Correspondence.

Plating Organic Bodies with Metal.

To the Editor of the Scientific American:

The short editorial notice in your last number (p. 17, vol. xlvii.) of Professor Christiani's method of preserving and plating with metal, flowers, leaves, insects, and other organic bodies, suggested the idea that a detailed description of similar processes for attaining the same end might be of interest and service to your readers. The following have been used by me for several years past, and in my hands have proven entirely satisfactory:

FOR SILVERING WITHOUT A BATTERY.

The object to be silvered, after being freed from adherent dust, dirt, etc., is immersed for two or three minutes in a saturated solution of gallic acid in distilled water. It is then dipped in a solution of 20 grains of crystallized nitrate of silver in 1,000 grains of distilled water. This operation is to be repeated two or three times, moving the object alternately from one bath to the other until it has acquired a silvery appearance. It is now rinsed in distilled water and laid on clean bibulous paper to dry. In the meantime have prepared two solutions as follows:

Reducing Solution.—Grape sugar or honey, 5 parts; quicklime (CaO), 2 parts; tartaric acid, 2 parts; distilled water, 650 parts. Mix, dissolve, and filter.

Silvering Solution.—Dissolve 20 parts of crystallized silver nitrate in 650 parts of distilled water. Add strongest water of ammonia, drop by drop, continuously stirring the solution with a glass rod, until the brown precipitate is nearly but not quite redissolved. Filter and put in a glass stoppered bottle.

If more of the reducing solution be made up than is needed for immediate use it should be kept in a closely stoppered vial, filled to the top, so as to prevent atmospheric action.

Equal parts of these solutions are mixed together in a gutta percha or japanned dish, and, after thorough stirring, filtered. The object to be silvered is immersed in the mixture, care being taken that the fluid shall come in contact with every part. The deposition of silver commences in from twelve to fifteen minutes, and continues for two or three hours, until the fluid is exhausted or the object sufficiently plated. The rapidity of deposition depends on the temperature, intensity of light, etc. After the object is plated it should be washed in a solution of carbonate of lime, rinsed in distilled water, and dried.

All sorts of organic matter may thus be treated and hermetically inclosed in pure metal. I have thus coated leather, bone, wool, hair, horn, silk, flowers, leaves, insects, and anatomical preparations. Glass, porcelain, and earthenware may be coated without first using the preparatory bath. If the latter (earthenware) be porous it will be necessary to first coat it with water glass or varnish, otherwise there is great waste of material.

I have before me a sprig of arbor-vitæ, on which a dragon fly is affixed, silvered by this method more than six years ago. The coating is without a visible break, though it has been somewhat roughly handled.

PROCESSES WITH A BATTERY.

The success of these processes depends upon making the surfaces of the objects to be plated good conductors of electricity. The principles and *modus operandi* are nearly the same in all of them. The object to be plated is immersed in a solution of some easily reducible metallic salt, and kept there until its surface absorbs more or less of it. It is then so treated chemically that the absorbed salts are reduced to a metallic state, and so intimately attached to and connected with the surface of the material to be plated that they will not peel off or separate under any ordinary circumstances. The subsequent treatment is the ordinary electrotypic or galvanoplastic one of plating with any desired metal. On account of their easy reducibility the salts of silver are those usually chosen for the preparatory manipulations.

CAZENEUVE'S METHOD.

Dissolve 40 parts of crystallized silver nitrate in 1,000 parts of wood spirit. Macerate the object in this solution until sufficient absorption has taken place. The length of time needed for this will vary according to the material, the horny shields of beetles, for instance, requiring much longer time than the softer parts, or than a piece of leather. Removing the object from this bath it is partially dried by draining off any surplus fluid attaching to it, and immersed in the strongest water of ammonia, by which the easily reducible double nitrate of silver and ammonia is formed. The object is now dried and suspended in mercurial vapor. In a few moments the surface is completely metallized, and can be electroplated in the ordinary manner. This method gives excellent results, especially for hard, compact, organic substances.

ORÉ'S METHOD.

This process is that which has recently been much used in France for plating anatomical preparations, and when properly manipulated gives exquisite results. The preparatory bath, like the foregoing, is silver nitrate dissolved in alcohol or wood spirit, six grammes of the salt to one liter of the fluid. In this the object is immersed for ten minutes, when it is taken out and carefully drained. It is then transferred to a close box, in which sulphureted hydrogen is liberated, and left for fifteen to twenty minutes. When it is removed the surface will be covered with a dark deposit of silver sulphide. The object should be exposed for a few minutes to the air before transferring to the galvanoplastic cell where the operation is completed. A human brain prepared by this process over a year ago is still a beautiful object, and bids fair to remain so for an indefinite period.

In using this method for the preservation of brains and such material the object should be kept in alcohol for at least one month to give it the requisite hardness and consistency. Pledgets of cotton should be introduced into the fissures so that the circumvolutions are separated and the preserving fluid may penetrate every part. The pledgets must be removed before plating.

From your short notice Professor Christiani's method seems to be a slight modification of Oré's (substituting phosphureted hydrogen for the sulphureted in the reduction of the silver nitrate).

TO KEEP SILVER PLATED ARTICLES BRIGHT.

Articles of silver and silver plated ware rapidly tarnish when kept in rooms where gas is used for illuminating purposes, and everywhere in cities like St. Louis, Pittsburg, Cincinnati, etc., where the air is constantly filled with sulphurous vapors. My cabinet of silver plated specimens, instruments, and water pitchers used to give no end of trouble this way. This is all avoided now by dipping the articles occasionally in a solution of hyposulphite of soda. Large articles, like pitchers and salvers, should be wiped off with a rag dipped in the solution, and dried with a soft towel. A rub with a bit of chamois leather makes them as brilliant as new.

Respectfully,

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201 N. 6th St., St. Louis, Mo., July 8, 1882.

Meter for Steam Heating.

There is now on exhibition in this city an ingenious apparatus, invented by Mr. E. F. Osborne, of St. Paul, Minn., for controlling the admission of heat into buildings from a general steam-heating system in cities and for accurately recording the quantity of heat actually used. It consists substantially of two parts—a transmitter and a combined trap and meter; both of which in a compact form are intended to be placed in the cellar of any residence or place of business.

The transmitter resembles an ordinary upright tubular boiler in its appearance and functions—with this difference, that steam circulates through the tubes instead of the ordinary products of combustion, and communicating or giving forth its heat through the tubes converts water in contact with them into steam, which the consumer may use for warming rooms or for other purposes. As the steam generated from the water in the transmitter parts with its heat in being distributed through a building the water of condensation returns to the transmitter, as in ordinary gravity systems, at about the temperature of the steam. The local or consumer's circuit is entirely separate from the supply circuit; or, in other words, it is heat, not steam, which is sold. As water soon loses its heat when brought in contact with good conducting bodies of lower temperature it is only at and near the surface that the high temperature of the steam is maintained. Below this upper stratum no heat may be said to be transmitted from the steam of the "main" or street supply. If the user of the heat raises or lowers the level of this hot stratum he receives less or more heat just as he desires; and the mere moving of a weight on the arm of a pressure diaphragm regulator puts up or down the water level.

Below and at right-angles to the transmitter we find the combined trap and meter, which may be described as an iron tank, that acts as a receptacle for the water condensed in the transmitter from the "main" pipe, and also contains the meter for ascertaining how much heat had been abstracted by the consumer. The meter is essentially a compound or duplex pump, the pistons of which operate suitable mechanism that indicates on dials the rate of heat consumption in dollars and cents.

There is employed in this system a balanced return, which is a method of restoring by steam pressure the water of condensation from all parts of the "main" supply to the boilers of the central station.

When the steam from a "main" is sent to a place where its heat is to be utilized, it is first admitted to the trap, where it is freed from water, and it then goes into the transmitter in a dry state. In the transmitter, after having converted the water of the consumer's circuit into steam, through the conducting agency of pipes and diaphragms, the steam of the central station assumes the form of water, descends into the trap, sets the meter in motion, and returns under pressure to the boilers.

It will thus be seen that the users of the heat have the whole control of the amount they require; that the producers of the heat or the owners of the system are, as well as the consumers, fully and fairly notified of the rate of its consumption; and that, finally, as the water of condensation is returned to the steam generators at a very considerable temperature, there is a resulting economy which, in connection with the use of the meter, may not unreasonably be considered sufficient to bridge over the gap between success and failure, financially speaking, in the effort to heat separate buildings by steam from a general central source of supply.

The Osborne method has been adopted by the American Heating and Power Company of this city, and it is now being put in operation in a district east of the lower part of Broadway in this city.

Some Results of the Recent Eclipse Observations.

A writer in the New York *Sun* says: "The new observations seem to show pretty conclusively that the influence which produces sun spots is powerfully felt in the upper regions of the solar atmosphere, where it causes wonderful phenomena. Sun spots go in periods. Once in about eleven years they reach their maximum, or become most numerous. There was a solar eclipse in 1871 during a sun spot maximum, and another in 1878, when sun spots were very rare, and the astronomers observed a decided difference in the form of the corona or great gaseous envelope that surrounds the sun and blazes into sight during a total eclipse in the most fantastic and wonderful forms. The eclipse of this year fell in another period of sun-spot maximum, and it is an exceedingly interesting fact that the corona again presented the appearance seen in 1871. The most striking difference in the form of this magnificent atmosphere of the sun, as seen at sun-spot maxima and sun-spot minima, seems to be that when the spots are fewest the envelopes of glowing gases are deepest at the sun's equator, and also exhibit striking forms about his poles, while when the spots are most numerous, as at present, the corona extends away from the equator, and is not so conspicuous about the poles, but an enormous quantity of hydrogen appears in the solar atmosphere, glowing with the most intense heat. What a wonderful thing the sun appears to be in the light of these facts! Instead of a round, solid body, glowing with a white heat, we see in the sun a globe of gases subjected to a temperature and a pressure almost too frightful for the mind to conceive—a fiery globe in which iron and the solidest substances we know are not merely melted, but turned into a whirling mass of vapor, which is heaved and tossed with awful convulsions, while around it all, outside the sun as we see it, there is an indescribable atmosphere thousands and hundreds of thousands of miles deep, composed of glowing gases, some of which if condensed over our heads would set the world afire with red hot rain. Then we see, through some cause which we cannot yet understand, this ball of flaming gases, which is rushing through space like a hot shot hurled from a cannon of infinite power, lashed every eleven years into seven-fold fury, until its glowing surface is pitted with tremendous chasms, and jets of flaming hydrogen and other gases leap from it like gigantic geysers of fire and set its great upper atmosphere aglow.

"Another interesting result of the recent eclipse observations is the evidence obtained of the existence of enormous quantities of vaporized calcium in the corona, or upper atmosphere of the sun. If this is so, then we see an element which, in limestone and other combinations, forms whole ranges of solid mountains on the earth changed to the condition of a shining vapor, and serving to make up part of the atmosphere of the great orb of day. The existence of calcium in what may be called the body of the sun was recognized long ago, but heretofore there has been no good evidence that this terrestrial mountain-making element was floating at a tremendous elevation above the surface of the sun.

"Again, the recent observations have, it appears, gone far toward proving, what has been for many years suspected, that the chemical elements as we know them are not able to withstand the tremendous temperature of the sun, and that they are thus split up into still more elementary substances, an achievement far beyond the power of our chemistry. If this is so it is a great advance in the spectroscopic study of the sun.

"These are only some of the discoveries made by the astronomers in Egypt, and which have been so slow to leak out. There are a great many other things of public interest that they could throw light on; for instance, the sword-shaped comet which they discovered close to the sun and photographed, and the discovery of indications of an atmosphere in the moon, the particulars of which would interest everybody, especially if they can give us any hope that the moon is not a dead world after all."

Over Five Thousand Electric Lights in One Building.

The Mills Building, Wall and Broad Streets, has been wired for 5,588 Edison lamps. As this is the largest enterprise of the kind ever undertaken the details may prove interesting. The conductors consist of 1,650 feet of Edison's patent electric tubes, 628 feet of lead pipe containing taped wires thoroughly insulated, 23,658 feet of zinc tubes, 75,909 feet of wire conductors, and 24,162 feet of wooded receptacles, placed between the floors, to hold the system of distributed wires. The total amount of wires used was 3,774 lb., besides 48 vertical main cut-outs, and 253 division cut-outs. The work was done by the wiring department of the Edison Illuminating Company of New York, under contract with Mr. D. O. Mills, the owner of the building.

The Next Transit of Venus.

Two German expeditions will go to American stations in order to observe the transit of Venus in December next. Observations will be taken at Stratford, Connecticut; at Aiken, South Carolina; at Bahia, Blanca; and at Punta Arenas.

The Normal Amount of Carbonic Acid in the Air.

In a lecture before the Paris Academy, M. Dumas presented the following address on the present state of our knowledge of this interesting subject.

Of all the gases that the atmosphere contains there is one which offers a special interest, as well on account of the part ascribed to it in the mutual interchange going on between the two organic kingdoms, as on account of the relation that it has been observed to occupy between earth, air, and water; this gas is carbonic acid.

Ever since the fact has been established that animals consume oxygen and give out carbonic acid as the product of respiration, while plants consume carbonic acid and give out oxygen, the question has often been asked whether the quantity of carbonic acid contained in the air did not represent a sort of sustaining reservoir which was being continually drawn on by the plants and resupplied by animals, so that it has doubtless remained unchanged owing to this double action.

On the other hand, Boussingault has long since shown that volcanic regions give out through crevices and fumaroles enormous quantities of carbonic acid. The deposition of carbonate of lime that is continually taking place on the sea bottom is, on the other hand, fixing carbonic acid in quantities which we may accurately estimate from the strata of limestone seen on the surface of the earth. We might imagine, that in comparison with the huge volumes of carbonic acid sent forth in volcanic districts, even in the oldest one, and the mass of carbonate of lime deposited on the sea bottom, the results attributed to the life of plants and animals would be of no consequence either for increasing or diminishing the physiological carbonic acid in the air comparable with those which are accomplished by the purely geological exchange.

Schloesing has recently succeeded, by a happy application of the principle of dissociation, in showing that the amount of carbonic acid in the air bears a direct relation to the quantity of bicarbonate of lime dissolved in sea water. If the quantity of carbonic acid diminishes, the bicarbonate of the water is decomposed, half of its carbonic acid escapes into the atmosphere, and the neutral carbonate of lime is precipitated. The aqueous vapor condensed from the air dissolves part of the carbonic acid contained therein, and carries it along, when it falls as rain upon the earth, and takes up there enough lime to form the bicarbonate, which is thus carried back to the sea.

The physiological role of carbonic acid, its geognostic influence, and its relations to most ordinary meteorological phenomena on the earth's surface—all these contribute to give special weight to studies concerned in the estimation of the normal quantity of carbonic acid in the air.

Nevertheless, this estimation is attended with great difficulty. Not every one is able to take up such questions, and not all processes are adapted to it. The first thought which would naturally arise would be to inclose a known volume of air in a given vessel, and then determine its carbonic acid by measuring or weighing it. In this way we should obtain the exact relation between a volume of air and the volume of carbonic acid in it, for any given moment, and in any given place. If, however, this be done with a ten-liter flask, for example, it would only hold 3 c. c. of carbonic acid, weighing 6 milligrammes, and whether it is weighed or measured, the error may easily equal 10 per cent of the real value, hence no deductions could be drawn from the observed facts.

For this reason larger volumes of air were taken, and a current of air, whose volume could be accurately measured by known methods, was passed through condensers capable of retaining the carbonic acid. But in this case the air must pass very slowly through it, so that the process may last several hours; and since the air is continually in motion, owing to vertical and horizontal currents, the experiment may be begun with the air of one place, and concluded with air from a far distant spot. For example, if an experiment lasting 24 hours was made in Paris when the air moved but four meters per second (9 or 10 miles per hour), it might be begun with air from the Department of the Seine, and end with air from the Department of the Rhone, or the Belgian frontier, according to the direction of the wind.

So long as we had no analytical methods of sufficient delicacy to estimate with certainty the hundredth, or at least the tenth of a milligramme of carbonic acid, it was very difficult to determine the quantity in the air at a given time and place. It is frequently possible to analyze upon the plain air that has descended from the heights above, and to examine by bright daylight the effect of night upon the atmosphere.

Still other difficulties show themselves in such investigations. It seems very easy to collect carbonic acid in potash tubes, and to determine its amount from the increase in weight of the tubes; but alas! to how many sources of error is this method exposed. If the potash has been in contact with any organic substance, it will absorb oxygen. If the pumice that takes the place of the potash contains protoxide of iron, it will also absorb oxygen. In both cases, the oxygen increases the weight of the carbonic acid.

Every experimenter who has been compelled to repeat the weighing of a somewhat complicate piece of apparatus, with an interval of several hours between, knows how many inaccuracies he is exposed to if he is compelled to take into calculation the changes of temperature and pressure, and the moisture on the surface of the apparatus. After fighting all these difficulties, and frequently in vain, the experimenter begins to mistrust every result that depends only on difference in weight, and to prefer those methods whereby the substance to be estimated can be isolated, so that it can be seen and handled, weighed or measured, in a free state, and in its own natural condition.

The classical experiments of Thenard, of Th. De Saussure, of Messrs. Boussingault, on the quantity of carbonic acid in the air, are well known to every one; they need only to be organized, repeated, and multiplied.

J. Reiset, who has conducted a long and tedious series of experiments on this subject, has adopted a process that seems to offer every guarantee of accuracy. The air that furnishes the carbonic acid is aspirated through the absorption apparatus by two aspirators of 600 liters capacity. The temperature and pressure of the air are carefully measured. The carbonic acid is absorbed by baryta water in three bulb apparatus. The last bulb, which serves as a check to control the operation, remains clear, and proves that no binoxide of barium is formed. The baryta water used is titrated before and after the operation, and from the difference is calculated the quantity of carbonate formed, and hence of the carbonic acid.

These tedious experiments, which varied in duration from 6 to 25 hours, require at least two days of continuous labor. They were repeated 193 times by Reiset in 1872, '73, and '79. They were made in still weather, and in violent winds and storms. The air was taken at the sea shore, in the middle of the fields, on the level earth, during harvests, in the forests, and in Paris. Under such varied conditions, the quantity of carbonic acid varied but little; the numbers obtained were between 2·94 and 3·1, which may be taken as a general average of the carbonic acid in the air.

The quantity of carbonic acid in the free atmosphere is tolerably constant, which must necessarily be the case according to Schloesing's proposed relation between the bicarbonate of lime in the sea and the carbonic acid in the air. The only cause that seems at all competent to change the geological quantity of carbonic acid in the atmosphere is the formation of fog. As the aqueous vapors condense, they collect the carbonic acid; and the foggy air, as a rule, is more heavily laden with this gas than ordinary air.

It is not surprising that there is less carbonic acid in the air collected on clear summer days, in the midst of clover, etc., that is, in an active reducing furnace; if anything is surprising it is that the quantity of carbonic acid does not sink below 2·8.

It is also a matter for surprise that in Paris, among so many sources of carbonic acid, the furnace fires, the respiration of men and animals, and the spontaneous decomposition and decay of organic substances, the quantity of carbonic acid does not exceed 3·5.

If, then, the great general mean of normal atmospheric carbonic acid deviates but little from 2·9 or 3·0, it is not doubtful that under local conditions, in closed places, and under exceptional meteorological conditions, considerable variations may occur in these proportions. But these variations do not affect the general laws of the composition of the atmosphere.

There are two entirely distinct points from which the measurement of the atmospheric carbonic acid may be contemplated.

The first consists in considering it as a geological element which belongs to the gaseous envelope of the earth in general, and it leads us to express the general relation of carbonic acid to the quantity of air, as about 3 volumes in 10,000.

The second, which relates to accidental and local phenomena, to the activity of man and beast, to the effect of fires and of decomposing organic matter, to volcanic emanations, and finally to the action of clouds and rain, permits us to recognize the changes which can occur in air exposed to the influences mentioned, and to a certain extent confined. Without denying that it is of interest from a meteorological and hygienic standpoint, it does not take the same rank as the first.

J. Reiset's experiments, by their number, accuracy, the large volumes employed, and the interval of years that separate them, have definitely established two facts on which the earth's history must depend; the first is, that the percentage of carbonic acid in the air scarcely changes; the second, that it differs but little from $\frac{3}{10000}$ by volume.

These results are fully confirmed by the results which were obtained by Franz Schulze, in Rostock, in 1868, '69, '70, and '71. The averages which he got, with very small variation, were 2·8668 for 1869, 2·9053 for 1870, and 3·0126 for 1871.

More recently Muentz and Aubin have analyzed air collected on the plains near Paris, on the Pic du Midi, and on the top of Puy-de-Dome. Their results agree with those published by Reiset and Schulze.

The grand average of carbonic oxide in the air seems to be tolerably fixed; but after this starting point is established, it remains to study the variations that it is capable of, no from local causes, which are of little importance, but from general causes connected with large movements of the air. Upon this study, which demands the co-operation of a definite number of observers stationed at different and distant points of the earth, the experiments being made simultaneously, and by comparable methods.

M. Dumas called the attention of the Academy to this point, in connection with its mission of selecting suitable stations for observing the transit of Venus. The process and apparatus of Muentz and Aubin offer the means adapted for making these experiments, and seem sufficient to solve the problem which science proposes, of determining the present quantity of carbonic acid in the air.

If these experiments yield satisfactory results, as we have good reasons to believe they will, it is to be hoped that annual observations will be made in properly chosen places, so as to determine the variations which may possibly take place in the relative quantity of atmospheric carbonic acid during the coming century.—*Compt. Rend.*, p. 589.

[Although this proposition was made by a Frenchman to his fellow scientists, would it not be well for some American to accept the challenge, and bring it before the coming meeting of the American Association for the Advancement of Science, in the hope that we too may contribute our mite of effort in the same direction?—ED.]

About Earths.

While chemistry was under the dominion of fancy and metaphysics, before the establishment of the maxim that facts are to precede and serve as the basis of all reasonings in natural science, it was imagined that all material substances were resolvable into four simple bodies, viz., air, fire, water, and earth, which were hence called the four elements. The two first were avowedly almost wholly unknown, most liquids were supposed to be modifications of the third, and the solid particles of bodies were attributed to the last. Earth in this extended sense was chiefly characterized by the properties of hardness and solidity, and was subdivided into various species, according to the supposed modifications that it underwent. Thus the class of combustible bodies was imagined to contain more or less of an inflammable earth, the various metals were considered as abounding with a metallic or mercurial earth, and so on of the other great classes into which solids are divided. These several earths, however, were considered as only modifications of the primitive elementary one. Modern chemistry, though it has retained the term in a much more restricted sense than it was applied formerly, has yet included under it a sufficiently heterogeneous assemblage of bodies, a considerable portion of which may much more properly be considered as belonging to the class of alkalies.

The principal earths that are at present known are as follows: Silex, zircon, alumina, glycine, yttria, barytes, strontian, lime, and magnesia. When purified by art from all foreign mixtures they agree in the following properties: 1, They are of a snow-white color; 2, are infusible by a very intense heat; 3, are not reducible to the metallic state by being heated in contact with combustible matter. Of these nine earths, however, the four last have all the properties of alkalies (whence indeed they have sometimes been called alkaline earths), not differing from potash or soda so much as these do from ammonia. If, therefore, we were to confine the term earth to the five first, this double advantage would accrue from the arrangement, that the two classes of alkalies and earths would each admit of a genuine chemical definition, which they both equally want at present.

If such an arrangement were adopted, the remaining earths would be thus characterized: They are infusible and insoluble in water, and have neither taste nor smell; they exhibit neither acid nor alkaline characters; they combine with acids and with alkalies either pure or carbonated; they have no action on metallic substances, and are incapable of assuming the reguline form.

A considerable stir was made many years ago in Hungary by the pretended metallization of several earths by MM. Reprecht and Tondi, till their experiments were repeated by Klaproth and others, and shown to be entirely fallacious. The chemists first mentioned took a small quantity of any earth—barytes, for example—and, having beaten it up with a little water and charcoal, smeared it on the inside of a Hessian crucible; the cavity was then filled with powdered charcoal, and at the top of all was placed a layer of bone ash; a cover being then luted on, the crucible was exposed for three-quarters of an hour to a blast furnace, in which it was heated almost to a state of pasty fusion. When the contents of the crucible were examined, the barytes was found in part melted with the earth of the crucible, and containing from two to four per cent of brittle metallic globules, which were supposed to have originated from a decomposition of part of the barytes. These globules, however, on examination by Klaproth, proved to be nothing more than phosphuret of iron; the metallic part doubtless originating from the iron contained in the earth of the crucible, and the phosphorus from the bone ash by means of the charcoal. That this is the true explanation of the appearance is evident from another experiment of Klaproth, in which he repeated the process of Ruprecht, only substituting a porcelain for a Hessian crucible; but the earth of the crucible contained no iron, and there was not the slightest appearance of metallic globules in the barytes which it contained. Further, the experiment was again repeated in a Hessian crucible, only leaving out the barytes, and the globules made their appearance as plentifully as when the barytes was present.—*Glassware Reporter.*

A NEW VARIETY OF GLASS.—A chemist of Vienna has invented a glass which contains no silex, potash, soda, lime, or borax. In appearance it is equal to the common crystal, but more brilliant; it is transparent, white, and clear, and can be cut and polished. It is insoluble in water, and is not attacked by fluoric acid, but it can be corroded by hydrochloric and nitric acid. When in a state of fusion it adheres to iron, bronze, and zinc.