

## Business and Personal.

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See New American File Co.'s Advertisement, p. 302.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 302.

Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p. 300.

Steam Pumps. See adv. Smith, Vaile & Co., p. 300.

Stenographers, type-writers, clerks, and copyists may be obtained free of charge at the Young Women's Christian Association, 7 East 15th Street, New York.

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Farley's Directories of the Metal Workers, Hardware Trade, and Mines of the United States. Price \$3.00 each. Farley, Paul & Baker, 530 Market Street, Phila.

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Supplement Catalogue.—Persons in pursuit of information on any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

## NEW BOOKS AND PUBLICATIONS.

HOW TO MAKE PHOTOGRAPHS; A MANUAL FOR AMATEURS. By T. C. Roche, and edited by H. T. Anthony, Esq., well known for his practical knowledge of photography. New York: E. & H. T. Anthony & Co.

This book contains a concise description of "How to Make Photographs," intended for beginners in photography. All of the latest and best formulas are briefly stated. It contains two characteristic photographs, is finely printed and abundantly illustrated. A valuable work for those wishing to learn this interesting art.



## 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 the 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) A. K. writes: On the evening of April 26, one of the armature journals—Babbitt box—of a 20 light dynamo electrical machine became highly heated, melting the Babbitt, which after examination was found, as it were, welded to some portions of the journal and could only be removed by use of cold chisel and file. The only apparent and usual thing to do was to true up the journal, which was badly cut, and pour a new box. But owing to the location of the machine this was difficult to accomplish, besides necessitating considerable delay. The idea thus suggested itself of inserting a lining of sheet lead between journal and old box. After running the machine at a slow speed on the old bearing, and being fully convinced that it would heat rapidly, I procured a piece of sheet lead—from the covering of a tea caddy—about one sixty-fourth of an inch in thickness—and inserted it under the journal, started up the machine, and have been running it for hours at a time since then without any signs of heating, the journal soon taking a good polish and being apparently as good as ever.

(2) A. M. V. writes: I have a handsome blued rifle barrel, which has become rusty from lying in a closet against the outside wall of the house. When I attempted to clean it with fine emery paper and oil, I also took off the bluing. Will you tell me if I can re-blue it, and if so, how? A. The bluing of a gun barrel is quite an art, and requires some experience. It is done by carefully heating the barrel. We recommend you to have a gunsmith blue it for you. 2. Of what does the ink used in the hektograph or gelatin copying pad consist? A. Dissolve 1 part of methyl violet in 8 parts of water and add 1 part of glycerine. Digest the whole for about one hour; then allow it to cool, and add one-fourth part of alcohol. The black ink is made with nigrosin.

(3) E. A. D.—There is no satisfactory method of preserving rubber hose. The best cure is to use pure rubber. The coating of hose with a solution of sodium silicate or water glass is recommended. Immersion in ammonium hydroxide 1 part and water 2 parts is recommended as giving new elasticity to the hose.

(4) L. J. D. asks: Will you be kind enough to answer the following questions through the columns of Notes and Queries in your valuable paper: I have a lot of tan which has been used for tanning leather and is of no use now. Can you tell me how to mix it with coal dust so that I can press it into cakes about the size of brick, dry it quick, and break it about the size of stove coal? Give me the amount of coal dust and other ingredients to be used with the tan. I would also like to know the quickest way to dry the tan when mixed, and where to get machinery for mixing and pressing the tan into bricks. I would also like to know how to make a liquid to keep the polished work on engine bright. Something that I can use when the engine is running and that the heat will not affect, such as steamer polish that is sold in liquid form in the stores. A. Spent tan bark can be dried in the air cheapest, or in a steam drying oven at the cost of handling and the heat, which is probably more than the tan bark is worth as fuel. You can mix asphalt with the tan bark and coal dust and press warm into bricks. The quantities will have to be ascertained by experiment. Those that make brick

machines can make the proper machines for your purpose. The waste coal dust of the mines can be had free, we believe, by taking it away. Use oxalic acid and water for brass work; tripoli and oil for iron work.

(5) A. T. S.—The difference in illuminating power in reflectors depends very much upon the fineness of polish. As a general rule, 60 to 70 per cent is the value of a reflecting telescope as compared with a refractor of the same aperture and focus. Both being the same in defining power, and sharp, you should be able to see the companion to the pole star bright and clear; the companion to Rigel faintly. Among the close faint stars, Zeta Hercules,  $\alpha$ , 3d mag.,  $\delta$ , 6th mag., distance 1.2 seconds; No. 37 Pegasus,  $\alpha$ , 6th mag.,  $\delta$ , 7½ mag., distance 1.1 seconds; Lambda Ophiuchus,  $\alpha$ , 4th mag.,  $\delta$ , 6th mag., distance 1 second; if you can separate this, you have a first class telescope.

(6) J. C. H.—For cast iron bells you will need, for bringing out a good tone, a hard, crystalline grain which will also be tough enough not to crack easily. This can often be done where you have a good selection from the different grades of iron. No 3 iron or its equivalent, by mixing Nos. 2 and 4, or Nos. 1 and 4, makes a good tone. No. 2 and good tough scrap make a good mixture. If you are casting general machinery or agricultural work from all sorts of mixtures, and have a few bells to cast, then you may make a good alloy with tin—tin scrap, or copper, from 1 to 3 ounces to a 75 pound ladle. Draw into the ladle when the best metal is running, then put in the ingredient, and thoroughly stir and pour. Antimony has also been used for toning iron bell metal—one to two ounces of antimony to 100 pounds iron, and possibly a little more according to the grade of iron you are using. You will need to make a few trials with a 20 or 30 pound bell, so as to get a good tone and also to secure toughness of metal to prevent cracking.

(7) A. W. M. asks how to wash rags that have become saturated with benzine, coal oil, and resin varnish, so as to enable them to be used again. A. Soak the rags in a bath of naphtha or benzine, and when sufficiently cleaned the benzine or naphtha can be driven off by exposure to the sun.

(8) C. D. & Co. write: Will you please inform us through the SCIENTIFIC, the proper speed for driving grindstones with safety, for surface grinding? A. There is considerable difference in the strength of grindstones. The soft, coarse kind will bear 700 feet peripheral velocity per minute up to 4 feet diameter. Hard stones fine and compact will bear a speed of 900 feet as above. These speeds are sometimes exceeded, but we do not know that there is any advantage derived. This will be from 60 to 75 turns per minute for a 4 foot stone.

(9) F. A. G. asks: 1. What is the number of your paper in which you describe a new double revolving plate electric machine; and is the description minute enough to enable an amateur to construct one? A. See page 71, current volume SCIENTIFIC AMERICAN. 2. What is the best kind of paper to use for the armatures of the Toepler-Holtz machine, also the best adhesive to use in applying it? A. Use drawing paper, secure it to the glass with starch paste. 3. In what respect do the Toepler and the Vose improved machines differ? A. Mainly in details of construction.

(10) G. H. W.—For case hardening large articles like locomotive links and blocks, pack the pieces in bone charcoal or bone meal such as is sold for fertilizers, if you do not care about the smell, in an iron box—thick sheet iron or tank iron is the best, but cast iron will do. Pack so that the faces required to be case hardened shall have the benefit of the carbonizing substance; the rest may be filled in with sand. Heat in a slow fire to a cherry red for from a half to two hours according to size of piece or depth to be case hardened, and harden as with steel. Charcoal pulverized with 10 per cent of its weight of prussiate of potash is good.

(11) T. S. G. writes: I expect to burn screenings under my boiler; would there be any advantage by taking the hot air from chimney? If so, is there a blower made for that purpose? A. We cannot recommend drawing air from the chimney for feeding a fire. If your combustion under the boiler is perfect, there is no free oxygen left in the gases of the chimney.

(12) J. H. Z. asks: Can you give me through your SCIENTIFIC AMERICAN a receipt for a paste that will paste gum or leather soles on gum boots? A. Rubber cement is prepared by dissolving India-rubber in carbon disulphide, chloroform, or benzine; apply it to both portions of the soles. 2. Also, how can I keep flowers from withering when plucked from the bush, and kept out of water? Is there anything better than sprinkling them with cold water? A. Keep the stems in water in which 25 grains ammonium chloride have been dissolved.

(13) H. R. E. writes: In using a 3 inch achromatic object in a telescope like the one described in SUPPLEMENT 252, can I use the same eyepieces, and what power do I get with them? How can I make a celestial eyepiece of high power for the above? What is the best focal length for a 3 inch object—36 or 48 inches? A. The 1½ inch and half inch combinations in SUPPLEMENT 252. A three-eighth single lens, which will give you a power of 90 with a 36 inch object glass, or 128 with a 48 inch O. G. You can make higher or lower power by following the proportions as described in SUPPLEMENT 252. The shorter focus is the best, provided the form, definition, and achromatism are perfect.

(14) D. H. writes: I have been watching your Notes and Queries column for a long time, for a liquid that will give a gloss to a black surface; it must not be sticky, and must dry in three or four hours. A. Use an ordinary shellac varnish.

(15) J. W. asks: Will you give directions that will enable us to dye feathers a "glossy jet black"? A. Try the following: First thoroughly cleanse the feathers with ammonium carbonate and wash them out. Steep over night in a bath of iron nitrate at 7° B., then rinse them in water. Boil out equal parts of logwood and quercitron bark, enter the feathers at a hand heat

and turn them frequently, raising the temperature slowly to a scald, but not to boiling point. Let them steep in it till perfectly black, take out, and wash in warm water. Dissolve 3½ ounces potassium bicarbonate in 5 quarts of hot water and stir in 17½ ounces of olive oil till an emulsion is produced; take them openly through this at hand heat for a short time; then gently draw all the wet out with the thumb and fingers, and then well shake them till dry over a stove or in a well heated room.

(16) S. L. M. writes: Will you please give me recipe for making a good liquid glue from common glue? A. Fill a glass jar with broken glue of best quality, then fill it up with acetic acid, keep the jar in hot water for a few hours, until the glue is all melted, and you will have an excellent glue always ready.

(17) J. L. D. asks for the best mode of destroying stamps of trees that have lately been cut, and how are they burned by petroleum. A. The method by which stumps are removed by petroleum consists in allowing the stumps to become completely saturated with petroleum, and then setting them on fire. The method by using saltpeter consists in boring holes into the head of the stump and putting into each 1 ounce of saltpeter, and after leaving it to become wet and penetrate the substance of the stump, the latter is set on fire, when it will be completely consumed.

(18) J. L. C. asks: Will you please give a recipe for making good wine from cherries? Also, the best cherries for making wine. A. Ripe fruit, 4 pounds; clear soft water, 1 gallon; sugar, 3 pounds; cream of tartar dissolved in boiling water, 1¼ ounce; brandy, 2 to 3 per cent; flavoring as required. A better and stronger article may be made by adding 1 or 2 pounds each additional of fruit and sugar.

(19) R. W. M. writes: 1. I have a rare old German coin with some curious designs upon it, and some of my friends would like a copy of it as a curiosity. I made a plaster of Paris mould of it, and poured in, first lead and then type metal, but although the metal fills the mould it does not run into the fine crevices. Please tell me how to proceed or what to use to make it a success? A. See SCIENTIFIC AMERICAN SUPPLEMENT No. 17, page 272. 2. Please tell me how to dissolve gum copal in alcohol so as to make a good varnish for oil paintings. A. Fuse 8 pounds of very clean pale African gum copal, and when completely fluid pour in 2 gallons of hot oil; let it boil until it will string very strong, and in about 15 minutes, or while it is very hot, pour in 3 gallons of turpentine. Perhaps, during the mixing, a considerable quantity of the turpentine will escape, but the varnish will be so much the brighter, transparent, and fluid, and will work freer, dry quickly, and will be very solid and durable when dry. After the varnish has been strained, if it is found too thick, before it is quite cold heat as much turpentine and mix with it as will bring it to a proper consistence. 3. Please give a good receipt for "black heads" or "flesh worms"? A. See page 52, vol. xlvii, SCIENTIFIC AMERICAN, January 28, 1882.

(20) J. J. B. asks: Can you give the receipt of how to make imitation turtle shell? Can celluloid be softened and cast in moulds? A. The dark spots in horn that are made to represent tortoise shell are produced by using a strong aqueous solution of silver nitrate mixed with gum arabic so as to flow properly from a brush. A little red lead may be mixed with it to give body. After standing an hour soak in soft water for several hours before finishing. Pieces of horn may be united by softening the edges with boiling water and then submitting to powerful pressure while surrounded with boiling water. For description, etc., of celluloid, see SCIENTIFIC AMERICAN SUPPLEMENT No. 227, page 3617.

(21) W. C. asks if there is any process whereby beef bones can be softened so as to be used in moulds. The bones can be softened by placing in dilute hydrochloric acid, which extracts the calcium salts.

(22) F. J. R. asks: What would be the size of a boiler (of the same construction as that shown in SUPPLEMENT No. 158, January 11, 1879, built by H. S. Maxim) that I need for a steamboat, 16 feet long, 3 feet 4 inches beam, of good shape, so as to be able to run it at least 10 miles an hour, the engine being 3 inches bore and 3 inches stroke? What size, shape, pitch, and weight of a propeller wheel would I need? A. To make 10 miles per hour you will require a screw 2 feet in diameter, 4 blades. Pitch 45° on edge, making over 300 revolutions per minute. This would be hard work for your little cylinder. If you could be content with 6 or 7 miles per hour, a wheel of 18 inches diameter would require 250 revolutions of engines per minute which could be possible with 60 pounds steam and a good boiler of 20 square feet heating surface.

(23) T. B. asks: Is the expansion of metal lengthwise the same in all thicknesses, say for instance in two pieces 24 inches long, one 16 wire gauge and the other half an inch round. In the raising of the temperature from 32° Fah. to 90° Fah. will the longitudinal expansion be the same in each, or will the half inch expand more, in proportion to the larger amount of metal in it? A. The wire No. 16 gauge and the half inch round iron should expand exactly the same, provided they are both annealed and are the same quality of iron. A hard drawn wire cannot be expected to expand exactly in unison with a hot rolled iron rod. The differences in lateral dimensions should not make an appreciable difference in longitudinal expansion until the difference becomes so great as to involve a considerable change in crystalline structure.

(24) E. J. K.—A boiler that is just large enough for your work with fresh water is too small for the same work with salt water. Your boiler should be blown off enough to keep the water inside clear or far below the point of saturation. It requires the same kind of care that is given to marine boilers. Again, an upright boiler is unfit for salt or brackish water under any circumstances. Boilers for salt water need large evaporating surface.

(25) S. W. asks when that motion commonly called "kicking" is given to a gun. Whether at the time the powder is ignited, or at the moment the