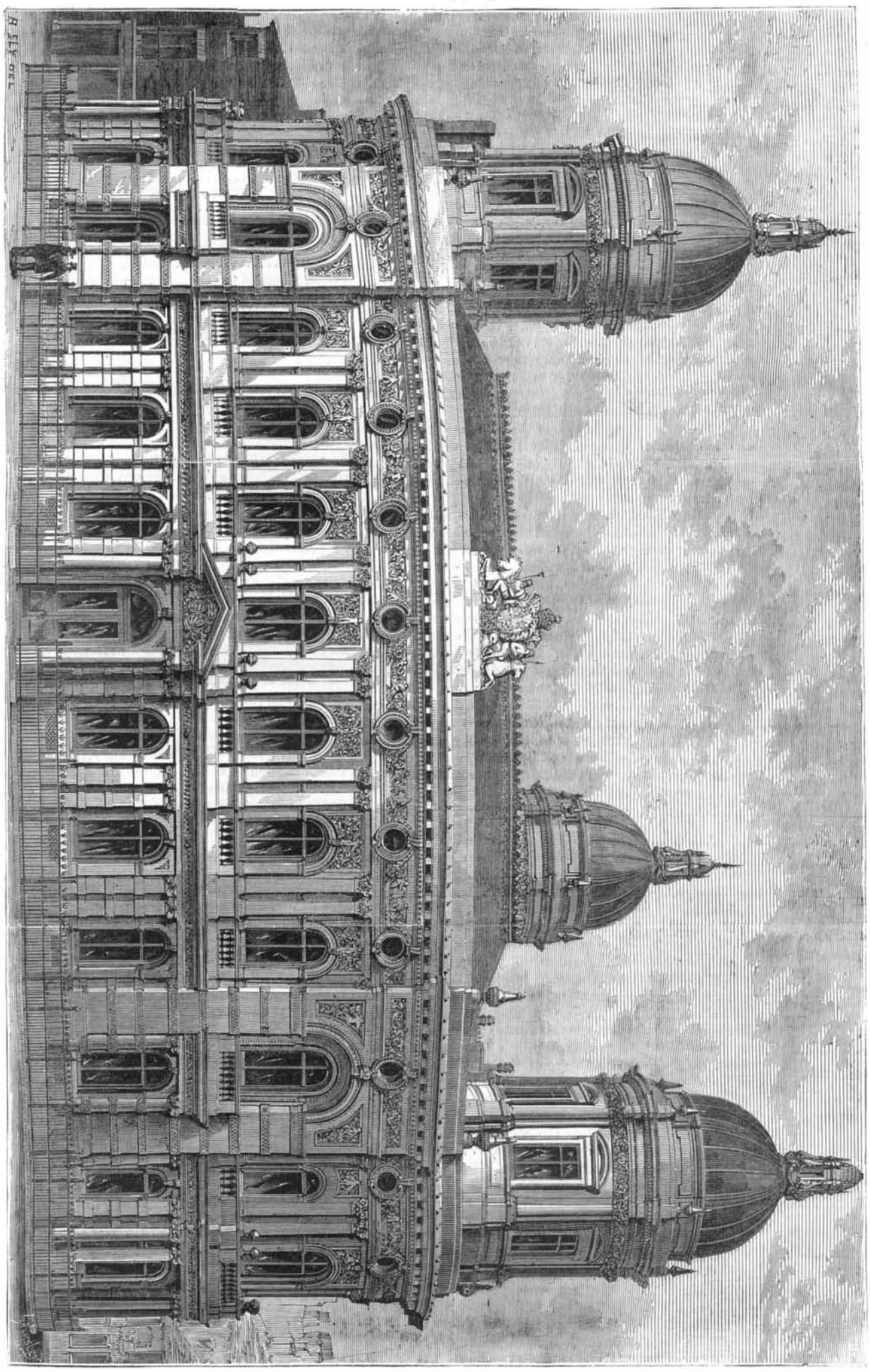
THE HULL DOCK COMPANY'S NEW OFFICES.

The wealthy corporation who own the extensive docks at Hull, in England, have recently erected a highly ornate building for their offices, of which we present an engraving. The structure stands on a triangular piece of ground, its plan consequently presenting much difficulty, especially as a maximum accommodation was required upon a comparative limited area. The architect, by designing the building to follow the outline of the complete site, has utilized the whole area, and obtained space for a central court for light and ventilation. There being much water in proximity to the site, the Italian style of architecture, of the Venetian type, has been adopted for the building, which is arranged with three facades, corresponding with the frontages. The main façades are connected with each angle by short circular façades, but having projecting porticoes, with detached Ionic columns, on the ground floor, which serve as buttresses to towers and cupolas surmounting these angles.



NEW OFFICES FOR THE HULL DOCK COMPANY ENGLAND

The entire building is faced with selected Ancaster stone, excepting the principal sculptures, which are of Portland, and the basement, which is of Bramley Fall. The roofs are covered with Westmoreland slates. The whole structure is surrounded by an iron railing, the uprights formed of ornamental tridents and harpoons placed alternately, with solid square standards at intervals, capped by escutcheons and crowns.

Within the building is an open court; this affords means for thorough ventilation and lighting. The warming and ventilating arrangements are effected by means of a fan, worked by a small steam engine.

Labor and Machinery.

The rapid introduction of steam power and machine labor into all branches of trades and industries shows how capital, availing itself of invention, science, and steam and animal power, is daily gaining an advantage over labor. When this aspect of the case was first presented, and the laborer by instinct, as it were, denounced the machine that excelled him both in quality and amount of labor, he was met by a sharp denial that machinery prejudiced his chances for a livelihood. It was asserted that the only effect would be to change his mode of employment, to relieve him from slavish drudgery, to quicken his intelligence by illustrating the triumphs of mind, and to elevate him from a mere beast of burden to the presiding spirit over the powers of nature. Within certain limits, all this is true. In that new and golden age, when all the relations of society are properly adjusted to the true standard, it may be that every man will be to some extent relieved from muscular toil and from need of it at the same time. But before that time comes, the process of re-adjustment must be attended with serious disturbance. Every day is changing the field of labor, putting more upon the machine and less upon the man. If, as is claimed, the expansion of industry and production shall make room for labor in a higher position, requiring more skill and returning a better reward, the final result will be only beneficial. How this is to be done without some convulsions remains to be seen.—*American Builder.*

Secondary Currents and their Applications.

BY M. G. PLANTE.

In pursuing the study of the phenomena presented by secondary couples with plates of lead, I have made the following observations: The chemical modification of the electrodes, which constitutes the source of the secondary current, is rendered more complete by alternate charge of the primary current in two directions, with repose between this double action. By the successive action of the primary current in two directions, the deposits of oxide are reduced, and the electrodes are modified in their molecular constitution not only at their surface but in their mass. By rest, the deposits formed on the surface of the plates, whether the deposits be of metallic oxides or of reduced metal, acquire a crystaline texture and strong adherence which contribute to protect the sub-adjacent deposits tending to form themselves under the continued action of the primary current. By following this course of operation, which I have termed the formation of secondary couples, deposits of great thickness may be obtained, admitting in the discharge of calorific effects more or less prolonged. A secondary couple, having less than five and a half square feet surface, charged under the foregoing conditions by two Bunsen elements, will redden a platinum wire of 0·02 inch diameter during twenty minutes, and a wire of 0·008 inch diameter for about an hour, without any communication with the primary source, even forty-eight hours after charging. A battery of 16·5 square feet surface, equally well charged, preserved sufficient of its charge to redden a platinum wire for some minutes a month after charging. Although the formation of the secondary couples necessitates the use of two Bunsen couples, of which we change the direction, with intervals of repose, in order to give the deposits time to take a crystalline aggregation, once this operation is effected, it is no longer necessary to change the direction of the current, and the secondary couples can then be charged by the aid of a very feeble primary current acting constantly in the same direction, such as that furnished by a sulphate of copper element, even mounted with water around the zinc. The chemical work produced by this feeble pile accumulates slowly, but nearly without loss, in the secondary couples, and there will be received, in the discharge, effects of an intensity infinitely superior to that of the primary source. These observations facilitated the several applications of the secondary currents that I have already mentioned, and have led me to construct the apparatus that I have the honor to submit to the Academy. It consists of a small couple perfectly prepared, or formed, contained in a box, of which the base and sides carry a system of connections arranged so as to redden a platinum wire, and to ignite, by simple pressure of a finger on a metallic touch, a wax candle, spirit lamp, or gas jet. The battery intended to put the apparatus in action consists of three elements of zinc and water, copper and sulphate of copper, and copper, and is placed at a distance or near the apparatus. It is not necessary to maintain the secondary couple constantly *en charge* under the action of the battery; for, once charged, we can produce a hundred consecutive ignitions. The ignition of a wax candle can be produced instantly, and such method of ignition is very economical and safe. The apparatus may be employed with electric bells in such a manner as to use only three cells of a sulphate of copper battery, being placed in a derived circuit from the primary and in direct communication with the two poles of the battery. It appears that, during the charge of a secondary couple under the action of a battery in whose circuit occur one of several bells, the couple absorbs all the current, and prevents the use of the bells; but, as the secondary couple acquires, under the influence of the battery, a high temporary intensity, it results that it does not act as an inert derived circuit, but itself contributes to the action of the bells. Further, if the battery

is rendered too feeble to work the bells, the secondary couple is capable, by the electricity which it accumulates, of putting them in action. By a combination of the apparatus, not only may sound be produced, but light may be obtained at the same time.—*Comptes Rendus.*

Correspondence.

The Treatment of Cancer by Pressure and Iron.

To the Editor of the Scientific American:

Pressure is supposed to act beneficially in cases of cancer by diminishing the supply of blood, and consequently of nourishment to the tumor, by preventing the growth of the cells by depriving them of the necessary space, by injuring them from direct violence, and by promoting absorption. The credit of this discovery is due to the writer of this. Although there were many who doubtless had some vague glimmerings of the truth, yet none ever put their ideas into practice. The number of cases subjected to the pressure system alone was nineteen. Of these, seventeen were cancer of the breast, and two, ulcers of the cheek and upper lip. Twelve cases terminated by cure, and five were considerably benefited, the two cutaneous ulcers being somewhat improved. The majority of the tumors were hard, irregular, tuberculated, and the seat of great pain. Six of them were ulcerated and discharged ichorous pus. Even in the worst cases, the tumor diminished in size, but the patients fell victims to the constitutional disorder.

So favorable results attracted but little attention, and almost all my resources were exhausted, and I was afraid that I would have to give up any farther experiments, when I attracted the attention of M. Récamier, of the Hotel Dieu, Paris, who consented to go on with my experiments. One hundred cancerous patients were selected, on whom the pressure system was employed; sixteen appeared incurable and underwent a palliative treatment. Thirty were completely cured by compression alone, and twenty received considerable benefit from it; fifteen were radically cured by extirpation and pressure combined, and six by compression and cauterization. The compress used was made by using strips of soap plaster and adhesive plaster. Since then, I have used soft rubber balls, three quarters full of air or water, binding them on the ulcer with a common form of bandage. The artery feeding the cancer must be compressed by a spring truss, and great care must be taken that no ulceration of the artery ensues. A caustic plaster may be used to advantage under the ball, where the cancer is small.

Give the patient carbonate of iron, of which the dose is from 6 to 12 grains. Keep the bowels open; and if suffering great pain, use hydrate of chloral. The diet must be carefully attended to, and stimulants may be freely employed. In every place where this treatment has been pursued, every case has been cured with but one exception. Iron has been cried down, and been as little used as possible of late years; but it exerts great influence on cancer, and kills the cancer cells that may exist in the blood and allows no other cells to gather. I have just received a letter, from a gentleman of high standing in medical circles, in which he assures me that he has used iron in the form of the carbonate, and that in every case it has effected a cure. GEO. W. BAILEY, M. D.

Two Wrinkles.

To the Editor of the Scientific American:

Mechanics who want small gig saw blades will find that the steel springs of which hoop skirts are formed will make capital ones of any lengths; and they vary in width so as to be suitable for a variety of uses. They can be jointed straight by brazing, and then they make capital band saws.

I would suggest the investigation of the practicability of weaving covers for umbrellas, of a circular form, with a selvage around. The invention of a loom to produce such work would furnish ample study for an ingenious man, and would probably lead to fortune. WM. P. HOPKINS.

Lawrence, Mass.

The Interplanetary Telegraph.

To the Editor of the Scientific American:

Officers of the United States Coast Survey have long been accustomed to converse together at stations over 100 miles apart, by long and short flashes of sunlight reflected from the surface of a mirror. Similar signal lights are occasionally used at sea.

1. Any cryptogram, hieroglyphic, or signal flag alphabet is readily solved by modern ingenuity, often without a key. We may safely assume that any race of beings, who have developed a superior civilization to our own, would be able to interpret Morse signals, if their attention was once attracted thereto. That such beings exist, we infer from the fact that our sun is only a second rate yellow star, of comparative insignificance.

2. Light is the only means of communication available or possible for traversing space.

3. It is therefore probable that light messages are even now passing around us in every direction, between the inhabitants of different stellar systems.

Let us assume, for example, that the huge planets which travel around Sirius or Procyon are peopled by intelligences slightly more advanced in science than ourselves, and that they communicate with Uranus or Neptune in the manner supposed. It is evident that we need only a large telescope wherewith to verify the existence of such a conversation, in order to join in it with manifest profit to ourselves. In such a case we should select the simplest telluric language, perhaps the "modified English" of Minister Arimori Mori. Our stellar correspondents would perceive a flash of light from each metallic element in turn, followed by its English name in Morse signals. Wherever in the universe these light rays might impinge upon the object glass of a telespectroscope, there the observer would become aware of the existence of an inquisitive humanity.

One objection to my project of an interstellar telegraph is the insufficient swiftness of light, only 186,000 miles per second. Thus no less than four hours are required to send a message to Neptune, and three years are necessary to send a signal from our earth to the planets of a neighboring star. The same length of time must elapse before receipt of an immediate reply. SAMUEL H. MEAD, JR.

New York city.

Scientific Prophets.

Under this heading the New Orleans *Picayune* very tersely gives the results of the labor of the learned scientific Americans who lately met in Portland, from which it would appear that the prospect of the denizens of this sublunary world is not of the most cheering character.

"Professor Young tells us that the sun is nothing but a gigantic spherical mass of gaseous matter, which is constantly being contracted by the gradual cooling of its outside circumference. The central kernel of this huge star will always, according to the learned Professor, finally be crusted over with a thick, impervious coating, through which neither light nor heat can possibly reach us. The result, as far as we are concerned, will be total darkness, intense cold, the end of animal life, and a return to primeval chaos.

"General Barnard—another scientific seer—compares the earth to a hollow india rubber ball filled with molten lead. The spherical shape of our globe being the result of its rapid rotary motion, any accident such as the bursting up of some great volcano, the shock of a comet or of a meteoric body, would open a vent through the thin rind upon which we live whereupon the incandescent matter would at once project expiring humanity into vacant space.

"Professor Walling denounces the sun as a spendthrift who wastes with stupendous folly his inheritance of heat and light, and who, thanks to his prodigal habits, is fast progressing towards that bourne whence no traveller returns—the bankruptcy court.

"Professor Franklin Hough draws it more mildly, as he only threatens us with the total disappearance of water, owing to the wanton destruction of trees and forests.

"Professor Le Comte has paid special attention to insects, and warns us that their frightful increase will ultimately lead to the total destruction of the vegetable world, after which man himself will become their prey. The earth will then be a gigantic parish of Plaquemines, in which the mosquito tribe will rule supreme, until some other equally noxious vermin shall arise and devour them."

This cheerful *resumé* of the labors of our American *savans* indicates, adds the *American Builder*, that the human race is decidedly in a tight place. If the sun is to go out like a snuffed candle and the earth to explode like an old steam boiler, we may as well overlook the lesser contingencies of rainless years and the universal prevalence of vermin. *De minimis non curat scientia*

Impure Water.

Public attention cannot be too often called to the danger of using impure water in households. The origin of typhoid fever, which so frequently runs through families in city and country, is oftener in wells and springs than is supposed. In cities it is easy to understand, when aqueduct water is not supplied, how wells may become contaminated, but for many it is not so easy to see how wells in the country, among the hills or in the green valleys, can become so impure as to be sources of disease.

Since the general introduction of aqueduct water into large cities, typhoid fever has become more common in the country than in the city, and this disease is certainly zymotic, or one which results from a poison introduced into the blood. Wells in the country are very liable to become contaminated with house sewage, as they are generally placed, for convenience, very near the dwelling, and the waste liquids thrown out upon the ground find easy access by percolation through the soil to the water. The instances of such contamination which have come to our notice, and which gave rise to fevers, are numerous. The gelatinous matter, which is often found covering the stones in wells affected by sewage, is a true fungoid growth, and highly poisonous when introduced into the system. It is undoubtedly concerned in the production of typhoid fever. How it acts it is difficult to determine, but it is at least conceivable that the spores of the fungus may get into the blood and bring about changes after the manner of yeast in beer. These spores, as is well known, develope rapidly by a kind of budding process, and but a little time passes before the whole circulation becomes filled with them, giving rise to abnormal heat and general derangement, called fever. These fungoid or confervoid growths are always present in waters rendered impure by house drainage, and great caution should be used in maintaining well waters free from all sources of pollution.—*Boston Journal of Chemistry.*

MOTH PREVENTIVE.—The following recipe for keeping moths out of clothing is a favorite in some families: Mix half a pint of alcohol, the same quantity of spirits of turpentine, and two ounces of camphor. Keep in a stone bottle, and shake before using. The clothes or furs are to be wrapped in linen, and crumpled up pieces of blotting paper dipped in the liquid are to be placed in the box with them, so that it smells strong. This requires renewing about once a year.

Electrical Metallurgy.

Specifications of the English patents of R. Werderman, C. E., have lately been published, which are interesting as presenting a new application of electricity to the arts. This new purpose, to which electricity lends its aid, is to the reduction of metals from their ores, and the refining and purifying of the reduced metals, without the ordinary chemical action of carbonaceous matter, the purifying and refining taking place at the same time and by the same process, during the reduction from the ore. The ores, that is to say, oxides, sulphides, carbonates, or other combinations in which the metals exist in Nature, are first crushed, and then heated in a suitable furnace or retort. After the whole charge is raised to a red heat, two pieces of carbon or platinum, or some other suitable material which conducts electricity, are plunged in the crushed ore. These two pieces are connected by platinum or other suitable wires or ribbons with the two poles of a galvanic battery or magneto-electric machine. The electrical action and chemical decomposition which then take place may be seen from the following equations, which are given for the purpose of illustration, and are arranged in the order for their elimination:

	Negative pole.	Positive pole,
Oxide of zinc.....ZnO	Zn	O
Red oxide of copper.....Cu_2O	2Cu	O
Plumbic oxide.....PbO	Pb	O
Sesquioxide of manganese..Mn_2O_3	2Mn	O+O+O
Loadstone.....$FeOFe_2O_3$	5Fe	SO_3
Hematite.....Fe_2O_3	2Fe	As_2O_5, Ph_2O_5
Brown hematite.....$2Fe_2O_33H_2O$	3Fe	SiO_2, $Si\bullet_2$
Spathic iron.....$FeCO_3$	Fe	CO_2
Sulphide of zinc (blende)..ZnS	Zn	S
Subsulphide of copper....CuS	Cu, Cu	CuS
Sulphide of nickel.....Ni2S	2Ni	SO_3, SO_3
Bisulphide of iron (pyrites) FeS_2	Fe	$2SO_3$
Manganous carbonate.....$MnCO_3$	Mn	CO_2+O
Carbonate of zinc (calamine).$ZnCO_3$	Zn	CO_2+O

The reduction of iron ores may be effected either in the usual manner in the melting furnace with carbonaceous matter, or in a reverberatory furnace with some suitable flux only. The best ore for this purpose is the hematite, because it is a good conductor of electricity. As soon as the oxide begins to flow, the reduction takes place, and all noxious elements are eliminated in the following order, viz: sulphur, arsenicum, phosphorus, titanium, silicon, carbon.

By regulating in a suitable manner the electromotive force and the intensity of the electric current, and stopping it at the proper moment, cast iron, wrought iron, or steel can be produced directly from the furnace without any intermediate operations. This puddling by means of an electric current will occupy from 10 to 15 minutes only, instead of several hours as in the ordinary puddling by hand labor or machinery, and consequently a great saving of time will be effected.

The entire liberation of the electro-negative elements is in some cases not effected immediately, but an intermediate transformation of the ore takes place. For instance, in treating the subsulphide of copper, this ore does not conduct electricity at the ordinary temperature, but at 230° Fahrenheit it becomes a very good conductor; copper is then produced at the negative electrode or pole, and at the positive pole sulphide of copper is formed, which, being a good conductor at a lower temperature, is now entirely decomposed and converted into metallic copper. A great difficulty in the reduction of plumbic oxide in the usual process consists in the formation of silicate of lead, due to the presence of silicates mixed with the ore. This difficulty is entirely overcome by the application of the electrical current for the formation of the silicate of lead, which is readily fusible and is no obstacle; and all ores rich in silicates, which could not be treated till the present time, can now be employed for the extraction of lead.

Instead of treating the sulphides and carbonates and other more complicated combinations directly by the electrical current, such ores may first be converted into oxides by roasting them in the usual manner for some time in contact with atmospheric air or oxygen.

While the metal is being reduced, all impurities and noxious elements mixed or combined with it are eliminated, so that finally the metal is collected perfectly purified and refined.

In purifying metals, the removal of the metals or metalloids which are to be eliminated is effected either in a melting furnace or in a crucible or converter or puddling furnace. Two pipes of fire clay are dipped in the molten metal. Two hollow cylinders of carbon or platinum or other suitable matter are fixed inside the clay pipes at the end immersed in the molten mass. To the carbon or platinum cylinders are attached two platinum wires or ribbons, which run up inside the clay pipes and are connected directly or by means of copper wires to the two poles of a galvanic battery or magneto electric machine. To prevent the development of heat in the battery or magneto-electric machine, the connecting wires pass through a cooling apparatus. Instead of hollow cylinders of carbon or platinum, solid cylinders or sheets, or any other suitably shaped pieces, of carbon or platinum or other suitable matter can be used; in the latter cases, space must be left between the said pieces and the fire clay envelope, to permit the eliminated metals or metalloids to be volatilized and to escape through the clay pipes, and to be collected in a suitable vessel, in which they are converted either into the liquid or solid state or into salts, in bringing them in this *statu nascendi* in contact with any suitable matter to which they have great affinity.