Correspondence

Platinum Glass Pots.

MESSRS. EDITORS:—In your journal of this date there is an article on "Platinum Crucibles," by F. H. S., in which he says:—"If platinum crucibles can be made to stand heat and fluxes, at a reasonable price, and will last, on a guaranty, say four months, a large business can be done," etc.

Some twenty-five years ago I made some experiments with platinum, in hopes of making it available in the flint glass business (though not for crucibles or pots, as they are technically named); and I am therefore able to assure F. H. S. that it will stand the heat and fluxes with impunity, without diminution in size or weight, and would, if carefully used in dragading and scraping, last for years; but the first cost will be an insuperable barrier to the practical use of that metal for the purpose designated, for, at a rough calculation, the cost of platinum pots for a ten-pot flint furnace would not be less than $500,000.

My experience teaches me that F. H. S. is unjust to manufacturers in insinuating that they "take so little interest in the scientific part of their art." I do not think there is any business that requires and receives a greater share of attention, or in which more money is expended in practical experiments, than in the flint glass business. He is, however, correct in his supposition "that they desire to keep the formulas secret," and, I opine, that if F. H. S. had devoted his time for years, and expended no inconsiderable amount of money, in chemical and practical experiments to improve the quality of his metal, that on his succeeding in doing so he would not be so apt to "contend there is no necessity for secresy."

The experiments of M. Pelouze have, doubtless, been on a diminutive scale, probably in a small experimental furnace. I always built my furnaces with proper facilities for this purpose.

I imagine your correspondent is not acquainted with any other branch of the business than the hollow-ware trade, while there are five different and distinct branches, viz.: flint glass or crystal, plate glass, crown glass, broad or common window glass, and bottle or hollow-ware, requiring different styles of furnaces and shapes of pots, and an equally distinct class of workmen. The flint glass being the most beautiful and costly, and requiring the greatest amount of practical and scientific knowledge in the manufacture, and a great delicacy of manipulation on the part of the workmen to produce a perfect article.

In regard to the construction of furnaces, etc., the relative proportion of pots (crucibles) and furnaces must necessarily be somewhat varied, depending entirely on the nature of the fuel and the power of evolving caloric. I have myself used five different kinds of fuel, and have found it necessary to vary the size of the eye and the rise or spring of the cap or crown to suit the fuel. As to the best material for benches (as they are termed in the hollow-ware houses) or sieges (in the flint house), I cannot think there can be two opinions among men conversant with both branches of the business. I have known a clay seige, constructed with care, last fourteen years, while the same material, used for the benches of a hollow-ware furnace, would not, without entailing trouble and expense in repairs, last a single blast of ten months; this will be obvious to the initiated. But it would take up too much of your valuable space to even cursorily enter into details at a greater length upon the various points mentioned by your correspondent; they could be better treated of, be of more use to inquirers, and certainly more interesting and entertaining to your readers, it systematically arranged in the form of a series of articles on glass making. W. H.

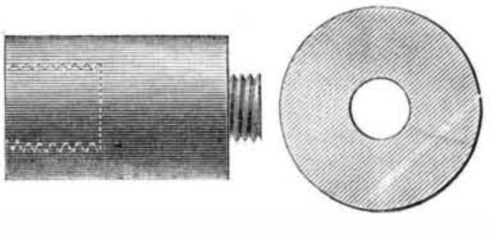
Bordentown, N. J., Sept. 9, 1865.

Chuck to Hold Sheet Metal, Etc.

MESSRS. EDITORS:—To turn a thin piece of sheet brass circular, and then to mill its edge, requires time and skill; first, to fasten the uneven piece of brass plate to a wooden chuck by means of screws, in order to turn a circular disk; and, secondly, to fasten that disk between points, and a center, to hold it true and firm during the time needed to mill its edge. Unless great care be taken, the sheet bars will be indented by the points and the center-point. To obviate these difficulties, I adopt a very simple and quick mode of fastening the metal plate to a chuck.

Some of your readers may suggest that the plate could be secured by shellac or cement. This plan is the true principle, but the slightest blow would detach the plate and spoil the work. If, however, you use solder as a cement, the adhesion is perfect; and by the following plan, in a few minutes, the plate can be fixed so firmly to the chuck that no blow or jar will affect it.

As I have found old hands at the lathe entirely ignorant of the process of soft soldering, and as I have labored for years under the same disadvantage, it may interest some of your young subscribers to know how to attach two pieces of metal in a few seconds. This is effected by placing on each piece, with a leather or small brush, a small quantity of muriate of zinc, and then holding each piece over a spirit lamp—taking care not to inhale the former—and when it boils rub the plate with a thin stick of pure tin or soldier; I prefer tin, which I melt in a ladle, throw out, with a jerk, on a metal or stone slab, so as to form a sheet when cold, and then cut into strips a little larger than an ordinary match; I, however, prefer drawing the tin into wire, of different thicknesses, and using it in that state. Any one can make the muriate of zinc by filling an ale glass one-third full with muriatic acid, and adding pieces of zinc (in the open air) until it will dissolve no more, then pour it off clear. As an experiment for the learner, let him heat a cent by a spirit lamp, placing a drop of muriate of zinc on it, and then rubbing a small quantity of tin on it, while the cent is held by a pair of pincers; then take a copper tack, dip the head in muriate of zinc, and place the head on the middle of the cent, which is still held by the pincers over the lamp; in an instant the head of the tack will become turned, and when both are cool press it with the foot into the floor. The first person who sees the cent on the floor will try to pick it up, and he will enjoy a laugh at the other's expense, and, at the same time, have taken the first lesson in soldering.



But to return to my chuck, which I call my "solder chuck." It would answer to heat any thin brass chuck and tin its face, then to heat the sheet brass you wish to turn round, and to tin it also; placing the two tinned surfaces together, you heat them and let them get cool, with a weight pressing them together until cold; but this would consume too much time and alcohol. I, therefore, make my chucks, of brass or iron, with a steel male screw, projecting not quite one-fourth of an inch beyond the face of the chucks.

I make several washers of brass, one-fourth inch thick, and tap them so that they screw acccurately on to the male screw; they are of different diameters, to support smaller or larger pieces of brass plate, according to the diameter of sizes I may wish to turn. One side of these washers I tin by the process before described. I now take a piece of sheet brass (square or any other shape) mark the center with a point; then I tin, as before described, a place about as large as the washer to be used; then I place the tinned side of the washer on the sheet brass, in the center, which you see through the hole in the washer; let the whole be heated over a spirit lamp, and cooled, and this operation—which will only take a minute or two—fastens the sheet brass to the washer perfectly, and you now can screw the washer on to the chuck. You can thus turn the sheet brass round with perfect accuracy, and mill its edge, if you choose, as our silver coin was formerly milled on the edge, and then if you wish to form the bottom or top of a metal box you can turn a groove to receive the body of the box. To disconnect the finished disk from the washer you heat it over the lamp and separate the two while hot, rub off most of the tin with a piece of newspaper, and, when cold, the rest of it with sand paper. I have before me a flat, round, brass match box, made in this way; grooves were turned in the top and bottom disks, and short pieces of brass pipe were soldered into the grooves in the same way as above described; the bottom was turned with eccentric circles to strike the match on, and the top ornamented with looped figures by an elliptical cutter; the box was then bronzed—it might have been plated or gilted.

The above description illustrates only one kind of "solder chuck" for turners. It will suggest, however, a variety of other plans for attaching work to be turned by the adhesive properties of solder. For instance, when I wish to turn steel "in the air" with great accuracy, I bore a hole into a brass chuck to receive one end of a bar of steel, which I solder into it, and thus avoid the possibility of shaking so usual in universal or die chucks. E. J. W.

Lenox, Mass.

Cement for Aquaria.

MESSRS. EDITORS:—I would be obliged, and, no doubt, others of your readers, if you would give us the proper quantities of glue, rosin, oil and whiting required for a good composition to ornament frames or other inside decoration. I find by putting them in by chance they are apt to crack up and cost much labor to refix.

I have seen for years many inquiries in your paper for a good cement for aquariums. I have tried fifty different ones, and find the best composition is, one part common pitch, one-half part gutta-percha; they can be melted in a little turpentine. To make it work easier, there must be no coal oil in the turpentine, or the pitch will soften and be destroyed; a rascally druggist made me lose several dollars' worth of gutta-percha in that way. You will find this mixture gives a little with the material that the tank is made of, as the changes of heat and cold affect it; and it will adhere to glass, wood or iron. E. BRUCE.

St. Louis, Mo., July 30, 1865.

[The proportions are one pound glue, one-half pound linseed oil, two pounds whiting. Stir well while melting, and let it cool gradually on a stone covered with powdered whiting; heat it well again until it is tough and firm; cover with a damp cloth when not in use.—EDS.

Perfumers.

MESSRS. EDITORS:—Most all of your readers have seen the neat little article used to blow permme in a handkerchief; it is composed of two pieces of tube glass, and when one is inserted in a bottle, and the other piece is blown through, the perfume rises in the tube, and is blown off in a delightful spray. What I wish is, that you will explain the philosophy of the thing. Why does the fluid rise in the main tube? Is it caused by the current of air passing at right angles with the main tube? Or how, then? C.

[The explanation is simply friction. When a current is moving through any fluid the particles on the outside of the current rub against those of the fluid, and carry along a portion of them, thus creating in the fluid a current in the same direction. When the vertical limb of a T-shaped tube is inserted in a liquid, and a current of air is blown through the horizontal limb, the air is swept out of the vertical limb by this rubbing or dragging action, and the liquid is then pressed upward into the tube by the weight of the atmosphere resting upon the surface outside of the tube.—EDS.

Petroleum for Worms.

MESSRS. EDITORS:—I read your abstract of the debates of the Farmers' Club with much interest, but have not yet seen it stated that coal oil, such as is used for lamps, will destroy tree worms, and the common yellow caterpillar and the measure worm. With us these vermin appear some three weeks earlier than with you, and may then still be dosed.

I have a plum tree some dozen years old—a bearing tree—in my yard, that has been regularly attacked and the verdure destroyed, unless much time was spent upon it, every summer. This summer, remembering how effectually my people extirpate vermin from the house, I took my fishing rod, with a rag of the bulk of an egg tied upon the tip, and attacked them. I saturated the rag two or three times, and used it as many, touching under and upon the nests wherever I could, and not very thoroughly either. The leaves that had been attacked by the worms died and dried up; this was evidence of cessation of their work. In a week new leaves appeared under the still standing web, but there were no more signs of worms. A second crop, being another batch, appeared in a month or six weeks, and were as easily disposed of; and none have since appeared. I believe this to be a thorough and good remedy. Those worms that it touches I know it kills, and such as get a smell of it leave at once, perhaps die.

R. H. A.

Baltimore, Sept. 9, 1865.

An Electric Circuit.

MESSRS. EDITORS:—In a late number of the SCIENTIFIC AMERICAN there appears an article stating the manner in which the defect in the Atlantic cable was located. From the language used it appeared that the current sent out on the wire from Valentia passed off at the bit of wire, and the ocean then served as a conductor to carry the current back to the coast of Ireland—forming what electricians term a "circuit." Do I understand that, to form a circuit, the current must return to the same point from which it started? and, if so, why would not the current that passed off the wire at the place the bit of wire ran through the outside covering of the cable, as likely cut across through the ocean to the American coast as to return to the coast of Ireland? Or, in other words, explain the word "circuit" as employed by electricians. SUBSCRIBER.

Paterson, N. J., Sept. 13, 1865.

[If you pour some dilute sulphuric acid into a glass cup, and place a plate of copper in the cup on one side, and a plate of zinc on the other, so long as the metal plates are not brought in contact or connection no action takes place; but if a metal wire or other conductor of electricity is stretched from the copper to the zinc outside of the liquid, a current of electricity immediately starts from the zinc, passes through the liquid to the copper, and from the copper along the wire to the zinc, thus flowing in a perpetual circuit. Instead of leading the wire directly from the zinc to the copper, it may be led from the zinc into the earth, and from the copper into the earth, when the current will flow the same as through a direct connection. The reason why the current should go to Valentia was, that the cable was connected with one plate of the battery, and the other plate was connected with the ground at Valentia. The mode of connecting the wire with the ground is by soldering it to a broad copper plate, and burying the plate in moist earth. In cities an easier and more effectual method is to connect the wire with gas or water pipes. At some of the stations on the line of the California telegraph, in the Great American Desert, the ground is so dry that it acts as an insulator, and no conducting connection with the earth can be made. It was at first supposed that the ground acted precisely the same as the portion of wire which it displaced, and that the current of electricity darted along through water, gravel and rocks from the end of the wire connected with the copper plate to the end of that connected with the zinc plate; but it is now regarded as settled that the earth is a great reservoir of electricity, into which the current flows from the end of the one wire and from which it is drawn into the end of the other.—EDS.

Action and Reaction.

MESSRS. EDITORS:—There is, I believe, an important law of mechanics, never, as yet, definitely announced, and, so far as I am aware, lying unknown, because a current form of words, true in their application to a different case, is supposed to cover vastly more than their author ever intended. In this I allude to action and reaction in a mechanical sense, as distinct from the same when considered as an element of statics. Since Newton announced as a law of statics that action and reaction were equal and in opposite directions, the law has, with unquestioning credulity, been extended to another science as different from that of which this simple law forms the chief part as two sciences in the least akin can ever be. Statics, as is well understood, treats of pressures alone, or of the intensity of forces, which is the same thing, while the science of mechanics considers forces with reference to their quantities. The law of statics referred to can, therefore, only mean that from every exertion of power the pressures produced in opposite directions are equal. But when we come to speak of mechanical action and reaction the question is what is the *quantity* of force consumed respectively by action and reaction. A mechanical force being always estimated by multiplying its intensity into the distance through which it moves, and, the intensity being always equal in opposite directions, it follows that the quantities of force expended in each of the two ways are to each other exactly as the distances acted through in the different directions; or, in other words, as the respective lengths of the forces. Assuming this as probably clear to every one, we have now but to inquire for the law which governs the distances moved through by different bodies in the same time when acted on by equal pressures. But it is a matter of every-day observation that this is proportionate to the intensity of resistance which they offer. The deduction from this is so clear that it might be made by any one, viz—that, in a mechanical sense, action and reaction are in opposite directions, and in quantity inversely as the intensity of the resistance in their respective directions. And this is a law verified by so large a number of instances that none can have failed to observe them, rendering a present induction of facts unnecessary. ISAAC E. CRAIG.

Cleveland, Ohio, Sept. 16, 1865.

[Prof. Treadwell has published a pamphlet discussing this problem at length and coming to the same conclusion as our correspondent.—EDS.

To Preserve the Eyesight.

MESSRS. EDITORS:—It may be well known, perhaps, by many of your readers, if not all, that, as a person grows old, the eye loses its convexity or the pupil becomes flattened. For this reason near-sighted people, whose eyes are too convex, often experience an improvement in their eyesight as they grow old, for the reason mentioned above. If all persons who are not near-sighted should, every time they wash their faces, press their eyes outward, or try to make them as round as they can, taking care not to press or flatten the pupil of the eye, their eyesight would be improved. In this manner I have improved my eyesight, which showed signs of decay. Another theory, almost as important—avoid rubbing the eye when it itches, for in this way the eye is not only inflamed but often flattened. When the eye feels tired wet your finger with spittle and rub it around the lids, this will cure inflammation; and, next, avoid coming from the dark to light, or light to dark; and never read much in a cloudy day or look long sideways. C.

[Many years ago we heard this same direction for preserving the eyesight, and, being then very young, we accepted it without questioning; but every year of our observation of men brings some new evidence to strengthen our distrust of human testimony—not from the disposition of people to tell falsehoods, but from their carelessness of observation. When the French tourist saw a Dutchman recover from a fever after eating boiled cabbage, he entered in his journal: "Boiled cabbage will cure fever;" when, however, he saw the same remedy followed by death in the case of one of his own countrymen, he modified his conclusion, and made a new entry in his journal: "Boiled cabbage will cure a Dutchman of a fever and kill a Frenchman."

Men recover from disease without using any remedy; they doubtless frequently recover in spite of injurious remedies employed. Many persons never have occasion to use spectacles, though they follow no special method in washing or rubbing their eyes. We know of no reason why the plan proposed by our correspondent should not be perfectly effectual; we only want satisfactory evidence to believe that it is so; but one or two cases, observed in the careless manner which is common with most people, and not compared with the numbers of cases in which the plan was not pursued, we should hardly regard as any evidence whatever.—EDS.

UP IN A BALLOON.

At the junction of Sixth avenue and Fifty-ninth street, in this city—just by the southern boundary of the Central Park—there is a vacant lot, which has been rented by the well-known aeronaut, T. F. C. Lowe, for the purpose of giving any person who may desire it, a balloon ascent to the hight of a thousand feet. The lot is inclosed by a board fence, and twenty-five cents is charged for admission, the sum of five dollars being charged for each ascent; the balloon carrying up two at a time, beside the aeronaut, who accompanies them—thus making the charge two and a half dollars for each person. The balloon is held by a rope an inch in diameter and 1,200 feet in length, which is passed under a pulley and wound around a large drum, 16 feet in diameter. During the ascent the revolutions of the drum are held in check by two men with levers acting as brakes. The balloon is drawn down after an ascent, by turning the drum—a horse being at present employed for this service, though it is designed to use a steam engine. As a measure of precaution, a second rope is attached to the balloon, and this is let out and drawn in by hand. The balloon is about 40 feet in diameter, and holds about 25,000 cubic feet of gas. Its buoyant power is estimated at about 1,500 pounds, though it is the practice to take up only two persons at a time beside the aeronaut.

In the still bright forenoon of September 20th, two of "us" took our seats in the basket, some bags of sand were lifted out, the stout rope that fastened the balloon to the earth was unhooked, the word "All right!" was given, and we were lifted easily and swiftly upward into the air. In accounts of balloon ascensions it is usually stated that the sensation is that the balloon remains stationary while the earth sinks away beneath it; but this is not the case in this kind of attached ascent. The earth seems to stand as firm as ever, while we are the movable things that feel ourselves borne gently upward to a hight in the air, compared with which the climbing of Trinity church spire, or Bunker Hill Monument, is contemptible. Though both extremely sensitive in this respect, no giddiness was experienced—the stout rope netting around the basket making a tumble-out manifestly impossible. We were, therefore, able to enjoy the novel experience with unalloyed satisfaction and pleasure.

There is, perhaps, no spot on the earth better fitted for such ascents than the one selected by Mr. Lowe. On one hand is the Central Park, with its serpentine roads, green lawns, and bright lakes and reservoirs; and on the other, the great city, with its long parallel avenues and cross streets, with its cars and omnibuses looking like crawling turtles, and its Liliputian men and horses moving about so far beneath us. The geography of the city and its environs is displayed with remarkable distinctness; the North and East rivers, the islands of the harbor, the towns and villages all about, with embracing woods beyond—are shown in the double clearness of a combined map and landscape view. After gazing our fill upon the scene from our airy hight, we inform our attendant aeronaut that we are ready to descend, he blows a shrill whistle, the horse commences his circling journeys around the whim, and we are drawn quite rapidly down to the surface of the earth again. The descent occupies about five minutes; the ascent a little less.

The whole thing is admirably managed, and nothing could be more agreeable and satisfactory in every respect. Mr. Lowe informs us that more ladies than gentlemen have improved this extraordinary opportunity to make a short aerial journey.

Submarine Cables.

In Europe, Asia, Africa, and Australia there are 52 submarine cables, which are of the aggregate length of 5,625 miles, and the insulated wires of which measure 9,783 miles. The longest of these is 1,550 fathoms, and the shortest 1½ fathom. There are 95 submarine cables in the United States and British North America, which measure 68 miles, and their insulate wires 133 miles. The overland telegraph line between New York and the west coast of Ireland, through British Columbia, Northern Asia, and Russia, will be 20,479 miles long, 12,740 miles of which are complete. It has at length been resolved that this line shall cross from America to Asia at the sothern point of Norton