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.

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.

(1) W. asks: 1. How large or what sized spool, silk insulated copper wire No. 35, must one have to obtain the best results in making a pair of bell telephones? A. The spool should be about ⅝ inch long and 1½ inch diameter. 2. Is it absolutely necessary for the spool to fit close up to the magnet, or must the wire be wound directly on the bar? A. The spool should fit the bar, and it should be very thin, so that the wire may be as near as possible to the magnet. 3. Will common annealed iron, such as is used for self-binding harvesters, do for a line for working telephones from one half to three miles? A. It is not large enough. Use No. 12. No. 10 is still better.

(2) F. P. H. asks (1) how to make nitroglycerine in quantities of, say, 50 lbs. A. To 33 parts of an ice cold mixture, 1 part fuming nitric acid (sp. gr. 1·49), and 2 parts strongest sulphuric acid, add slowly by drops 5 parts of pure and concentrated glycerine (sp. gr. 1·25). The liquid should be constantly agitated by blowing a uniform current of cold air through it. After standing for 10 minutes or so the whole contents of the vessel is cautiously transferred to a large tub of very cold water to which a rotary motion has been imparted. The nitroglycerine sinks to the bottom as a heavy oily liquid, which may be washed by decantation with fresh water. Consult Mowbray's "Trinitroglycerine." 2. How is the oil of glycerine manufactured and from what? A. Glycerine in a more or less impure state is a by product from the manufacture of candles and soap. It is most readily obtained in a pure state by the action of superheated steam or neutral fats. See Wagner's "Chemical Technology," p. 634.

(3) F. K. writes: I have a large plate of glass that has a scratch on it. Is there any way to fix it so the scratch cannot be seen, that is, to replace the quicksilver? A. Clean the bare portion of the glass by rubbing it gently with fine cotton, taking care to remove any trace of dust and grease. If this cleaning is not done very carefully, defects will appear around the place repaired. With the point of a knife cut upon the back of another looking glass around a portion of the silvering of the required form, but a little larger. Upon it place a small drop of mercury; a drop the size of a pin's head will be sufficient for a surface equal to the size of the nail. The mercury spreads immediately, penetrates the amalgam to where it was cut off by the knife, and the required piece may now be lifted and removed to the place to be repaired. This is the most difficult part of the operation. Then press lightly the renewed portion with cotton; it hardens almost immediately, and the glass presents the same appearance as a new one.

(4) J. S. asks: 1. How can I stain white holly wood to a suitable dark brown color for scroll sawing? A. Paint over the wood with a solution made by boiling 1 part of catechu, cutch, or gambier, with 30 parts of water and a little soda. This is allowed to dry in the air, and then the wood is painted over with another solution made of 1 part of bichromate of potash and 30 parts of water. By a little difference in the mode of treatment, and by varying the strength of the solutions, various shades of color may be given with these materials, which will be permanent, and tend to preserve the wood. After drying, slightly oil and finish with shellac varnish if desired. 2. Will the same materials do for staining butternut gunstock? Is it best to use varnish or shellac after? A. Yes, if the wood is free from oil. 3. Also please tell how to make a hand mirror, that is, what will I put on the back for reflecting? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 105.

(5) D. T. J. asks for the number of pounds pressure per square inch from twenty to forty feet head of water. A. A column of water one foot in height produces a pressure of about 0·433 lb. per square inch.

(6) J. E. S. asks: Is there a receipt for softening cast iron so that it can be drilled? I have used quicklime and it had no effect on sleigh shoe. A. To get a good effect from the lime, you must have a large quantity, that is, sufficient to prevent the radiation of heat from the iron after it is immersed in it. Try heating the shoe and leaving it in the fire until the fire dies out.

(7) L. H. D writes: In the preface to "The Pioneers," Appletons' edition, page xiii., occurs the following: "It is worthy of remark that one of the most ingenious machines known in European art is derived from the keen ingenuity which is exercised in this remote region." What machine did Mr. Cooper allude to?—[Perhaps some of our readers may be able to answer Mr. D.'s question.]

(8) J. D. H. asks: What are the proportions of the ingredients of a bichromate battery? A. For information concerning batteries see SCIENTIFIC AMERICAN SUPPLEMENTS, Nos. 157, 158 and 159.

(9) C. W. H. asks: What is best to use for whitening belts worn by the militia? Something that will not rub off. A. If not enameled, rub them thoroughly with chalk reduced to impalpable powder and a trace of sperm oil.

(10) N. A. C. asks how to clean nickel-plated brass or iron which has become coated with burned grease and dirt, without injuring the nickel surface. A. Boil in strong solution of potash or soda, rinse in water, and rub first with moistened and then with dry rouge or chalk.

(11) J. W. W. asks: 1. What degree of centigrade is water at its greatest density? A. 4°. 2. How is the degree of centigrade converted into Fahr.? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 141. 3. What would the degree of 4° centigrade be if converted into Fahr.? A. 39·2°.

(12) A. B. C. asks: What is the best method of cleaning and polishing old copper coins which have become badly coated with dirt and oxide? A. Boil them in a strong aqueous solution of caustic soda, rinse in soft water, and dip bright in nitric acid, and quickly rinse again. Polish with a little putty powder, rouge or tripoli.

(13) C. L. writes: 1. I have made two electro-magnets which, when connected with the battery, are very strong, but retain the magnetism for several days after being disconnected. Please let me know cause and remedy. A. If the armature of a magnet is left in contact with its poles during and after the rupture of the electric current, the magnetism will be retained. If the cores of the magnets are not of the softest iron, they will retain more or less magnetism. 2. Is "bichromate battery," described in SUPPLEMENT No. 159, suitable for telegraphing purposes? A. If you refer to the Grenet, it is not sufficiently constant.

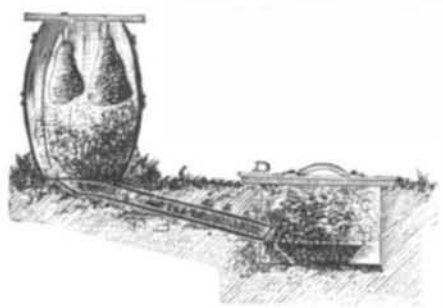
(14) F. S. asks (1) how to construct an electro-magnet of about 4 lb. sustaining power, and how many cells of gravity batteries it will take to run it? A. Take a ½ inch bar of soft iron, 8 inches long, bend it into U form, with the arms about 2 inches apart. Wind on each limb of the U 8 or 10 layers of No. 18 wire. These coils must be wound in opposite directions. Use three or four cells of gravity battery. 2. How many of the same cells will it take to run an electric engine powerful enough to run a large sewing machine? A. 40 or 50. 3. How can I clean a straw hat that became dark? A. Hang it in a barrel or box filled with the acid fumes of burning sulphur.

(15) E. N. S. asks how to put on the watered or mottled appearance to brass articles. A. The brass is first polished to the required degree, and if it is a fine surface, the mottled appearance is imparted by rubbing over it with a gyratory motion a Scotch gray stone moistened with water. If the work is not very fine, a piece of fine emery paper may be used in the same way. If it is coarse, a dead smooth file may be used. Another method is to secure emery cloth or paper to the end of a small round stick, placing the stick in the universal chuck of a lathe, holding the work against it with a light pressure, and moving it along while the lathe revolves

(16) F. A. S. asks: 1. Does the strength of a bar magnet increase in proportion to its size? A. No. 2. Does the strength of a telephone depend more upon the strength of the magnet or size of the induction coil? A. It has been determined that the strength of a telephone magnet may be varied between very wide limits without materially affecting the loudness of the tones. If an induction coil is used, it should have about the same resistance as the telephone bobbin. 3. What sized magnet and induction coil are used upon the latest improved telephones? A. A triple bar magnet with a round wrought iron pole extension seems to answer well. The induction coil may have in its secondary wire 200 or more ohms resistance. 4. Is there an advantage in rounding the end of a bar magnet? A. Yes.

(17) H. H. J. asks: 1. Would a steel flue, ¼ inch thick, or an iron one, ⅛ inch thick, 20 inches in diameter, and 7 feet long, be safe without stays of any kind? A. Five sixteenths inch thick would do for ordinary purposes, if but 7 feet long. 2. Would you prefer a boiler like that in the steamship Columbus, for portable use, to locomotive type? A. No. 3. In SCIENTIFIC AMERICAN, February 1, 1879, in an article headed "A Hint for an Invention," you say the construction of the fire box of the locomotive boiler "is an arrangement necessitated by the requirements of science, and not indicated by rules of utility or good construction." Will you please give the scientific reasons for this construction? I have long supposed there must be some cause not apparent for this style of boiler. A. From the design of the machine as a whole, the parts attached to and depending upon each other.

(18) N. M.—Professor W. R. Brooks, in *Rural New Yorker*, gives the following simple but very effective smoking arrangement for all kinds of meats, especially hams, shoulders, and bacon. The smoking is effected in a very thorough manner and in a short time. The writer had for this morning's breakfast some ham which was smoked in a contrivance precisely similar to this, in six hours. The arrangement can be made by any one without the least trouble, and it is sure to "work" every time. The sketch almost explains itself. The device consists of the barrel, A, of any suitable size. An ordinary flour or apple barrel will smoke four or five moderate sized hams or shoulders. Both heads are removed and a movable cover provided for the top. This may be of boards, or an old oil cloth or tight blanket will answer. A short trench is dug, in which is laid a length of old stove pipe, B. A larger excavation, C, is then made, in which a pan



of burning cobs or chips can be placed. This is covered by a tightly fitting plank, D. One end of the stove pipe communicates with this excavation; over the other end the barrel is placed, the earth banked up around the bottom of the barrel and over the stovepipe, to keep all tight, as plainly shown in the cut. The meat may be suspended from a stick laid across the top of the barrel, and then all covered tight with an oil cloth or blanket. On placing a pan of smoking cobs or chips in the place provided, the smoke passes through the stovepipe into the barrel, filling it with a dense, cool smoke. Should the support of the hams, etc., break, the latter cannot be hurt by coming in contact with the fire or ashes, as sometimes happens in the regular smoke house.

(19) W. H. asks: Will you please tell me the composition of the mixture with which manifold paper is prepared, and what keeps the black from rubbing off on the hands? A. Melt together one part of beeswax and 6 or 7 parts of good lard, and add to the fused mixture sufficient lampblack. Rub this mixture into the paper placed on a heated iron plate. Then pass between heavily weighted rollers to remove excess.

(20) R. F. B. asks for the method of preparing what is known as "bottled light." It is used by the watchmen in Paris to give light in places where explosives are stored. A. Agitate a few fragments, about the size of peas, of clean phosphorus, with about 3 fluid drachms of pure olive oil, hot enough to melt it. Then close the flask, which should not be more than one-fifth full, with a glass stopper. When required for use agitate and remove the stopper for a minute.

(21) "Subscriber" asks: Is there an electric light that would be suitable for lighting a mine; if so what would be the cost? The mine is about 200 feet deep and 600 feet long. Want to light the bottom when the men are at work. A. There are several electric lights that would answer your purpose. Consult our advertising columns, or insert in the SCIENTIFIC AMERICAN an advertisement for proposals to light your mine.

(22) Chemist asks if there is known any chemical or combination of chemicals which, if applied to the hair of the head, will turn it gray, without producing any injurious consequences. A. We know of nothing that we can recommend for this purpose.

(23) S. W. C. writes: In your paper for February 1, 1879, page 75, No. 14 of "Notes and Queries," you state that a strong aqueous solution of tannic acid will restore faded writing on parchment. Would that work on paper? A. Yes.

(24) W. M. asks what is the best varnish or paint for iron tanks, to protect them from rust. Would like to get something that will not scale off. Would paraffine applied to the iron hot, stick well and stand for a long period? A. Coat the dry tank with genuine asphaltum varnish, and when this has nearly dried, with melted paraffine. Let the varnish harden thoroughly before filling the tank.

(25) L. M. C. asks how to make a gold bath for plating, so that he will get a dark gold deposit, and how many Bunsen's elements are required. A. See "Electro gilding," p. 2540, SCIENTIFIC AMERICAN SUPPLEMENT, No. 160.

(26) J. B. asks what chemicals are used in fire extinguishers. A. Usually a strong aqueous solution of carbonate or bicarbonate of soda and strong sulphuric acid.

(27) W. H. G. S. writes: I have a large quantity of small malleable iron castings: I wish to copper them. How shall I do it? A. See SCIENTIFIC AMERICAN, vol. 39, p. 75 (23).

(28) J. P. asks: 1. Is there any way of making artificial stone without kiln drying; is there any treatise on the manufacture? A. Yes; consult patents 82,202, 82,731, 105,132, 100,944, 100,945, 101,253, 118,477, 119,394, 150,179, 157,511, and 155,176. See Maj. Gen. Q. A. Gillmore's "Practical Treatise on Colguet Beton and other Artificial Stones." 2. Have the postal department found a satisfactory canceler? A. We believe not.

(29) C. H. asks: What was the first steamship to cross the Atlantic? Was it the Savannah of New York in 1819 or a vessel from Liverpool in 1817? A. Savannah, 1819.

(30) F. H. B. asks how to make a glossy blue japan for tin. I tried white varnish added to blue dissolved in linseed oil and spirits turpentine, but the color was dingy and the mixture muddy. A. Grind bright Prussian blue or smalt with pale shellac or mastic varnish.

(31) H. L. asks: What wire gauge is referred to in giving the size of wire used on the dynamo-electric machine described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 161? A. American.

(32) J. A. S. writes: 1. Give size and material (metals, etc.) of the Righi telephone (dimensions of each part). A. The construction of the Righi telephone is described on p. 186 of current volume of the SCIENTIFIC AMERICAN. The dimensions given in the engraving are correct. The diaphragm may be of wood or metal, or a membrane may be used. The spring may be of brass or steel. 2. Where are the connections made? A. One wire is connected with the spring, the other with the metal attached to the diaphragm.

(33) J. W. W. asks (1) how lead pipe is made. A. By forcing semi-melted lead by hydraulic pressure, through a die, in which, concentric with its walls, is supported a core. The process is analogous to that of tile making. 2. How is iron gas pipe made? A. By passing strips of iron heated to a welding heat between rolls having semicircular grooves. The pipe is formed and welded over a mandrel as it passes between the rolls.

(34) R. E. H. asks: Does the Gatling gun send all its shots to the same point, or do they scatter? A. It may operate either way. The gunner, by giving it a lateral motion, may scatter the bullets to almost any extent.

(35) J. H. F. asks by what process he can extract nicotine from tobacco. A. Tobacco leaves are digested for 24 hours, and repeatedly, with water containing sulphuric acid, pressed, and the liquid evaporated half down. It is then distilled with caustic potassa, and the nicotine exhausted from the distillate by ether. The ether is removed from the ethereal solution by evaporating, finally elevating the temperature to 140°C (=284° Fah.). The nicotine, which is still impure, of a brown color, is distilled slowly at 180° C (=356° Fah.) in a current of dry hydrogen over quicklime. Some varieties of tobacco yield as much as 7 per cent of nicotine, Havana only 2 per cent. Nicotine turns brown and is partially decomposed in contact with air.

(36) F. H. N. writes: You told in a late paper how to cut off water gauge glasses for steam boilers. I suggest a better plan. Take a small round file, insert it in the glass, and hold your thumb for a gauge as to the length you want to cut off, then scratch around and the thing is done.

(37) M. McL. asks (1) how gas is made, and of what material, at the Municipal Works, foot of 44th street. Is it made from water? My friend contends that it is made from water; I say that it is not possible even in this age of science. A. Yes; when superheated steam is passed slowly through a large body of ignited carbon (coal) it parts with its oxygen to the latter. The resulting gas—composed chiefly of hydrogen—and carbon monoxide—has very little illuminating power, but this is remedied by introducing a small quantity of the vapor of some rich hydrocarbon—as naphtha—into the retort with the gases. 2. Also what is meant by the governor room in a gas works. A. The governor is an appliance by which a uniform pressure is automatically maintained as the gas passes from the reservoirs or gas holders to the street mains. The room where the governor stands is called the governor room.

(38) D. C. asks: 1. What is the temperature of a vacuum? A. The temperature of bodies within a vacuum under ordinary circumstances varies with the temperature of surrounding bodies, the inclosing walls, etc. 2. What is the recipe for making a brilliant black ink used in fine pen work? A. See answer No 15, p. 218, current volume SCIENTIFIC AMERICAN. 3. Which is the best steam engine governor in use? A. There are several governors that seem equally good. We are unwilling to decide between rival manufacturers.

(39) G. L. L. asks: 1. What can I use to coat the inside of a wooden box for holding silver plating solution? A. Line the vat with sheet lead, and give the latter several good coats of a melted mixture of equal parts of genuine asphaltum and gutta percha. 2. What kind of wood is the best to make the box of? A. Cypress is among the best. 3. Is the inclosed sample of rubber the kind that is used for making rubber hand stamps, and will I have to vulcanize it after taking it from the mould? If so what is the most simple process? A. Yes; see pp. 48 and 105 SCIENTIFIC AMERICAN, vol. 39.

(40) W. G. W. asks: 1. What will make hair grow, such as beard and moustache? A. Keep the system in a vigorous condition and the skin clean. Bathe the parts frequently with cold water containing a small quantity of tincture of cantharides. See "Hygiene of the Hair," by Professor Erasmus Wilson, SCIENTIFIC AMERICAN SUPPLEMENT, No. 110. 2. What will turn it black or dark, not instantly, but slowly? A. The diluted juice of the hulls of green walnuts (Paulus Ægineta) is commonly employed.

(41) C. H. H. writes: 1. Take two round balls of precisely the same size, one being, say, four times heavier than the other, and let them both drop at the same time. Will the heavy ball strike the earth any quicker than the light ball? A. In air the heavier body would reach the earth first. 2. In the SCIENTIFIC AMERICAN of February 15, in the article headed "Galileo's Museum" by H. D. Garrison, it is stated that all bodies large or small, dropped from an elevation at the same time, will reach the earth at the same time. Is this so? Please explain, as I think the atmospheric resistance would be greater in the large body than in the small. A. In a vacuum all bodies would fall with the same velocity; in air, the action is modified. 3. In query February 1, in answer to E. W. in directions for making a Leyden jar, he is told to coat an ordinary candy jar with shellac and then coat with tin foil inside and out. This I have tried by putting three or four layers of shellac on first, and then coated both inside and out smoothly with tin foil, and yet the jar will not work. Please give me the reason. A. Jars for this purpose should be of green glass. Flint glass is not a good insulator. You should also reject a jar which has the slightest crack or flaw.

(42) B. W. asks if an electrical plate machine and a battery of Leyden jars will work an electrical pen, as well as a Bunsen battery? Or tolerably well? A. No; the discharge of sparks is not sufficiently rapid.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

W. M. S.—It is the pollen of the pine (Pinus strobus).

COMMUNICATIONS RECEIVED.

On Electric Light. By G. F. S.
On Vibratory Motions. By J. C. W.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending

March 11, 1879,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city.

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English Patents Issued to Americans.

From March 11 to March 14, inclusive.

Archery, W. H. Wright *et al.*, Rochester, N. Y.
Carding machinery, E. A. Dick, Washington, D. C.
Carding machinery, W. C. Bramwell, Hyde Park, Mass.
Cooking apparatus, W. Pickhardt, New York city.
Electric light, C. F. Brush, Cleveland, Ohio.
Fog signal compass, W. Hughes, San Francisco, Cal.
Locks, H. Rogers, New Haven, Conn.
Meters, liquid, J. F. de Navarro *et al.*, New York city.
Pumping engine, G. F. Blake, Boston, Mass.
Sewing machine, G. W. Hooper, New York city.