

Barrel, Keg, Hoghead, Stave Mach'y. See adv. p. 76.
 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.
 Planing and Matching Machines. All kinds Wood Working Machinery. C. B. Rogers & Co., Norwich, Conn.
 "Wrinkles in Electric Lighting," by V. Stephen; with illustrations. Price, \$1.00. E. & F. N. Spon, New York.
 Iron and Steel Wire, Wire Rope, Wire Rope Tramways. Trenton Iron Company, Trenton, N. J.
 Brass and Iron Working Machinery, Die Sinkers, and Screw Machines. Warner & Swasey, Cleveland, O.
 Small Bench Lathes, with Countershaft, \$16.00. Circular free. T. F. Welch & Co., 35 Battery-march Street, Boston, Mass.
 Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

2 parts, maw seed 1 part, ox heart 1 part. Boil the ox heart well in water, cut it small, and place it in a pan in an oven, where it must be allowed to become perfectly dry and crisp. All the ingredients must then be thoroughly mixed and ground in a mill to coarse powder.

(12) G. B. M. writes: 1. Can you give me a formula for mixing paint suitable for painting wire cloth green—one that will dry quick and hard and not easily crack off, and be glossy as if varnished? A. It will be found most satisfactory to purchase your paint ready prepared from some reputable house rather than to attempt its manufacture yourself. A mixture of three-fourths zinc white with one-fourth white lead, to which a little drier has been added, will be found to answer quite well. Coloring matter to suit is ground in with the above. 2. How to mix and apply oil to prevent wire cloth from rusting by long standing? A. Use raw linseed oil.

(13) W. A. K. asks: 1. Are the glass tubing and rods, etc., used by traveling glass blowers any different or more easily melted and worked than ordinary glass? A. The glass referred to is ordinary lead glass, and is similar in composition to the common white glass made in this country. 2. What metal would best resist the corrosive action of gas, the metal being used for lining cornice, water troughs, and water conductors upon gas works? A. Cast iron or lead is much better than tin. You might coat the tin with asphalt.

(14) W. J. H. desires (1) a recipe for making bay rum in small quantities. A. Take 2 pounds of leaves of the Myrtus acris, 1/2 pound cardamoms, 2 ounces cassia, 1 1/4 ounces cloves, and 9 quarts rum. Distill 1 1/2 gallons. Bay rum may be colored with tincture of saffron or with a mixture of equal parts caramel and tincture of turmeric. 2. Also a recipe for office muilage. A. Mix 3 ounces gum, 1 ounce acetic acid, 1 ounce white sugar, and sufficient water.

(15) J. D. B. asks if one's eyes are open or shut when walking in sleep. A. Both conditions are known, but principally with the eyes open.

(16) L. T. R. desires some simple method of detecting the adulteration of spirits of turpentine by the mixture of petroleum naphtha. A. Test its bloom by dropping on a black glass plate, or test its solubility in absolute alcohol. The turpentine dissolves in this reagent, while the petroleum naphtha does not.

(17) C. S. A. writes: I have some pieces of steel that have been nickel plated, then soldered to a piece of tin. I find the nickel of the steel piece very much stained from the muriatic acid used in soldering. Is there any liquid article or compound that will restore the nickel to its former brightness? A. The nickel plating is porous. The soldering acid penetrates to and oxidizes the steel, which stains the nickel plate. We have not succeeded in recovering the luster of nickel plate that has been thus treated. Soldering should have been done with resin, and cleaned with turpentine or alcohol.

(18) H. M. N. writes: In Newton's law, "all bodies are attracted to each other directly as their mass, and inversely as the square of their distance;" do you understand the "distance" to be the distance between the centers of gravity or the distance between the most adjacent particles? A. If the mass of the body is intended, then its center of gravity is the measure of the distance. If the atoms of a mass only are considered in their relation to each other, then each atom is the measure of any distance.

(19) E. A. W.—The Wilkes exploring expedition, as also several English expeditions, has skirted the Antarctic polar land, and found it impenetrable. The north pole has elicited more attention from the scientific world from its nearness and interesting detail of distribution of land and water, as well as the evidence of an open polar sea, which does not seem to be the case at the south pole.

(20) A. D. O. asks how to find the azimuth of a place. A. Obtain the true meridian by corrected observation of the pole star, and from this take the departure with a theodolite or compass if the place is in sight. If not, make a triangulation or series of triangles reaching to the place sought with a theodolite. This will require a trigonometrical computation and geodetic correction for establishing the true azimuth.

(21) H. J. H.—As you are a machinist and blacksmith, it is supposed that you know how to weld steel and iron together. The welding of two pieces of cast steel is a very difficult and uncertain matter, and depends very much upon the grade of steel, the low grades or coarse steel giving the best results. The welding can be facilitated by placing a thin piece of good iron in the weld between the pieces of steel, using borax only. The piece of iron may be welded to one piece first, then give the iron facing the strongest heat. Work the steel well under the hammer after the weld is completed, to fine the grain.

(22) C. W. W. writes: In a target pierced by 1/2 inch projectile, what becomes of iron occupying space through which projectile passed? A. It is torn and bent back if the iron is tough; or a piece punched out and carried with the ball from brittle plates.

(23) A. D.—Suction is not strictly a scientific term, yet it is in common use in mechanics, hydraulics, pneumatics, etc., as applied to the act as well as the appliance for producing decreased atmospheric pressure. Custom has sanctioned its legitimate use. See Webster unabridged.

(24) D. L. V. N. writes: We received a new church bell, 400 pounds weight, hung in such a shallow yoke that about two-thirds of its weight is below the axis. The result was the bell was hard to ring, and strokes of hammer too close or in too quick succession for such a large bell. We bolted 25 pounds of iron on the upper portion of rope wheel, which has improved it greatly. There is a bell of same weight near here which strikes less rapidly (rings easier), and consequently has more prolonged

and sonorous sounds. Why is there this difference? Should we add more weight to top of wheel? A. The weighting of the wheel to balance the bell is admissible, but tends to deaden the sound. Better send to the makers of the bell for a proper yoke. The sonorosity of bells depends so much upon their composition and form that we could not tell you, in exact terms, why or what is the cause of the difference. The bell founder may have made a blunder in the form of the bell as well as in the yoke.

(25) G. B. E. asks the mixture with which to brown gun barrels. A. Chloride of antimony mixed with a little olive oil. Add a few drops of nitric acid to sharpen its action, if required. Another: sulphuric acid 1/2 ounce, sweet spirits niter 1/2 ounce, blue vitriol 2 ounces, alcohol 1 ounce, tincture of the chloride of iron 1 ounce, water 40 ounces; add alcohol last.

(26) R. B. R. asks the best and simplest method of keeping cistern water as soft as possible. A. Paraffine rubbed on the dry walls and bottom of a cistern and melted into the cement with a hot iron is the most effectual method of keeping the water soft or free from lime. Cisterns, when plastered with pure Portland cement, generally give satisfaction.

(27) B. J. asks how they get the different tones in a single bell chime whistle. A. By dividing the bell into two or three parts which are unequal. This is the subject of a patent.

(28) L. L. asks: 1. What would be the expansion of an inch bar of wrought iron five feet long under a temperature of 300° steam heat? A. 1/16 of 1 inch. 2. What would be the difference between the expansion of the above bar of wrought iron and a cast iron pipe of the same length under the same temperature? A. 1/32 of 1 inch. 3. What, if any, would be the difference between the expansion of cast iron and homogeneous steel casting? A. Slightly less than 1/32 of 1 inch.

(29) J. H.—Scrap brass varies so much in its composition that we cannot give you any intelligent answer how to use it in casting without inspection. The bright yellow brass may be from 6 to 8 ounces zinc to the pound of copper. By melting 1 pound of copper with 1 1/2 pounds of such yellow brass, you will make what is called a 3 to 4 ounce brass, which is very rich in color. For dark colored scrap we cannot advise, as it probably contains lead and iron.

(30) T. H. C. asks: 1. Has a miner any legal right, after going below the surface, to undermine a neighboring claim? A. It will depend entirely upon the nature of the deposit he is working. If it be a true fissure vein, the United States Mining Law gives him the right to follow it as far as he chooses between the two vertical planes determined by the end lines of his claim; provided, however, that his surface lines include the highest point or apex of the outcrop of the vein. If he is working a deposit or seam, he is limited by the vertical planes passing through both his side and end lines. 2. What is the difference between the rules governing the mining of coal and the different metals? A. As coal is always a regular member of the geological formations, a seam, and not in any sense a vein—though the latter term is often improperly used—the miner is always limited by the vertical planes passing through his surface lines. He is open to an action at law if at any time he removes the coal from beneath a neighbor's property.

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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) G. F. S.—There is no difference whatever in the action of the pump or the pressure upon the valves or sides of the chamber, whether the pistons be pointed or flat. The sectional area at the sliding surface is the real measure of the pressure.

(2) H. C. D. writes: 1. Do you think it will be as economical to use a 30 horse power boiler for 20 horse power work as it would a 20 horse boiler? A. It is economical to use a 30 horse power boiler for 20 horse power work. 2. The gas company in this city have reduced the price of gas from \$2.50 to \$1.50 per M., but the reading of the meters after the reduction was much larger than before, so that it almost counterbalanced the reduction. A daily paper stated that they had increased the pressure, but I claim the reverse. Can you explain where the hitch comes in—the pressure or the quality of gas furnished? A. By impoverishing the gas and increasing the pressure you are made to burn more gas for the required light, and by this means the company loses but little, and you are scarcely a gainer. The hitch is in both quality and pressure. 3. Is the lye sold in 1 pound iron boxes a preventive of scale in boilers? A. Yes.

(3) T. M. N.—Two balls of different weights or a solid and a hollow ball will drop in equal times in a vacuum. In air the friction will most retard the ball that has least density or is lightest in comparison with the area of its diameter.

(4) L. B. writes: I wish to run a light upright saw with a crank and pitman. Is there any way (patented or not) whereby I can get two down cuts of the saw with one revolution of the crank? A. Only by a cam or its equivalent. See Brown's "507 Mechanical Movements," which we can send post paid for \$1.

(5) E. H. B. asks a simple, practical way for testing Russian iron, so as to distinguish readily between the genuine article and the many inferior imitations that are in the market. A. The genuine article is known by its fine black luster and small granulation of the surface in reflected light. Otherwise, by its toughness in bending with and across the grain.

(6) J. W. S.—Choke bore is a very slight decrease of diameter at the muzzle of shotguns, for the purpose of preventing the excessive spread of the shot. When properly made, it commences from 3/4 inch to 1 inch from the muzzle. Rifles are not choke bored, but slightly taper bored. A load rides easiest at about two-thirds the distance from fore toward the after wheels.

(7) C. F. U. asks: Which is most economical of fuel—a boiler made after the pattern of a locomotive boiler, without jacket, with shell exposed to the atmosphere, or a common stationary boiler incased in a brick wall with brick furnace? A. We consider the brick-set horizontal tubular boiler the most economical in fuel, and most satisfactory in steaming qualities as well as safety.

(8) J. C. B.—For a soap to clean clothes without rubbing: Take 2 pounds sal soda, 2 pounds yellow bar soap, and 10 quarts water. Cut the soap in thin slices, and boil together 2 hours; strain, and it will be fit for use. Put the clothes in soak the night before you wash, and to every pailful of water in which you boil them, add a pound of soap. They will need no rubbing, but merely rinsing.

(9) C. W. R. asks how to make a good pomade for the hair. A. Take of castor oil 1 pound avoirdupois, pure white wax 4 ounces, melt them together, and then add oil of bergamot 2 1/2 drachms, oil of lavender (English), 1/4 drachm, essence royale. Stir the mixture while cooling.

(10) H. P. G.—See Henderson's formula for making gelatine emulsions in the SCIENTIFIC AMERICAN of November 8, 1884, page 293. For sensitizing albumen paper, see Newton's solution, page 65, SCIENTIFIC AMERICAN of August 2, 1884.

(11) B. O. asks how to make mocking-bird food. A. Hempseed 3 parts, toasted wheat bread