing the oxidation of it by the oxygen of the air, aided by one of the oxygen compounds of nitrogen, is still the predominant method; and, in fact, all of this acid that is manufactured, except the small quantity made by distilling copperas, and called Nordhausen acid, is made by this process.

It will not, however, be unprofitable to the readers of this report to enumerate some of the various attempts made in the last twenty years to supplant the present method in lead chambers. Lealand and Deacon, in 1854, suggested the use of chambers made of stone, or earthenware. Simon, in 1860, proposed vulcanized gutta-percha, but on trial this substance was found more destructible than lead. Peter Ward, in 1862, proposed a series of glass sheets to increase the surface and hasten the reaction; that, however, had been used before, and as the formation of sulphuric acid is not dependent on surface action, it is of no advantage. Philips and Kuhlmann, as far back as 1838, proposed the use of heated air, and sulphurous acid passed over spongy platinum, but this has been almost forgotten. Fouché and Lepelletier, in 1850, employed a series of large Woolfe bottles instead of the lead chambers, at Javelle, near Paris, but this has been long since abandoned. Kuhlmann proposed to pass a mixture of sulphide of hydrogen, obtained by proper means from soda waste, through nitric acid in stoneware bottles, but the method was never put in practice. Petrie, in 1860, applied a system of stoneware columns, filled with pebbles, through which currents of nitric acid and sulphurous acid in proper proportions were passed; but this has not been successfully applied. Several years ago Persoz accomplished the oxidation "by passing the sulphurous acid gas through nitric acid, diluted with from four to six volumes of water, and heating to 212° Fah., or through a mixture of nitric acid, or a nitrate with hydrochloric acid. The reaction takes place in a comparatively small vessel of suitable material; the gas arising from the deoxidation of the nitric acid is reconverted into nitrous acid by air and water. Theoretically, it works without a loss of nitric acid; nevertheless the process has never been adopted in practice, possibly from want of suitable material to withstand the combined action of the two strong acids.

II.—SUBSTANCES EMPLOYED IN THE MANUFACTURE OF SULPHURIC ACID.

Sulphur.—There was a most beautiful display of specimens of sulphur from the south of Italy and from Sicily; and these countries furnish all the sulphur that is employed in the arts and in agriculture, except some little that is employed for domestic use in countries producing it, of which notice will be taken a little further on.

While we now obtain the larger proportion of sulphuric acid made in Europe from pyrites, it is very much to be desired that new and abundant supplies of sulphur may be found, for the acid made from this substance directly is purer, and the apparatus required less expensive than when pyrites is used. Besides the sulphur exhibited from Southern Italy and Sicily, there were specimens from Apt, in France, which locality furnishes a poor sulphur mineral. Also in the neighborhood of Constantine, in Algiers, there is native sulphur. In central Italy, near Bologna, there is a vein of sulphur ore about fifteen miles long, but the mineral is not rich, and is necessarily taken from a great depth, sometimes over 800 feet. About 12,000 tuns are produced here annually, which is almost entirely consumed in the neighboring country for diseases of the vine. From the Papal States there were also specimens of sulphur, but the quantity produced there is very small, not exceeding 500 tuns. The Spanish specimens come from Murcia and neighboring localities, where there are some fine mines of sulphur.

Besides the above, there were specimens on exhibition from Galicia, near Cracovy, from Corinthia, in Hungary, from the Grecian island of Milo, from Tripoli, Isthmus of Suez, on the borders of the Red Sea, province of Rio Grande, in the north of Brazil; but, as already stated, it is from Sicily that we obtain the great bulk of sulphur used in the arts. In this island the strata of sulphur extend over a length of about 170 miles, superimposed one on the other to a depth of from three to twenty-five feet and containing about thirty per cent of sulphur. The mines are owned by various influential individuals, who, by restricting the supply and by rude and imperfect mining, keep up the price to the present standard. There have been as many as 1,000 mines opened, but at the present time not more than one half are worked.

The manner of obtaining the sulphur has been frequently described, and was formerly of a crude character. The method now in most frequent use is that of Tucci, the inspector of of mines of Catanisette and Catania. It is by means of a species of furnace called *calarones*, by which very large amounts of the mineral can be operated upon at once. These *calarones* are simply circular furnaces of a conical form, having an inclination of from 20° to 45°, according to the nature of the gangue (which is calcareous or of gypsum), so that the viscous sulphur can descend and run off at the bottom. The walls of the furnace are about one foot thick and ten feet deep, and made of a capacity to hold more than 1,000 cubic yards of the ore; at the bottom of the furnace there is a hole to run off the melted sulphur, being the outlet of a channel coming from the interior of the furnace, which channel is continued for a little distance outside the furnace, and is branched and arched over by laying masses of the mineral so as to form little tunnels leading to a reservoir.

The furnace is charged by putting large lumps in the middle, and then smaller fragments on the outside, and finally covering all over with previously exhausted ore. Around the upper part of furnace are several small chimneys going down a foot or two; by these the furnaces are kindled at the top and air is supplied by percolation from above. One operation requires about twelve or fourteen days. The sulphur which has been collected in the reservoirs is cast into molds. The furnace requires twelve or fourteen days to cool down, when it is cleaned out and recharged; and this operation is repeated so long as the furnace lasts.

There are recent processes of separation proposed by Fangére, and by Emile and Pierre Thomas, depending on heat, but they deserve no special notice.

The most novel method is that of Deiss; namely, to dissolve out the sulphur by sulphuret of carbon, and an apparatus has been erected to extract by his process several tuns of sulphur daily, but practical difficulties still exist and prevent it from becoming a complete success. The quantity of sulphur produced in Sicily has gradually increased from 46,000 tuns in 1832, to 300,000 tuns at this time, worth from $22 to $24 a tun at the port of exportation. This increased consumption of sulphur, in spite of the diminished use of it in the chemical arts (for it will be shown a little further on that pyrites to the amount of 800,000 tuns, representing 250,000 tuns of sulphur, has taken its place), is due to the very large and increasing amount used for preventing diseases of the vine—diseases that have been almost exterminated by its use; but its use is kept up, as it is considered of great importance to give the vineyards an annual treatment of sulphur. If, however, sulphur should fall in price a little below what it is now, it would again come into general use in the manufacture of sulphuric acid.

Sulphur from Soda-Waste.—In the German section were shown the results obtained by the process of M. Mond, a chemist, of Utrecht, by which he extracts sulphur from soda-waste. The soda-waste has ever been a great nuisance, as well as a great loss in the manufacture of soda by Leblanc's process. It has become so great a nuisance in many of the large factories, that stringent sanitary laws have been passed concerning the disposal of it; and in some places, where it has been scattered over large surfaces, birds have been known to be asphyxiated while flying over it, and to fall to the ground.

A large amount of sulphur is thrown away in this waste, so that for forty or fifty years chemists have endeavored to solve the problem of turning it to some account. The prospects now are that it can be made to yield up much of its sulphur, and the residue to furnish a valuable fertilizing agent, instead of a pestilential nuisance. Some idea may be formed of the abundance of this waste when it is stated that for every tun of alkali manufactured one and a half tuns of dry waste is produced, furnishing the accumulations referred to, that during moist and rainy weather emit sulphureted hydrogen gas, and in solution, poisoning waters of all kinds in the neighborhood.

Besides the process of Mond there are two others brought forward, one by M. Schaffner, and the other by P. W. Hoffman; and seven works exhibit sulphur prepared by one or other of these processes. All the processes are based on the same principle—the conversion of the insoluble sulphide of calcium in the waste into soluble compounds, by bringing it freely in contact with air, in order to oxidize it; lixiviation of the oxidized mass, and precipitation of sulphur in these liquids by a strong acid, as muriatic acid.

(To be continued.)

REVERIE is not thought, though many people mistake it for thought. Thought is systematic; reverie is disjointed and fragmentary. Thought is laborious; reverie is the reverse.

Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

Heat from Percussion and Heat from Friction.

MESSRS. EDITORS:—On page 149, current volume, under the head of "Hammering Iron until it is Red Hot," I find the following, which I quote: "It has been asked whether iron could be hammered cold until it became red hot." And it is stated that, as an experiment to prove the affirmative, "when a piece of very tough iron was hammered with a moderately heavy hammer it became hot, but would not scorch a piece of paper. It was then hammered by two men, one of whom used a sledge hammer, but with no better result. Presently another workman took a horseshoe nail, and after hammering for less than two minutes with a light hammer part of the nail was brought to a bright red heat. The blows were light but frequent, and the nail was partly turned at each blow."

Now, is this not in strict accordance with the vibratory theory of heat?

No doubt a great part of the muscular force imparted to the hammer was, in both cases, changed into sonorous vibrations in the material sustaining the shock; this, of course, would produce the sensation of sound instead of heat.

The blows of the heavy hammer did not, directly, produce heat, but as the iron was not sufficiently elastic to recover from so great a compression, it was condensed, which caused a certain part of its latent heat to become sensible, but beyond this nothing was obtained. The light hammer, if at all, condensed the iron very little, and, the blows being "light but frequent," its force was expended in producing the very rapid molecular vibrations necessary in bringing it to the red heat which it acquired.

The human arm is incapable of striking very rapid blows, but if to the periphery of a wheel a series of small hammers be attached so that by the revolution of the wheel they will rapidly and in succession strike on a piece of iron it would probably produce a red heat much sooner than is possible by the hand alone. By greatly reducing the size of the hammers and increasing their number we would nearly approach what would seem to be the best mode of producing the desired result. Now let us look at the file, the saw, and the grindstone, and see if they do not furnish direct proof in support of theory.

What else than percussion would a piece of iron receive if pressed against the teeth of a revolving circular saw? Except the saw be put in too rapid motion the jumping of the iron from one tooth to the next would, in effect, be the same as so many distinct blows.

The same holds in relation to the grindstone. As it revolves hold one end of a nail against it, and it will soon, by leaping from one granule of the stone to another, acquire such an inconceivably rapid molecular vibratory motion as to become red hot. That a piece of iron under these conditions will soon become intensely hot is well known. The coarser the grit of the stone the more apparently is its action analogous to percussion.

These remarks lead us to see the close connection between friction and percussion—the one being insensibly graduated into the other; the difference is only in degree. Who can draw a line of separation? SPECTRUM.

Havana, N. Y.

The Gerner Boiler.

MESSRS. EDITORS:—Permit us to correct an error in your statement, in your issue of October 9, respecting the amount of heating surface in the small Gerner boiler you tested at Paterson, N. J.

The boiler is 10 feet long, 2 feet front, and 3 feet rear diameter, giving a total heating surface of $83\frac{30}{144}$ square feet, instead of 144, as stated. The results obtained by you being over 15-horse power shows $5\frac{1}{2}$ square feet in these boilers to be sufficient to produce a horse power, and illustrates the efficiency of the heating surface. KASSON & CO.

New York city.

On the Flow of Elastic Fluids.

MESSRS. EDITORS:—On pages 50 and 118, of the current volume of the SCIENTIFIC AMERICAN, are articles "On the Flow of Elastic Fluids through Orifices or Pipes." The theory of this subject which appears to be accepted by the writers of these articles, is the old theory, and the only one, so far as I know, that has as yet found its way into treatises on physics. It is, however, a theory which is widely at variance both with sound theoretical philosophy and with the results of experiment. It is, in fact, nothing more than the theory of inelastic and inexpansible fluids applied to those which are elastic and expansible; it being assumed that there is no difference between the two in respect to the law of their flow except what is due to the smaller ratio of weight to pressure in the elastic fluids.

The effect of the expansibility of elastic fluids is such as to take them entirely out of the law which governs the flow of those that are inelastic. It causes the flow into a vacuum in a given time to be only half as great as the old theory calls for; and this, not because the velocity of the flow is less than that theory assigns, but because the density of the flow is only half as great as the theory assumes it to be.

Another curious and important fact which results from the expansibility of a fluid, is that when it flows from one vessel into another containing fluid of less density, the fluid in the receiving vessel has no effect whatever to obstruct or retard the flow, unless its density exceeds half the density of that in the other vessel. In other words, steam at 20 pounds pressure in the cylinder, will discharge itself into the condenser already containing steam, of not exceeding 10 pounds, just as