For best low price Planer and Matcher, and latest | fiesh and smoke well; the squaws, who always do this mproved Sash, Door, and Blint Machinery, Send for satalogue to Rowley & Hermance, Williamsport, Pa.

Steam Pumps. See adv. Smith, Vaile & Co., p. 107. Catalogues free.—Scientific Books, 100 pages: Electrical Books, 14 pages. E. & F. N. Spon, 35 Murray St., N. Y. The Porter-Allen High Speed Steam Engine. Southwork Foundry & Mach. Co., 430 Washington Ave., Phil.Pa. Steam launch or factory engine 4 in. by 4 iu., \$90. Stamp for 28 p. list. Steam launches new and second hand. Snyder Engine Co., 106 Liberty St., N. Y.

Gears.-Grant, 4 Alden St., Boston,-Water motors.

NEW BOOKS AND PUBLICATIONS.

BLEACHING, DYEING, AND CALICO PRINT-ING Edited by John Gardner, F.I.C., F.C.S. P. Blakiston, Son & Co., Phila-delphia. Price, \$1.75.

This book presents mainly a condensed summary of for practical workers who do not wish to give the time contains a good selection of approved recipes, indicating the familiarity of the editor with the more recent English and French methods.

THE MODERN HOUSE CARPENTER'S COM-PANION AND BUILDER'S GUIDE. By W. A. Sylvester. Cupples, Upham & Co., Boston. Price, \$2.00.

This is a standard book of its kind, and has reached its third edition. It is written for workmen, by one who commenced his preparation for the task in the memoranda made during early experience at the trade. Explanations of the mathematical questions arising in ordinary carpentry and building are fully given, with great plainness of statement and ample illustration. The book is one which any apprentice may study diligently with profit, and which most master builders might find it of advantage to frequently consult.

HINTS ON THE DRAINAGE AND SEWERAGE of Dwellings. By William Paul Gerhard, C.E. William T. Comstock, New York. Price, \$2.50.

Every topic of importance touching dwelling house sanitation here receives some attention. Illustrations are given of many different kinds of closets, traps, sinks, piping, etc., with practical directions for securing good plumbing and detecting that which is bad. The book is a valuable contribution to the literature of mica of poor quality can only be cleaned by stripping. the people, on the subjects of which it treats, is plain sanitary conditions by which he is surrounded.

GEOLOGICAL SURVEY OF ALABAMA, 1881-82, WITH AGRICULTURAL FEATURES. Eugene A. Smith, Ph.D., State Geolo-

This is an eminently practical book, containing a great deal of what might be styled basic information for all present or would-be agriculturists in the State of Alabama. So far as the geology of the State is concerned, there are, perhaps, no points of especial scientific interest to be developed. There is only a small: portion of the State, in its northeastern section, where the elevation above the sea equals 500 feet, and the geologist's work is principally confined to an analysis of soils which have come into their present place in a perfectly natural and easily understood way. But the different lands of the State are well mapped out, their formation and chemical composition graphically represented, the different varieties of natural and artificial manures required in various localities fully discussed. and analytical details of present productions given in the most attractive style. The State presents great inducements for agriculturists, particularly in cotton growing, having an area greater than that of the State of New York, without one-quarter of the population.



HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the

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

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.

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 Supplies MENT 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 indentiaroom of 600 cubic feet and 400 ft. of 1 in. pipe.

rub the brains and fat of animals thoroughly into the notseparate in the proper use of the instrument.

work, being obliged to work the skins with great thoroughness

(2) A. C. R. asks: What is the best, cheapest, and most simple way to dry clays, where it is desirable to have all moisture evaporated, and from to ten twenty tons perday being required, the clay being about the consistency of stiff putty when taken from pit? A. The fire brick makers dry the clay that is to be baked for making fire sand, by placing the lumps as dug out of the pit upon a hot floor of fire tile, which is the cover of a series of flues to a furnace. A coil of steam pipes might be used, but it is expensive. Another way, which is very economical as to heat, is to build a brick room as large as may be convenient for your requirements with shelves all round upon which the clay can be piled. In the center of the room place a heater or large stove; have the pipe turn down upon the floor and around the sides of the room before entering the chimney, so as to save all the heat. In such a room the 'ed. See Scientific American Supplement, Nos. 163 temperature may be raised to 250°, which will dry very what has heretofore been presented in more elaborate fast. Ventilate slowly. Experience will give you the works. It will make, however, a convenient manual best practice in regard to ventilating. As a general practice it is found best to close, the room tightly for a and trouble required for more extended research, and few hours so as to heat the contents to the highest degree and then open the ventilators. The air for the furnace may be taken from the outside of the room through a pipe.

> (3) J. T. asks: How can I unite by casting a piece of mushett steel to the end of a piece of cast iron 13 square by 7 io. long? The steel is 13 square by 1 in. thickness. A. Make a core print to correspond with the steel, lay the steel in the mould, gate beneath to allow the iron to escape, and pour and waste perhaps one or two pounds so as to heat the steel; then plug up the waste gate and fill the mould.

(4) C. A. K. asks: What kind of liquids or gas are fire extinguishers charged with, especially the new hand grenade of Chicago, Ill.? A. Fire extinguishersare generally charged with carbonate of lime or carbonate of soda and water, with a combining quantity of sulphuric acid in a position to be discharged into the water at the required time. We do not know the construction of the Chicago hand grenades.

(5) H. B. C. says: In answer to D. D. L., query No. 19, Dec. 22, I cleanmymica as follows: Take them out of stove, lay on a smooth board, and with a Brass and copper vessels that are kept scrupulously Box. See Folding box. Package box. Shoe stiff bristle brush dipped in concentrated ammonia brush the surface until it feels smooth and glossy, then wash off the dirt and rinse with soft water. If the mica is not shelly, they will be as bright as new. Shelly or

(6) W. H. writes: Will you tell me the reaand direct in its statements, and every householder can son that an ax at one corner and sometimes both cracks learn something therefrom relative to improving the in tempering it, and how to prevent? Also a good receipt for small springs, such as main spring to gun locks, and other small springs? A. To prevent the cracking of an ax in hardening, have the iron poll split to receive the steel bit; not the bit to receive the poll. Heat the iron as well as the steel, and plunge into clear cold water until chilled. Use the best of cast steel for gunlock main springs. Forge to size. Do not use a file on the springs. Heat over a charcoal fire, harden in water, and draw the doubled-over portion to a blue.

(7) J. W. H.—Inquiry No. 8, Scientific AMERICAN of Dec. 1, 1883, concerning quantity of water for boiler. In our reply we should have said cubic foot instead of gallon. The inquiry and answer as corrected stand as follows: How many gallons of water are required for a steam boiler per horse power, say at 60 pounds pressure? A. At the Centennial Exhibition and tests, 30 pounds steam per horse power per hour was taken as standard; this is a little less than half a cubic foot of water, but it depends much on the character and condition of the engine through which the steam is worked. The quantity of water may vary from one third of a cubic foot to two-thirds of a cubic foot and evenone cubic foot in a verybad engine.

quaintme with any cheap liquid that will keep an even gest the size of the strainer, which should be large temperature (or nearly so) the year round? What are the non-conducting properties of oils or water glass?

(9) H. S., of Russell, Kas., asks the specific gravity of pure milk by a lactometer? A. The specific gravity of milk varies with the different breeds and age have records of specific gravities ranging from 1 035 center with a hook, where it can be caught with the to 104, the variation being due to the proportions of grapple. casein, sugar, salts, and fat. The excess in casein, sugar, and salts produces the heavier specific gravities, while the grades containing an excess of fat globules (cream) are of the lighter specific gravities. The lactometer measuring only the always slight variations between the weight of milk and that of water, must be very accurate to afford any guide, and we have known farmers who reported a difference of 20 degrees in the milk by a lactometer in four weeks' change from feed to good pasturage in the spring. The actual amount of water in milk is very regular at about 87 or 88 per cent, though its cream or butter producing qualities vary much more widely.

(10) H. W., of Frankfort, Ky., asks about of a personal character, and not of general interest, ventilating a drying room 8 x 12, and 6 ft. high, in which there are 400 ft. 1 in pipe for heating, present arrangement not working well? A. The steam coil should be 5 or 6 in. above floor; the flat kinds are the most efficient. The ventilation inlet should be under the coil so as to spread the air as much as possible; the outlet also should be at several places, so that the current through the room will be nearly equal in all parts. Openings equivalent to 1 square ft. are sufficient for a

(11) W. T. says: I am told that a thermometer in which, on being inverted, the mercury breaks (1) G. H. B., Cleveland, O., asks how skins in running to the top of the tube is not reliable; that pounds. In practice this has been exceeded under favare dressed to render them soft enough to make clothes instead it should form a vacuum in the bulb. Is this of, and what is the Indian process? A. Most of the right? A. Theoretically, and with an absolute vacuum buffalo robes and other beavy skins are either lightly above the mercury, the latter should, when inverted, tanned in bark liquors, or tawed with alum and salt, fill the tube. But when the latter is very small a slight and well worked and dressed with oil. Most skins can cause a little roughness, or obstruction too diminutive be easily prepared for single skins by rolling up with to be seen with the naked eye, may cause a parting, and salt and alum sprinkled on the flesh side, first having theinstrument still be practically useful. It is very debeen well scraped; this wants to be repeated several sirable to have a thermometer as perfect as possible.

(12) J. B. F. M. asks: 1. Is the Blake transmitter as good as any? A. For general purposes, yes; it, however, lacks power for long distances. The Hopkins transmitter, by actual test, has proved the best for long distances. 2. Is the induction coil in the Blake transmitter composed of more than one sized vire, and what sizes and amounts are used? A. Yes. wo layers of Nos. 16 and 18 insulated copper wire are wound in a coil a in. diameter by 11/2 in. long for the rimary, and over that is wound from five to six layers Δf No. 34 silk covered wire for the secondary wire. The revistance of the secondary coil is usually 150 ohms. 3. If a larger coil was used than ordinary, would it give better results? A. No, except for long lines of great resistance; then a larger coil is better. 4. What is the spring made of that carries the platinum point? An alloy of tin and brass something like German silver, to give it softness and elasticity. 5. What kind of carbon is used? A. Fine French battery carbon highly polishand 150.

(13) A. S. P. writes: I have been trying to electroplate with two jars, Grenet battery, 7 in. high, object about 11/2 in. square. I get a deposit of copper, but it takes a long time and consumes too much zinc. What is the fault? Can I not get good effects with that battery? A. Use two or three cells of gravity battery. The Grenet is not well adapted to electroplating.

(14) W. W. M. says: I have a glass wheel, the remnant of an old electrical machine. It is about 2 ft. in diameter and % in. thick. Can it be utilized in making a Holtz machine? If so, what thickness would be best for the additional wheel? A. It is a curious fact that plate glass is worthless for a Holtz machine. The natural surface of ordinary blown glass seems to be necessary to the successful working of the macbine. Your plate would answer for a frictional

(15) J. H. B. asks: 1. Is not properly secured cistern or rain water the best for drinking and cooking purposes? A. We do not consider that cistern water in its best condition is equal to water drawn from sand or rock beds, but is no doubt better than the water of many wells. 2. Is there any danger arising from the use of water in brass or copper vessels? A. clean are suitable for cooking in or holding water for drinking. Brass pipe for conveying water is now much used, and is not considered more dangerous than lead pipe. 3. What effect, if any, has the rubber pipe upon water secured through it, such as our lawn and sidewalk hose? A. Rubber hose has no deleterious effect upon water. 4. Where is the best water found when exposed to the sun and air, and standing in open vessels-atthe top or bottom of the vessel? A. We do not know that there is any difference in the quality of water drawn from the top or bottom of an open vessel, provided both vessel and water are clean.

(16) W. W. asks: What is the best material to mix with gas tarto form a durable waterproof coating for tin, shingle, or paper roof? A. Boil the tar with lime, stir in powdered slate, and then apply.

(17) F. T. K. G. writes: I was much interested in the article entitled "The re-enforcement of deficient water supply in wells," which appeared in the SCIENTIFIC AMERICAN of November 10, but it does not explain how to manage where there are large quantities of granite bowlders, which is the case in many parts of the country. A. The deepening or re-enforcing of wells located in bowlder strata is not easy work. It requires several feet at different places close together and near the center of the well will generally reveal its condition (8) S. R. asks: Will any fellow reader ac- as to the number and size of the bowlders, and will sugenough to allow the bowlders to be drawn up with a finger grapple. The sand may be taken out as in the pro-cess before described. The bowlders can be loosened with a hook and taken up with the finger grapple. If the bowlder catch under the edge of the tube, bore down of cattle, the season of year, and kind of feed. We near it and below it and work the bowlder toward the

> (18) E. D. C. asks for a rule by which he can solve the following problem:

Ball weighing one pound.



one pound strike an upright at D, having traveled the Clamp. See Screw clamp. Strap clamp. ten foot incline? A. A body acquires the same velocity Clay crusher and tile machine, combined, Fate in descending any inclined plane as by falling freely through a distance equal to the height of the plane minus the friction due to the manner of moving down the plane. The impact in foot pounds equals the velosquare root of the product will give the velocity acquired in feet per second. In your case $\sqrt{2} \times 64.\overline{333} =$ 11.334 feet per second, 11.334 \times 1 lb. = 11.333 foot orable circumstances 4:426 times, so that you may obtain in practice any value in pounds for a one pound ball, from 11 to 44 pounds.

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

J. N. T .- The specimen is probably infusorial earth, times, and the skins finally well worked. The Indians The break in the column does no harm provided it does but it is too gritty to be of much use for polishing purrub the brains and fat of animals thoroughly into the notseparate in the proper use of the instrument.

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