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 inqnirers.

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) Miss A. S. B. asks: 1. At what temperature and under what pressure do oxygen and hydrogen gases liquefy? A. According to the experiments of M. Pictet, oxygen liquefies at a temperature of —202° Fah., under a pressure of about two tons per square inch, or at —220°, under a pressure of 3,780 pounds per inch. At a temperature of —220° Fah., hydrogen requires a pressure of 9,780 pounds per square inch to liquefy it. 2. Have these gases, or air, been solidified? A. Yes. In Pictet's experiments the solidification of particles of these substances was made apparent by the peculiar sound of the liquefied gas as it issued from the tubes when the valves were opened, the particles striking the floor with a noise like fine hail. The electric light thrown on the jets showed bright central cores of solid matter.

(2) A. H. asks: Is there any way of removing rust from the wrapping of hoop in skirts? A. We know of no practical way.

(3) E. M. says: Please give a good receipt for a liquid shoe polish. A. Dissolve in a half pint of soft water three-eighths of an ounce of potassium bichromate, and add six ounces of logwood extract dissolved in one gallon of warm water. Dissolve in one gallon of water by continued boiling six ounces borax and one and a half ounces of shellac. Mix all together while warm, and add three ounces of aqua-ammonia. Apply with a brush.

(4) C. E. asks: Can you inform me what the ingredients and proportions are of priuter's ink and how to make it? Also, how to make anilline ink dry quickly? What driers are usually used? A. See Printing Inks, page 400, No. 26, vol. xliv.

(5) J. J. asks: Can you give me a recipe for bleaching dark hair to light or golden tinge—that is the so-called golden fluid which is sold at perfumers' shops? A. One of the "golden fluids" sold for this purpose consists of an aqueous solution of bisulphite of soda, prepared by passing a current of sulphurous acid gas, generated by the action of hot oil of vitriol on copper scraps, into a saturated aqueous solution of carbonate of soda until the liquid will absorb no more of the gas. Another bleaching agent used for the hair is a dilute aqueous solution of peroxide of hydrogen.

(6) T. B. S. asks: 1. What are the old and the new formula of common potash alum? A. Old—$KOSO_3+Al_2O_3 3SO_3+24HO$; new — $K_2Al_24SO_4.24H_2O$. 2. What is the formula, according to the new system, of ammonia alum? A. $(NH_4)_2Al_24SO_4+Aq$. 3. What per cent of sugar does the sugar beet yield (in practice)? A. About 8 per cent.

(7) R. G. C. asks: Will creosote preserve wood from the teredo, and how long? A. When well impregnated with creosote or dead oil wood is safe against the attacks of insects under ordinary circumstances.

(8) I. McP. asks: Which kind of sumac is it that is used for tanning, dyeing, etc.? A. *Rhus coriaria*, which closely resembles our common stagshorn sumac (*Rhus typhina*), is most in demand; but the stagshorn and other similar varieties of sumac are nearly as valuable as the *R. c.*

(9) A. K. asks: 1. How can I gold plate small articles? I have a few rings and cuff buttons which I would like to plate without a battery. A. Digest a small fragment of gold with about ten times its weight of mercury until it is dissolved, shake the amalgam together in a bottle, and after cleansing the articles coat them uniformly with the amalgam. Then expose them on an iron tray heated to low redness for a few minutes—the mercury volatilizes, leaving the gold attached as a thin coating to the article. The heating should be done in a stove, so that the poisonous mercurial fumes may pass up the chimney. See Gold Deposits, page 116, vol. xliv. 2. Could a battery be attached to a small velocipede so as to propel it without going to much trouble or expense? If so, what kind of a battery would be best? A. It is impracticable.

(10) E. A. W. asks: Do you know of any way of joining sheet or bandage rubber so that it will be as of one piece? I have used the various kinds of rubber cement, but find that they will not withstand heat or moisture, and will readily come apart on being immersed in warm water. A. Prepare a cement as follows: Digest in a wide-mouthed stoppered bottle a quantity of purified gum rubber (caoutchouc) cut into fine shreds, with just enough bisulphide of carbon to thoroughly soften and convert the gum into a uniform thick paste, assisting the action of the solvent by frequently shaking the bottle. Moisten the edges of the sheets to be joined with a mixture of one part chloride of sulphur and twenty parts bisulphide of carbon, well shaken together; then spread on the cement, bring the parts together and put under strong pressure for twelve hours in a room heated to about 80° Fah. The cement should not be used or kept in the vicinity of fire.

(11) N. A. P. asks: 1. Can you give me a good and at the same time cheap receipt for silver plating, or method of electro-plating small wares, such as spoons, forks, etc.? A. You will find a comprehensive article on silver plating (electro-silver plating) on page 81, vol. xliv. 2. Can I use coin or old silver in the process? A. Coin or old silver can be used, but refined silver is very much better. 3. Also a cheap recipe for making vinegar quickly. A. See quick vinegar process in article on potatoes and their utilization, page 229, current volume. Almost any alcoholic liquid can be used instead of the potato spirit.

(12) M. J. D. asks: 1. What liquids will cut or dissolve gutta percha? A. Bisulphide of carbon, benzine, benzole, or naphtha, and some of the essential oils. 2. How can these solvents be colored a clear dark red? A. Try cochineal, alizarine, or madder red, or lac dye previously ground very fine with a little of the solvent. 3. How can I make a good rubber cement? Do you know of any books on cements? A. You will find good receipts for rubber and other cements on page 2510, SUPPLEMENT, No. 158.

(13) A. T. C. says, in reference to our answer to G. B. L. (4), page 186, current volume: "If I understand his question your answer is not correct. Your answer would do for what is called a wiped seam, except, in place of 'hot lead' you should have said hot solder, which is a mixture of 16 parts tin to 31 parts lead. To burn a seam is a very different process, that being done by the flame of the oxyhydrogen blow pipe or a modification of the same principle, hydrogen in combination with a blast of air. The sheets of lead or the edges of which are to be burned are placed one upon the other and cleaned, the flame is applied to the edge of the outer and surface of the inner sheets, and they are melted together drop by drop commencing always at the bottom of the tank. This process requires great skill, and is in hands of a very few. This method of burning sheets of lead together is used in chemical works, where solder would be eaten by acids."

(14) C. V. W. writes: Will you give, through your valuable paper, your opinion of phrenology? Is not it a first class fraud? If you can, will you please give an historical example in which this pretended science has been correct in its demonstration? It is, in our opinion, a veritable occult science, with the aim of preying on the credulity of the public, but then, all persons do not think alike. A. Phrenology is not a "fraud," neither is it an "occult science." Its disciples are often enthusiasts, whose opinions and theories have little scientific value; and to a considerable extent the positions taken by the better instructed believers in phrenology are, in our opinion, at variance with demonstrable facts and theoretical probabilities; but the same can be said of all attempts to solve the problems of mental and moral action and the relation of character to physical structure. As a working hypothesis phrenology has done good service in spite of what seem to us to be errors, and there are reasons for supposing that its term of service is far from completion.

(15) D. J. P. asks: How can copper and silver be most readily separated from alloy with gold—*i. e.*, for the purification of the gold and silver? A. Hammer the pieces into thin ribbons and put them, with about ten times their weight of pure lead, into a good scorifier, which heat in a muffle at a bright red heat until the metals have all melted. When a current of heated air is allowed to play over the surface of the fused alloy the lead (and copper) is gradually slagged off. As soon as the ring of slag formed closes over the entire surface of the fused metal the contents of the scorifier is poured into an iron cup, and when the slag has chilled and cracked off the metal is returned to the muffle in another hot scorifying dish and the slagging off continued until the button is small enough to put into a bone ash cupel. The cupel having been heated to bright redness, the button of metal is cautiously dropped into it. The metal soon melts, the lead and copper gradually slag off—the slag being absorbed into the porous cupel—until a button of pure gold and silver remains. The silver is separated from the gold by means of hot nitric acid, which dissolves the former and not the latter. That this separation may take place it is necessary that the alloy should contain about three times as much silver as gold—enough silver must therefore be added to the alloy if deficient in this metal. The alloy should be hammered out into a ribbon before putting it in the acid, to facilitate the operation. See Assaying, page 339, vol. xliv.

(16) C. J. V. writes: We have a standpipe, 160 feet high and 6 feet in diameter. Would it not take less power to pump in at top of stand pipe with 12 inch pipe than at bottom? A. No.

(17) J. C. asks: How much air is used in the consumption of a pound of wood or coal? A. For bituminous coal, 150 cubic feet air per pound; for anthracite, 196 feet per pound; for wood, about 95 feet per pound.

(18) J. R. asks: Are emery wheels used for grinding plow castings? If so, are they as economical and satisfactory as grindstones? A. Emery wheels are very satisfactory for this purpose. 2. Will a dry grindstone work better on cast iron than a wet one? A. Dry grindstones are generally used in preference to wet ones, principally on account of rust caused by moisture. 3. How will I proceed to make an emery belt? A. Procure an endless belt of cotton webbing, coat it with the best glue, a section at a time, and press it into the emery, which must be made just hot enough to melt glue and not burn it. 4. Is there any kind of tool, less expensive than a diamond, that will work satisfactory for truing up emery wheels? A. No.

(19) A. B. K. asks: 1. Are cast iron magnets used in the various dynamo machines for electric lighting? A. They are used in some machines. 2. What is the comparative magnetic power of cast and wrought iron magnets of the same size, number of turns of wire, and charged by same batteries? A. The advantage is largely in favor of wrought iron, but it varies somewhat with the construction of the machine. 3. Will gas carbon answer instead of graphite in the sulphur and graphite carbons mentioned in late number of SCIENTIFIC AMERICAN? A. Yes, but graphite is preferable. 4. Is the sulphur sold in drug stores free from carbonate? If not, where can such sulphur be obtained? A. It is sufficiently pure for most purposes.

(20) M. writes: We have a five mile telegraph line from this office, with only one wire. The main battery is all at our end, and at this end we also have a good ground connection, but none at the other end. Would our line work better if a good earth connection was at each end? A. You require a good ground connection at each end of your line.

(21) F. I. writes: I have made twelve plates of the Faure accumulator, and coupled them up exactly as described in the SCIENTIFIC AMERICAN of June 25, page 406. I then connected each pole to a Siemens dynamo machine of 2,000 candle power for fifteen minutes, then uncoupled and found that it heated red hot two inches of No. 25 platinum wire, for perhaps two minutes, and at the end of ten minutes could not get any further power out of it. I may say that when the battery was connected to dynamo machine, the belt slipped very much, and it took a large quantity of power to drive it. I therefore thought the battery must be short circuited, and have carefully examined it, and find this not to be the case. Shall be glad if you could point out my failure. What thickness is canton flannel as used by you in your experiment? A. The Faure battery will run down very quickly when short circuited. In charging you should apply less current for a longer time. As canton flannel is soon destroyed by the acidulated water, it would be well to use woolen flannel. You will find it advantageous to separate wrapped plates by two strips of rubber packing one-sixteenth of an inch thick.

(22) J. J. M. writes: Will you please tell about a score of young men in this village from how deep a well can water be drawn up with a common pump? What we want to know most is, what is the greatest distance possible from spout of pump to surface of water? Philosophy tells us that this distance can be no more than 30 feet; then how many feet can we have between lower valve and spout? Is it possible to draw water from a well 60, 80, or 100 feet deep, by having a long pipe? A. If you have not more than 26 or 28 feet from surface of water to plunger valve, you can have any height you like from lower valve to the spout. It is only limited by the power employed in working the pump.

(23) A. G. asks: Can you tell me through your paper if it is practicable and economy to warm a building with the exhaust steam from an engine? Last winter I ran a 10x24 inch engine, and exhausted into a steam drum, 4 feet by 30 inches, through a three inch pipe, then took the steam from the drum through a two inch pipe to the circulating pipes about the mill. I also had a three inch pipe leading from the drum to the open air with safety valve attached, so that I could carry the required amount of pressure to force the steam around the mill, and it required more fuel to run the engine and warm the mill with the exhaust steam than to exhaust in the open air and heat with steam direct from the boiler. I know parties who are running about a 10 horse engine, and have their mill piped with four inch circulating pipe, and no back pressure, and they say it is not economy to use it and do not use it now. What is the reason? A. It has always been considered economical to heat by exhaust steam, and many factories and buildings in New England are so heated. We think in your case your pipes were entirely too small, as they must cause much friction and give but little radiating surface.

(24) A. H. T. writes: Your recent notes and articles on steam boiler explosions have attracted much attention. Your views on the following would be very welcome: A flask of thin glass, two thirds filled with water, is boiled for a moment and tightly corked. The temperature of the water is allowed to fall 20° or 30°, and cold water dashed on the upper part of the flask. The contained water is instantly thrown against the sides of the vessel, shattering it to pieces. For the success of the above it is necessary that the flask be of rather large size, say of two quarts capacity, and that it be of thin blown glass. A steam boiler under similar conditions may be exploded in the same way. The sudden opening of a large valve, or the rupture of some part of the boiler, causes the water contained in it to

be precipitated against its sides, producing a great strain and often a violent explosion. I do not think it possible to *explode* a boiler containing *no water* by forcing steam into it. The boiler would simply be ruptured at its weakest point, as by hydrostatic pressure. A. The conditions you name have been frequently complied with, sometimes by way of experiment and sometimes accidentally. The latest of the latter class is the breaking of the steam pipe of the Plymouth Rock. No explosion followed. Even in a small way, with a thin weak glass flask, the experiment must be made very carefully to be successful. You find no such conditions, as required in your experiment, in the ordinary use of steam boilers.

(25) E. J. D. writes: I wish to pump boiling water on the fruit trees in my orchard, to try and kill the scale bug. In driving a portable steam boiler through the orchard, stopping at every tree, in the stopping and starting the water will slush at the back end and forward end of the boiler, perhaps uncovering the flues of the boiler, the fire still burning in the fire box. I would like to know if there would be any danger of an explosion from the boiler? The steam pressure would be about 30 lb. A. There will be no danger except the tubes be uncovered too long. This action can be checked in a measure by putting in the boiler, above the tubes and crosswise of the boiler, a couple of "swash plates," that is plates on edge, and standing in your boiler say 10 or 12 inches above the tubes, and strongly fastened; these plates to be punched all over with holes, say, three-fourths or one inch diameter.

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

H. & Co.—A talco-argillaceous rock containing much iron sulphide—pyrites.—J. R. E.—An argillaceous hematite iron ore containing mica.—C. W.—Clay iron stone—an impure iron ore.—W. E. H.—Limestone and quartzite.—R. J. McD.—Impure barium sulphate—heavy spar—chiefly used for adulterating whitelead paints.—C. H. E.—The scale is composed chiefly of lime carbonate—not injurious in drinking water.—M. G. S.—A bituminous coal containing a large per cent of ash.—C. E. C.—Your mica is of very fair quality—See Mica, page 257, No. 7, current volume, and Hints to Correspondents.—R. T.—Chiefly magnetic iron sulphide—pyrrhotine.—A. M. K.—It is quartz containing zinc blende and galena—valuable ores of zinc and lead; also a small quantity of iron sulphide—pyrite. The value of such an ore can only be determined by a chemical analysis—it is worth an analysis.—E. S. M.—It is a small fragment of meteoric iron.—S. S.—A bituminous coal containing considerable ash, but nevertheless a good fuel.—D. St. J.—A mixture of limestone, quartzose rock, and carbonate and sulphide of lead—probably silver bearing.—W. F. M. E.—No. 1 is hematite or specular iron ore. No. 2. Orthoclase. No. 3. Silicious limestone.—A. H. H.—The composition contains copal and resin (colophony).—A. E. S.—The sand is not iridium, as you suggest, but magnetic iron ore sand—magnetite.—J. O'B.—It is composed chiefly of hornblende—contains no corundum or emery.—F. F.—The quartz contains much iron sulphide and a little copper sulphide. Not rich enough in the latter to be considered as a copper ore.—N. S.—The garnet sand is of no commercial value here at present.—H. M.—It is gypsum—sulphate of lime—used for making plaster of Paris.

COMMUNICATIONS RECEIVED.

On the Strength of Bricks. By H. F. N.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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

October 18, 1881,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for 25 cents. In ordering please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

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Cable traction street railway, C. W. Rasmusen, Chicago, Ill.
Electro-magnet, J. M. Stearns, Jr., Brooklyn, N. Y.
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Sewing machine cabinet, J. Jorgensen, Petersburg, Va.
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Telephonic apparatus, W. R. Patterson, *et al.*, Chicago, Ill.
Telephonic apparatus, C. E. Buell, New Haven, Conn.
Telephonic communication, J. M. Stearns, Jr., Brooklyn, N. Y.
Tricycle, S. N. Silver, *et al.*, Auburn, Me.