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Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 46.

Hercules Lacing and Superior Leather Belting made by Page Belting Co., Concord, N. H. See adv. page 238.

Cutting-off Saw and Gaining Machine, and Wood Working Machinery. C. B. Rogers & Co., Norwich, Conn.

Domestic Electricity. Describing all the recent inventions. Illustrated. Price, \$3.00. E. & F. N. Spon, New York.

Brass and Iron Working Machinery, Die Sinks, and Screw Machines. Warner & Swasey, Cleveland, O.

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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 This is for our information, and not for publication.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.

(1) M. W. writes: 1. I have not met with success in bleaching dark nettle-tree wood (Celtis australis), by using muriatic acid and water or calcium chloride, etc., at 3 to 4 atmospheres pressure. How can I bleach this dark wood? A. Saturate the wood as completely as possible with a clear solution of 17 1/4 ounces chloride of lime and 2 ounces soda crystals in 10 1/2 pints water. In this liquid the wood is steeped for half an hour, if it does not appear to injure its texture. After this bleaching, it is immersed in a solution of sulphurous acid to remove all traces of chlorine, and then washed in pure water. The sulphurous acid, which may cling to the wood in spite of washing, does not appear to injure it, nor alter the colors which are applied. 2. What kind of cement is used by the ferule makers for brass and copper ferules to put on walking canes and whip sticks? How are they soldered? A. As a general thing, no cement is used, but you can use glue or shellac. See also "Cements," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 158.

(2) B. S. F.—The force required to overcome gravity on an inclined plane=weight X height ÷ length. Thus an 800 ton schooner on a marine railway with an incline of 10 feet in 100 feet will require 80 tons force to overcome gravity, to which must be added the friction of the rollers. We do not apprehend the manner of pulley application you speak of, but suppose you have a leverage of 1 to 100 on the combination, which will make the force on the last turn of the rope about 1 1/2 tons including friction.

(3) J. W. P. asks: What is meant by first, second, etc., dilutions, in homeopathy? A. The first dilution consists of one grain of the crude drug triturated with nine of milk sugar or dissolved in nine drops of alcohol. It is also called the first decimal attenuation. The second dilution or first centesimal dilution is one part of the drug mixed with 99 of the milk sugar or alcohol.

(4) T. W. S.—An excellent plan to polish brass consists in using oxalic acid and whiting mixed and applied wet, with brush, and brushed again when dry with soft plate brush, to polish with dry whiting. The oxalic acid removes the dirt and the whiting does the polishing.

(5) J. B. J. asks (1) the method used by engineers to determine whether the steam from a boiler is wet, saturated, or superheated. A. A dry

cloth held in a jet of dry steam will not become moistened, or but very slightly; in wet steam it will soon become saturated. A moist cloth held in a jet of superheated steam will become dry. All these methods in which a jet of steam is tested are imperfect, because the air alters the condition of the steam. 2. How to determine the percentage of water in steam? A. By passing it through a condenser maintained at its own temperature, and collecting and weighing the water that accumulates. The steam that has passed must be separately condensed and its weight determined. 3. How many heat units in a pound of hydrogen? A. One pound of hydrogen in its combustion will raise the temperature of 34,000 pounds of water one degree Centigrade or one and four-fifths degrees Fahrenheit.

(6) K. J. asks: 1. What is the opposite adjective of slippery? A. Sticky, adhesive. 2. Does the increased size of an animal or a person increase the sensibility of pain? A. It does not as far as we know. 3. Why does a person see sparks or flashes of light in the eyes when the head is struck or receives a sharp blow? A. Professor J. G. McKendrick, of Glasgow University, says: "A luminous sensation may be excited by various modes of irritation of the retina or optic nerve. Pressure, cutting, or electrical shocks may act as stimuli, but the normal excitation is the influence of light on the retina." It is generally believed that it is the filaments of the optic nerves, and not the retina, that receive the effects of these abnormal disturbances.

(7) J. A. R. asks: What can I use for ink to print with a rubber stamp on hard wood and make it indelible, or so much so that by occasional washing it will not be easily effaced? A. We would recommend printer's ink, thinned down with turpentine.

(8) J. W. P.—Lozenges consist principally of powdered sugar, made into a mass with some gummy liquid, such as gum arabic, thin isinglass size, etc., without the aid of heat, and dried. The lozenges mentioned by you are probably similar, and flavored with extract of wild cherry.

(9) J. D. asks: 1. To mix Venetian red paint with oil, what measure or weight of dry color should be used to the gallon of oil, to give the best satisfaction on weather-beaten boards of barns? Should the first and second coats be mixed the same? A. The proportions are about seven pounds of the dry color to six pounds of oil. The two coats are generally the same. 2. To reburnish a Darlot photo lens. A. The reburnishing of the lens will be a difficult operation, in the same way as the original grinding and burnishing. 3. Also to reblack the same inside. A. Use gum water and lampblack.

(10) F. S. W.—To clean marble, mix quicklime with strong lye, so as to form a mixture having the consistency of cream, and apply immediately with a brush. Let this composition be allowed to remain on a day or two and be then washed off with soap and water.

(11) T. E. writes: We have an exhaust fan belted direct from engine, and when run to high speed the belt flaps badly. Would a fly wheel set in same shaft as fan prevent the flapping? A. The flap in the belt may be due to the irregular motion of the engine, in which case a fly wheel could be better applied to the engine; or, if the engine has a small sized fly wheel, make one very much larger in diameter, but not necessarily heavier. It is the large diameter fly wheel that gives regularity of motion. We would not recommend a fly wheel on the fan until you are satisfied that the fan is at fault.

(12) J. K. B. asks a rule for finding strength or size of wrought iron sheets in water tanks or standpipes, say when diameter or area is given, and height or depth of water to be carried. For instance, thickness of plates needed for wrought iron tower, 25 feet diameter and 125 feet high. A. For the strength of the different sections of a water tower or stand pipe, proceed as in the case for the safe strength for boilers under various pressures, adding a requirement for supporting extra high towers. Thus you would have a hydrostatic pressure at the bottom of your tower equal to 53 pounds per square inch. You should provide for stability or safety, wear and tear by oxidation, and loss of strength by riveting, at least four times the above strain, or say 200 pounds, which, multiplied by the diameter in inches=300 X 200=60,000 pounds tension on each vertical inch of iron forming the sides at the bottom. As plate iron cannot be trusted over 45,000 pounds tensile strain, you will require not less than 1 1/4 inches for the above allowed strain. This, divided by 2 for the two sides, calls for the lower sheets to be 3/4 inch thick, say for 30 feet, 3/8 inch for the next 30 feet, 1/2 inch for the next 20 feet, and 1/4 inch for the last 15 feet. This will make a substantial tower for a lifetime.

(13) E. R. S. asks the best method of tempering an anvil. I have tried it once, and I cannot get it hard enough. I used a hardening compound, but it seemed not to affect it. A. We know of nothing better than giving the anvil a full cherry red heat and dipping sidewise, so that the bubbles of steam will clear the surface. It is the steam hanging on the under surface that prevents hardening.

(14) A. P. H.—Hard wood floors may be finished with beeswax or paraffine by rubbing the wax over the floor and burnishing it down with a leather pad. Floors are painted with various colors. Prince's metallic paint is a red oxide of iron, and is mixed with boiled linseed oil. It will make the floor red. Chrome yellow with a little Prince's metallic paint make a bright orange much in vogue for country houses. You will require no license for your boat on waters that are not commercial highways.

(15) Gyp.—Will you please inform me, by your paper, what gold is worth a carat, also the worth of fine sterling and coin silver, and the amount of alloy used in reducing both fine and sterling to coin? A. Gold is worth per ounce \$20.67183; per carat in ounce, 1/2 of this sum. Silver varies in price continually. Coin silver and gold of this country contain

1/2 of the pure metal. Silver 999 fine is worth about \$1.02 per ounce. Sterling gold or English coin gold contains 1/2 gold, 1/2 alloy. Sterling silver or English coin silver contains 222 silver to 18 of copper. The values of the different alloys can be calculated from the above figures.

(16) O. A. asks: Why is the sun marked in our almanacs "fast" from April 15 to June 15 and from September 1 to December 25, and "slow" the remainder of the year, while the angle passed over by the radius vector is greatest January 1 and least July 1? A. The phenomenon of the fast; and slow sun arises from two causes, viz., the unequal motion of the earth in its elliptic orbit and the obliquity of the ecliptic, which latter gives much the largest element in the variation of the sun's apparent motion. See Newcomb's and Holden's Astronomy.

(17) W. H. B. asks: 1. What will prevent worms from eating hickory handles? A. Most solutions adapted for this use are somewhat poisonous, and hence not adapted to handles. Creosoting or immersion in hot solution of carbolic acid with some pressure after thorough kiln drying would seem safe, and would be effectual provided it did not deteriorate the fiber of the wood. Linseed oil is recommended. See SCIENTIFIC AMERICAN, May 8, 1886, p. 289. 2. Will steaming them prevent it? A. Steaming will not prevent it, but will kill any that have begun operations.

(18) W. M. B. asks: 1. Can a quantity of well ground apples, occupying the space of 3 by 4 feet by 2 1/2 or 3 inches thick, be pressed dry in half a minute? If so, what is the weight required? A. Cider presses cannot be worked quickly. It takes time for the apple juice to work out. The whole pressure should not be put on at once. 2. Can wood be finished to imitate marble? A. To some extent. 3. How are gun barrels flowered and lettered with silver and gold? A. Inlaying in gold and silver on gun barrels is done by etching the design with acid and undercutting the edges with a graver, then hammering the soft gold or silver into the design and dressing the surface with file and polisher.

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

C. H. G.—The sample is another of clay containing iron. It might be of value as a paint if burnt and ground in oil. In its present condition it is of no use; it lacks body, although apparently free from grit.—R. W. S.—The sample of clay sent is altogether too small to form any sort of an estimate concerning its value. As it is somewhat gritty, it can scarcely be used for anything except common purposes. If it will stand heat, it might be used in the manufacture of fireclay bricks.—F. M. B.—The specimen is syenite, similar in composition to the obelisk in Central Park, and consists of the minerals feldspar, hornblende, and quartz. It is of no value.

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