The device herein recommended consists of a glass funnel, A, capable of holding five or ten pounds of mercury, the tube of which is cut off at a point just below the stopper of the bottle, B. Cotton wool is jammed into the tube until it fills up the neck, and bulges out at the bottom of the funnel. A short glass tube bent at right angles passes likewise through the india rubber stopper of the bottle and is connected with a water air pump. The bottle is two thirds filled with dilute nitric acid (one part of acid and four or five parts of water). The impure mercury poured into the funnel, A, is drawn through the cotton plug in a multitude of streams, and passes as a fine rain through the acid below. The foreign metals, if not in too large quantities, are removed by solution in the acid, and the pure mercury collects below. It is then run off through the stop cock into a second funnel, C; and, after being thoroughly dried by suction through another plug of cotton wool, it is caught and preserved in the bottle, D. A short time suffices for the almost automatic purification of a large quantity of mercury.

Stevens Institute of Technology, February, 1874.

Correspondence.

The Principles of Ventilation.

To the Editor of the Scientific American :

Unless I greatly mistake the intelligence and disposition of the average American, his "scientific" representative will be deluged with articles protesting against the crude notions contained in the article coming from "the land o' cakes," entitled "The Ventilation of the United States Senate Chamber." I purposely ignore the special subject of his article, the senate chamber, and beg leave to refer very briefly to some of the most untenable of his general assertions.

He boldly asserts that "the whole secret of ventilation consists" in providing "an entrance for fresh air below and an exit for foul air above," and bases this erroneous idea upon the false assumption that "foul air," making no distinctions, "ascends and accumulates at the ceiling" only. He also says: "If our halls, like the ancient Greek houses, were without roofs, ventilation would cause no thought," for "the foul air from our lungs and bodies would ascend right into the air, and a fresh supply would come down to us through the same opening."

As a simple and plain refutation of his statement regarding the tendency of foul air to "accumulate at the ceiling," I would refer him to the familiar experiment of placing a bit of lighted candle at the bottom of a tall glass jar with open top. He will find, upon exhausting the lungs into the bottom of the jar, by means of a tube, that the light will be extinguished almost immediately; and if he breathe downward into the jar—not directly over the flame, but near the side of the vessel—the light will just as certainly be put out as in the previous experiment, only the inevitable and fatal result will be retarded. If, instead of the lighted candle in the tall jar, he places "the ancient Greeks" or a few live Scotsmen in a "high" room, closed at the bottom and open to the free air of heaven at the top, he will find results quite parallel to those in his previous experiments. Any causes favoring the sudden generation of an excessive amount of carbonic acid gas would result in speedy death to them all, or in asphyxia, as in the first experiment. Confinement in the same place, under more favorable circumstances, would somewhat retard the fatal result; but ultimately, as the air became contaminated by poisonous exhalations, languor, decay, and death by some "chronic" malady, would occur as surely as the light was slowly extinguished in the second experiment.

In both these instances, "the destroying angel" is carbonic acid; it is the principal deleterious element which contaminates the air we breathe, and to which we are most universally exposed; it is generated by decomposition, by combustion, and by respiration. At any ordinary comfortable living temperature, the specific gravity of this poisonous gas, even when exhaled from the lungs, is greater than that of the surrounding air; therefore it of necessity gravitates to the bottom of the jar or to the bottom of a room, instead of rising to the ceiling. No matter what may be its source, if in excess it is "the destroying angel," always injurious, often fatal. We find, in what is called pure air, about 4 5 parts of carbonic acid to 10,000 of air; the open air of cities is often contaminated by from 6 to 15 parts to 10,000, while the confined air of some public halls and school rooms has been found to contain as many as 75 parts to 10,000, in such cases rendering the air absolutely poisonous.

If warming were not inseparably connected with proper ventilation, as, unfortunately for the position of your correspondent, it is in our climate, it might do to provide only for the escape of foul air above and the introduction of fresh air below; but, as he admits, "one undeviating law of air currents is that they always take the shortest cut, and depend upon it" the necessary and inevitable effect of providing an opening for inlet below and an opening for outlet above would be to "freeze out" the inmates of a room, whether the incoming fresh air is warm or cold. If cold, the incoming fresh air would spread itself out and fill the lower part of the room first; if warm, it would immediately take "the shortest cut" and escape at the top, without materially affecting the temperature or the quality of the air throughout the room, except in the direct course of the moving current, which would be from inlet to outlet.

For these plain reasons, the crude method advocated by your correspondent is not commendable even in a warm climate or in the summer weather, for then, if the doors and windows be left open, the air will freely circulate in any natural direction. In short, his positions are contrary to the advanced experience and philosophy of such able specialists as Box (see his work on heat) Reid, Ruttar, Leeds and others on ventilation. His ideas are diametrically opposed to modern practice and experience, especially in the West, where the downward exhaust principle has been introduced very generally in nearly all new public and private buildings.

A. R. MORGAN.

To the Editor of the Scientific American :

Your correspondent, Mr. Wm. Mackean, in his article on ventilating the senate chamber, must either allude to summer ventilation or be without practical experience of the subject; for ventilation in cold weather, when we require warmth and comfort as well as air, necessitates an entirely different arrangement.

First, if he use an opening of two square feet in the roof for ventilation, and numerous smaller ones (their combined areas being equal to or less than the roof aperture) in the floor or wainscoating, the heated air would go direct to the opening in the roof, warming the surrounding air but little, and leaving the large body of air in the room very cold. I have seen the temperature of a room fall 3° in 5 minutes on opening the hot air register in the floor and the ventilator in the ceiling; and although the fire was kept up about four hours, the temperature did not rise half a degree.

Secondly, he says that the air, on being discharged from the lungs, is warmer than the surrounding air, and therefore rises; which is true, but it only rises a short distance, when it becomes of the same temperature as the air through which it passes; and being loaded with matter thrown off from the lungs, it becomes heavier and falls to the floor to be again inhaled.

There is a vast difference between ventilation in the summer and ventilation in the winter, also between a building heated by hot air and one heated by direct radiation from a heated surface.

CHARLES A. WEST.

Richmond, Va.

The Centralization of Matter.

To the Editor of the Scientific American:

A few modern scientists have recently proclaimed the theory that the resistance of space to the planets, in their revolutions around the sun, will ultimately cause them to approach to and become part of the sun. Another writer says that the centralization of matter is one of the great laws of Nature, which will eventually produce the same result: that each satellite, as it loses its internal heat, will be absorbed by its planet, and the planets by the sun. I do not know whether this is orthodox science, or whether it is a "new departure;" but if this process of Nature is in existence, it certainly has been going on for all time, and our own planet should exhibit some of the results or footprints of this great law. Therefore I ask: Has the earth, since it has taken its place as a planet, received any accession of considerable bodies of matter, going to make up the great mass it now presents? Most assuredly it has; several of the continents still bear unmistakable evidence of being a deposit of this character, having probably been former satellites of the earth, and to have been precipitated upon it without great violence, but sufficient to crumble and scatter their contents in the direction of their motion. South America bears the most striking illustration of a phenomenon of this character. When the satellite had gradually wound its diminishing orbit, until it came within the confines of the earth's atmosphere, by a storm or commotion below it is suddenly enveloped in our heated atmosphere; and losing its hold upon the cold medium of space, with a plunge it is precipitated to the earth. The first contact is at Cape Horn; then with a rolling, settling, and crumbling motion, it spreads out nearly to its present limits, and, while yet in motion, commences the grandest feature of all. Before this great mass of *débris* can acquire the motion of the earth in rotation, the great waters and sediment of the Pacific are surged up to the very clouds, rolling up the western border like a scroll, of which the Andes bear witness, and of which your correspondent, Professor Orton, (page 40 of your current volume) says: "Here the landscape was purgatorial, presenting the confusion of the grab box of a geologist."

The fact that guano is now admitted to have been a sediment of the ocean, and is found on the mountain sides, as well as on the islands, and that the beds of the ocean (especially the Atlantic) are crushed down near the borders of the continents, all tend to confirm this theory. The crowding up of the Andes proves that the earth was rotating in about the same position as now, although what is now Cape Horn may have been near the equator before this occurrence. As the surface of the satellite would be a frozen mass, her glacial period would soon have an end; and the sudden acquisition of so large a body of matter on one side of the earth (within what is now the southern hemisphere) would necessitate the withdrawal of a large body of water from the northern hemisphere to establish an equilibrium, and complete the spheroid. Hence the greater exposure of land surface now in the northern hemisphere, much of which is known to have been submerged.

Where then is the base line of geology, when we find that our igneous rocks were produced in other worlds, before being deposited with us?

A. D.

A Substitute for Mica in Stoves.

To the Editor of the Scientific American:

The want of durability in mica and the difficulty in bending it renders the application of another material desirable. My observations have convinced me that we have the most desirable qualities in thin glass tubes, so arranged as to present an even and a nearly airtight surface. As glass tubes are drawn at the glass houses, they are slightly though perceptibly conical, a matter of no moment, as, by alternating the larger and smaller openings, when they are laid parallel, close joints result.

Three kinds of glass are met with in the market: Brown bottle, greenish lime, and cullet and flint glass, more or less perfect. Either of these kinds may be used, as radiant heat from the fire will anneal them; flint glass, being the most pliant, is best adapted to the nicer purposes. Tubes drawn quite thin, from one eighth to one third of an inch bore, may be used, always with reference to the thickness of the envelope of which they form a part. They may be arranged side by side, either vertically or horizontally, to fill any size or space, resting loosely in a recessed space or in a clip of malleable metal to support them and exclude dust. Combinations of shorter and longer tubes may be used for paneling or otherwise varying the surface. But ornamentation will doubtless be best gained through colored and particolored tubes, so arranged as to produce the most pleasing variety. It is well known that silvering within the colorless or colored tubes can be easily so adjusted that much light will be transmitted, while on another part the luster of burnished metal may be obtained, while little light is lost.

Sliding, folding, and curved screens of any size, flexible or fixed, can be formed with these tubes, so that stoves with open or closed fronts may be made. There is not the slightest risk of fracture of the tubes, excepting from a blow or similar accident; and any partial destruction can be repaired by substitution in a few minutes' time; indeed, the pliancy of the structural forms of large size is a safeguard. Washing or other cleansing of the surfaces can be done without danger when the glass is cool.

The increased consumption of glass in this way will diminish its cost in the form of small tubes, and lead to the introduction of ornamental and beautiful designs in all appliances for warming apartments by visible fires.

A. A. HAYES.

Electroplating Pewter Surfaces.

To the Editor of the Scientific American :

I noticed in a recent number of the SCIENTIFIC AMERICAN that a correspondent experienced great difficulty in plating pewter surfaces. To him, and all others who have met with similar difficulties, I will give the following recipe, which will be found simple and very effective:

Take 1 ounce nitric acid and drop pieces of copper in it until effervescence ceases; then add ½ ounce water, and the solution is ready for use. Place a few drops of the solution on the desired surface, and touch it with a piece of steel, and there will be a beautiful film of copper deposited. The application may be repeated if necessary, though once is generally sufficient. The article must now be washed and immediately be placed in the plating bath, when deposition will take place with perfect ease. This is an excellent recipe, and should be known to all electroplaters.

Friendsville, Ill. JAMES POOL.

About Ourselves.

To the Editor of the Scientific American :

We have come to the conclusion that a thing of real practical value has but to be advertised in the SCIENTIFIC AMERICAN to insure its success. From one week's advertisement of our small Welch Water Engine, in your columns, we have answered as many as eighty letters in a single day. That single advertisement will pay us largely as an investment, unless the overwhelming amount of correspondence therefrom really ruins us.

THE NEW ENGLAND MOTOR AND MOWER COMPANY.

Danbury, Conn.

The Aerophore.

This is an apparatus for enabling persons to breathe and work, with a light, in unbreathable and explosive gases in mines, wells, sewers, and caverns. It is the invention of Messrs. Denayrouze, of Paris. The aërophore consists of a number of large or small cylinders as desired, which are lowered into the mine with the workman. Connected with the cylinders is a long flexible tube about an inch in diameter, of such strength that it cannot be damaged even by being trod upon. The person who is to use the aërophore first puts on a strongly made jacket of webbing, to the back of which is attached a couple of moderating valves which serve to supply the compressed air to the mouth at ordinary atmospheric pressure—not higher—the pipe being attached to these valves. Another pipe passes over the shoulders and to a mouth piece. The nostrils are closed by a nipper. The mouth piece is constructed so as to be available either for a light or heavy breathing man. Exhalation is accomplished by means of a small aperture in the tube about two feet from the mouth. This aperture is fitted with a proper valve, which stops the ingress of all air or gases. By another valve and tube, air is supplied to the lamp which the miner carries in his hand, and enables it to burn brightly, and a pair of "goggles" are provided in case the eyes are likely to be affected. These can readily be fastened on by means of an elastic strap.

D. D. S. writes to suggest that lightning rods be made in the form of an elongated oval, about 6 feet wide, so that the conductor would present the appearance of two rods, side by side, joined at the top; and they would also be joined under ground. He thinks that this arrangement will give better protection to a building, from the better ground communication it would afford.

Richard Trevethick's Thousand Feet Tower.

Mr. F. S. Hoffman, of Philadelphia, Pa., writes to remind us that the eminent engineer Trevethick proposed to erect an iron tower 1,000 feet high, in commemoration of the passage of the Reform Bill in England in the year 1832. In that year he sent a note to the London *Morning Herald*, which contains the following:

"Design and specification for erecting a gilded conical cast iron monument (scale 40 feet to the inch), of 1,000 feet in hight, 100 feet in diameter at the base, and 12 feet diameter at the top; 2 inches thick, in 1,500 pieces of 10 feet square, with an opening in the center of each piece 6 feet diameter, also in each corner of 18 inches diameter, for the purpose of lessening the resistance of the wind, and lightening the structure; with flanges on every edge on their inside, to screw them together; seated on a circular stone foundation of 6 feet wide, with an ornamental base column of 60 feet high; and a capital with 50 feet diameter platform, and a figure on the top 40 feet high; with a cylinder of 10 feet diameter in the center of the cone, the whole hight, for the accommodation of persons ascending to the top. Each cast iron square would weigh about three tuns, to be all screwed together, with sheet lead between every joint. The whole weight would be about 6,000 tuns. The proportions of this cone to its hight would be about the same as the general shape of spires in England. A steam engine of 20 horse power is sufficient for lifting one square of iron to the topin ten minutes; and as any number of men might work at the same time, screwing them together, one square could easily be fixed every hour; 1,500 squares requiring less than six months for the completion of the same. A proposal has been made by iron founders to deliver these castings on the spot at £7 ($35) per tun; at this rate, the whole expense of completing this national monument would not exceed £80,000 ($400,000). By a cylinder of 10 feet diameter, through which the public would ascend to the top, bored and screwed together, in which a hollow floating sheet iron piston, with a seat round it, accommodating 25 persons; a steam engine forces air into the cylinder column from a blast cylinder of the same diameter; and working three feet a second, would raise the floating piston to the top at the same speed, or five or six minutes ascending the whole hight; the descent would require the same time. A door at the bottom of the ascending cylinder opens inwards, which, when shut, could not be opened again, having a pressure of 1,500 lbs. of air tending to keep it shut until the piston, descends to the bottom. By closing the valve in the piston, it would ascend to the top with the passengers floating in the air, the same as a regulating blast piston, or the upper plank of a smith's bellows. The air apparatus from the engine should be of a proper size to admit the floating piston, with the passengers, to rise and fall gradually, by the partial opening or shutting of the valves in the top of the piston. Supposing the springs or soft substance, for the piston to strike on at the bottom of the column cylinder, descending three feet a second, would give no greater shock than falling from 9 inches high, that being the rate of falling bodies, or the same as a person being suddenly stopped when walking at the rate of two miles an hour. The pressure of the air under the piston would be about half a pound on the square inch; the aperture cannot let the piston move above 3 feet a second, but this speed may be reduced to any rate required by opening or shutting the valves on the floating piston."

"Within two months," says Trevethick's biographer, "from the date of the design for a gilded column, Trevethick had passed away. His family in Cornwall received a note, dated April 22, 1833, from Mr. Rowley Potter, of Dartford, stating that Trevethick had died on the morning of that day, after a week's confinement to his bed. He was penniless and without a relative by him in his last illness, and for the last offices of kindness was indebted to somewho were losers by his schemes.

Trevethick's grave was among those of the poor buried by the charitable; no stone or mark distinguished it from its neighbors. He is known by his works. His high pressure steam engine was the pioneer of locomotion and its wide-spreading civilization. England's mineral and mechanical wealth on land and sea are indebted to its expansive power, its applicability, and durable economy."

The Semi-Centennial Anniversary of the Franklin Institute.

The Franklin Institute recently celebrated the semi-centennial anniversary of its foundation, at the Musical Fund Hall, in Philadelphia. Mr. Coleman Sellers, the President, presided, and delivered an address, in which he sketched the past work of the Institute, and its influence upon the mechanical and scientific progress of the country. An earnest plea was made in behalf of technical education, and the value of proper instruction for working men warmly advocated.

Mr. Frederick Fraley, one of the founders of the Institute, gave some interesting recollections of its establishment, and said the first meeting was held in the County Court House, in Philadelphia, on February 5, 1824. Professor R. E. Rogers spoke upon the immense progress of knowledge which has occurred during the past half century, and, in quite a lengthy address, reviewed the history of inventions, beginning with Fulton's steamboat and ending with the most recent developments in astronomy, physics, and other mechanical and scientific professions.

President Morton, of the Stevens Institute, pointed out that, in the view of Science, the universe of matter is as truly the universe of motion, and hence the branch of study to which we should most devote our attention is that which treats of matter in its relation to motion, in other words, to "mechanics." It is to the development of this knowledge that the Franklin Institute has contributed during the last fifty years. The speaker compared the advancement of the world to the gradual growth of a child; and in conclusion, he said that the necessities of the age are new means of applying great truths already discovered.

Electroplating.

At a session of the Physical Association held in Frankfort on August 30 last, Dr. Otto Volger delivered an address on the history and progress of the art of depositing metals by galvanic action, of which the following is an abstract:

At an early date it was known that a current of galvanic electricity was able to decompose liquids, and that metals deposited from solutions of their salts by this means assumed fantastic shapes, which appeared so similar, at the first glance, to vegetable growth that they were called galvanic trees, or metallic vegetation, although really consisting of crystals, and formed according to the laws of crystalization. Professor Böttger took especial delight in producing this sort of vegetation with different metals.

The use of such metallic deposits for electroplating was discovered accidentally. In 1830, Mr. J. P. Wagner, of Frankfort, and Professor Jacobi, of St. Petersburg, were endeavoring to employ electromagnetism as a motive power, instead of steam. Jacobi employed a Daniell's battery, which is distinguished for its constant and regular action. It consists of an outer cup of copper, and an inner cell of unglazed porcelain which contains the zinc rod. The intermediate space is filled with a saturated solution of sulphate of copper. When the battery is working, this solution of blue vitriol is slowly decomposed, depositing metallic copper, which finally becomes injurious, and must be removed. Once when Jacobi was busied with removing such a deposit from his copper cup, he noticed that there were several layers of copper, each having the form of the sides of the copper vessel, and hence, concluding that the sheet copper of which the vessel was made had split up into layers, he accused the man who made it of employing a poor quality of sheet copper. A closer investigation, however,showed him that these layers, or leaves, did not belong to the walls of the vessel, but to a new deposit of metal, which imitated,in a remarkably perfect manner, the shape of the surface of the walls. It occurred to Jacobi that this troublesome disadvantage could be turned to profit by using it for reproducing objects. In 1838, he communicated to the St. Petersburg Academy a description of his discovery of the use of galvanic electricity for reproducing objects in the arts.

Czar Nicholas requested a German chemist named Klein, who was then employed in the imperial printing office, to test the practicability of the discovery and to ascertain to what extent it was capable of development. The answer being a favorable one, he gave the discoverer the means of making his new art the common property of the whole world.

Electrotyping or plating with copper consists in merely making the object to be copied the negative element of a simple Daniell's battery. If the object is a conductor, metal for instance, and is to be only partially covered, the parts that are to remain uncovered are rendered non-conductors by coating with some non-conductor, as wax, stearin, or varnish. If it is a non-conductor, its surface is rendered conducting by brushing it over with a thin film of the finest graphite or silver powder. Murray discovered that graphite works the best. The reaction consists in the separation of the sulphate of copper into sulphuric acid and oxide of copper, while the water is simultaneously separated into oxygen and hydrogen. The sulphuric acid liberated at the anode or positive pole unites with the oxide of zinc, formed there by the oxygen given off from the decomposed water, to form sulphate of zinc, which goes into solution.

The hydrogen evolved at the opposite pole abstracts the oxygen from the oxide of copper, and forms water, while the copper is left in a metallic state. Hence it is really the hydrogen which causes the reduction of the oxide of copper to metallic copper, at the negative pole or cathode.

Up to the year 1840, this new art was only employed for making small copies, like coins and medals, and these often came out of the mold imperfect, or were broken in detaching the mold. At that time, however, Professor Böttger prepared handsome relief plates of copper, and also employed galvanism for depositing a metallic coating on other metals, as for instance gilding silver, copper, and brass. In the same year, a copper plate engraver, named Kress, came to St. Petersburg, learned from Klein the galvanoplastic art, as Jacobi had named it, and became acquainted with the latter. Jacobi called his attention to the fact that he could in this way make perfect copies of his etched or engraved plates, thus multiplying the original plate so as to obtain a great number of the most excellent impressions; for it is well known that a plate soon loses its sharpness, and every impression is poorer than the preceding one. At this suggestion Kress took up the art, and by 1844 had brought it to great perfection in his business. In 1841 Professor Böttger had made a copy from one of Professor Felsing's copper plates, in Darmstadt (the *Ecce Homo*, after Guido Reni, 12½ inches by 9½ inches), which was so perfect that Felsing declared that proofs printed with it were identical with those from the original plate, and of equal value. These plates are still in existence, the one in Berlin Museum, the other at Frankfort on the Maine.

The galvanoplastic art has extended itself in three directions: 1. For covering other metals, as in electroplating with gold, silver, copper, steel, and nickel. 2. In producing objects formerly cast in metal. This has been brought to great perfection in several German cities,especially Mayence, where the smallest natural objects are copied and the largest works of art produced. Among the latter are three colossal figures on a monument in Frankfort. 3. The reproduction of engraved and stereotyped plates, and the like. In the latter, farther progress is still possible.

Early in 1840, Péligot reduced protochloride of iron by passing hydrogen gas over it, and in this way obtained metallic iron in octohedral crystals and in malleable plates. In 1846, Professor Böttger made the first attempt to decompose the chloride of iron by the electric current,and with success, but soon found that a mixture of the double sulphate of iron and ammonium and the double chloride of iron and ammonium was better for electroplating. This he prepared by dissolving simultaneously 2 parts by weight of protosulphate of iron and 1 part sal ammoniac in water. As anodes he employed a piece of sheet iron; the cathode at once acquired a polished appearance from the metallic iron deposited on it. In this way he copied a florin in iron (several such specimens were exhibited by the lecturer.) The iron is very hard, like steel, but unfortunately very brittle, so that it frequently breaks in taking it from the mold. No technical use could at first be found for it. In 1859 Jacquin found an application of it in covering copper plates with steel. This consisted in precipitating on the copper an extremely thin film of iron, which did not destroy the sharpness of the impression, but by its hardness offered such a protection to the copper that the latter was almost as durable as a steel plate. In this process, also, Professor Böttger's recipe proved the best and was generally followed.

Recently,a chemist in St. Petersburg,also named Klein,has brought electroplating with iron to a remarkable degree of perfection. In 1868 he exhibited, before the St. Petersburg Academy, excellent results which he had obtained by using a solution of bisulphate of the protoxide of iron, and a Meidinger battery,with a piece of sheet iron as anode. Klein deposited the iron in large plates both thick and thin, as copies from engraved copper plates,and thus combined a soft, easily wrought plate for the engraver, and an iron plate as hard as steel for the printer. The iron thus deposited was, to be sure, very brittle,which Klein found to be due to the hydrogen occluded in it,its specific gravity being 7·675, or a little higher than rolled iron. By heating the iron, he succeeded in expelling the hydrogen, when it became more dense, and had a specific gravity of 7·811, which is higher than wrought iron. It was perfectly malleable, highly elastic, and could be welded like sheet steel, in short, was an excellent malleable iron. Klein has prepared plates of this iron weighing 16 lbs.

Electroplating in iron will find an important and extensive use in manufacture of stereotype plates, especially for printing government paper and postage stamps, where colored inks are employed, for the iron would not be attacked by the colors containing mercury, which acts on copper and other metals.

In conclusion, the lecturer referred to the occurrence of native metals in the earth, and the theory, advanced almost 30 years ago, comparing the earth to a voltaic battery. Hardinger believed that he could prove that the surface of the earth was the anode and the interior of the earth the cathode of a galvanic battery. According to this, native metals should only be sought deep down in the earth, which is not always the case. It is much more probable that native metals have been reduced by the decomposition of organic matter. This applies especially to copper, and also to the very rare telluric iron. The graphite found in the latter, is to be considered as the residuum of decomposed organic compounds. In the Rotanger sea in Sweden, native iron is found replacing particles of wood, as if petrified, and the microscope is able to detect the cells and determine that it was a species of pine wood. The interior of the cells is also filled with a deposit of iron. This is not to be attributed to the action of a galvanic current, but to the reducing power of the hydrogen liberated from the decomposition of organic matter.

Borax for Colds.

A writer in *The Medical Record* cites a number of cases in which borax has proved a most effective remedy in certain forms of colds. He states that in sudden hoarseness or loss of voice in public speakers or singers, from colds, relief for an hour or so, as by magic, may be often obtained by slowly dissolving, and partially swallowing, a lump of borax, the size of a garden pea, or about three or four grains, held in the mouth for ten minutes before speaking or singing. This produces a profuse secretion of saliva, or "watering" of the mouth and throat, probably restoring the voice or tone to the dried vocal cords, just as wetting brings back the missing notes to a flute when it is too dry.

A correspondent, Mr. A. O. Kruger, reports the discovery of a copper mine at Isle Royal, Minn., which yields ore of a quality similar to those of the Calumet and Hecla mines on the south shore of Lake Superior. It is in a conglomerate rock, the belt of ore being 26 feet between foot and hanging wall, and has been found at points 14 miles apart. Our correspondent states that preparations for mining on an extensive scale are in contemplation, and that the discoverers believe that it will be the largest copper mine in the world.

"A Railroader" writes to suggest placing a partition in the sand box of a locomotive, so that screenings of sand or gravel may be used if required. A second rod would be required to let the gravel on to the rail; but the coarser stuff would be very useful when the metals are covered with ice or snow.