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 the following week's issue

For Sale--One 15 H. P. double cylinder, double drum, friction horizontal hoisting engine, with boiler and fixtures. New. Address W. P. Davis, Rochester, N. Y.

"U. S." metal polish. Indianapolis. Samples free.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

6Spindle Turret Drill Presses. A.D. Quint, Hartford,Ct.

Mixing machinery. J. H. Day & Co., Cincinnati, Ohio.

For mud dredging engines. J. S. Mundy, Newark, N. J.

Universal and Centrifugal Grinding Machines. Pedrick & Ayer, Philadelphia, Pa.

For Sale—Patent 460,883, portable centering machine. Address P. O. box 118, Harrisburg, Pa.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Laight and Canal Sts., New York.

Centrifugal Pumps. Capacity, 100 to 40,000 gals. per minute. All sizes in stock. Irvin Van Wie, Syracuse, N.Y.

Crandall's patent packing for steam, water, and ammonia. See adv. next week. Crandall Packing Co., Palmyra, N. Y.

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum apparatus, air pumps, acid blowers, filter press pumps, etc.

Split Pulleys at Low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, $4; Munn & Co., publishers, 361 Broadway, N. Y.

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Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

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(4246) F. C. L. asks: 1. Why does it grow colder as you go higher? A. At higher elevations we are further removed from the heat-radiating surface of the earth, and less protected by the atmospheric envelope of the earth. 2. Does copper wire contract and expand the same as steel wire? A. Copper when heated from 32° Fah. to 212° expands 1-582 of its length; steel expands 1-846 its length. 3. Is there anything that will remove ink from paper so it cannot be seen and not harm the paper? If so, what is it, and how applied? A. Mix equal parts of oxalic and tartaric acid and dissolve as needed in a little water. Apply, and take up the ink and eraser with a blotter. Alcohol will remove the stains of aniline. Red ink can sometimes be removed with alcohol. 4. If a dynamo and motor were belted together and started, would the result be perpetual motion? If not, why not, and how long would they run? A. The power required to run a dynamo is always greater than that developed by a motor driven by the current, consequently such an arrangement as you propose would not run at all. 5. Which is the cheapest—cable or electric railroad? A. Taking the cost of construction and maintenance together, we think there is little difference.

(4247) A. M. asks: 1. Will you kindly inform me, through your paper, regarding the following? What is the best compound to use with three Fuller compound batteries, and will they be sufficient to light a three candle power incandescent light (or must I have four) with thirty feet feet No. 18 copper wire? A. The formula for the solution is as follows: Bichromate of sodium is dissolved in water to saturation; to this solution slowly add one-fifth of its weight of commercial sulphuric acid. Three cells of Fuller battery will hardly be sufficient; use four or five. 2. How can I light a gas jet entirely by electricity, and what amount of E. M. F. will be needed? A. For information on electric gas lighters we refer you to SUPPLEMENT, Nos. 213 and 446.

(4248) F. E. F. writes: How much H_2SO_4=sulphuric acid theoretically can be produced from one pound of sulphur? Can you give me a formula from the atomic weights to figure the same? A. The atomic weight of sulphur is 32, the molecular weight of sulphuric acid is 98. Hence we have the proportion 32: 98: : 1: x; giving us x=3·0625 pounds sulphuric acid from one pound of sulphur.

(4249) J. R. M. asks whether the magnesium light is yet available for burning for two or three hours, and its intensity as compared with the lime light, and its comparative cost? A. The magnesium light is used to some extent for continuous illumination in a lamp which feeds the ribbon or wire forward as rapidly as it is burned, but its action is uncertain, and it does not compare with the lime light or the electric light. As to cost, we think the expense of running such a light is considerably more than that of the lime light.

(4250) J. G. asks: 1. On how long a line will the Bell telephone receiver, described in SUPPLEMENT, No. 142, transmit and receive articulate speech? A. Two or three miles, if the line is hung adjacent to telegraph or electric line wires. 2. Would it articulate more clearly if the magnet, bobbin, and diaphragm were increased one-half? A. We think not. 3. Has the patent expired on the above receiver? A. No. 4. What size and kind of wire is best for a telephone line four miles in length? A. No. 12 galvanized iron or steel wire. 5. Through how many ohms resistance will a Leclanche cell ring an ordinary wood box bell? A. Fifty or more.

(4251) W. H. J. writes: Please explain the trolley system of electric street railway. The wiring is what confuses me. Why is it that the car nearest the generator does not short circuit the others? Also the method of lighting them? A. The resistance of a motor is such as to permit it to take only the amount of current required for running it. The rest of the current goes on for distribution among the other motors. The current for lighting is taken from the circuit in the same manner.

(4252) J. H. O. says: A discussion arose recently as to the value of a contrivance in common use as a ventilator. The same consists of a sheet of tin, usually occupying the place of a pane of glass, out of which is cut a circular hole, within which is a wheel of tin, with flanges set at an angle. The wheel revolves when a current of air passes through it. Does the wheel in any way favor ventilation? Would a hole of the same size without a wheel serve as well? A. The wheel adds nothing to the force of the draught; rather lessens it. Its only value is as a diffuser. By its action the air is spread out, so that it does not become dangerous to health as a direct draught upon a person.

(4253) J. I. C.—Tin plates wholly made of American metals are at present manufactured to a limited extent in this country.

(4254) H. S. R. asks: What solution should zinc be treated with to render its surface suitable for pasting labels on? A. Clean the zinc with with caustic potash (lye) or ammonia.

(4255) G. H. H. asks: 1. Is there a so-lution or liquid whose specific gravity is 2·25? A. A solution of mercury iodide in potassium iodide or a solution of cadmium boro-tungstate are the best. 2. Would soluble glass be poisonous to butter if the butter were put in a package lined with the soluble glass or would it give it any bad taste? A. It would not be poisonous, but might slightly affect its flavor where in contact with it.

(4256) W. A. H. asks: Is clay consid-ered an ore since the discovery of aluminum? A. No.

(4257) W. S. writes: I inclose a piece of the twig of a fruit tree (cherry I believe) infected with scale. Will you have the kindness to describe in answer to correspondents, the best means of eradicating the affection? A. Reply by Professor C. V. Riley: In reply to the letter of Mr. William Shackelford of The Dalles, Oregon, I will state that the insect which he sends is the San Jose scale (*Aspidiotus perniciosus*). This is one of the worst pests of deciduous fruit trees on the Pacific coast. Many experiments have been tried against this insect by my agents in California, with the result that the most satisfactory has been found to be a wash made as follows:

Resin	30	lb.
Caustic soda (70 per cent)	9	"
Fish oil	4½	pts.
Water to make	100	gals.

At twice the dilution it will be safe to apply it to foliage, but it will not then be so effective. This preparation should only be applied during winter or during the dormant period; applied in the growing season, it will cause the loss of foliage and fruit.

(4258) W. B. asks: 1. The name of the river whose bed is not land, but water, and the name of a large river north of China, which river must be some relation of Shakespeare's Othello. A. The Gulf Stream and the Amoor we suppose are the rivers meant, Othello being the Moor of Venice. 2. What language is spoken in the Argentine Republic and in Brazil? A. In Brazil, Portuguese. In the Argentine Republic, Spanish is the official language, but owing to a large influx of Italians a great deal of Italian is spoken. 3. Where can I get a good book, not too expensive, on North American entomology? A. We recommend and can supply you with the following books relating especially to the subject you refer to: "Entomology for Beginners," by Packard, price $2. Packard's "Guide to the Study of Insects," price $5.

(4259) W. N. asks: Can common stove pipe be used instead of Russian iron in making a motor? A. Yes.

(4260) R. H. P. asks: 1. Can you tell me of any process by which India ink marks may be removed from the person without injury or a scar? A. India ink being composed of finely divided particles of carbon cannot be removed by any chemical means. Try a piece of pumice stone. 2. I wish to construct a plunge battery of nine cells, connecting five cells together and have the other four so I can turn them on one at a time. A. You will find description of plunge batteries in SUPPLEMENT, Nos. 157 and 792. 3. Would nine cells 4×5 with zincs and carbons 2¾×5 be suitable to use in electrolysis? A. They will answer if connected in parallel. Larger cells would be better.

(4261) H. H. B. asks: 1. How many 25 volt 16 candle power lamps could I run at one time with dynamo in SUPPLEMENT, No. 600? A. 16. 2. Can the motor described in SUPPLEMENT, No. 641, be run as a dynamo? If so, how much power would it have? A. The motor was not made for use as a dynamo. It would, however, yield a small current if used that way, probably enough for one or two 3 candle lamps. 3. Would it work better with a Gramme or Siemens armature? A. The Gramme armature is preferable. 4. Could 8 light dynamo be run as a plating machine? A. Yes, with the changes described in SUPPLEMENT, No. 793.

(4262) H. D. W. asks whether a block of charcoal made from pulverized charcoal would have the same or nearly the same capacity for absorbing and condensing gases as a similar block made from the natural wood? A. It would depend on how the dust was agglomerated. Any paste or sirup used for the purpose would interfere unless the mass was subsequently carbonized.

(4263) H. W. L. asks: What is the com-position of the substance known as "Frankfort black" in England, and also where it is procurable in America? A. Frankfort black is a high grade of bone black. You may order it from a wholesale dealer in artists' materials.

(4264) J. G. R. asks: 1. What will take red stains from red woolen underclothing out of fine white muslin? A. By a mixture of equal parts of chloroform and ether; if this does not remove the stain, it will probably resist all other applications, though javelle water might be tried. 2. Will a ball keep its weight in a space where the air is pumped out, the same as in a space filled with air? A. Yes. 3. In pumping the air out of a space, will the pump need more force, when the air is nearly pumped out, than in the beginning? A. Yes.

(4265) C. L. R. asks: Would it be prac-tical to run induction coil described in "Experimental Science" (Hopkins) with dry batteries? If so, how many? A. It can be done by allowing 4 cells of dry battery connected in parallel for each cell of bichromate.

(4266) G. A. B. asks: 1. What is the difference between the pitch and loudness of tone? A. The pitch is determined by the number of vibrations per second, while the loudness or intensity depends on the extent of the vibrations. 2. What causes a gun barrel to become hotter shooting a blank cartridge than a loaded one? A. If the increased temperature is a fact, it must be due to difference in the rate of combustion under different pressures.

(4267) F. A. S. asks (1) how to make the solder used for connecting the filaments and leading-in wires in incandescent lamps? A. The filaments of incandescent lamps are secured to the wires by means of electric soldering, by copper as the material for forming the connection, or by means of carbon. 2. Also some phonograph company that sell their machines? A. We understand that the phonographs are not sold, but leased.

E. A. B. asks for the table for the removal of spots and stains.—R. L. M. asks for the dimensions of drawings intended for the patent office.—C. C. W. asks for the composition used by toy manufacturers in moulding dolls' heads.—N. P. H. asks for the solvent power of glycerine.—B. B. S. asks how hams are cured.—T. R. L. asks for remedy for headaches.—C. R. O'B. wants the composition for hektograph sheets.—C. W. H. wants information about indicator diagrams suitable for a beginner.—H. P. J. wants information on catechol and paramidophenol developers.—N. H. S. wants a table for doses of medicine, called a posological table.—G. M. B. says: What is the composition of common painter's putty?—P. W. S. says: Can you give me formulas for the following inks—vanadium, invisible yellow, silver and autographic?—J. McA. asks how to bend glass tubes.—J. J. W. asks: What is the composition of fuller's earth?—J. T. asks: Of what is glaire composed?—E. D. W. asks: Can you give me reliable receipts for etching glass?—T. J. asks: What process is used in staining pool balls, and how are they striped?

Answers to all of the above queries will be found in the "Scientific American Cyclopedia of Receipts, Notes and Queries," to which our correspondents are referred. The advertisement of this book is printed in another column. A new circular is now ready.

Replies to Enquiries.

The following replies relate to enquiries recently published in SCIENTIFIC AMERICAN, and to the number therein given:

(4205) H. D. H. writes: Your reply to question No. 4205, in your paper of March 26, seems a little behind the times, being based upon the law of Newton, which law only holds true of bodies falling in vacuum. On page 303 of the Smithsonian report for 1889 you will find given, from F. H. Wenham, June, 1866, the fall of bodies in air to be "limited by the weight of air set in motion in a given time." Professor Langley, in his researches in aerodynamics, SCIENTIFIC AMERICAN, February 13, 1892, proves that a body in motion displaces a body of air equal to its greatest diameter transverse to the line of motion, multiplied by the distance traveled in a given time. Accordingly take a cannon ball weighing one pound, and three inches in diameter, falling say fifteen feet in one second in a perpendicular line, and the same ball when projected 1,000 feet per second. In its vertical fall it overcomes a weight of air equal to the area of its greatest circle, about seven inches, by the distance it falls, fifteen feet, equal to 1,260 cubic inches, but when projected horizontally must overcome the weight of three inches, multiplied by one thousand feet, multiplied by fifteen feet, equal to 6,480,000 cubic inches of air, to come to the ground in the same time and as the impulse projecting it acts only horizontally, it is impossible for it to come to the ground in the same time.

TO INVENTORS.

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April 12, 1892.

AND EACH BEARING THAT DATE.

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