two cuts at the same time, has been invented by Mr. T. F. Osburn, of Jerseyville, Ill. Two reciprocating saws work in a frame by means of slide rods driven by eccentric gearing. The piece of wood to be sawn is held in position by suitable holding and adjusting rods.

A new Coal Drill has been patented by Messrs. J. J. Rigney and William Hemingray, of Shamokin, Pa. It consists of a tapering and toothed cylinder, which is screwed into the coal by means of a wrench, and which carries the boring auger, the latter working by screw threads in a removable nut.

Mr. Cyrus Hunter, of Stonewall, Va., has invented a Steam Engine, in which the essential feature is a cylinder with closed heads and broken-out middle part, by which in reality two cylinders are formed, in which two separate pistons, with a single connecting rod and cross head, work. The valves are put in motion by the pistons, and are coupled together. The inventor claims a more perfect alignment by this arrangement, and freedom from the leakage and friction of the stuffing box of ordinary engines, none being required by the piston rod, as it does not pass through a cylinder head, partition, or abutment.

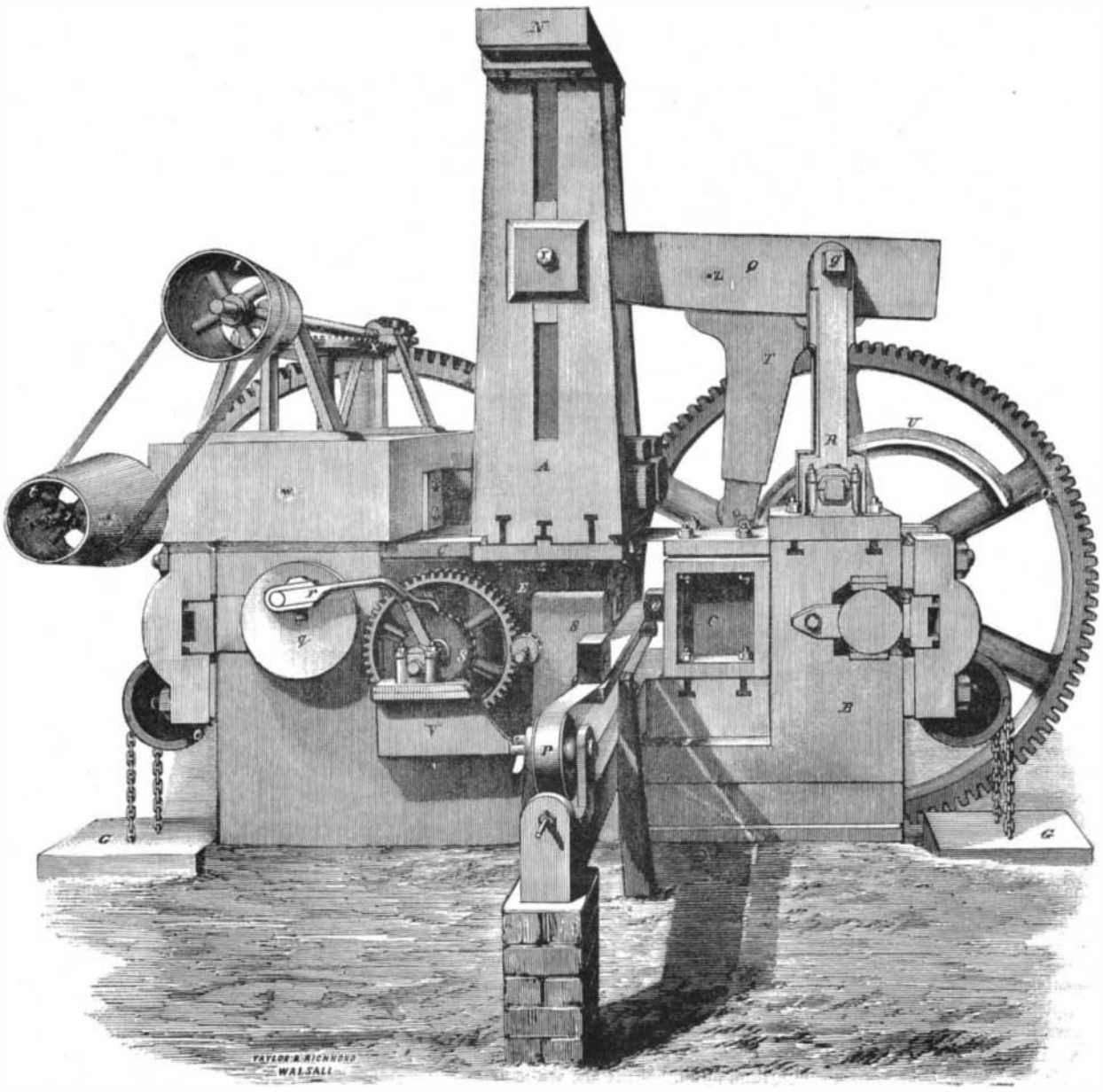
An improved Gas Lighter and Automatic Extinguisher, invented by Mr. G. S. Dunbar, of Pittsfield, Mass., is operated by an ingenious system of clock work, designed to work with regularity and effectiveness.

BROWNHILL'S BRICK MACHINE.

The machine shown in the accompanying illustration is the invention of Mr. R. W. Brownhill, of Walsall, England. Its most striking feature is the large margin of strength allowed in its construction, the dimensions of all working parts being so increased as to provide against great or unusual strain. Having thus provided for strength and durability, the inventor claims that the machine is capable of operating upon all kinds of brick earth in any condition, rough, ground, disintegrated, wet, dry, or semi-dry. Of course the quality of the bricks made ultimately depends upon the character of the material used; but, so far as the machine itself is concerned, the avoidance of the breakages and interruptions, so frequent with machinery of this class, is an essential point gained.

Referring to the engraving, B is a strong cast iron frame, with moulding box, S, cast on it. C C are slide boxes to guide the pistons, *e e*, which form two sides of the brick. The pistons are fitted with strong friction rollers. The pulleys, C *e*, and the chains and weights, G G, are to keep the pistons close to the cams cast upon the main shafts during their irregular motion. The hammer to drive the clay into the mould, S, works on the slides, A A, connected at the top by the cap, N; it falls during every revolution, and supplies and consolidates the clay through the hopper, E, into the moulding box, S, and between the piston pallets, *e e*. The hammer is operated by the helve, Q T, which works upon a reeler, R, turning upon a gudgeon, *g*. At the lower end of the helve, T, is fitted a friction roller to work upon the spiral, U, which is connected to the large spur wheel. By this means the hammer is raised and then dropped with the force of its own weight. The pallets, *e e*, deliver the bricks upon the band, P, which is worked by a small band pulley lifted at the moment when each brick comes out of the mould.

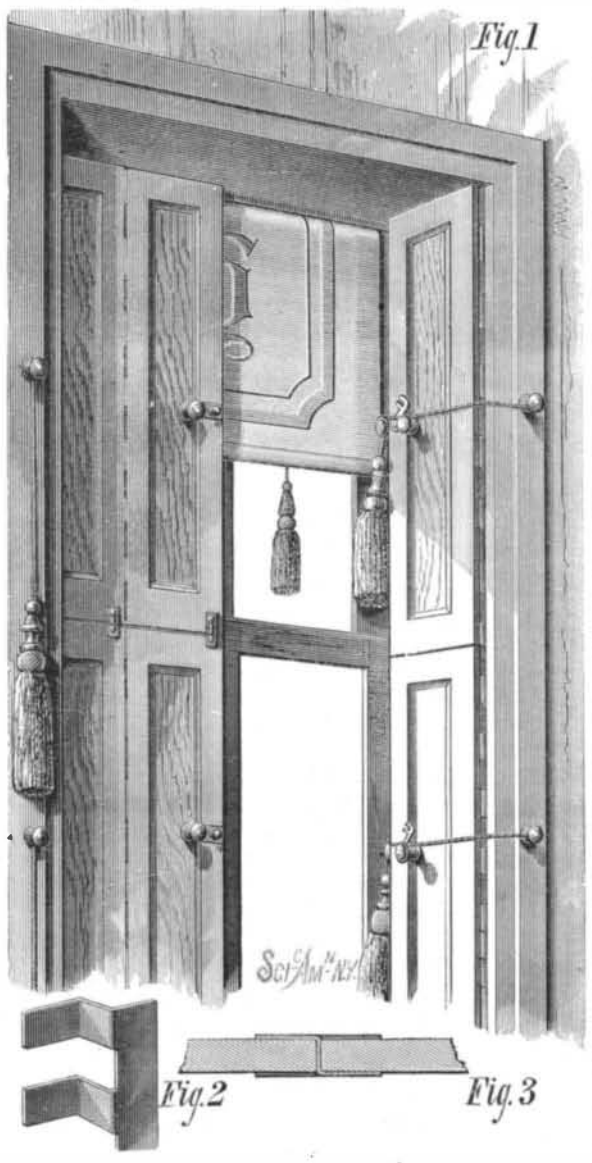
The operation of the machine is as follows: Clay is fed into the hopper, W. The screw revolving at the bottom of this hopper carries an adjustable quantity of clay into the hopper proper, E. Under this hopper the distance is regulated between the pallets for a regular quantity of feed, and it in reality becomes the mould. Just at the moment the pistons are in position the hammer falls, and forces the material into the mould. The motion of the cams causes one piston to retire while the other advances, and presses the brick. The retiring piston then entirely leaves the mould, and the advancing piston forces the brick out of the mould, to be taken away by the band before described, and thus completes one brick. The machine is adjustable in all its motions.



THE BROWNHILL BRICK-MAKING MACHINE.

IMPROVED PAPER SHUTTER FOR WINDOWS.

Our engraving illustrates a new adaptation of paper to building purposes, the same being the manufacture of the



PAPER SHUTTER FOR WINDOWS.

material into inside blinds or shutters for windows. A shutter composed of paper is claimed not to be so liable to be affected by shrinkage and expansion, and therefore is free from the disadvantages of binding or open joints. It is lighter and cheaper than wood, and it may be attached where wooden shutters cannot be. It admits of every variety of painting or ornamentation in set patterns ready for the trade, renewable at any time in similar manner to wall paper.

The shutter parts are composed of panels or sections united by flexible joint hinges of cloth, as shown in Figs. 2 and 3. The strip of fabric is cut as shown with tongues, two strips being glued one on each side of the same section, and the tongues of each strip lapping on the opposite sides of the adjacent section. These hinge strips extend from top to bottom, as shown in Fig. 1. The panels thus joined are similarly hinged to jamb pieces for attachment to the jambs, which pieces are wide or narrow to suit different styles of windows, and are constructed with reference to the folding of the shutters. At the point of junction of the shutter parts, in the center line of the window, they are provided with rabbets to close the joint and shut out the view, and to prevent the shutter from springing or warping. The jamb pieces can also be applied upon the surface of the architrave, where the jamb is too shallow to receive the wooden shutter now in use. This is claimed to be an important advantage, as it permits of the application of inside shutters to any house without alteration of the windows.

Patented January 15, 1878. For further information address Messrs. Hipkins & Meek, Bellaire, Belmont county, Ohio.

Japanese Textile Fabrics.

Calling attention to a fine display of Japanese woven and embroidered stuffs—the spoils of a temple and palace in the center of Dia-Nippon—exposed for sale in this city, Mr. Frederic Vors gives, in the *Tribune*, an interesting account of this branch of ancient Japanese manufacture. He says:

"Numerous articles have been written about the fictile, metal, and enamel productions of Japan, but little, until now, has been said of the proficiency of the Japanese as weavers and manufacturers of textile fabrics. For years past we have been familiar with Japanese silks, such as were offered for sale in drygoods stores, especially made for the European and American markets; but what has been excessively scarce and almost unknown until now are the woven stuffs, brocaded dresses, and embroideries that were worn by the princes and daimios of a period at which the most remarkable manufactures were made, like Sèvres porcelain, only for presentation pieces, or for the use of crowned heads.

"For the artist and the collector the study of such stuffs affords an unusual interest, for it shows even to better advantage that subtile quality of ornamentation which makes Oriental art so interesting. The first impression received on seeing these superb textures is one of exquisite delight at the perfect harmony of design and color, but, as the eye wanders over the stuff, new details appear in every spot. The color of the groundwork changes, and so does that of the ornamental pattern, but on several yards of stuff the same juxtaposition of color between the ground and the ornament will not be repeated, thus affording great interest to the observer. The robes of the princes were of large dimensions—which seems singular when we think how low in stature the Japanese race is—and cut square, for their artistic sensibility is so acute that they could not have the heart to cut 'bias' through a beautiful pattern. This detail is not without interest, for we can take the dresses apart and use the wide bands of stuffs for decorative purposes. The lining used for each dress is always in perfect harmony with the outside hues of the garment, which offer the most striking variety even in one single piece. The dresses of musicians, jesters, priests, and lords, though cut in the same shape, are ornamented with suggestions of the occupations of the wearers. Some are so heavy with gold brocade that their weight is nearly sufficient to bear a man down, but in all cases that most exquisite harmony of color, which is such a relief to us after all the dogmatic art we have suffered under so long, is carried out in the most delightful

fashion. These people, who live in abodes that are more like tents than houses, and who, thanks to the glorious climate of their country, are always out of doors, seem to imbibe the influence of the magnificent coloring of nature by which they are always surrounded. Japanese art is true art in the fullest acceptation of the term; that is, a simple rendering of nature without any effort of the brain. When imagination comes in play, then it introduces those terrible though gracefully curved monsters which astonish us and set us thinking, for their magnificent grotesqueness does not interfere with the general composition of the design, but only enhances its beauty by strong contrast.

"The metallic threads used in their brocades are always made of paper, gilt or silvered, for the Japanese are masters in paper manufacture. This has a two-fold utility; while it makes the stuff more rigid, it does away with the hard cracks which occur in pieces in which gold thread of inferior quality is used, for real gold thread is too costly to be used except in church ornamental work, and even then only for pieces used on the altar. In some of the finest embroidery, such as was made for the hangings of temples, the gold work on the dragons is heavy enough to introduce glass eyes and metal claws, which help very much in making the monsters terrible. In embroidering on crape—such as is known in the trade as *crêpe de chine*—they are without rivals. They use a peculiar method of reserving certain parts by painting them over with a chemical which prevents spots thus prepared from taking the dye. In this way, when the stuff comes out of the dye vat, an important part of the ornamental design is already indicated by white masses and lines. Plaids produced by lines of different colors and thickness intersecting at right angles seem to have been used by them long before they became identified with Scotch fabrics."

Communications.

Our Washington Correspondence.

To the Editor of the Scientific American:

Owing to insufficient appropriations many very valuable clerks were recently dismissed from the Patent Office, and complaints have already begun to be made of the interruption of business resulting therefrom. The Commissioner, however, says that the discharge was unavoidable, as funds had run short, and that the allotment for salaries, etc., had even been exceeded. This should be remedied at once by Congress. It is not as if the Patent Office were an expense to the Government, as in that case there might possibly be some excuse for the parsimony which Congress exhibits; but when it is considered that over $120,000 more was received for fees than was paid out for expenses last year, and that over $1,100,000 lies to the credit of the Patent Office in the Treasury, a good reason is shown for more liberal dealings toward the office.

There is another matter where Congress is also derelict in its duty: it has suffered the Patent Office to remain for months without a decent roof, and has taken no steps toward repairing the injuries done by the fire. The inventors of the country have a right to demand that the edifice should be put in order again with the least possible delay, so that the model museum may be again ready for the convenient arrangement and storage of the models, as they pay fees enough to entitle them to sufficient accommodation.

THE PROPOSED PATENT COURT.

Mr. Vance has introduced into the House a bill to establish a Court of Patents, with three judges at a salary of $5,000 each. It allows appeals from the Commissioner to the court, and the decision of the court is to be conclusive, but not to the extent of preventing any person from testing the validity of a patent in any court of law or equity. The clerks and messengers of the court are to be assigned by the Commissioner of Patents from his force, and the rooms to be occupied by the court are to be in the Patent Office building. The board of examiners in chief is to be abolished, and all statutes applicable to it are to be made to apply to the Court of Patents. We have already pointed out the objectionable nature of this project.

REMOVING BARS IN THE MISSISSIPPI.

Captain Eads, having succeeded in his great enterprise at the mouth of the Mississippi, is looking around for more worlds to conquer, and now proposes to apply his jetty system to the removal of the bars wherever they occur between St. Louis and the Mississippi's mouth. He claims that by his method of operating a channel 25 feet deep can be secured between those points, and, moreover, that by making the width of the stream uniform the velocity of the water will equalize the bed of the river through the movement of the sediment, thereby rendering levees unnecessary.

In view of the success of Captain Eads, where it was doubted by many of our prominent engineers, his proposition, notwithstanding the enormous expense involved, is worthy of a careful consideration. The importance of the Mississippi as a national commercial channel cannot be exaggerated, and it consequently has strong claims for a large share of the money which Congress may see proper to appropriate for internal improvements. The money which it would require to construct a complete system of levees is so enormous as to stagger even the warmest friends of a liberal policy in regard to such matters. If it is believed on investigation that the plans of Captain Eads are practical, the expense of improving the Mississippi, and confining it within bounds, would be so greatly reduced that Congress would not be likely to hesitate about granting all the aid necessary for that purpose.

AMERICAN BUTTER IN ENGLAND.

The last report from our Consul at Newcastle-upon-Tyne gives some facts relative to American butter, which it seems desirable that the producers of that article should know. Complaint is made that the butter is too salt and packed in roughly finished red oak tubs. If made with less salt, but of the best quality, and packed in neat firkins or kegs of white oak, ash, or white cedar, and sent across the Atlantic in refrigerator steamers, it would command a good sale at remunerative prices. Danish butter has the preference on the east coast of England and in Edinburgh, the price being as high at present as from $38.44 to $38.93 per hundred. In London, Liverpool, Manchester, and Glasgow the American sixty pound tubs give satisfaction.

NORTH CAROLINA GOLD MINES.

A memorial from the Sixth Congressional District of North Carolina asks the appointment of a commission to visit the mineral regions of that district and to make a report thereon. From a pamphlet accompanying the memorial it appears that the gold producing area of North Carolina covers about 12,000 square miles, containing 140 mines already developed, besides large coal, iron, and copper areas. The yield of gold from these mines up to June 30, 1877, was $10,370,492.

OCCASIONAL.

Washington, D. C.

Correlation between Gravity and Electricity.

To the Editor of the Scientific American:

The experiment of Professor Pirani, described on page 80 of the SCIENTIFIC AMERICAN of February 9, 1878, and intended to demonstrate that electric currents are subject to the influence of gravity, does by no means prove what it purports to do. The influence of gravity upon a column of liquid is its hydrostatic pressure on the lower end, and this must necessarily affect the condition of the surface of the electrode which is exposed to this pressure, and make a difference with that which is at the top of the column not exposed to the same pressure. This difference of condition is sufficient to generate a weak current, perceptible by a sensitive galvanometer; this is sufficiently illustrated by the currents developed by two plates of the same metal attached to the ends of the coil of a delicate galvanometer, and plunged in the same solution; the least difference in the condition of their surfaces, or plunging one plate deeper in than the other, will cause a current to be produced.

To this must be added that liquids are very different from gases in respect to uniformity of the mass, which, by the nature of the molecular motion of gas particles and the consequent law of interpenetration, remains perfectly homogeneous throughout the whole mass, while in liquid solutions there is a tendency to greater concentration at the bottom of a column, when not mechanically agitated. I think, therefore, that this experiment may be dismissed as proving nothing in regard to the direct action of gravity upon electric currents; the more so, as from our present knowledge of the nature of these currents, and the overwhelming proofs that no such thing as an electric fluid exists, it is obvious that gravity cannot act on a thing which has no existence. This experiment belongs to the same class as that which tends to prove that heat has a negative weight, by showing that a body when warm weighs less than when cold. In fact a delicate balance will easily show this; but the cause is that the warm body generates upward air currents, which carry up the side of the scale on which the body is situated. In a similar way gravitation causes a difference in the condition of the two ends of a liquid column, which change may generate an electric current.

On page 148 of the SCIENTIFIC AMERICAN of March 9, a comment on the above appears in a communication on "The Correlation of Magneto-Electricity and Gravitation," in which the writer makes several erroneous statements and shows that he has very obscure conceptions of the nature of these forces. He says: "First, gravitation acts upon all kinds of matter; Faraday proved the same of magnetism." The latter statement is incorrect; Faraday proved that most substances were either para- or dia-magnetic, but that magnetism does not act at all on some bodies. "Secondly, gravitation is attractive; so is magnetism." Again incorrect; magnetism attracts or repels, according to whether poles of different or similar kind act upon one another. "Third, gravitation is proportional to the mass; the force of magnets depends also upon the mass." Not so; light and thin steel bars can be better and more strongly magnetized than heavy, thick ones. "Fourth, gravitation acts in an inverse ratio to the square of the distance; so does magnetism." Again incorrect; in some instances, such as the magnetic attraction of wires through which an electric current is passing, magnetism acts in the inverse ratio of the distance and not as the square, as has been proved by Ampère. "Fifth, gravitation does not manifest polarity; magnetism is known not to do so." The latter is the most absurd of all the statements made. It is magnetism which has revealed to us what polarity is; it is the very force which taught the existence of polarity, and with electricity exhibits the only polar phenomena. "Sixth, gravitation acts independently of bodies affording a resistance to light and heat; so does magnetism." Again wrong; while neither light nor heat affect gravitation, light has lately been proved to affect the electric conductibility of selenium, tellurium, and other metals, while increase of temperature diminishes magnetic attraction, and a sufficiently high temperature destroys it altogether.

The true magnetic connection between sun and earth may be more plausibly explained by Barlow's hypothesis that the alternate heating of the different sides of the earth during its daily rotation generates electric currents, from east to west, on the principle of thermo-electricity, and that the compass needle, according to the law of Oersted, places itself at right angles to these currents.

As by irregularities in the earth's surface these currents run in most localities not exactly east and west, the needle does not point exactly north and south, except in the few places where the electric currents run exactly east and west. If by reason of the sun spots the amount of heat emitted from the sun fluctuates, the electric currents generated by that heat change; and this may account for the connection between sun spots, magnetic periods, and auroras, which are nothing but electric currents through the rarefied air above the clouds.

Your correspondent further states that "the isoclinal, isodynamic (of the magnetic), and isothermal lines run parallel." This is by no means the case; the only thing which can truthfully be stated in this regard is that there is a slight tendency that way, so that the point of greatest cold on our earth's surface inclines toward the magnetic pole.

Finally, P. M. C. asks some questions, which I will attempt to answer. "1. Will not the supposition that the sun is a huge magnet account for the production by that body of light, heat, etc.?" Answer: Only to those for whom the word magnetism is a mysterious agent which may explain everything; but for those who have studied magnetism and know what a magnet is, it will explain nothing of the sort. Second question: "Admitting this hypothesis, will it not explain why the light of the sun increases as a heavenly body approaches it?" Answer: It will not; the approach to a magnet of another body, whether magnetic or not, never increases its temperature. Third question: "Will any other theory explain this satisfactorily?" Answer: It will; the theory of gravitation teaches a disturbance or tidal wave caused in the solar atmosphere of incandescent vapors by the mutual attraction of gravitation on the approach of a heavenly body. Fourth suggestion: "No known force except magnetism can produce all the phenomena of comets." Answer: A gratuitous assertion, pleasing to those who consider magnetism a convenient word to use in place of a rational explanation. The phenomena of the dual appearance of Biela's comet, the multiplication and relative position of the tails, and their coruscations have been a subject of deep research among speculative astronomers, and the mere assertion that "magnetism is sufficient to produce these most wonderful and least understood features" is a loose statement, without sufficient foundation, and as such insufficient for a rational investigator.

The only road to progress in our knowledge of natural phenomena is by thorough investigation and legitimate deductions from correct premises, while wholesale assertions, especially when they are utterly untrue, can only retard progress by deluding us with a shadow, and even less than a shadow, while the substance remains unknown.

P. H. VANDER WEYDE.

New York, March 16, 1878.

Rating Steam Boilers.

To the Editor of the Scientific American:

The frequent effort to decide the horse power of a steam boiler by the caprice of law, or the impression made by unintelligent experts on an ignorant jury, shows the want of a standard of duty on this subject that would be acceptable to steam users, without entailing on boiler makers a burden "grievous to be borne."

I suggest as a boiler horse power the evaporation of the number of cubic inches of water, obtained by dividing Watt's inch pounds per hour, by the duty developed, when a cubic inch of water is expanded into steam at atmospheric pressure.

Thus boiler H. P. = $\frac{33{,}000\times60\times12'}{14{\cdot}7\times1{,}700}$ = 950 inches, which will make two horse power when a good engine is used, and I do not think a boiler maker should be required to furnish an amount of boiler which may be necessary to supply steam to develop a horse power on a bad engine.

T. J. LOVEGROVE.

3,326 N. Broad Street, Philadelphia, Pa.

Man's Place in Nature.

To the Editor of the Scientific American:

What is it that led Dr. J. W. Dawson some years ago to report Huxley as saying that the Engis skull might have contained the brains of a philosopher, without giving the remaining portion of the sentence quoted?

We could not of course expect anything different from the colossal misrepresenter Cook, and therefore are not astonished to find that he quotes the sentence in the same way; but when the President of the New York Academy of Sciences, Professor Newberry, gives the same mutilated quotation, we begin to suspect that there is a mutual understanding between these three, that they will all bear false witness in this matter.

Or is it more probable that Dawson quoted carelessly from memory, and that Cook found it convenient for his purposes to follow Dawson, and that Newberry has been reading the reports of Cook's lectures?

May I beg you to print the sentence from Huxley in italics, so that those who are too lazy to look up the book (which