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. R. asks how to mix aniline colors so that they will hold on glass buttons without rubbing off by touching. A. Mix them with a thin colorless varnish (alcoholic), such as bleached shellac or spirit copal.

(2) C. E. N. asks how to soften rattan so as to make neat basket work. A. Coil and steep in boiling water for a time.

(3) C. H. A. asks: Are kerosene heaters unhealthy? A. As commonly used, without means of carrying off the products of combustion, yes.

(4) J. B. asks how to make soap hard and firm. A. Heat the paste nearly to boiling, add plenty of soap, skim off the curds soap which separates, press and let stand to cool. Then cut up and stack in a dry place to harden

(5) W. B. H. asks if the same cutter is used to cut all the wheels in a set of change wheels for a lathe. I have a lathe, and wish to cut some more wheels, have an index plate and gear cutter, but don't know whether a cutter made from one of the wheels as a pattern would answer for others having more or less teeth. A. Yes, if you shape your cutter to the teeth of a wheel not differing much from the diameter of that you wish to cut. 2. Please give me the title of some good work on amateur mechanics, or some work where I can get some information relative to gear cutting, etc. A. "Shelly's Workshop Appliances."

(6) H. S. asks the cause of the noise in the pipe connecting the range and boiler. The noise is something like that of a steam pump. The pipe connecting my range and boiler has burst twice in as many months, and the plumbers say they cannot account for it, and, therefore, cannot remedy it. The boiler is about 40 gallons size, and is supplied from a tank. The burst has occurred just where the noise is, and the noise does not commence until the water becomes heated. A. The pipe when it leaves the water back must rise gradually and have no place for steam to gather in. Anything which retards the free circulation of the water will cause noise, whether there is a partial stoppage in the pipe or whether the pipes are not properly set. It is excessive heat, with alternate heating and cooling at that part of the pipe, assisted by the ordinary pressure, which causes it to burst.

(7) A. W. asks: 1. Is there a common way of melting German silver? A. Use a black lead crucible, cover with charcoal, and give a good white heat in a small crucible or melting furnace. 2. How can I harden small gouges? A. Heat to bright redness under charcoal and quench in clean water, draw to a purple color. 3. Can you tell me of a way by which I can clean files, such as used by manufacturers of metal show cases; they get filled with soft solder? A. Use a piece of sheet brass or soft hoop iron to detach the metal between the teeth by striking across the file in the direction of the teeth.

(8) C. G. R. asks: 1. At what speed is the boat described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 166, supposed to run with a load. A. Probably eight to eight and a half miles. 2. What wood is best for ribs and keel, and is it bent or sawed into shape? A. White oak; best bent. 3. What wood is best for the hull and how thick? A. Cedar or cypress, five-eighths inch or three-fourths inch thick. 4. Would a four horse power engine answer for this boat? A. Probably it would if the stroke is not too great.

(9) M. J. H. asks for a cheap receipt or process for removing the color from calico prints and colored cotton cloth and bleaching it white. A. Boil in a strong solution of caustic soda, rinse thoroughly in clean water; steep for half an hour in a strong clear solution of chloride of lime (calcium hypochlorite) in water; ring out and pass through water containing about 3 per cent of sulphuric acid, rinse in running water until all traces of the bleaching materials are removed; dry.

(10) W. C. K. asks: What will remove tattoo marks from the skin? A. It is said that milk pricked into the skin in the same way that the ink was originally applied will change the blue color to red and ultimately cause it to disappear.

(11) J. B. D. asks how to make a solution that will take thick grease from steel wire so that it can be immediately dried, without causing it to rust? A. Use a boiling hot solution of potash in water. Bisulphide of carbon and naphtha also readily dissolve grease or oil without rusting.

(12) R. E. N. writes: We have two valuable sleigh robes, which are not used very often; how can I keep them free from moths when not in use? A. Alcohol, 1 pint; camphor, half an ounce; dissolve. Spray with this liquid before storing.

(13) W. T. B. asks (1) how oil of neroli is made. A. The freshly gathered flowers (sweet orange) distilled with an equal quantity of soft water in a retort provided with a condenser. The oil separates from the distilled water, which is returned to the still with fresh leaves. Rectify by redistillation. About 600 pounds of the flowers produce 1 ounce of the oil. 2. How are orange flowers gathered and preserved? A. The flowers cannot be preserved without loss.

(14) C. asks: Can you give me test for grease in glue? A. Macerate the glue with a little pure bisulphide of carbon, draw off the latter, filter quickly, and let it evaporate, in a clean porcelain vessel. The oil or grease (if any) in the glue tested will remain as a residue.

(15) J. S. B. asks why it is that the salts in a storm glass rise to the top of the hermetically sealed glass tube in damp weather, and sink to the bottom in dry weather. A. These glasses are usually not "hermetically sealed—the change is chiefly due to the effects of the varying temperature.

(16) F. M. W. asks: What is the method of preparing and using soluble glass in the place of resin, in the manufacture of hard and soft soaps? A. Pure quartz sand, 1 lb.; reduce by grinding to a fine powder, and intimately mix with 1¾ lb. carbonate of soda deprived of water by calcination. Place the mixture in a retort, capable of holding four times the quantity, and expose to a white heat until the mixture is in a state of calm fusion. Pour out on an iron plate to cool. When powdered it dissolves to a sirupy liquid in boiling water. Consult Feuchtwanger's "Soluble Glass" and Dussauce's "A Treatise on the Manufacture of Soap."

(17) L. G. G. asks: 1. What gas is the lightest? A. Hydrogen. An equal volume of atmospheric air under like conditions of temperature and pressure weigh about fourteen and a half times as much. 2. How much lifting power has it per 1,000 cubic feet? A. If pure, about 109 pounds. 3. How is it made? A. On a large scale usually by decomposing dilute oil of vitriol with scrap iron, or by decomposing superheated steam by passing it over red hot iron. See Giffard's process (illustrated), p. 104, Vol. 38, SCIENTIFIC AMERICAN. 4. If kept in an air-tight vessel will it always remain the same under all conditions of weather? A. If pure, yes.

(18) J. S. asks whether there is any process besides painting, of transferring a photograph on glass for the purpose of showing it in a magic lantern. A. The process of obtaining photographic lantern transparencies is briefly as follows: Clean the glass, coat it with a thin ammoniacal solution of albumen, dry, flow with photographer's sensitized collodion, dip for a few moments in a bath of nitrate of silver, 5 drachms; distilled water, 10 fluid ounces (in a dark room). Adjust the photograph to be copied before the camera and focus. Then put the sensitized glass plate in the dark box, transfer to the camera, expose a minute or two (according to light), then cover, immediately remove to the dark closet and wash the plate in a strong solution of sulphate of iron to develop the picture. Tone in a little warm water containing a few drops of gold chloride, wash and fix by immersion in a strong aqueous solution of hyposulphite of soda or cyanide of potassium, rinse thoroughly dry, and flow with photographer's varnish. Place this in the outer aperture of a dark tube, the other end of which joins the front of the camera, so that the light passing through it enters the lenses of the camera and the image may be focused on the glass plate at the back. Then prepare another sensitized glass plate as before, expose in the camera, develop, tone, and fix as before. This plate will bear a positive image, and may be used directly in the lantern. Consult any good photographer.

(19) J. M. R. asks: By what means can I restore to its original whiteness a plaster vase that has become yellow? It appears to be a mixture of plaster of Paris and oil or wax of some kind, the outside being coated with spermaceti or paraffine. A. While chlorine or peroxide of hydrogen might be tried, we believe that there is no known method of restoring the original purity of a plaster article prepared as indicated. The easiest and most effective manner will be to paint it with a white paint possessing good body, such as Dutch white lead.

(20) E. B. F. asks: Can you give a description of the blue photographic process of copying tracings, etc., used by architects and others? The process is that by which white lines on a dark blue or purple ground are obtained. A. To compress a full description in the small space at disposal in this column would be impossible, but we give hints from which you can work. Brush the paper over with a solution of ferric-oxalate, ten grains to the ounce. This paper will remain good for years, but must be kept carefully in the dark. Expose to light under the drawing that is to be copied, and then brush it over with or immerse it in a solution of ferridcyanide of potassium (red prussiate of potash), by which the picture will be immediately developed, white lines upon a blue ground. The strength of the developing solution is immaterial. The blue color becomes intensified by subsequent washing with a solution of bisulphate of potash. The best sensitizing preparations are those in which ammonia as well as oxalic acid forms a part. Such ammonio-ferric oxalate may be prepared by mixing together oxalate of ammonia, 437 grains; oxalic acid, 386 grains; water, 6 ounces; heating the mixture to the boiling point and then stirring in as much hydrated peroxide of iron as it will dissolve. Peroxalate of iron alone is simply prepared by adding peroxide of iron to a hot solution of oxalic acid in water to saturation.

(21) S. A. C. asks how the iron moulds for cast steel ingots are made. Do they separate at the corners or in the middle of the mould to allow the ingot to be got out? A. The moulds are in a single piece. The cavity into which the metal is poured is made slightly tapering to admit of lifting the mould from the ingot.

(22) G. K. writes: I have a lot of keys that have got badly rusted through lying by for some time. Will you please inform me how to clean the rust off? A. Scour with a little fine emery and oil, if iron; if brass boil in strong washing soda solution, rinse in water, then dip momentarily in strong nitric acid, rinse quickly, rub with a cloth or sawdust and slightly oil.

(23) J. P. B. asks for a recipe for making a cheap black paint for coating canvas. The paint must not crack, and have a good gloss. A. Try the following: Gumamber, 16 oz.; melt in boiling oil (linseed), half a pint; add genuine asphaltum and resin, each 3 oz. Mix thoroughly over the fire, remove to the open air, and gradually add 1 pint of oil of turpentine, slightly warm.

(24) E. T. W. asks: What is used and how prepared and applied for a dressing for carriage tops when they become worn? I have seen one that had been dressed over and it looked as well as new. A. See answer to J. P. B., this page.

(25) J. N. S. asks: How many pounds of iron turning, of vitriol, and of water will it require to make eight thousand cubic feet of hydrogen gas? Can I make it in one vessel or tank, and what size, or will it operate better by using two or more smaller vessels, and of what size? A. About 1,176 lb. iron turnings, 374 gallons strong oil of vitriol, and 45 barrels of water. Better use a number of large, tight hogsheads. Make connection by means of varnished canvas hose, with a short piece of iron pipe driven in a hole in the head of the vessel; 7 lb. iron require at least 12½ lb. acid mixed with about 6 gallons of water. See Giffard's apparatus and process for making hydrogen for inflating balloons, p. 104, Vol. 38, SCIENTIFIC AMERICAN.

(26) J. F. writes: I have in my possession a graduated tube with a bulb on the end loaded with shot; it is marked "Baume for coal oil," temperature 60° Fah. I wish to know how to use it so as to tell the best oil and which is the least explosive. It is marked from 10 up to 75. I have never seen these instruments described by you. A. In Baume's hydrometer for light liquids zero (0°) indicates a specific gravity of 1·075; 10° corresponds to sp. gr. 1·000; 25° to sp. gr. 0·906; 50° to sp. gr. 0·782, and so on. Suspend the instrument in astral oil, which will serve as a good standard; those in which the instrument sinks deeper are of poorer quality. Almost any dealer in optical and philosophical apparatus can provide you with printed tables and explanations of the instrument.

(27) D. V. C. asks if there is any ingredients which would mix with our sizing, composed principally of glue and soap dissolved in water, to prevent

window shades from curling on the sides when exposed to the beat of the sun. A. Try the addition of a trace of glycerine to the size.

(28) C. E. R. asks: 1. Is the pressure the same on the bottom of steam boiler as on the top? A. The pressure is as much greater at the bottom, than the pressure of steam, as is due to the head of water. 2. What is the largest size steam engine cylinder ever made? A. We suppose the largest cylinder is that of the drainage engine at Harlem lake, 144 inches diameter.

(29) J. M. M. asks: 1. With what color are paraffine matches colored? A. Usually the colors are pigmental and not dyes, such as red and yellow lakes, ochers, Prussian blue, and green, etc. 2. If it is aniline how is it applied and mixed? A. The aniline dyes may be introduced by first dissolving them in alcohol. The merest trace of the dyestuff is sufficient. 3. Is there any liquid color for dyeing matches in the market? A. We know of no color sold especially for this purpose.

(30) F. T. R. asks: How is brass made and melted? My experiments have resulted in a blueflame and ashes. A. Yellow brass—zinc, 30; copper, 70; for turning (common) copper, 90 lb.; zinc, 10 lb.; lead, 1 to 5 oz. Red brass for turning copper, 24 lb.; zinc, 5 lb.; lead, 8 oz. Red brass, free, for turning copper, 160 lb.; zinc, 50 lb.; lead, 10 lb.; antimony, 41 oz. Another—copper, 32 lb.; zinc, 10 lb; lead, 1 lb. Best red brass for castings copper, 24 lb.; zinc, 5 lb.; bismuth, 1 oz; put in bismuth last. In melting use a black lead crucible, put in the copper and heat in a crucible until melted (requires a very bright red, or white heat). When the copper is barely hot enough to remain liquid, add the zinc, with a little borax and charcoal powder. The zinc must be dry. Where lead, antimony, or bismuth is one of the constituents, stir in these just before taking from the fire to pour. Stir with a stick of green wood, skim and pour. In remelting brass use a quick fire and add a little zinc to make up for that invariably lost in the operation.

(31) W. M. C. asks how to put a black bronze on gun barrels. When the guns or carbines are first issued to us they have a lustrous black bronze, which lasts about six months and wears off, leaving the barrel smooth and bright. I think that it is applied with a brush or by a dip, as muriatic acid takes it off clean, leaving the barrel bright. What I need is a recipe such as a soldier can use. I think that a liquid preparation would be the thing, if possible. A. The blue color is due to a thin film of oxide formed in tempering. We know of no way of reproducing the film without reheating the whole barrel. A thin coating of spirit copal varnish, diluted (with alcohol), somewhat and properly colored with aniline blue, may be used to imitate the color and appearance, but it is not very durable.

(32) T. W. asks if a glass ball placed on top of a flag staff on a house is any protection against lightning. A. No, the glass ball would not be any protection from lightning. The proper protection would be a three-quarter inch iron rod, made if possible in one continuous piece, or in sections with soldered and riveted joints, extending from the staff or highest point on the house to the ground, and connected underground with the iron water main pipe or iron gas pipe; the connection between rod and pipe being by soldered joints. This would afford a large area of conducting material under ground in direct connection with the rod. No rod is a protection unless it is thoroughly joined to a large conducting surface in the earth.

(33) J. P. sks for formula for electro-plating iron on other metals. A. Neutral ammonio sulphate of iron (double sulphate of commerce) three-fourths lb.; water, 1 gallon; dissolve and filter. Use a clean iron anode, clean the work thoroughly. (See Nickel Plating, p. 153, Vol. 43, SCIENTIFIC AMERICAN.) Use a moderately strong battery. The success of the operation depends very much upon the preparation (thorough cleansing) of the work. 2. Is the formula given in No. 1, new volume, for electro-plating brass, patented? A. No.

(34) J. H. M. writes: Some makers of boilers, to be used in connection with pipes for heating dwellings and greenhouses by the hot water system, have, in this country and in England, used pipes for grate bars, intending that the water in the boiler should circulate through these pipes, and expecting to obtain greater efficiency from the exposure of more surface to the action of the fire. In what respect is an apparently good theory practically defective, for it seems to have been adopted by but few, and to have been abandoned by some who have experimented with it? A. Such "water grates," as they are called, are not used for economy of fuel, but because they are more durable than the ordinary grate. Coal burning locomotives are frequently fitted with them

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

R. P. W.—It is a fine silicious sand, useful for polishing purposes and for glass making; might also find a market with pottery manufacturers and artificial stone makers.

COMMUNICATIONS RECEIVED.

A Plan for the Reformation of the Orthography of the English Language. By H. A. S.

On Solar Phenomenon. By J. C.

NEW BOOKS AND PUBLICATIONS.

EXTRACTS FROM CHORDAL'S LETTERS. New York: *American Machinist* Publishing Company.

These selections from the contributions of "Chordal" to the *American Machinist* make an interesting, entertaining, and usefully suggestive addition to the literature of the machine shop. The author discusses shop work and shop management with much practical shrewdness, and in a manner that mechanics, artisans, and wide-awake working men generally cannot help but enjoy.

YELLOW FEVER: ITS SHIP ORIGIN AND PREVENTION. By Robert B. S. Hargis, M.D. Philadelphia: D. G. Brinton.

Dr. Hargis is an enthusiastic disciple of Professor Gamgee as to the nautical origin of yellow fever, though he professes to have developed the same theory long before. This book comprises a number of articles on the subject published in several medical journals during the past year.

STUDIES IN SONG. By Algernon Charles Swinburne. New York: R. Worthington.

Swinburne's command of singing English is marvelous. His verses are unequaled in sweep and melody. If he could only freight them with thought and feeling of equal quality he would be a poet, and a great poet.

THE SCIENTIFIC BASIS OF SPIRITUALISM. By Epes Sargent. Boston: Colby & Rich. 12mo, pp. 372. $1.50.

Of the two classes of men—those who believe in spiritualism and those who reject the spiritual hypothesis—one must be grievously in error: perhaps both are. We are inclined to think that the one (however correct on the main point) errs as much in denying real phenomena because they are not readily explainable under a too limited theory of what is natural, as the other does in over haste to accept phenomena which are misunderstood or fraudulent, because they tell in favor of that most marvelous of men's inventions—the supernatural. Mr. Sargent's book is not likely to change radically the belief of either class. The natural material out of which men have created and peopled the supernatural, the "invisible universe," the "spirit world," or whatever it may be called, will have to be much more broadly and minutely understood, both as regards its origin and its character, before the question of fact and fancy involved in spiritualism can be brought to any real scientific basis.

SPONS' ENCYCLOPEDIA OF THE INDUSTRIAL ARTS, MANUFACTURES, AND COMMERCIAL PRODUCTS. Edited by G. G. Andre. 30 parts. Each 75 cents. New York: E. & F. N. Spon.

Parts 15, 16, and 17 of this encyclopedia complete the subject of explosives, and embrace feathers, fibrous substances, floor cloth, food preservation, fruit, fur, coal gas, gems, glass, and graphite.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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

January 4, 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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