Drilling Glass.

Few who have not made the trial would credit with what facility glass may be perforated in any desired direction by means of a common drill applied in a proper manner. Small circular holes in glass sheets or cylinders are often required by the practical student, who does not care to have recourse to the "shop" for every little job.

Supposing it to be desired to bore a hole through a glass sheet, such as might be employed in the construction of a plate electrical machine. A perfectly flat board should be provided, on which the glass may be rested, and a small depression made with a bradawl exactly in the centre. If a piece of boxcloth be placed over this board and fastened down tightly by tacks at the sides, all danger of breakage through inequality of surface will be removed. The position of the hole having been decided upon, the glazed surface of the glass (the skin) is grazed at that point by a scratch or nick with a three-square file. The glass is then placed on the board with the marked spot exactly over the depression. A good steel drill fixed in the stock of a common bow or Archimedean drill, and of the dimensions suitable to the hole required, is to be dipped in oil of turpentine and then into fine emery. Placing the point of the drill over the marked spot, the operator proceeds to communicate rotary motion, without, however, exerting any considerable pressure, especially towards the end of the operation.

It is by no means necessary that the drill should be excessively hard: even a copper drill, if duly supplied with emery and turpentine, will do the work effectually. Should it be desirable to produce apertures of considerable diameters, such as from a quarter of an inch upwards, it is advisable to make some little change in the arrangement. Thus the drill must be grasped at one end below by a "collar" to prevent any change of position while rotating, and the head of the drill should be worked by means of a hinged lever, which is fixed by the brace to any convenient spot and weighted at the other extremity the head of the drill-stock supporting it in the centre. By this means an equable "feed" is secured. Instead of a steel drill, a brass or copper tube of the size of the aperture required is fastened to the stock, which, for this purpose, should work with a bow. By moistening the tube constantly with a solution of camphor in spirits of turpentine, and feeding with fine emery, a true and smooth aperture may be quickly cut.

THE FOOD OF MOLES.—A correspondent of the *Field* communicates his knowledge of the movements of a tame mole now in the possession of Mr. Howlett, Newmarket. It is kept in a large propagating glass that holds about three pails of earth; and in this it works its subterranean passages and throws up the hills. Its food consists of earth-worms and wire-worms, and from the careful observations of Mr. Howlett it consumes daily about 100 worms, which are supplied every morning. It is quite at home, and feeds freely out of the hand of its master.

THE MADDER PLANT.—Versmann states that the madder plant has been cultivated in Holland for more than three hundred years: France (especially the neighborhood of Avignon) now produces about one-half of all the Madder consumed, to the value of about £750,000 per annum. Turkey and South Russia also supply considerable quantities of high quality. Some experiments in cultivating madder were made in Derbyshire some years ago, but with indifferent results, though the plant is quite hardy in England. The Dutch madder will dye red, but not purple, and the color is not fast. Naples madder dyes good red and purple, but the colors are not fast; that of Turkey dyes good red and purple, and is very fast. France supplies the market with two qualities, called "rosées," from their dyeing beautiful reds and pinks, and "paluds," which give a good purple, besides a fine red: this is the best French quality. The last name is derived from the fact that the plants are grown on marshy land.

TO FORM PERFECT SQUARES.—Squares can be tested with the dividers by drawing two circles, one within the other, from the same centre, of sixteen and twelve inches diameter respectively: then set the dividers to ten inches, insert one point in any part of the outer circle, and mark the point exactly where a circle (drawn with the dividers in this position) would intersect the inner circle; now draw a straight line through the centre of the circles and through the point marked in the inner circle; and through the outer one, another line starting from the point where the dividers were inserted in the outer circle through the centre of the circles, until the outer circle is reached. If this is done exactly, the points where those lines intersect the outer circle will form the corners of a perfect square whose side is 11.3137 inches. If the square is correct, it will fit the square thus formed and also the lines in the centre, which divide the circle into four equal parts, and the angles must be ninety degress. This is based on the rule for finding the hypothenuse of a right angled triangle, thus 6 square=36 and 8 square=64, sum 100, the square of which is ten. This is sometimes called the six, eight and ten rule for squaring buildings.

TIME MADE BY FAST HORSES.—Goldsmith Maid, 2:14; American Girl, 2:16 1-2; Lafa, 2:16 3-4; Occident, 2:16 3-4; Gloster (dead,) 2.17; Dexter, 2:17 1-4; Nettie, 2:18; Red Cloud, 2:18; Lady Thorne, 2:18 1-4; Lucy, 2:18 3-4; Judge Fullerton, 2:19; George Palmer, 2:19 1-4; Bodine, 2:19 1-2; Camors (dead,) 2:19 3-4, Flora Temple, 2:19 3-4.

PURIFYING THE AIR IN WELLS.—Take a fanning mill and set it beside the well; take a bed quilt or waggon cover and hang it over the end and around the well; unhook the shaking works (or shoe) then turn fast a few minutes. This will create a current of air to the bottom—at least it did in my well, 40 feet deep. Previous to doing that a candle would burn only about half way down.

TO CLEANSE KEROSENE CASKS.—Set the cask on its end, remove one head, and build a fire in the bottom of the cask with straw, or any light combustible matter. Allow the head which has been taken out to remain suspended in the cask while burning. When the inner surface is charred, put out the fire by covering up the open end, and rinse the barrel with strong lye. A barrel thus treated can be used for cider, meat or any other purpose.

RECENT TRIALS of Garretson's straw-burning engines in England have proved that with 1 cwt. of straw for fuel there can be thrashed 17 cwt. of net wheat straw, and extracted from it a weight of wheat equal to 12 cwt. 3 qr. 21 lb., giving 29 cwt. 3 qr. 21 lb. as the gross weight passed through the machine. Even in England the question arises whether it will not be profitable for the farmer to use his straw in this way and return to the soil, instead of guano or other purchased manure.

SUBSTITUTE FOR COFFER-DAMS. An engineer at Dublin who is building breakwaters and harbor-works, constructs concrete blocks that weigh three hundred and fifty tons each, and then, by a clever contrivance, sinks them to their place at the bottom of the sea, and thus, in a comparatively short time, brings the work above the low water-mark, when the upper portions can be built in the usual way. This saves all the trouble and cost of coffer-dams and pumps, and must be regarded as a triumph of engineering.

BLOOD POISONING BY IMPURE WATER.—An English farmer had lost several horses lately, in a strange manner. When seven had died, he had a *post mortem* examination made of one of them, the last that died, the result of which showed unmistakably that death had resulted from blood poisoning. All the horses which had died had drunk regularly of the water of a certain pond. The pond water was stagnant, black in color, offensive, and largely impregnated with animal and vegetable matter. The other sources of water supply to the premises were the home pump and a small running stream. Their waters were clear, tasteless, and free from smell. Their supply was constant, and free from any source of pollution. The facts of the case all pointed to the pond water as the source of the mischief.

EPPS'S COCOA "GRATEFUL AND COMFORTING."—"By a thorough knowledge of the natural laws which govern the operations of digestion and nutrition, and by a careful application of the fine properties of well-selected cocoa, Mr. Epps has provided our breakfast tables with a delicately flavored beverage which may save us many heavy doctor's bills. It is by the judicious use of such articles of diet that a constitution may be gradually built up until strong enough to resist every tendency to disease. Hundreds of subtle maladies are floating around us ready to attack, wherever there is a weak point. We may escape many a fatal shaft by keeping ourselves well fortified with pure blood and a properly nourished frame."—*Civil Service Gazette*. Made simply with boiling water or milk.—Each packet is labelled—"JAMES EPPS & Co., Homœopathic Chemists, 48 Threadneedle Street, and 170 Piccadilly; Works, Euston Road and Camden Town, London."

MANUFACTURE OF COCOA.—We will now give an account of the process adopted by Messrs. James Epps & Co., Homœopathic Chemists, and manufacturers of dietetic articles, at their works in the Euston Road, London."—See article in *Cassell's Household Guide*.

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