Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from $1 to $5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) J. A. C. asks how he can temper and put an edge on a piece of sheet steel five inches long half an inch wide, and one-sixty-fourth of an inch in thickness. A. Steel in this form is best hardened in oil. It may be tempered by blazing off. It may be brought to an edge on a wet grindstone.

(2) A. B. N. asks how much of which kind, and what number of insulated copper wire, to use in making a sounder-magnet, 1½ inches long by ¾ inch core—to be one, and sometimes two instruments on a short line, probably from one room of the house to another. A. Use eight or ten layers of silk covered insulated copper wire, No. 22.

(3) J. E. K. asks: Can you inform me how to get rid of roaches? Our building is infested with them. We have tried a great many drugs, but with no effect. We are manufacturers of paper bags, and the paste breeds them. A. Use plenty of finely powdered borax and dalmatian insect powder. Put a small quantity of borax in the paste.

(4) J. S. B. writes: Please explain the manner in which the air brake operates in checking a railroad train. A. In the vacuum brake the exhaustion of the air from behind the piston allows the external air to drive the piston inward, carrying with it the brake levers, thus applying the brakes. In the air brake the air pressure created at the locomotive acts on a piston connected with the brake.

(5) M. M. H. wants to know how to make a good quality of court plaster. A. Soak isinglass in a little warm water for seventy-four hours, then evaporate nearly all the water by gentle heat, dissolve the residue in a little proof spirits of wine, and strain the whole through a piece of open linen. The strained mass should be a stiff jelly when cool. Now stretch a piece of silk or sarsanet on a wooden frame, and fix it tight with tacks or packthread. Melt the jelly, and apply it to the silk thinly and evenly, with a badger hair brush. A second coating must be applied when the first has dried. When both are dry, apply over the whole surface two or three coatings of balsam of Peru. Plaster thus made is said to be very pliable and never breaks

(6) R. J. B. asks how white lead is made. A. The molten lead is poured through an iron sieve into a tank filled with water, whereby it is converted into threads of one-sixth of an inch in thickness, which are now placed in vats, each of which holds about 1,000 threads. Vinegar is now poured over the lead, and immediately drawn off again. Under the influence of the air and the vinegar adhering to the metal, the latter is oxidized. The vinegar is now poured into the vat and again drawn off, when it carries away the acetate formed on the surface of the metal in solution. After this process has been repeated a number of times, the vinegar has been transformed into a concentrated solution of basic acetate of lead, from which the carbonate may be prepared by the introduction of a current of heated carbonic acid gas. The supernatant liquid is mixed with another quantity of vinegar, used again for the same process.

(7) A. A. U. writes: I have or had a slip of selenite on a glass slide to show various colors with the polarizer. The glass slip got broken, and I carefully heated the slip and transferred it to another piece of glass. It looks just as it did before, but does not work. It looks no different from a piece of glass. A. It has probably been injured by the heat, an cannot be repaired.

(8) C. A. V. writes: Having been a reader of your paper for more than twenty years, and knowing that it is justly held in high favor by many others in this city, I know that an opinion expressed in your columns would have due weight and consideration with your subscribers here. Can you give us an article in relation to smoke consuming? Or, if not consistent with your practices to do that, will you give replies to the following questions in your Answers to Correspondents: Does a mixture of steam and air introduced into the fire box of a boiler furnace have an injurious effect on the boilers? If it does, in what way and to what extent I have heard it stated that when steam is injected into a boiler furnace a chemical combination takes place between the steam and the coal, forming a gas or vapor which corrodes the adjacent iron. Is this the case, and if so, what is the action? What is your opinion in regard to using a steam jet, or a combined steam and air jet, for the purpose? A. When steam is brought into contact with highly heated pure coal in an engine fire box, carbonic oxide, carbonic acid, hydrogen, vapor of water, and nitrogen are the chief products. If air is injected above the fuel less carbonic oxide and hydrogen pass off unconsumed. Ordinary coal, however, nearly always contains more or less sulphur, and the sulphurous oxide formed in burning may be changed by contact with the steam to hydrosulphuric and sulphuric acids, both of which injure iron, especially when mixed with much aqueous vapor. The latter portions of a boiler are, however, not so apt to be corroded by these as the portions furthest from the fire. A steam jet in the fire box may, therefore, prove injurious to the boiler in some cases. Steam and air, or air alone, introduced at the proper time and in proper proportions, is effective.

(9) J. M. K. asks: Is it possible to freeze pure alcohol or pure whisky? A. Alcohol could doubtless be solidified, but it would require a temperature lower than any yet attained by artificial means.

(10) W. N. W. writes: Will you kindly tell me how to clean or whiten the white medallions on blue Wedgwood ware? A. As the colors are burnt in it is not possible to bleach or remove them, save by mechanical means, such as the sand blast or scratch brush.

(11) D. H. A. writes: 1. I wish to coat small castings with some material that would be permanent and resist the action of hot water. Is there any material as good as galvanized iron, that would be cheaper than said material? A. Zinc is probably the cheapest coating. 2. Please describe the process of galvanizing. A. Cleanse the castings by pickling them in water to which has been added about ten per cent of sulphuric acid, and scouring with sand. After rinsing pass them through a strong slightly acid aqueous solution of zinc chloride, and then put into a bath of melted zinc (contained in a shallow iron pot over a furnace) until properly coated with zinc. The bath of zinc should be covered with a layer of salammoniac to keep its surface free from zinc oxide. 3. Would there be any objection to having a churn made wholly of tin? A. Yes; wood is to be preferred.

(12) W. G. A. B. asks: Can you tell me how to make the moulds of glue and molasses, such as Rodgers uses for making his statuettes? A. The flexible moulds referred to are prepared as follows: Glue, 8 lb.; molasses (New Orleans), 7 lb. Soak the glue over night in a small quantity of cold water, then melt it by heat over a salt water bath, stir until froth begins to rise, then add and stir in briskly the molasses, previously heated. Continue to heat and stir the mixture for about half an hour; then pour.

(13) L. McN. asks: How can I obtain large crystals of boron? I obtained small crystals by heating together 80 grains of boracic acid and 100 grains of aluminum. Would keeping the crucible in the fire longer and cooling more slowly develop larger crystals? A. The largest crystals of boron are prepared as follows: 1,500 grains of anhydrous boracic acid are closely powdered and mixed with 900 grains of metallic sodium cut into small pieces. This mixture is introduced into a cast iron crucible previously heated to bright redness; 700 to 800 grains of solid, but previously fused sodium chloride is placed on the top of the mixture, and the crucible is covered. As soon as the reaction is over, the still liquid mass is thoroughly stirred with an iron rod and poured, while red hot, in a slender stream into a large and deep vessel containing water acidulated with hydrochloric acid. The undissolved pulverulent boron is then collected on a filter and washed with acidulated water until the boracic acid is got rid of, the washing being continued until the boron begins to run through the filter. It must be dried upon a porous slab without the application of heat In order to convert this amorphous into crystalline boron it is mixed into a thick paste with water and packed tightly into a crucible with a piece of aluminum weighing about 90 grains in the center. The cover having been luted on the crucible is inclosed in a second one, the interval between the two being filled with recently ignited charcoal. The outer crucible is next closed with a luted cover and the whole exposed for about two hours to an intense white heat. The temperature is then allowed to fall slowly, and when cold the contents of the inner crucible are digested with dilute hydrochloric acid, which dissolves out the aluminum, leaving the boron in large clear yellowish or brownish octahedral crystals mixed with copper colored scales of boron and aluminum.

(14) J. D. H. asks: What is the action of alcoholic tinctures on blue litmus paper which it turns red? Pure alcohol has no effect on it. What is the cause of this? A. The tinctures (the extracts) you have been experimenting with are doubtless slightly acid.

(15) L. McN. writes: Can you give the proper proportion of ingredients to make a good clear glass? I have tried, upon recommendation, 60 grains silica, 20 grains lime, and 28 grains clay, but instead of a glass I obtained a white stone. A. Fine hard glass is made from the following materials: Fine white sand (silica), 29 lb.; best calcined soda, 18 lb.; quicklime, 3½ lb.; niter, 1 lb., broken scrap glass (same quality), about 17 lb. A heap bottle glass is prepared from common sand, 100 lb.; soda (common), 30; wood ashes, 40; potter's clay, 100; broken glass, 100.

(16) J. J. B. writes: Please state manner of producing a white paste alive with animalcules just visible to naked eye. How long will it take to produce such? Several friends and myself were shown a paste similar to the above. A discussion arose as to the manner and time of its production. A. Mix wheat flour it to thin paste with a little yeast and cabbage water, and let it stand in a warm place until it becomes quite putrid. Mix this with water (or a little common vinegar) and examine. The time required to prepare such a paste under favorable conditions need not exceed three days.

(17) E. B. asks: Will you give me a recipe for making a bronze or varnish such as is used on steam radiators to give them a bright gold color? A. Give the iron a good coating of common gold size, reduced with oil of turpentine so as to work freely from the brush. When this coating has nearly dried lay on the bronze powder (procurable in the market) so that every part is covered. After standing for an hour or so go over the work with a soft cloth, removing all excess of the powder and developing the luster of the coating by gentle friction.

(18) H. B. L. asks: Will you please inform me how to finish wooden panels for oil paintings in the natural color of the woods and for black? A. You will find directions for such painting in "The Painter, Gilder, and Varnisher's Assistant." Address the book-dealers who advertise in this paper.

(19) W. R. S. writes: I have a separate sink in my yard into which the deposit of my water-closet empties. It was dug sixteen years ago, and has a light sandy bottom. For fourteen years no sign of its filling was apparent; suddenly it began filling, and in the past two years has had to be taken out three times. Had the kitchen refuse run into it, I could have easily accounted for the trouble in the grease forming a coating on the bottom preventing the fluid portion from filtering through the sand, but such is not the case. some persons have told me that there is a substance which, if emptied into the sink, will evaporate all the fluid and leave only the solid. Can you tell me what means will dispose of this fluid? A. This is a common difficulty, due chiefly to the gradual clogging up of the soil in the immediate vicinity. A new cesspool or connection with a sewer trap are the only remedies we know of.

(20) J. P. asks: 1. Will rubber (elastic) bands serve for making rubber cement? A. No; pure (unvulcanized) rubber is required. 2. About what is the per cent of chlorine gas contained in ordinary chloride of lime? A. It is very variable in the commercial substance it varies from 12 to 30 per cent. When pure, dry, freshly prepared bleaching powder may contain 38·5 per cent of the gas. 3. What quantity of commercial sulphuric acid is necessary to set free the chlorine gas in ordinary chloride of lime? A. As one sample may contain much more of the gas than another it is impossible to give close figures. The pure, dry, freshly saturated substance would require about 1¾ times its weight of the acid for its complete decomposition. 4. What is the proportion of glycerine to glue for printer's rollers? A. If the glycerine is concentrated use about equal parts of both.

(21) E. T. G. asks for the best and most practical method of bluing tire bolts and stove bolts. A. Run your bolts through an inclined iron cylinder revolving over a fire. The speed of the cylinder must be regulated with reference to its temperature.

(22) E. R. writes: If "W. F. E.," No. 31, of December 17, will paint his stove with paint made of powdered black lead and linseed oil, and polish in the ordinary way when dry, he will have a sample stove that may be left out in all kinds of weather without injury to the polish.

(23) R. V. J. writes: 1. I have a can nine inches high and six inches in diameter, made of heavy galvanized iron, with a brass faucet in, all joints soldered secure. I wish to exhaust about one-third of the air it contains by means of the air pump, but it fills again in a short time. Have had it resoldered several times, and a different faucet put in, but with the same effect. Can it be made air tight, and by what means? A. Yes; fill the vessel with water under pressure to discover the leaks, which mark and secure with solder, after relieving the pressure. A well packed faucet must be used. 2. Is there any coating that could be applied to canvas to make it air tight that would resist the pressure of the atmosphere? A. Give the cloth several coats of rather thick alcoholic shellac varnish, allowing each to dry before another is put on. 3. I have a box containing one hundred and twenty-five cubic feet made of wood with sufficient strength to frame work inside to stand the force of atmospheric pressure. What is the cheapest material it could be covered with that will exclude air? I wish to exhaust air from the box and retain it for a length of time at about five pounds pressure within. A. You could use the varnished cloth above described, sheet metal, or lead foil.

(24) R. C. Co. ask: What will remove claret stains from white linen goods without injuring the fabric? A. See directions under "How to Remove Stains," in SUPPLEMENT, No. 158.

(25) W. J. McD. asks: 1. What will make thick petroleum lubricating oil, that is dark colored, lighter colored, or nearly transparent, without spoiling it for lubricating? A. See "Lubricants," page 41, current volume. 2. How is the white paraffine obtained from the thick waxy substance that comes out of the wells, and what is the process? A. Paraffine in an impure state is separated from the oil by refrigerating or "freezing" the fluid, and cold pressing. It is purified