Business and Personal.

Charge for Insertion under this head is $1 a Line.

S. will find directions for making a gutta percha varnish on p. 379, vol. 30.—H. C. H. will find instructions for frosting window glass on p. 264, vol. 30.—X. Y. Z. will find a recipe for lemon sugar on p. 378, vol. 30.—G. F. will find directions for making starch polish on p. 27, vol. 30.—W. P. P. will find a recipe for taking stains out of marble on p. 58, vol. 30.—A. W. and A. P. should refer to some good work on the dog; one was published by the late Mr. Butler, the famous dog fancier.—C. M. will find directions for making an aquarium on the editorial pages of this issue.

J. M. D. says: In No. 15, vol. 30, I saw a recipe for making fulminating powder. I followed the directions given, but failed. The mercury, instead of being dissolved in the acid, formed a white sediment. What was the fault? A. To prepare fulminating mercury, 1 oz. of mercury is dissolved in 8½ ozs., by measure, of nitric acid, by the aid of a gentle heat. The acid should be of specific gravity 1·4. Pour the solution into 10 measured ozs. of alcohol of specific gravity 0·830; action soon ensues, with the evolution of copious white fumes, and the fulminate separates in white crystaline grains, which are washed in cold water and dried at a very gentle heat. If this recipe be followed and your acids are pure, there can be no further trouble.

J. C. H. asks: 1. How can I make steel to cut iron, and what kind of acid is used with it? A. The steel is made in the usual way, and is forged and repeatedly hardened and tempered. Acid is not used. 2. How is fulminating silver made? A. When nitrous vapor is passed into a solution of nitrate of silver in alcohol, the fulminate of silver is deposited and forms delicate white crystals, which explode with terrible violence by friction with any hard body, even under water. It should be thoroughly washed and dried with very gentle heat. Your other questions are business matters.

J. E. D. asks: 1. How can I preserve a nickel-plated pistol clean, and save it from rusting? A. In cases like this, where the plating has partly worn or chipped off, or oxidized, because of the thinness or an imperfection in the covering, the best method that we can recommend is that of re-plating. It might also be lacquered. 2. Did M. Coggia discover the comet at Marseilles, or Versailles, France? A. Marseilles.

O. F. M. asks: 1. How can I make a galvanic battery for electrotyping? A. Several Smee cells would answer your purpose, and may be constructed as follows: Take two plates of zinc, about 3x5 inches, and one of carbon, of about the same dimensions. The zinc must face the carbon, which is supported by a piece of dry wood that at the same time serves to separate or insulate it from the zinc. The zincs are held in position by a brass clamp. Place the elements, thus arranged, in a glass or earthenjar nearly filled with a solution of dilute sulphuric acid and bichromate of potash. 2. How could I restore the color of the backs of books, bound in cloth or leather, which has faded under the light of the sun? A. This cannot be practically accomplished; and if it could, the process in no two cases would be similar. 3. What would be a good cement for holding together the edges of 5 pieces of squarely cut glass for making a tank about 7 x 10 inches? The cement must be watertight and not be destroyed by acids. A. Try diamond cement.

B. F. M. says. 1. In your last issue, C. D. S., in his reply to J. H. P., says there is no trace of glacial action in the tropics. Is it not well established by the researches of Professor Agassiz that there has been such action in the valley of the Amazon? A. The theory of glacial action in the Valley of the Amazon has been a subject of dispute. Humboldt said that the geological formations of the valley belonged to the old red sandstone period. Martius attributed them to the new red; Agassiz called them drift, or the glacial deposit brought from the Andes. The latter claimed that they were all fresh water formations, that there were no evidences of marine origin, no marine shells or fossils, and no tertiary deposits. Against this, Professor Orton, who conducted an expedition up the Amazon in 1868-69, brings opposing evidence. He found a fossiliferous bed intercalated between the variegated clays which are peculiar to the Amazon, that was crowded with marine tertiary shells. From this he concludes of course that the deposits are tertiary and of marine or salt water origin. This bed was found about 200 miles farther up the river than Agassiz went. It would seem as though the conclusion of Agassiz, that, because he saw no fossils in the formation, it was not of marine origin, was a rash one. Professor Orton states, as further proof against the glacial theory, that seams of a highly bituminous lignite are found interstratified with the clay deposits; these seams were traced for a distance of 400 miles. Agassiz acknowledged that he failed to find many of those proofs which we are accustomed to regard even in temperate latitudes as essential to demonstrate the former existence of glaciers where none exist now. He found no glaciated pebbles, no far-transported angular blocks with polished and striated sides, no extensive surface of rock, smooth and traversed by straight and parallel grooves. Mr. Charles Darwin, who travelled in the valley of the Amazon, also opposes the idea of Agassiz in regard to glacial action. Professor Orton says of the geology of the valley: "Around the rim of the basin are the outcroppings of the cretaceous deposit. This rests on mesozoic and palæozoic strata which form the ribs of the Andes. Above it, covering the whole basin from New Granada to the Argentine Republic, are the following formations: first a stratified accumulation of sand; second, a series of laminated clays of different colors, without a pebble; third, a compact sandstone; fourth, a coarse porous sandstone, very ferruginous; fifth, over the sandstone an ochraceous, unstratified sandy clay." The fourth deposit was originally 1,000 feet thick. But in all the region covered by his travels, Professor Orton nowhere found the evidence necessary for the support of the theory that these formations are the result of glacial action.

2. I none of your issues I notice a statement to the effect that steam or oxygen and hydrogen dissociated, was present in the atmosphere of the sun. In other works I have seen it stated that the spectroscope had never revealed oxygen in that body. Will you please tell me and your readers if it is present? A. Of all the elements known as metalloids, hydrogen is the only one which the spectroscope reveals to us as existing in the sun. At the same time no one who has been engaged in spectrum analysis is ready to pronounce definitely upon the absence of the rest of these elements; but on the other hand, such men as Lockyer, Norton, and Angström fully believe in their existence in the sun, and have each advanced plausible reasons to account for their not being detected by the spectroscope. The following, in substance, are the conclusions of Angström, as put forth in a memoir on the subject in 1868. The temperature of the sun is on the one hand too high to permit of such combinations as carburetted hydrogen, cyanogen, etc., being formed, and on the other hand too low to allow of carbon being converted into a gaseous state, so as to form its spectrum or to produce the spectra of oxygen and nitrogen. These conclusions were mainly based upon the results of investigations on the spectrum of the atmosphere and of carbon with the electric current.

H. L. asks: Is there a vortex called the Maelstrom, and where is it? A. Yes, on the coast of Norway.

2. Can a monkey swim? A. Yes.

3. I have noticed, when cutting out stock for cabinet making, that planks are often winding, and that eight out of ten are winding the one way. My opinion is that it is caused by the heat of the sun on the tree always being on the one side, causing the tree to twist in growing; therefore trees growing in the southern temperate zone would wind in the opposite way. Am I right? A. Trees are unquestionably affected in this way, particularly those standing in exposed positions.

J. E. F. asks: Of what are the red and green stars, used in Roman candles and similar fireworks, made? A. Make a solution of isinglass ½ oz., camphor ½ oz., alcohol ½ oz. For red stars add: 61 per cent chlorate of potash, 16 sulphur, 23 carbonate of strontia. For green, 73 per cent chlorate of potash, 17 sulphur, and 10 boracic acid. For dark blue, 60 per cent chlorate of potash, 16 sulphur, 22 carbonate of copper, 12 alum. For yellow, 61 per cent chlorate of potash. 16 sulphur, 23 dry soda. Make into balls of the requisite size, roll in gunpowder, and dry in the sun.

J. H. D. asks: 1. Does a heavy cannonade cause a rainfall? A. There have been many discussions on this subject, but as yet nothing definite has been arrived at.

2. Is there any society connected with aerostatics? A. There is at present no society of this kind in this country. We shall be pleased to receive the paper you speak of.

J. P. N. asks: In making vinegar from cider, sirup, or alcohol, how can I ascertain when the acetic fermentation is finished, the whole of the alcohol having been changed to vinegar? A. By testing, and seeing whether the percentage of alcohol has decreased, or that of acetic acid increased.

A. R. asks: What is the quickest way to cure moss, to turn it black? A. Oak moss is treated in the following manner: Bury underground until the outside fiber has rotted, then cleanse, dry, and dye.

S. W. J. asks: Is there any preparation of sulphur, not containing mercury, of a light vermilion color? A. A vermilion color cannot be made of any other sulphide but vermilion. Oxysulphide of antimony, or red antimony ore, is of red color.

W. D. S. asks: 1. A neighbor maintains that a cask with a vacuum formed therein will be more buoyant on the water than if filled with air. I say that the vacuum will have no effect as regards the buoyancy. Which is right? A. The cask would certainly be lighter after the air had been exhausted than before, for the reason that air has weight.

2. Are the compartments in ships airtight chambers, or are they rooms that are used for other purposes, such as storage, etc.? A. Airtight chambers.

W. L. D. asks: 1. What can I use to fill the hole in a flower pot, so that it can be used for a battery? A. Fire clay, rubber, paraffined wood, etc.

2. What is the cost of a strip of platinum, such as is used in a Grove battery? A. It depends upon the size of cell. Platinum is worth about 28 cents per gramme, or between 2 and 3 cents a grain.

M. V. & Co. ask: How is an electro-magnet made? How many times must the insulated wire be wrapped around the soft iron? A. This depends wholly upon the size of the magnet.

2. What kind of wire should it be? A. Copper wire is the only kind used.

3. How should it be insulated? A. By winding it closely with silk or cotton.

4. How must the wire be wrapped around the iron? A. In the same direction throughout.

G. G. G. asks: What sized gasometer would it require to contain gas enough to supply 4 burners or lights for 24 hours, allowing the pressure that is usually required to supply small cities with gas? A. You fail to mention the size of the burner to be used. If one consuming three feet per hour be used, you will require a gasometer about 8 feet in diameter and 6 feet high.

M. N. M. asks: 1. How are elastic india rubber stamps made? A. A number of manufacturers have been visited, who decline to describe their processes. 2. How can brass be deposited by the battery? A. We believe this has never been satisfactorily accomplished. 3. I burnished a piece of steel, washed with cream of tartar, and rinsed in running (Potomac) water, taking care not to touch it with my hands. I deposited a heavy coat of nickel by the battery. While burnishing, the nickel all peeled off. I never failed before. Can you suggest the cause of my non-success? A. After cleansing thoroughly as before, coat with copper by dipping for a moment into a solution of blue vitriol (sulphate of copper).

A. H. McK. asks: 1. How do electro-platers charge for plating? Do they charge by weight or by surface? A. In gold or silver plating, the charges are gaged by the acquired weight. Some nickel plating establishments estimate the surface and charge by the square inch. 2. What do they put in the plating solution to make the bright appearance and high polish? A. The metal after being removed from the bath is burnished. 3. What makes the silver peel off? Is the battery too strong? Sometimes it will not stick at all. What would be a good amalgam or preparation to put on the article to make the silver and gold stick? A. Articles of copper, brass, and German silver should be first thoroughly scoured with white sand, and then dipped into dilute acid to remove all oxidation, etc. They are then washed in clear water. If these directions are faithfully observed, your trouble will probably disappear.

J. G. C. asks: How many feet of No. 32 wire will be required to produce the electric light with carbon points, using two Grove's cells? A. You cannot obtain a satisfactory light in the way you mention, although with a large coil you might obtain a very long spark.

W. S. H. asks: Is there any way to prepare a copper-plating solution from the pure metal? A. Sulphate of copper is a solution of the metal (or oxide of the metal) in boiling sulphuric acid. A solution of the crystals in water forms the copper bath most generally used in electro-copper plating. It will be much cheaper for you to buy the salt than to attempt to make it.

H. H. P. asks: How can I clean a cask that has contained varnish, so that it would be fit for root beer? A. If the cask contained shellac varnish, it would probably be necessary to use alcohol; other varnishes are mostly solvent in turpentine. However cleansed, we think the cask would not be fit for your purpose.

F. H. B. asks: 1. What is the best mode of purifying butter? How can I make patent butter? I have seen a preparation for this purpose which looks like finely pulverized sugar. A. See p. 119, vol. 30 of the SCIENTIFIC AMERICAN, and p. 190, *Science Record* for 1874. 2. How can I take mildew out of cotton? A. Wet the spots with a solution of chloride of lime (bleaching powder). Wash out at once with warm water. 3. What can I use in place of rennet liquid that will answer the same purpose? A. Various substances can be used, as pure curd, agreeable old cheese, and extract of malt. Curd can be prepared as follows: Heat a quantity of milk which has stood 5 or 6 hours, cool it and separate cream completely. Add to the milk a little vinegar and heat gently, pour off whey, wash and knead with water repeatedly. Then press and dry for use. 4. What will restore colors on carpets, caused by water that has run the colors together? A. Nothing but a process of bleaching and re-dying.

F. R. says: I have an ice box 20 feet long, 12 feet high, and 8 feet wide, double walled and packed with fine charcoal, and lined throughout with galvanized iron. I have reduced the ventilation from 4 inches to ½ inch, and covered the ice with blankets: and still I cannot keep the ice. Its capacity is 3½ tuns, which lasts from 7 to 10 days. It has 3 divisions, each with a door 3 feet by 7 feet, packed with charcoal and lined with galvanized iron also. The ice is overhead, in a large pan (6 x 14 feet) of galvanized iron. The large ventilator is at the top and runs into a flue in the chimney. The waste pipe runs out of the wall into the cistern, and at the bottom of the pipe I have a cup that fits over the waste pipe, keeping the hot air from going up in the top of the ice box. Can you tell me how to make the thing work? A. The cooling power of the refrigerator depends on the melting of the ice, therefore if your box is kept cool the ice must melt. If your ice pan overhead has an open space each side of it, the following arrangement might be adopted to provide a circulation without any ventilating holes: Place a thin partition parallel to and 10 or 12 inches from the back, so as to make the cold air descend in this narrow space, and pass under the bottom of the partition. In the space between the ice pan and front wall, place a box of wire gauze filled with charcoal. Increase the hight also of the front side of the ice pan. Then the air entering at the bottom of the apartment, becoming slightly warmed, will rise, but, having to pass through the charcoal box, it will be freed from impurities. There will always be some circulation, and it will be increased when the door is opened.

C. A. H. asks: 1. What is the cheapest mode of making oxygen gas in quantity? A. The method of obtaining the gas from chlorate of potash, mixed with one quarter its weight of black oxide of manganese, and strongly heated in a retort, is perhaps best and in the end cheapest, because of the large volume of nearly pure gas obtained in a short time and with simple apparatus. 2. Is there any cheaper mode of making hydrogen gas than by using sulphuric acid and iron? A. If nearly pure hydrogen is desired, perhaps this will be the cheapest method. Large quantities of hydrogen may be obtained by passing steam through a red hot iron tube filled with iron filings. Charcoal or coke may be used instead of the filings, but the gas will have to be passed through a solution of caustic potash or lime to remove the carbonic acid. 3. If the armature of a permanent steel horseshoe magnet be rapidly detached and brought into juxtaposition, alternately, what will be the effect on the magnet? Will the portative force increase or decrease? What effect will the magneto-electric current produced have upon the magnetic fluid? A. Please state your question a little more explicitly.

W. C. B. says: A man says that he has invented a pump for condensing air which will condense air to 500 lbs. to the square inch without heating the air. Is not this contrary to the principles of natural philosophy? A. The greater number of substances are raised in temperature by compression; air is one of these. If, however, the compression is slow, the heat developed may be carried off by the cylinder in which it is compressed without being noticed. There may also be special contrivances arranged for abstracting the heat as fast as developed.

W. R. O.—A speaking tube will convey the voice 500 feet. The diameter of the pipe must be increased in accordance with the distance.

L. C. says: I have been told that tomatoes induce cancer. In view of the large quantity my family consume, that is to me an appalling statement, and I would like to hear on the subject from some of your medical correspondents. The world wants the best advice on cancers, and I know of no medium so sure as the SCIENTIFIC AMERICAN. A. It is well known that too free a use of raw tomatoes produces cankerous sores, but we call to mind no case of cancer thus induced. Perhaps some of our medical readers can give further information.

C. D. F. says: 1. In your vol. 26, p. 393, it is said that Professor Hough has found that if leather instead of clay is used for the porous cell in a Daniell's battery, the quantity of electricity is nearly doubled What kind of leather is used, and how is it prepared? A. Common unoiled leather of moderate thickness. 2 About how many cells of Hill's or Callaud's battery will it take to make a relay of ordinary resistance work satisfactorily on a line 500 feet in length? A. About 200 square inches of zinc. 3. How many feet and what sized wire is used in a relay of 150 ohms resistance? A. About 800 yards of No. 28.

N. P. J. asks: What is a recipe for an axle grease with tallow for its basis? A. Water 1 gallon clean tallow 3 lbs., palm oil 6 lbs., common soda ½ lb. The mixture should be heated to about 210° Fah., and well stirred till it cools down to 70°, when it is ready for use.