VANIER'S IMPROVED BRICK MACHINE.

The new brick machine represented in our engravings belongs to that class in which dry or damp clay is moulded by the application of heavy pressure. Its action is continuous, one pair of moulds being filled while the contents of another pair are being pressed. The construction is as follows:

The pairs of moulds, A, are formed upon the table, B, Fig. 2, and said table is supported by a vertical shaft. The main shaft, C, of the machine carries a heavy fly wheel. Placed above and below the shaft and table are the working beams, D, Fig. 1. The shafts of these beams roll on a flat surface in the ends of the standards, E, and are forced apart by springs. From one beam a tooth projects which is received in a mortise in the other. Above the table is a guide, F, supported by a spider which contains a follower having on its under surface projections which fit the moulds in the table. Means are provided for drawing together this follower, an intermediate block and the upper beam. Connected with the lower beam is another and similar follower. To the rear end of the beams are attached arms which engage with cam lugs on the shaft, C, Fig. 1. Said lugs are arranged diametrically opposite on the shaft and engage the two parts of the toggle simultaneously. The upper cam lug is the wider, so that the motion of the shaft is communicated to the upper beam longer than to the lower one. The toggle arms communicate by means of links with a rocking shaft, and this last communicates with a pivoted lever, G, which carries a roller engaged by a cam on the shaft, H. This shaft is rotated by gearing from the main shaft.

The lever, I, Fig. 2, is pivoted to an arm attached to the rear end of the frame, and is connected with a follower moving on guides formed on the spider. It also has two projections which fit the moulds on the table, and a cam opening which surrounds a disk on shaft, H. J is an endless apron which is moved intermittently. Above the table, B, there is a cylinder, K, in the bottom of which are two openings corresponding to a pair of the moulds in the table; and also several screw blades attached to a rotary vertical shaft.

The operation of the machine is as follows: The clay is placed in the cylinder, K, whence, being agitated and pressed down by the blades, it passes to the moulds. The table is then at rest, and a plate beneath prevents the clay dropping through. While one pair of moulds is being filled another pair containing clay is being pressed by the straightening of the toggle arms on the beams. The greater width of the upper cam on the main shaft causes the upper follower to move the brick downward in the mould after it is pressed, thus loosening it. After the bricks are pressed they are moved forward by the rotation of the table, B, and discharged from the mould by the follower on the lever, I, the table over which the endless belt, J, passes having previously risen to receive them. This table descends simultaneously with the follower, and when the table, B, makes another forward movement the endless apron is rotated sufficiently to carry the bricks outside the framework of the machine, when they may be removed. When the lever, I, is raised by rollers in the periphery of a disk it strikes a pin on the upper beam, causes the latter to rise, and by the interconnection between this beam and the lower one both are thus moved away from the moulds. In the present case the cams act at every fourth revolution of the main shaft, and this intermittent action is secured by holding the toggle cams out of the engagement with the cams while the shaft makes three revolutions, and moving them so that they are caught by the cams at the fourth revolution by means of the connection of the arms with the lever, G, which is moved at the proper instant by the cam on shaft, H. The motion of the fly wheel is accelerated during the three revolutions in which no work is done, and as it is of large diameter and great weight, its momentum is sufficient to exert the required pressure. The inventor states that there is no lateral strain upon the main shaft, as it simply revolves between the toggle arms, and the pressure exerted by the cams is alike above and below. All of the bearings, where any considerable strain is exerted, are constructed with rolling surfaces, so that the friction of the machine is reduced to a minimum.

Patented through the Scientific American Patent Agency November 27, 1877. For further information address the inventor, M. Zéphirin Vanier, Westborough, Worcester county, Mass.

Fig. 1

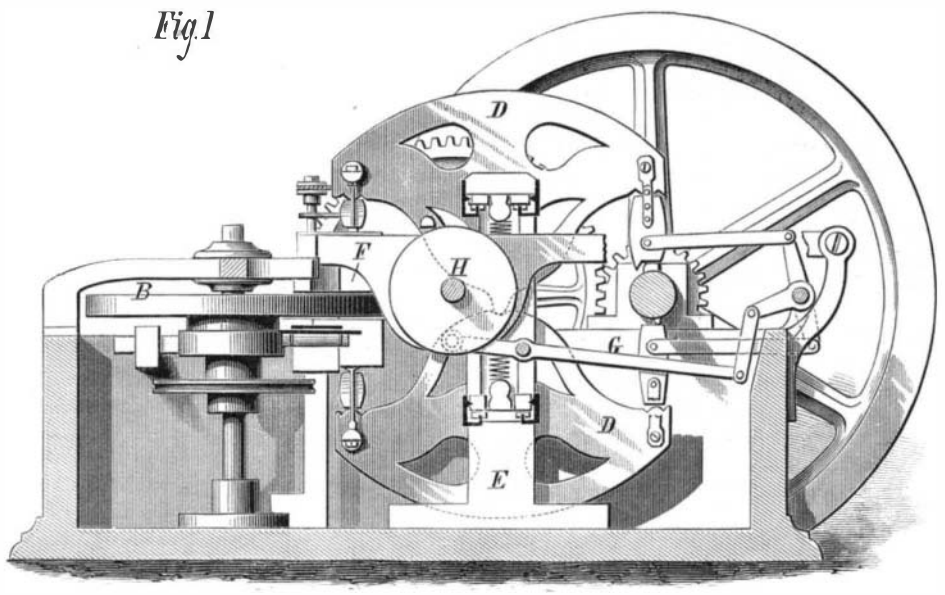
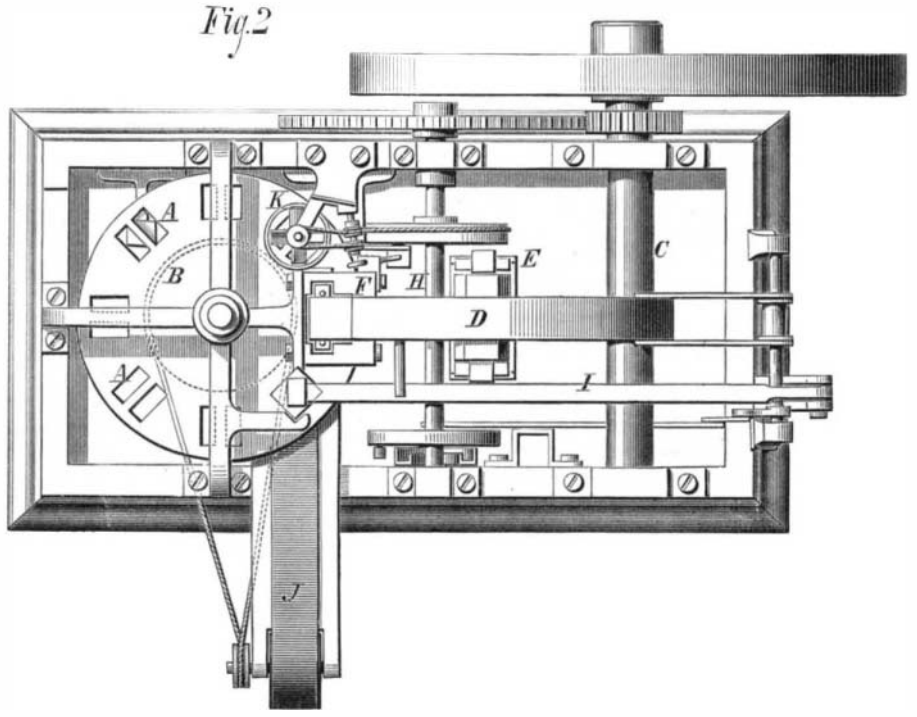


Fig. 2



VANIER'S BRICK MACHINE.

BAUGH'S PATENT SECTIONAL MILL.

In the annexed engravings are presented sectional and perspective views of a new mill in which a sectional system of grinding surfaces is adopted. Such grinding sections as may be broken or worn out may be replaced without renewing all, and various kinds of plates can be inserted to suit any sort of substance to be ground. This change can be very easily and quickly effected. The grinding surfaces are claimed to be arranged so as to be strong and to be subject to the smallest possible wear and tear. Their disposition will be readily understood from Fig. 2.

The No. 1 mill or crusher (Fig. 1) weighs about four tons. A still larger size is made specially for glue manufacturers. The variety of surface "dress" which is attainable under the system of casting in sections is very great, and to each class of substances to be reduced can be applied its appropriate grinding surface. Thus the mills are used not only for hard and brittle substances like minerals, ores, etc., but also for tough raw bones, damp guanos, pork and beef cracklings, and woods.

Each mill is complete in itself, bed plate, countershaft,

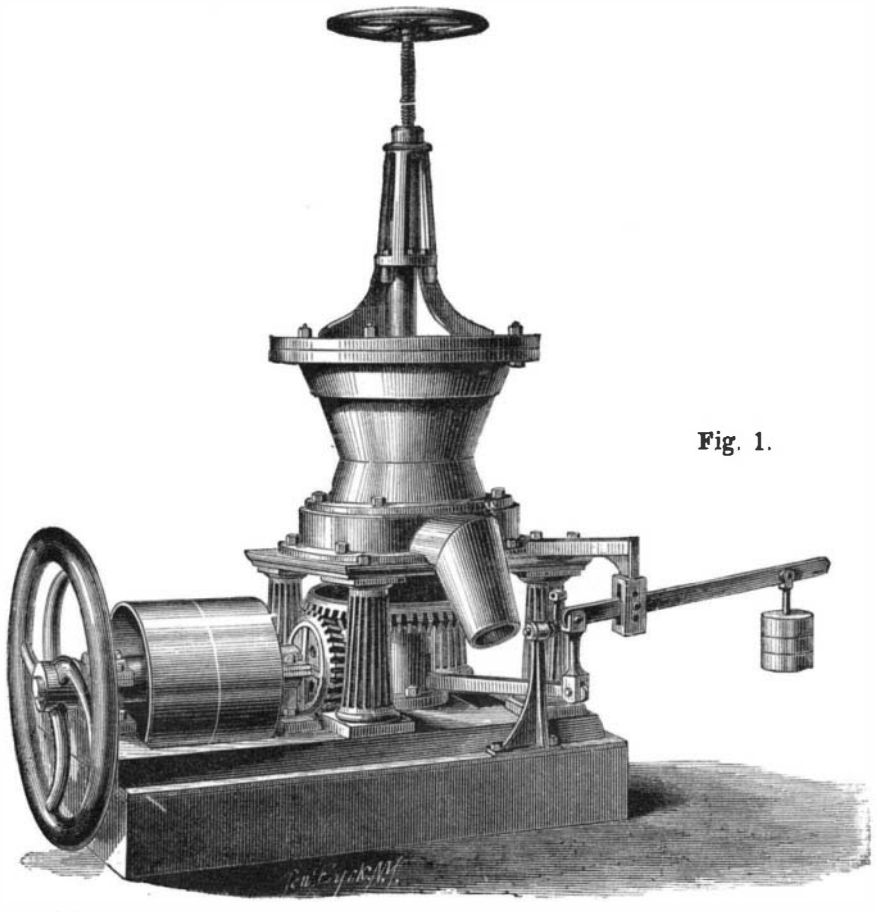
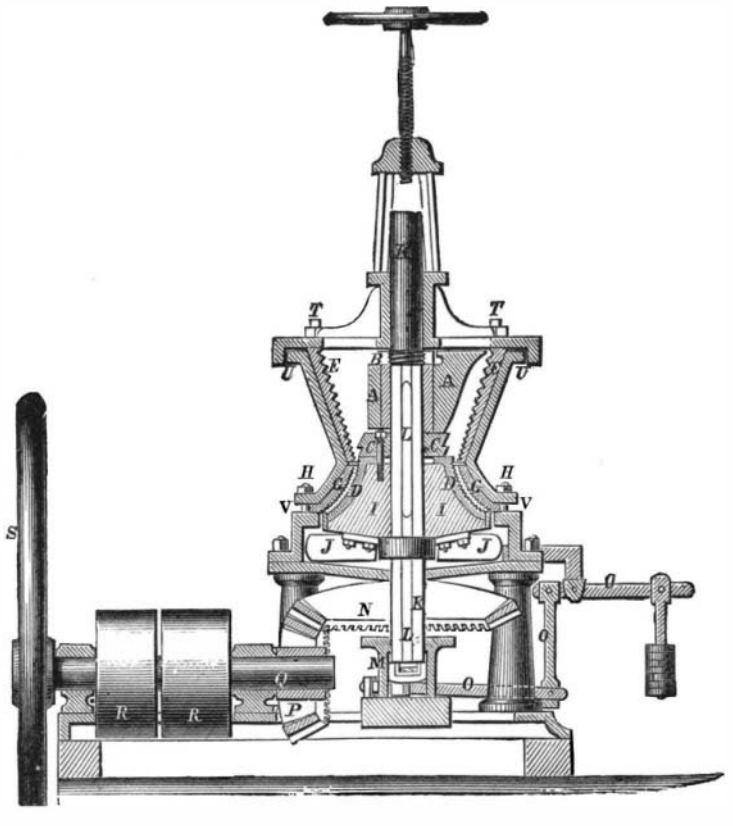


Fig. 1.



BAUGH'S PATENT SECTIONAL MILL.

fast and loose pulleys, fly wheel, etc., requiring merely to be bolted into position to receive the power to drive them. Suitable means are provided for regulating the fineness of the material to be ground.

For further particulars address Messrs. Baugh & Sons, 20 South Delaware avenue, Philadelphia, Pa.

Communications.

Coal Dust Fuel.

To the Editor of the Scientific American:

Since writing an article for your paper on "Coal Dust as Fuel" I have been in receipt of numerous inquiries as to the *modus operandi*. I think with your correspondent, Mr. C. J. Sanborn, of Massachusetts, that plenty of boiler room, also grate and heating surface, is a prime necessity. Care should be taken to keep all surface exposed to the action of the fire and heated gases as free from soot and ashes as possible. A careful watch should be kept of the inside of the boiler as well as the outside, as with a forced blast it does not answer to allow the scale to fall from the tubes and collect over the fire, as the consequence would be a burned sheet in a very short time. In regard to the grate, I use a flat grate, each bar being about 3 inches wide by 4 feet long, having 2 slots $\frac{1}{8}$ inch wide and 1 inch long to the width of the bar, and about 2 to the foot of the length of bar. I allow $\frac{1}{8}$ inch space between bars for expansion, and 1 inch in length, which I find sufficient. I have 16 square feet grate surface, and use a No. 2 Sturdevant blower, which gives plenty of blast. I do not quite agree with Mr. A. F. Upton, in your issue of February 2, as I have never known the "fine particles of fuel to be blown out of the top of the chimney," neither do I "melt the fuel on the grate," for, if there is plenty of boiler room, there is no necessity of giving it blast enough for that. In regard to the injury to the boiler I fully agree with him, but I think the saving in fuel will doubly cover that loss. I prefer to use the dust free from coal, as my experience is that I can burn fuel much more economically than with it, with less trouble, as the two fuels require different treatment. One peculiarity of dust is that I can run the steam up while cleaning the fire, whereas with coal the tendency is to run it down. Another is that I can keep fire and steam much longer than with coal, frequently keeping it from 4 P.M. Saturday till 6 A.M. Monday, and in several instances till Tuesday, not touching the fire in the meantime, and keeping steam up from 25 to 50 lbs. I use dry live steam to blow out boiler tubes, which (with dust) requires to be done two or three times weekly. There is another point which I have found materially to affect the steaming of my boiler, namely, keep the chamber back of bridge wall deep. I find that with the back from $3\frac{1}{3}$ to $4\frac{1}{3}$ feet deep I do not have to fire nearly as hard to keep up steam; I carry just as thick a fire with the gate in blast pipe half closed as I can, and keep the steam to 60 lbs., then, if an extra quantity of steam is wanted, open wide the blast pipe, thin down the fire, and I have plenty. If I want all that the boiler can make (which I very often do for an hour or two in very cold weather) I carry a thin fire full blast, and rake and stir the fire every few minutes. At night, just previous to shutting down, I rake my fire, cleaning it well, then cover with fresh fuel, only letting it get well warmed up, shut all dampers, and leave for the night. The heat from the walls of furnace will hold the steam about stationary. I usually have from 40 to 60 lbs. the next morning, and in from 5 to 10 minutes after starting the blower as fine a fire as any one would wish. My grate bars have been in two and one half years and are as good as ever, which, as you can see, is a great saving in grate bars alone.

Milford, Conn. WALTER F. SAGE.

Making Wooden Pulleys.

To the Editor of the Scientific American:

A pulley over 24 inches in diameter should be built on a spider; all under that size can be made on a wood centerpiece about 2 inches thick, having a cast iron flange, say 8 inches in diameter, for a 20 inch pulley, with a hub and boss about 3 inches long. Four bolt holes should be made through the flange for bolting to wood center. The latter should be a nice fit on the shaft, with key seat the same as for an iron pulley. After preparing the centerpiece by planing smooth and straight, make a templet, the length being about one sixth or one eighth of the diameter and 2 inches wide. By this mark out the amount of stuff for the required width of face. The lumber should be about seven eighths or 1 inch thick, sawed out to the same circle as centerpiece. Plane straight and smooth, and make the butt joints a perfect fit; glue and nail on. If a flange is desired on each edge to keep the belt from running off, make the outside layer a little wider and allow it to lap over the face. Put the pulley into a lathe and turn it up. Thus made, it will be durable and will not easily break. B. J. DONAWAY.

Terre Haute, Ind.

Preventing Collisions at Sea.

To the Editor of the Scientific American:

In regard to preventing collisions at sea, I would suggest the following plan: Each vessel could carry four different colored lights, say red for north, white for east, green for south, yellow for west; a set of these lights on each side of the vessel. If a vessel was going north it would hoist a red light; if going north-northeast, it would hoist one light under the red; if going northeast, two lights under the red; if east-northeast, three lights under the red; and so with east, south, and west, the white, green, or yellow lights could be raised, and the number of lights under them as the vessel is sailing points to the right of the direction for which the top light stands for. During fogs, when the whistle has to be used, one long blast could mean north; two, east; one short and one long, south; two short and one long, west; and as many short blasts as the vessel is steering points to the right of any of these points.

Eagleville, Ohio. L. A. OSBORN.

The Bicycle vs. Pedestrianism.

To the Editor of the Scientific American:

G. O. A.'s question in regard to the bicycle in "Notes and Queries" I should like to answer in the affirmative. The third time I rode a bicycle on the road I ran twenty miles over a rough road. Several hills were ridden over, and three very steep ones surmounted on foot, and yet my actual running time was two hours and a half. To have walked the same distance would have taken me at least four hours and a half. In regard to the exertion required, I can say that on this occasion, though somewhat tired, I was neither lame nor blistered, *sequelæ* which, I am sure, would have resulted from a walk of twenty miles.

This ride is, of course, a very inferior performance for a bicyclist, but is cited merely to show what can be done by one who was in bad condition for athletic exercise, and by no means an expert rider on his bicycle. X.

A Brilliant Meteor.

To the Editor of the Scientific American:

A meteor was observed by the undersigned last Sunday about 7:53 P.M., more brilliant than Venus, moving slowly from the direction of Andromeda southeasterly, and passing but a few degrees below Mars toward Canopus. The color of the light was white, and its brilliancy for the space of about 30 degrees observed remained uniform, traversing through that arc in about 3 seconds of time. No visible tail remained, though the sky was very clear and dark, but sparks apparently followed the meteor only for about a degree or two. The sparks denoted an apparently spiral movement.

New York. R. D'HEUREUSE.

Influence of Petroleum on the Compass.

To the Editor of the Scientific American:

I find from my own experience, and from information derived from others engaged in the trade, that the compass needle deviates greatly when a ship is loaded with petroleum, either crude or refined. And I have always found the deviation easterly on many voyages, and have never known a case where it was otherwise. The compass in use on my vessel, on my late passage with oil from Philadelphia, was a Ritchie's patent, and the deviation was 11°, or nearly a point. Is it the oil, or is it the immense number of iron hoops on the barrels? We had in 5,592 barrels, with 6 hoops on each. I think it important that it should be known for the guidance of masters inexperienced in the trade that the above are facts. Many ships have been lost, I believe, on this account. JOSEPH HAND,

Master of American bark "Sunbeam," of Philadelphia.

Antwerp, Belgium.

American Passenger Locomotive at Paris.

Among the curiosities to be exhibited at the forthcoming International Exhibition at Paris, says the London *Mining Journal*, is a really marvelous little model of an American passenger locomotive, which runs under steam upon an endless railway of only 6 inch gauge. It was entirely constructed by an American artisan formerly connected with the Delaware, Lackawanna, and Western Railroad Company —Mr. W. R. Lendrum—and is valued at £400. The total length of the engine is 5 feet, and it is a complete representative of the large engine in every respect, the driving wheels being only 7 inches diameter. The pressure of steam used is 22 lbs., and the cylinders, which have a $2\frac{1}{2}$ inch stroke, are but $1\frac{1}{8}$ inch in diameter; the boiler is but 24 inches in length from the smoke stack to the fire pot, and only 5 inches in diameter. Its embellishments are profuse, and include, besides the usual appurtenances, a bell, whistle, sand box, and cab. The model will certainly attract much attention at Paris.

Death of the Leper Governor.

From late Honolulu papers we learn the death of William P. Ragsdale, which occurred in December. Ragsdale, somewhat noted as the Governor of the Leper Settlement on the island of Moloka, Sandwich Islands, was a Hawaiian by birth, the son of a native woman by an American father. He was a lawyer by profession and spoke English and Hawaiian with equal fluency, and was the most noted orator of the whole kingdom. The way in which he discovered that he had the leprosy (*elephantiasis*) was accidental. Sitting in his office at Hilo (the capital of Hawaii) one night, in deep study over a law case in which he was greatly interested, the chimney from his lamp fell on the table. Forgetful of the fact that it was intensely hot, he picked it up thoughtlessly, in his excitement, without feeling the least inconvenience. Shocked at this, he looked at his hand, and found that it showed no sign of being burned. Repeating the experiment several times with the same result, he was convinced that he was a victim of the terrible disease, leprosy, so prevalent in tropical countries. His suspicions were confirmed by medical authority, and he lost no time in communicating the fact to the proper government officials. Although it was customary for the police to arrest those suspected of being lepers, Ragsdale on account of his exalted position was not molested. He, therefore, voluntarily delivered himself up as a victim of the fearful disease, and was sent to Moloka, and installed as governor of the Leper Settlement, an office that he held at the time of his death. By his judicious administration of affairs, the many reforms he instituted, and by his kind-heartedness he made himself extremely popular in this sad community of 800 afflicted people, and for these reasons the unfortunates loved him as a father.

The Orohellograph.

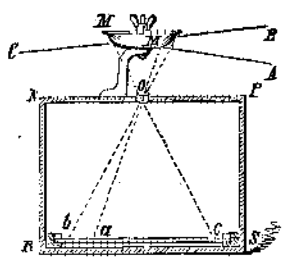
Our French correspondent writes: "Thanks to the extreme kindness of M. le Commandant de la Noë, I am enabled to give his communication to the last meeting of the Photographic Society of France in full."

It is as follows: I have the honor to present a photographic apparatus intended to produce upon one plate and by a single exposure the panorama comprising a nearly complete circle as seen from the position or station necessary from which it is obtained. The only interruption in the image obtained of the whole horizon is that which corresponds to the support of the mirror, which forms the special feature of this instrument; it thus results that if two views be taken, observing that the support occupies a different place in each, a panorama absolutely complete may be secured.

The instrument is composed of an ordinary camera inclined at an angle of 90°, as it was desired to photograph the sky; is surmounted by a parabolic mirror placed at a certain distance above the lens, the focus of which is equal to its axis. The purpose of this mirror is to reflect all the luminous rays emanating from the divers points of the horizon and to concentrate them upon the lens, which they traverse, forming upon the sensitive plate underneath the image of the corresponding points.

With this apparatus is obtained, in the form of a circle, a non-distorted image of the horizon. The horizontal lines become naturally curved, but the vertical lines are not deformed; and the angles obtained from the center of the circle to the different points of the image are exactly equal to those formed by the lines from the station carried out to the corresponding points of the horizon and all visible objects contained thereby. This property makes the apparatus most valuable for reconnaissances, for instance, in mountainous countries; and it can be imagined how by the aid of two or more panoramic views taken from determined places the operator can lay down upon a map the exact positions of different summits and calculate their altitude. In this manner may be obtained, with little labor and expense, the complete canvas or skeleton of a reconnaissance, which may have any of the details completed by ordinary means.

It is for this object, in fact, that the apparatus has been planned, and called by its author "oroheliograph." The problem was drawn up by M. Prudent, captain in the engineers, and realized by Lieut.-Colonel Mangin, of the same corps, who has calculated the form and size of the mirror and studied the various optical conditions which it was necessary to satisfy.



MM, mirror; *b a c*, sensitized plate; O, lens; N P R S, camera.

The model shown to the Society was rather primitive, and was organized to make the first essays. The mirror is not free from imperfections, and there is a sort of astigmatism in the images. The vertical lines are sharper than the horizontal lines. The reflecting surface is badly silvered, and has been injured by want of care in handling; in addition to this the silvering of the exterior is an inconvenience which, by another arrangement will disappear, and will permit of obtaining panoramic views without any interruption in their continuity. For all these reasons the print which has been obtained and exhibited does not possess all the perfection desirable, but it largely suffices to show that the final success is assured. The definite and revised apparatus is now in course of construction, and will most probably be made in such a way as to remedy an imperfection which I have not yet drawn your attention to. On the proof before the Society it will be seen that the landscape is in a sense reversed; that is to say, the objects which in nature follow from right to left are produced on the print from left to right. If it were only artistic results it were desirable to obtain, the film could be transferred upon a pellicle and printed from the reversed side, and the inconvenience would then disappear. But for topographical use this manner of proceeding would have bad results in consequence of the varied contractions of the pellicular image, which would render the angles incorrect; this will necessitate a modification, for which purpose there are several plans to choose from.

Such is the presentation I have had to make. You will, I am sure, excuse my having brought before you an apparatus in so primitive a shape; but I thought that the interest of the question would cover the form. I hope, however, to favor you soon by presenting the complete instrument, and in a state of perfection.—*British Journal of Photography.*