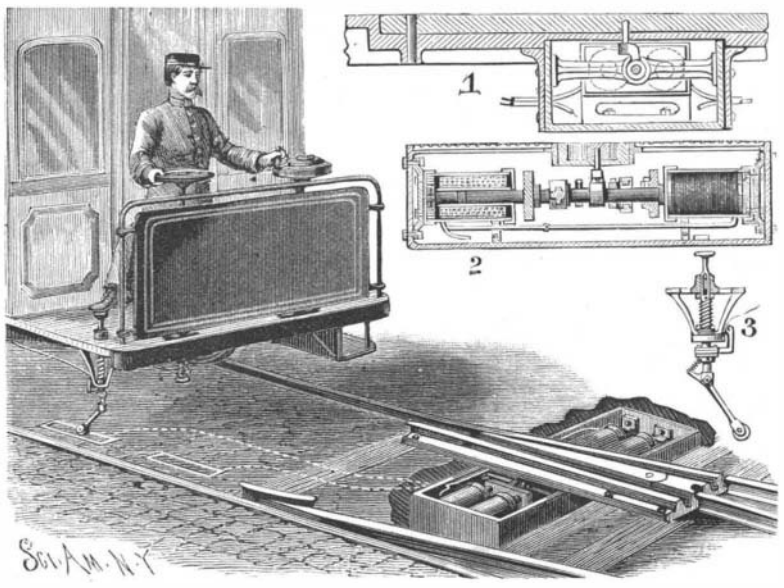
AN ELECTRICALLY OPERATED SWITCH.

The improvement shown in the illustration is designed principally for application to electric cars, although it admits of being applied to cars propelled by other power. It has been patented by Mr. Henry L. Falco, of No. 643 Carlton Avenue, Brooklyn, N. Y. The view in perspective shows the operation of the improved switch, Fig. 1 being a longitudinal and Fig. 2 a transverse section, while Fig. 3 shows the contact making device. The car may be supplied with the electrical current through a trolley, by storage batteries, or by a small dynamo taking power from the



FALCO'S ELECTRICALLY OPERATED RAILWAY SWITCH.

car axle, the wire carrying such current leading to the contact maker just under the car platform, and carrying at its upper end a foot piece to be pressed upon by the driver or motor man. The contact maker adapts itself to any distance between the car and the contact plates. The switch tongue turns on a pivot, and is mounted in a casting in the usual way. A pin projects from the tongue through a slot in the casting, and enters an arm on a sliding rod in the switch pit, there being on opposite ends of the rod cross bars carrying armatures which enter the coils of electro-magnets. These magnets have short cores and are inclosed in lead to prevent their being acted on by water entering the pit, and the mechanism is inclosed in an iron box with cross bars through which the rod slides, there being on the rod buffers to prevent shock when the armatures are drawn in either direction. There are two insulated contact plates in the roadbed near the track rail, a wire from one plate extending to one of the magnets, while the other plate is connected by a wire with the other magnet. When, therefore, a car approaches the switch, the driver can swing the switch tongue in either direction, to open or close the switch to the main or the side track, by simply pressing on the foot piece to bring the roller on the lower end of the contact maker down upon one of the contact plates in the roadbed, the current then being made to energize one or the other of the magnets to move the sliding rod connected with the switch tongue. The box containing the magnets is closed at the top by serrated covers in the usual way.

Gaseous Theory of the Earth.

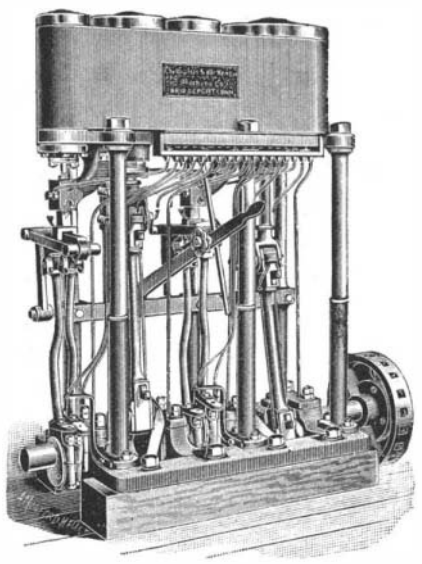
The idea of M. Rateau, as expressed the other day to the French Academy of Sciences, is that the phenomena of the earth's crust are well explained by considering that the planet's interior is molten, and that a layer of gaseous matter separates it from the portion of the crust forming the continents, whereas the seabeds rest directly upon the igneous globe. The continental masses tend generally to rise, being forced up by the accumulating gases, while the sea beds sink. The gradual escape of the gases, imprisoned under high pressure, will in time exceed the production of new supplies, when the pressure will diminish and the continents fall in, giving rise to more or less crateri-

A FINE YACHT ENGINE.

A fast steam yacht has been recently completed at Bridgeport, Conn., for Mr. H. M. Hills, proprietor of the *Evening Post* of that city. It is 60 feet long, 12 feet beam, and 5 feet deep, drawing 20 inches forward and 3 feet 4 inches aft. The engine for this yacht, shown in our illustration, is a fore and aft compound, designed and built by the Coulter & McKenzie Machine Co., of 500 Water Street, Bridgeport. It is designed to furnish 75 horse power, turning a 3 foot screw 250 turns per minute with 100 pounds of steam, supplied by a Herreshoff water tube boiler. The high pressure cylinder is 6 inches in diameter, the low pressure 12 inches and the stroke 9 inches. The exhaust from the high pressure cylinder passes around that cylinder and into the low pressure valve, thus making a receiver and jacket in one and permitting the passage of steam to the low pressure cylinder without piping.

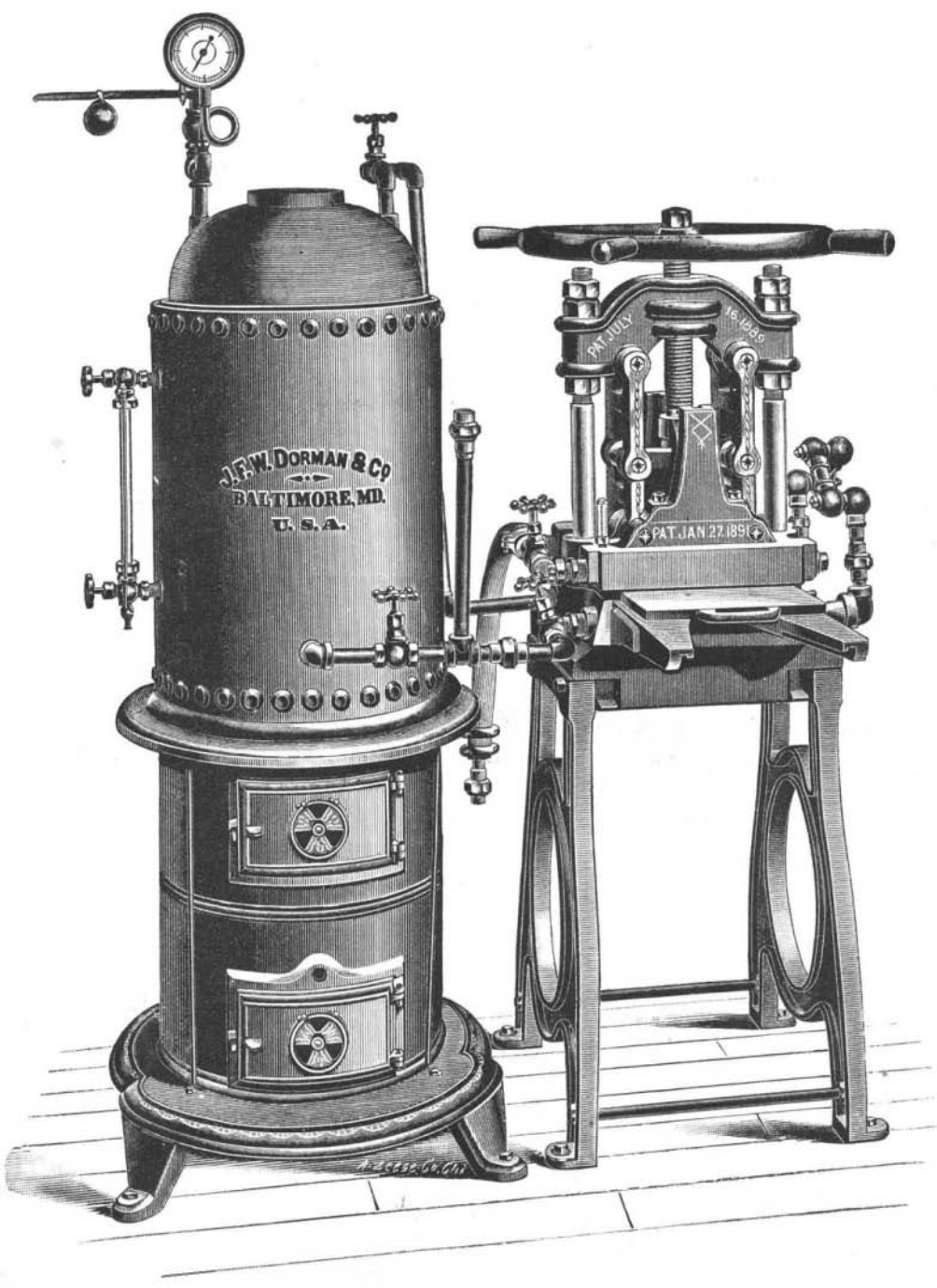
The pistons are fitted with a sectional Dunbar packing, consisting of a solid center, or "bull" ring, and on each side of which is fitted an L-shaped ring and a square ring. These rings are cut in three or four segments, as may be desired, and are adjusted so as to break joints. The rings are pressed against the walls of the cylinder by means of round wire springs of a diameter equal to the inside diameter of the rings.

The valves are of the balanced piston type, made up of a center and two end pieces held together by the valve stem and fitted with a steam-tight ring on each end. The live steam enters on the top of the valve, passes through the center and enters the cylinder from each end, the exhaust steam passing around the center. All the rods, connections and links have every means of adjustment for taking up wear. The shaft is of steel 3¼ inches in diameter and has bearing surface of 18 inches on the bed. The crank pins are 2¾ inches in diameter by 3 inches long, and are set at an angle of 90 degrees. The shaft is fitted with a Pry wheel, which is also used to balance the two cranks and forms one-half of the coupling connecting the wheel shaft. The cylinders and their heads are neatly incased with German silver covers. On the front and bottom of the cylinders is a reservoir for oil, under which there is fitted a trough holding 18 separate pipes carrying oil to the different bearings, separate oil holes being also provided for each bearing for use in case of need. The propeller shaft is fitted with a patented roller thrust bearing of new design. It consists of a box casting, in which are fitted two bearings, one on each end. Centrally between these bearings is a thrust collar clamped rigidly to the shaft. On each side of this thrust collar is a loose steel collar having four projecting arms or studs on which rollers are loosely mounted. The thrust of the shaft is received by these rollers, which are turned slightly rounding on the face, so as to overcome the sliding motion that would occur if they were flat.



ENGINE OF STEAM YACHT DREAM

One set of these rollers acts when in head motion and the other when in back motion. The box containing this bearing is filled with oil, so that the parts are constantly lubricated and friction is reduced to a minimum.



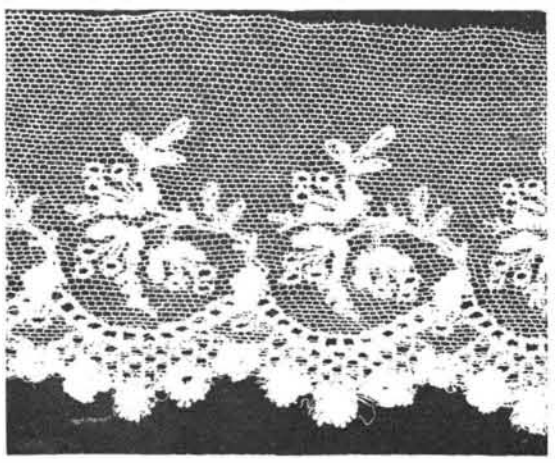
THE "CLIMAX" STEREOTYPER AND MOULDING PRESS.

MAKING CELLULOID STEREOTYPES ETC.

The illustration shows a combination machine embodying recent improvements designed to facilitate stereotyping and moulding, wherein a regulated amount of heat is necessary, and especially for the making of cellutypes, or celluloid plates, to be used in place of electroplates or metal stereotypes. By means of this machine, and the improved methods now followed, it is claimed that celluloid plates are made equal to electrotypes as to sharpness of face, and superior for durability, the plates not being affected by any of the fancy colored inks, and the work being done in far less time than now required. Where one has the necessary steam supply, at a pressure of some sixty pounds, the boiler is not necessary, but where this is not available, as in most small printing offices, the combination machine includes an efficient and specially adapted construction of boiler, whereby the press may be quickly and economically heated, in both its platen and bed, to the required temperature, and then again as rapidly cooled, by the adjustment of valves regulating the circulation of water and steam. The mould is made of a specially prepared powder and gluten water, in which, when it has attained a proper consistency, the type form, engraving, or other representation to be reproduced is impressed in the press, and in this mould an impression is afterward made in a thin sheet of celluloid, the press, mould, and celluloid sheet being heated up to about 240 degrees. The machine is afterward cooled with the celluloid in it under pressure, and the cellutype thus made may be employed in printing as an ordinary electroplate. This process of making plates is well adapted for the representation of

fine lace patterns, etc., the lace itself being placed in the press, and being impressed directly upon the celluloid, a pattern made in this way being shown herewith.

The convenience of such an outfit in a printing office will be at once apparent, as a cellutype can be made in a few minutes of any form from which a large



LACE SHOWN BY CELLUTYPE PLATE.

number of impressions are to be made, or one which will have to be used in the future, thus releasing type and saving time. The machine constitutes the most efficient of all appliances for making rubber stamps.

The "Climax" machine is made by Messrs. J. F. W. Dorman & Co., manufacturers of vulcanizers, stereotype machinery, and all stereotype supplies, No. 217 East German Street, Baltimore, Md.

Trade Marks.

The law of the land respecting the use of trade marks has been summarized and announced to the bar of the Supreme Court of the United States by Justice Jackson. The opinion was read in the case of the appeal of the Columbia Mill Company, of Minnesota, against W. W. Alcorn & Company, from the circuit court for the eastern district of Pennsylvania. The mill company had brought suit to restrain Alcorn & Company from using the word "Columbia" upon a brand of flour sold by the defendant, but the court refused to entertain the proceeding and dismissed the bill. From that judgment the Columbia Company appealed to the Supreme Court. Justice Jackson said that by a long line of decisions in the Supreme Court the law of trade marks was well settled. Those decisions, he said, established the following propositions:

1. That to acquire the right to the exclusive use of a name, device, or symbol as a trade mark it must appear that it was adopted for the purpose of identifying the origin or ownership of the article to which it is attached, or that such trade mark must point distinctively, either by itself or by association, to the origin, manufacture, or ownership of the article on which it is stamped. It must be designed, as its primary object and purpose, to indicate the owner or producer of the commodity and to distinguish it from like articles manufactured by others.

2. That if the device, mark, or symbol was adopted and placed upon the article for the purpose of identifying its class, grade, style, or quality, or for any purpose other than a reference to or indication of its ownership, it cannot be sustained as a valid trade mark.

3. That the exclusive right to the use of the mark or device claimed as a trade mark is founded upon priority of appropriation.

4. Such trade mark cannot consist of words in common use as designating locality, section, or region of country.

In view of these propositions, the justice stated, the court were of the opinion that there was no valid trade mark in the word "Columbia," and the judgment of the court below was, therefore, affirmed.

Remarkable Thunder and Hail Storms.

At a recent meeting of the Royal Meteorological Society, Mr. W. Marriott gave an account of the thunder and hail storms which occurred over England and the south of Scotland on July 8, 1893. Thunder storms were very numerous on that day, and in many instances were accompanied by terrific hail storms and squalls of wind. It was during one of these squalls that a pleasure boat was capsized off Skegness, twenty-nine persons being drowned. About noon a thunder storm, accompanied by heavy hail and a violent squall of wind, passed over Dumfries and along the valley of the Nith; many of the hailstones measured from 1 inch to 1½ inches in length. At the same hour a similar storm occurred at Peterborough. From about 2 until 10 P. M. there was a succession of thunder storms over the northeast of England and southeast of Scotland, and at many places it was reported that the thunder storms were continuous for nine hours. Two storms were remarkable for the immense hailstones which fell during their prevalence over Harrogate and Richmond in Yorkshire. The hailstones were 4 and 5 inches in circumference, and some as much as 3 inches in diameter. Great damage was done by these storms, all windows and glass facing the direction from which the storm came being broken. It is computed that within a radius of five miles of Harrogate not less than 100,000 panes of glass were broken, the extent of the damage being estimated at about £3,000. The thunder storms in the northern part of the country traveled generally in a north-northwesterly direction, at the rate of about twenty miles an hour. They appear to have taken the path of least resistance, and consequently passed over low ground and along river valleys and the sea coast. Several storms seem to have followed each other along the same track.

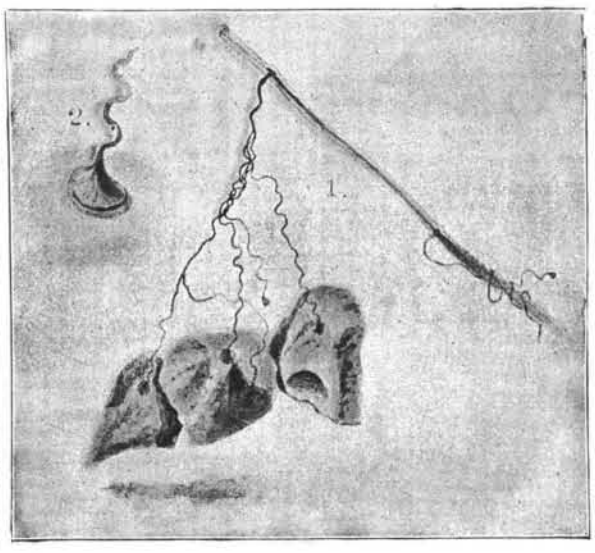
A NEW JERSEY PICK UP PLANT.

For new features in fauna and vegetable life, we are largely indebted to New Jersey. It was but recently that we saw how the daisy crop of the country might, through her instructive example, be doubled. Again has a new lesson come to us from that fertile land, of the handiwork of Nature operating as the handmaid of man.

In the quiet back garden of a New Jersey residence, devoted to the propagation of innocent flowers with savage mosquitoes in juxtaposition, have grown up, to the astonishment of scientists, molecules of vegetation that, by natural attachment to and consequent "swinging to and fro, vehemently encountering other molecules,' have moved stones. Our illustrations will show the mechanical and botanical means by which such results were accomplished. Fig. 1 shows the parent stem, from which are projected cord-like tendrils; our sketch, which is from nature, shows their final attachment to any mineral kingdom in the neighborhood; and Fig. 2 shows the way it is done, which seems, microscopically, to be similar to the way we boys used to take a round piece of boot leg, with a string in the center, and when it had been surreptitiously soaked in the Monday's wash tub, attachment similar to Fig. 2 would permit a good sized stone to be lifted.

Of the sized mineral at present utilized by this new agent of the industries, we are not concerned; it is its future that interests us. Here we have given us by a bountiful nature an embryo power that remains but for the Agricultural Department at Washington to develop to its full capacity. The mind dwells with pictured smile upon the development of those tendrils to rope-like proportions under fostering care. Chemical formulas of potash, nitrates, phosphates, silicas, etc., fed to this infant plant shall bring forth a power useful for man's domination, and not to be sneezed at. Tracts of land in Connecticut, now bountifully sown with bowlders, shall bless her sister New Jersey for this new salvation.

When the department shall have done its duty, a



right-minded citizen of Connecticut may casually sneak out at night and plant a few seeds in his neighbor's hedge, and rightfully find, later on, that this valuable plant has cleared his land. Each of these rope-like tendrils (Fig. 1) has attached itself to a bowlder, and jerked them all off his land on to the next man's lot.

The Frozen Fish Industry at Sandusky, Ohio.

A representative of *The Register* visited the warehouse of the Sandusky Fish Company the other day and there met Mr. Stoll, who showed him the plant and explained the method which he has perfected within the past few months of freezing and preserving both fresh and salt water fish.

The plant consists of two Hendrick Pontifex refrigerating machines, manufactured at Carbondale, Pa., of the absorption principle, their combined capacity being equal to a meltage of 50 tons of ice every 24 hours. If used for the purpose of making ice, these machines would produce twenty-five tons daily. At the present time only one machine is operated, the second being held in reserve. Briefly stated, the principle of the machine is as under:

A large cast iron cylindrical generator is charged with a quantity of aqua ammonia of the specific gravity of 26 degrees. In this cylinder is a coil, heated by steam, which starts the aqua ammonia to boil. The heated gases thus driven from the water are conveyed into condensers where they are cooled off and condensed into liquid anhydrous ammonia. Thence the anhydrous ammonia is conveyed into a chamber called the cooler. Underneath the floor is a cistern with a capacity of 4,000 gallons, containing liquid chloride of calcium. This liquid is sent through the cooler in a system of coils, and the anhydrous ammonia expanding, the chloride of calcium is cooled and then passes into the service pipes. The ammonia gas passes from the cooler into a vessel called the absorber, where there is a spray of weak aqua ammonia. Having a great affinity for water, it is combined with it and resolves itself into its original form of aqua ammonia, which issent back into the generator to be used again.

A large main pipe containing the cold liquid passes from the engine room into the warehouse, and from this lead smaller pipes which are carried into the sharp freezers and cold storage chambers. A constant circulation is maintained and the chloride of calcium returns to the tank, whence it is used over again with a very slight loss of temperature, in the space of five minutes.

When the fish are unloaded from the boats they are first sorted and graded as to size and quality. These are placed in galvanized iron pans, 22 inches long, 8 inches wide and 2½ inches deep, covered with loosely fitting lids, and each containing about 12 pounds. The pans are then taken to the sharp freezers. These are solidly built vaults with heavy iron doors, resembling strong rooms, and filled with coils of pipes so arranged as to form shelves. On these shelves the pans are placed, and as one feature of the fixtures is economy of space, not an inch is lost. The pans are kept here for twenty-four hours in a temperature at times as low as 16 degrees below zero. Each vault or chamber has a capacity of 2½ tons and there are sixteen of them, giving a total capacity of 40 tons, which is the amount of fish that can be frozen daily if required.

On being taken out of the sharp freezers the pans are sent through a bath of cold water, and when the fish are removed they are frozen in a solid cake. These cakes are then taken to the cold storage warehouse, which is divided into chambers built in two stories, almost the same as the sharp freezers. The cakes of fish, as hard as stone, are packed in tiers and remain in good condition ready for sale. It is possible to preserve them for an indefinite time, but as a rule frozen fish are only kept for a season of from six to eight months. They are frozen in the spring and fall, when there is a surplus of fish, and sold generally in the winter or in the close season, when fresh fish cannot be obtained. The warehouse has a storage capacity of 1,500 tons.

Though the freezing plant has only been in full operation since the first of August, about 550 tons of various kinds of fish have been frozen. Some cisco or lake herring from Canada and some sturgeon were frozen last July and the following varieties were frozen during the fall: No. 1 pickerel, No. 1 blue pike, medium blue pike, yellow saugers, yellow perch, suckers and mullets, sheepheads, white bass, upper lake and Lake Erie white fish, ocean blue fish and weak fish.

It is an interesting sight to note the process of freezing. The interiors of the freezers and cold storage chambers are thickly coated with beautiful snow crystals that give them the appearance of some enchanted cave. The fish, though frozen together, keep their shape; they are very clean and their condition can be seen at a glance. When our reporter visited the place large stacks of sturgeon and other fish were being taken out of the cold storage warehouse for shipment, and they were all in excellent condition. It is expected that there will be a large demand for frozen fish in the next few months, as the fall catch was the smallest on record.

The freezers and cold storage warehouse are of stone, with iron roof and iron doors and concreted attic floor. The place is well ventilated and fireproof, and the entire plant represents an investment of no less than $45,000. Mr. Stoll is to be congratulated upon the successful realization of his plans, which are founded on scientific principles and should be the means of increasing the importance of Sandusky's fish industry and preserving for the use of man the valuable food products of Lake Erie.

A Deep Boring.

The deepest boring of which we have any knowledge up to the present time, says *Revue Scientifique*, is at Parvschowitz, in the district of Ribnik, in Western Silesia. The depth attained is 6,568 ft., and the diameter of the hole is only 2·75 in. The work has been temporarily stopped in order to lower especial thermometers, which have been made with great accuracy, into the hole for the purpose of obtaining the temperature at different depths. The boring will then be resumed, and it is hoped that a depth of 8,200 ft. will be reached.