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.

(1) J. A. M. asks: Is there any instrument made for determining the moisture of soils? A. We know of no special instrument for this purpose. The moisture is usually determined by weighing accurately a small average sample of the soil and then drying it at 212° Fah., until it ceases to lose weight. The difference between the first and last weights corresponds to the weight of moisture.

(2) H. K. T. asks for a formula for a paste which will cause labels to adhere to tin without first brushing the surface of the metal with hydrochloric acid. A. Try the following: Water, 1 pint; borax, 1 oz.; shellac, 5 oz.; boil until the latter is dissolved. Thin with boiling water if desired. It works most satisfactorily while hot.

(3) E. P. M. asks: Can you give the formula for preparing good common logwood chrome ink? A. Distilled water 1,000 parts (by weight); logwood extract, 15 parts; carbonate of soda (cryst.) 4 parts, chromate of potassium, 1 part. Dissolve the logwood extract in 900 parts of the water by aid of heat, and let it stand to settle; draw off the clear liquid, beat to boiling, and add the carbonate of soda; lastly add, drop by drop, with constant stirring, the chromate (yellow chromate) previously dissolved in 100 parts of water. The color is not fully developed at once, but on standing for a few hours gradually deepens to a full bluish-black. The ink thus prepared flows well and dries quickly. The addition of a trace of clover oil will prevent mouldiness.

(4) S. R. J. asks (1) for a receipt for silver wash. A. The following bath for silvering by cold dipping gives excellent results: Dissolve in a small quantity of cold water an ounce of fused nitrate of silver, and gradually add, with constant stirring, a strong aqueous solution of good bisulphite of soda until the precipitate at first formed is just redissolved. A momentary immersion of the thoroughly cleansed articles (copper, brass, or bronze) is all that is necessary. 2. Electro silverplating. A. See article on Electro-metallurgy, page 81, current volume.

(5) J. K. asks (1) if there is any such thing as waterproof powder. A. We know of no waterproof gunpowder. Dynamite, duadn, gun cotton, and other blasting substances are not affected by water, but they are unsuitable for use in fire arms. 2. How long will powder last in an air-tight cartridge? A. If put up in a dry airtight cartridge ordinary powder will remain unchanged for an indefinite period. 3. Give the name of the best powder to use. A. Common war powder—*a*. Saltpeter, 75 parts; sulphur, 10 parts; charcoal, 15 parts. *b*. Saltpeter, 75 parts; sulphur and charcoal, each 12½ parts. Sporting powder—Saltpeter, 76·9; sulphur, 9·6; charcoal, 135. Blasting powder—Saltpeter, 62; sulphur, 20; charcoal, 18. See column of Business and Personal and Hints to Correspondents.

(6) E. K. B. writes: 1. Referring to SCIENTIFIC AMERICAN SUPPLEMENT, No 160, what are the long terminal points of the induction coil made of? A. Brass. On a large coil they might be tipped with platinum with advantage. 2. How are carbons made as for Bunsen battery? Will you please give the degrees of heat, etc.? A. Powdered coke or gas carbon is mixed into a uniform paste with thin coal tar, moulded by pressure, dried slowly in an oven, and then gradually heated to whiteness in muffles which exclude air. Repeated soaking in thin tar and reheating makes the surface hard and dense.

(7) C. F. M. asks: 1. Can dry plates be worked by Newton's process in a room lighted through yellow panes of glass? A. Yes. 2. In any photographic process, what is the exact color and shade of the glass which should be put in the window of the dark room? A. A clear dark yellow approaching orange. 3. Will not colored sheets of gelatine do as well as glass? A. Yes.

(8) E. F. C. writes: Some time ago you published a formula for a concentrated fertilizer to be used on potted plants, etc. Among the ingredients was biphosphate of ammonium. As no drug store or chemist's shop here has this chemical in stock, and no work on chemistry that I have consulted makes mention of it, I would be obliged to you if you would give the formula for making it. A. Macerate, for twenty-four hours or more, 81 lb. fine bone ash with 147 lb. strong sulphuric acid: dissolve 24 lb. carbonate of ammonia (or a quantity of ammonia water containing 18 lb. real ammonia) in 15 gallons of soft water, and gradually stir in the paste. After standing several hours draw off the liquid portion, agitate the remainder with a little fresh water; let settle, draw off the clear liquid, add it to the first liquid drawn off. If desired boil down this solution of acid ammonium phosphate until it will solidify on cooling. The portion insoluble in water is chiefly lime sulphate.

(9) J. M. H. asks: 1. Is there any difference in a troy ounce and an avoirdupois ounce? A. The troy pound contains 5,760 grains, the avoirdupois pound 7,000 grains; the troy pound contains 12 ounces of 480 grains each, the avoirdupois pound 16 ounces of 437½ grains. 2. What is the lifting capacity of one cubic yard of hydrogen gas? A. A cubic yard of air at 60° Fah., weighs about 11 ounces (avoirdupois), a cubic yard of hydrogen about ¾ ounce; the difference or "lifting power" is therefore about 10¼ ounces per cubic yard of gas. 3. Will hydrogen penetrate common tin, or waste if confined in such a vessel? A. Hydrogen will not penetrate tin or tinned iron.

(10) E. E. T. asks: 1. How can I take a gallon of silver solution and find out how much silver and cyanide it contains? A. Draw off two half-ounce samples, and to one add gradually (in the open air to avoid inhaling the fumes) about two ounces of pure hydrochloric acid, shake together, heat to boiling, and let settle. Decant the liquid, throw the precipitate on a small filter, wash with hot water, cover and set aside in a warm, dark place to dry; when dry weigh on an accurate balance, and multiply the weight by 153·6—the result is the weight of metallic silver (approximate) per gallon of solution examined. Evaporate the other half ounce to dryness, weigh, multiply by 192, and deduct the weight of silver found. The result (if the bath was plain silver potassium cyanide solution) will indicate the weight (approximately) of cyanide of potassium per gallon of solution. 2. Will the same rule work on a copper and gold solution? A. No. 3. What can I dip brass into to turn it black without destroying the surface of the metal? How do they get the deep yellow color so much worn on jewelry? A. Dip the article bright in nitric acid, rinse, and place it in the following solution until it turns black: one ounce each white arsenic and iron sulphate and twelve ounces of hydrochloric acid; rinse, dry in sawdust, and polish with black-lead or lacquer. See article on Electro-metallurgy, page 116 current volume.

(11) A. F. writes: My table gives size of drive pipe for No. 5 hydraulic ram, 2 inches; discharge pipe, ¾ inch. My friend claims I cannot use a larger discharge pipe. I claim it makes no difference what size is used after leaving nozzle of ram, whether ¾ inch or 36 inch, save that there would be less friction in using the larger pipe. Which is right? A. You are right. Strictly, the proper proportions depend upon the relative height from which the water is received and that at which it is delivered, but makers have satisfied themselves that for general use, the delivery pipe should be about half the diameter of the receiving pipe, and so make them.

(12) R. Q. T. writes: 1. We desire to supply our town with water; have a reservoir about 150 feet above the town, 4¼ miles distant—area 100 acres, depth 30 feet. What size of pipe will we need to supply, say, six hydrants in case of fire? A. 10 inches. 2. To what elevation can water be thrown? A. About 70 feet, depending upon length of hose. 3. What should be the size of the mains to furnish water to a population of 10,000? What would be the probable consumption for three months in the winter? A. Allow 35 gallons per day for each inhabitant. The above are only approximate. If you wish accurate information you should employ a hydraulic engineer to survey, examine, and estimate.

(13) W. M. A. wants information in regard to preparing brimstone in a paste form. I am engaged in working what they call locust timber into wagon hubs, and I want something to fill up the cracks or checks in the timber. Brimstone is cheap and it is the same color and it becomes hard. A. Heat the sulphur in an iron pan over a moderate fire until it melts to a thin liquid; too much heat thickens it. On cooling the sulphur regains its former appearance and qualities. It can be used advantageously in the liquid form as a filler.

(14) J. C. A. asks: How may I increase the cold of an ice box? My experiments teach me if I apply salt to ice in open air the ice will melt. Now, if I should make an ice box, and confine the ice crushed with salt, mixed in tubes, would the salt have the same effect on the ice, or would it have the opposite tendency and save the ice? A. Other conditions being equal, salt will liquefy ice in a closed tube as quickly as in the open air. The volume of salt ice water resulting will not absorb a greater total quantity of heat than the ice from which it was produced, though the salt liquid will be sensibly much colder than ice at first. Ice liquefied by salt in tubes will freeze water surrounding them, but the ice thus produced will be considerably less in quantity than the ice melted by salt to produce it. There is no way by which ice may be melted by chemical means without making the ice water unfit for potable purposes. See Tyndall's "Heat as a Mode of Motion."

(15) A. A. D. writes: In the SCIENTIFIC AMERICAN, of February 5, 1881, page 87, in article entitled "Filtration and Decolorization," by C. G. Pfander, London, occur the following sentences: "Three parts dried clay to four of blood, sometimes vegetable charcoal is added. The mixture is moulded into lumps, dried, mixed with equal bulk of granulated clay, and then carbonized in a retort." If blood is carbonized are not its peculiar cleansing qualities destroyed? I supposed the albumen of blood, coagulated by heat, formed a drag net or screen, which swept impurities to the surface of the liquid. Would not clay mixed with molasses and then carbonized answer as well as clay mixed with blood and then carbonized? It would obviate objections and difficulties. A. The product is similar in its action to the animal charcoal used extensively in sugar refiners' filters. It does not depend upon the action of albumen, but upon the decolorizing action of animal charcoal in a finely divided state. Blood or albumen clarifies by removing suspended impurities; charcoal chemically deprives of coloring matter, etc. Clay and molasses would not answer as well.

(16) A. G. asks for a recipe for a preparation known as Allen's crystals for the bichromate battery. A. To 3½ oz. of finely powdered bichromate of potassium (or ammonium) gradually stir in 1 oz. cold sulphuric acid, and rub thoroughly together.

(17) J. C. asks for a deodorizer for benzine and the proportions. A. Agitate it violently and repeatedly with about three per cent of sulphuric acid, let stand a few hours, draw off the clear portion, and slowly redistill, the vessel receiving the distillate being replaced by another from time to time. Select the contents of those receivers containing the portions freest from odor and discard the other portions.

(18) H. F. B. asks: 1. How are the leather packings for hydraulic jacks pressed or formed to prevent fulling at the edges? A. The leather is well softened in water, and then pressed in cast iron formers and dried. 2. How can I straighten a long two-inch brass tube which is slightly bent? A. Draw the tube carefully on the hollow side.

(19) M. B. asks (1) how to braze steel wires without a blowpipe. A. This is sometimes done by placing the wires, properly charged with flux and silver solder, between two white hot blocks of cast iron. 2. Is there a composition of some kind of a hard solder which, if kept in a molten state in a crucible, we could put on, and in which we could dip the ends of such wires for a moment for the purpose of brazing them? The blow pipe takes out temper. A. Brazing cannot be done in the manner proposed, and it cannot be done in any way without destroying the temper. The blowpipe method of brazing or soldering small articles is the best.

(20) J. K. writes: 1. I have sunk a tube well to the depth of about forty feet through blue clay, on to what is termed hard pan, which seems very hard and unyielding, so that I can drive deeper only with great difficulty. Now, how shall I proceed to drive clear through that hard pan, under which I expect to find plenty of water that will not be affected by drought? A. We think you should use a drill (inside the tube) to drill through the hard pan, before driving the tube. 2. How can I take the first muddy and sandy water from the tube? My pump will not work on account of mud and sand, which stop up the openings in the screen at the bottom, thus preventing the water from entering the tube, also works up into pump cylinder and locks the pump. A. Use a rough sand pump that will not clog. 3. How can I tell when deep enough down and when to stop driving, so as to leave the screen or bottom of tube in the best bed or supply of water, and thus obtain the best well? There is water in the well now, but I cannot pump it on account of mud that accumulates on the point which adheres and sucks into the openings of the screen so close that the water cannot enter the tube, but is shut out so perfectly and complete that the suction of the pump is not sufficient to suck it through into the screen and pump. This is the main difficulty: is there no remedy? A. We know of no way except by trial. You had better consult some one of experience in putting down drive wells.

(21) T. R. asks (1) how phosphorus is made from white burnt bone. A. The ground bone ash is mixed into a cream with twice its weight of water and a quantity of sulphuric acid (bone ash, 100; water, 200; acid, 78 lb). In twenty-four hours more water is added, and the mixture is heated in a leaden pan until it has lost its granular character. It is then diluted largely

with water and transferred to tall casks to settle, after which the clear liquid is drawn off, the residue washed with water, the clear washings added to the liquid, and the whole evaporated down in copper or leaden pans. The clear liquid is then drawn off from the calcareous deposit, the sediment drained on a filter, and the liquid evaporated to the consistence of honey and mixed with charcoal powder (9 lb. for 100 lb. bone ash). The mixture is then dried in iron pots and heated to incipient redness, cooled, and put into earthen retorts well luted and dried. Heat is applied around the sides of the retort in an air furnace. The beak of the retorts are connected with copper tubes which dip a quarter inch beneath the surface of lukewarm water, at the bottom of the vessel containing which the phosphorus which distills over collects. It is purified by squeezing it through chamois leather under water. While melted (under water) it is drawn up into glass tubes and transferred to cold water, where it solidifies and drops out of the tubes. These sticks must be kept under water. 2. What per cent of phosphorus do they contain? A. About 20 per cent.

(22) E. M. asks: Can you give me a good receipt for making manifold paper? A. Saturate fine unglazed paper with the following preparation. When dry it is ready for use: Tallow, 2 oz.; graphite (blacklead) in finest powder, ½ oz.; linseed oil, ¼ pint; lampblack, q. s. to make it of the consistence of cream; melt and rub well together in a mortar.

(23) H. S. W. asks for the best method of cutting a double, triple, and quadruple thread. A. There is no difficulty in doing it on a screw-cutting lathe; you determine the pitch of the thread, and you can then divide the thread into two, three, or four parts by changing the position of the cutting tool.

(24) N. B. P. asks: What will remove grape stains from a carpet? A. Wash out with warm soapsuds and a little ammonia water.

(25) S. R. B. writes: A wart has been growing on the right side of my nose for several years, and is now about the size of a large shot. Can you inform me how to remove it without leaving a scar, and whether there would be any bad result afterward? Several friends have suggested means for its removal, but I prefer to hear from you. A. By the system of Dr. Barnes—the use of an ordinary burning glass—the excrescence could be removed, leaving as little of a scar probably as by any method.

(26) H. D. P. writes: I have a piece of machinery which is almost constantly covered with a light rust: what can I apply to keep it off? A. Camphor, ½ oz.; dissolve in melted lard, 1 lb.; take off the scum, and mix in as much fine blacklead (graphite) as will give it an iron color. Clean the machinery and smear with this mixture; after twenty-four hours rub clean with a soft linen cloth. It will keep clean for months under ordinary circumstances.

(27) A. C. S. writes: I have a compound engine, small cylinder, 3 inches diameter by 6 inches stroke; large cylinder, 7 inches diameter. I wish to build a boat suitable for the engine. Please give me dimensions, also diameter and pitch of screw. A. About 16 feet long, and 3 feet 8 inches to 4 feet beam; screw about 18 inches diameter and 2 feet 9 inches pitch. 2. What should be the stroke of treadle for foot lathe, driving wheel, or large cone, 26 inches diameter? A. From 6 to 8 inches. The stroke should be adjustable to the ease of the person using it. What would be right for one would be too long or too short for another.

(28) J. S. asks: 1. Which is the best gasoline gas machine in use? A. For this information see our advertising columns and Hints to Correspondents. 2. What is the best absorbent for gasoline? A. Infusorial silica is about the best thing. Sisal hemp is often used.

(29) H. S. H. asks: 1. What pressure will a copper boiler, ⅛ thick, 2 feet long, 18 inches diameter; with 40 one-inch copper flues, depth of fire box from grate to crown 8 inches, space between fire box and outside shell ¾ inch, copper flanged head and flue sheet the same, copper rivets ¼ inch diameter and double riveted both ways, or every seam and head to be double riveted. A. 35 lb., if all parts are equal in strength to the shell. 2. I would like to know what horse power it would be, burning coke or hard coal? It is to be a vertical boiler. A. About 2 horse power. 3. What would be the power of two cylinders, 2 inches bore and 3 inches stroke, connected at right angles, running 300 revolutions per minute? A. With 80 lb. steam, 2 horse power. 4. What would be most durable, brass or iron cylinders? A. Cast iron.

(30) R. B. F. writes: We are in search of a handy and rapid means of retaining a copy of short notes, telegrams, etc., without the aid of the copying press. The stylographic process seems to be about the thing, but the manner of using the carbon sheet in the several ways we have been able to secure are unhandy and not adopted to our wants. I want to try and improve the methods employed, and would like to know how to prepare the carbon sheets. The sample inclosed is good, durable, and furnishes a clear line free from smut, more like ink than the usual smutty sheets used produce. Can you explain the process in your paper of making the sheets? A. Try the following: Tannic acid, 10 parts (weight); pure sulphate of iron, 15; glycerine, 35; indigo sulphate paste (nearly neutral), 1; warm the glycerine, add the tannic acid, and rub together in a mortar to dissolve; powder the iron salt, divide into two portions, and calcine one by stirring it about on an iron plate over a fire until it becomes brown. Mix with the other portion, and gradually triturate into the glycerine; add in a similar manner the indigo, and rub all well together. Saturate thin unsized paper with this (adding more glycerine if too thick), hot, pass between a pair of smooth iron rolls under strong pressure, and hang up in the air for half an hour before packing for use. See answer to E. M., this page.

(31) M. A. H. writes: I wish to put in a new boiler to run a 12x24 engine, to be run at 60 revolutions per minute. Am divided in opinion between these boilers, namely: *a*. A two flue (flues 15 inches diameter), 42 inches diameter, 24 feet long. *b*. A Norton flue (flues 6 inches in diameter), 48 inches diameter, 16 feet long. *c*. A twenty-four flue (tubes 4 inches diameter). 46 inches diameter, 14 feet long (tubular). I am aware that these are not the same horse power, but either will answer, and I want your opinion on the following points: 1. Is there any difference in the durability under the same treatment in the boilers? A. The two-flue boiler will wear longest and is easiest cleaned. 2. Which will use the least fuel to produce the steam necessary for engine? A. Boiler with 4 inch tubes. 3. Which is the most likely to leak first, the tubular at end of tubes, or the flued to crack at end of flues? A. The tubular at the tube heads. 4. Which do you consider the best for economy of fuel, safety from explosion, and general use for the engine named? A. Either is safe from explosion under proper care, but the two-flued boiler is easiest managed.

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

C. C. D.—The sulphur colored substance is pine pollen—carried by the wind.—F. M. D.—Silica similar to your sample is used in the preparation of cements, glass, enamels, silicate of soda, and artificial stones. It is also used for polishing and scouring purposes, and also filtertering. See Hints to Correspondents.

COMMUNICATIONS RECEIVED.

On the Cheops Pyramid. By G. V.
On the Propulsion of Ships. By J. G.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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

March 29, 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 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. 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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Furs, ornamenting, L. Havasy, New York city.
Garments, reversible, S. Rosenthal, Baltimore, Md.
Gas, manufacture of, C. F. Lawton *et al.*, Rochester, N. Y.
Gas, preserving substances by, C. F. Lawton *et al.*, Rochester, N. Y.
Governor for steam engine, P. Jordan, Paterson, N. J.
Guns, J. R. Haskell, Passaic, N. J.
Hominy, treating, W. S. Boon *et al.*, St. Louis, Mo.
Lock, Eagle Lock Company, Terryville, Conn.
Oil burner, C. Holland, Chicago, Ill.
Paper stock, apparatus for cooking, H. Coker, West Point, Neb.
Railway brake, J. Meissner *et al.*, New York city.
Spinning machinery, W. C. Bramwell, Hyde Park, Mass.
Steam regulator, F. W. Eames, Watertown, N. Y.
Steam heating apparatus, T. A. Ritson, Buffalo, N. Y.
Wire, manufacture of, H. Splidorf, New York city.