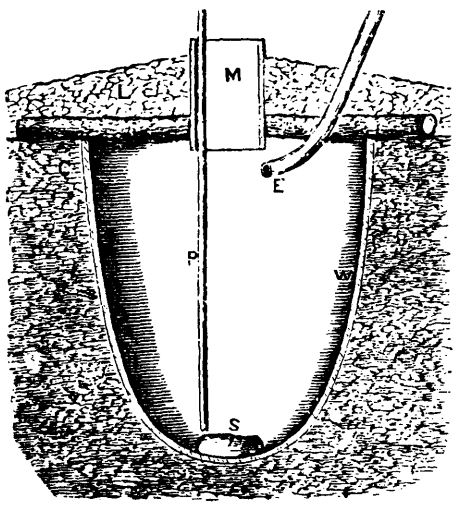
CHEAP CISTERNS.—Plenty of good water is of prime importance everywhere. There can be no better water than that naturally distilled, falling as rain or snow. On the average, at least 300 barrels of it fall upon every building 20 feet square, annually—in some places more, in others less. To catch this from every roof and keep it for use as wanted, is not difficult if one has cisterns enough. *Cheap cisterns* are easily made whenever there is solid ground within 2, 3, 4, or even 5 feet of the surface. Remove the lighter surface (*L*), down to that which is compact (*C*). Dig as many egg-shaped cisterns as are required, 6 to 9 feet in diameter at the top, and 6 to 10 feet deep. Put upon the sides and bottom an inch thick, or so, coating of mortar made of clear sand and any good hydraulic cement, often called "water-lime." At the top of the *solid* earth, cover with any durable timber, heavy plank, or even poles or rails laid across with the ends extending 12 to 18 inches upon the solid



ground. Leave a man-hole (*M*) for entering, and for inserting pump-pipe (*P*), or for drawing water with buckets. The entrance of water is through the pipe (*E*). Spread cement over the wood covering. Fill in the earth (*L*), raising it above the level to shed off water. To apply the plaster (*W*), first coat the earth with a *thin* layer of equal parts of sand and cement, mixed soft and apply as soon as mixed, beginning at the bottom. Next apply an inch or more of mortar made of 1 part cement and 3 of sand. If the soil be not very firm, or if it is springy, let this coat be 1½ to 2 inches thick. Finish with a thin coat of equal parts of good sand and cement, and "white-wash" with a brush with a thickish mixture of cement and water with no sand. Put a flat stone (*S*) at the bottom for entering water to fall upon, to prevent wearing the cement. We have earth-wall cisterns like the above, covered with locust poles, that have done good service for over 20 years, with no signs of failure yet, and we know of many others like them.

A VEGETABLE GREEN FOR CONFECTIONERS.—It appears, according to one of our French exchanges, that from the grains of raw coffee there may be extracted a beautiful green coloring matter adapted to all the purposes of the cook and confectioner, and which will undoubtedly prove of great value as a commercial product, inasmuch as the number of green colors suitable for such uses, and which are not poisonous, is very limited. According to M. Zech, who describes the process of extraction, the coloring matter is obtained in the following way: The coffee grains are crushed and the oil is extracted by means of ether; they are then dried and agitated with the white of eggs, so as to form a sort of paste, and the latter is exposed for several days to the air. The presence of the white of eggs then determines the appearance of an emerald green. A simpler process is to merely moisten the crushed and desiccated coffee berries with water, expose them three or four days to the air, and extract the coloring matter by means of alcohol.

PROTECTING LEAD PIPES.—The *Revue Industrielle* says that the interior of a lead pipe can be covered with an incrustation of sulphide of lead by making a warm concentrated solution of sulphide of potash flow through it for ten or fifteen minutes. Pipes thus treated seem to be covered with grayish varnish, which prevents the water flowing through them from acting upon the lead.

HOW TO GRIND EDGE TOOLS.

Edge tools are fitted up by grinding. The sharp grit of the grindstone, being harder than the iron or steel, cuts very small channels in the surface of the metal, and the revolving disk carries away all the minute particles that are detached by the grit. If we were to examine the surface of the tool that has just been removed from the grindstone under the lens of a powerful microscope, it would appear, as it were, like the rough surface of a field which has recently been scarified with some implements which formed alternate ridges and furrows. Hence, as these ridges and furrows run together from both sides at the cutting edge, the newly ground edge seems to be formed of a system of minute teeth, rather than to consist of a smooth edge. For this reason a tool is first ground on a coarse stone, so as to wear the surface of the steel away rapidly; then it is polished on a wheel of much finer grit; and finally, in order to reduce the serrature as much as possible, a whetstone of the finest grit must be employed. This gives a cutting edge having the smallest possible serration. A razor, for example, does not have a perfect cutting edge, as one may perceive by viewing it through a microscope. Beginners are sometimes instructed, when grinding edge tools, to have the stone revolve toward the cutting edge, and sometimes from it. When the first grinding is being done, it is a matter of indifference whether this is done or not; but when the finishing touches are applied near and at the very edge, a grinder can always complete his task with more accuracy if the periphery of the grindstone revolves toward the cutting edge, as the steel that is worn away will be removed more easily; whereas, when a stone runs in the opposite direction, the grinder can not always tell exactly when the side of the tool is fully ground up to the edge. This is more especially true when the steel has a rather low or soft temper. The stone, when running from the edge, will not sweep away every particle of the metal that hangs as a "feather;" but when the stone revolves toward the edge, there will be no "feather edge" to deceive the eye of the grinder.—*Cassell's Household Guide.*

WHAT SCIENCE HAS DONE FOR PRODUCTIVE ARTS.—When gas was first made for illuminating purposes, some of the substances produced by the distillation of coal and the purifying of the gas, were considered unmitigated nuisances. But these disagreeable products did not escape the persevering investigations of the chemists, and the results are among the wonderful discoveries of science. A curious illustration of the economical value of the ammoniacal liquor is given in the report of the business of the gas works at Bradford, in England. For 10 years a contractor paid £800 a year for this substance, now a new contract has been made by which the company receives £10,359 per annum for it. Fifty one thousand seven hundred and ninety-five dollars is a very pretty sum to receive for an article formerly regarded as having little value. The brilliant colors produced from this liquid make its great value.—*Paint and Drug Reporter.*

TO RESTORE THE LUSTRE OF JEWELLERY.—Take one ounce cyanide potassium and dissolve in three gills of water. Attach the articles to be cleansed to a wire hook, immerse and shake in the solution for a second or two, and remove and wash in clean water, then in warm water and soap. Rinse again, dip in spirits of wine, and dry in boxwood sawdust. If the solution is kept, put it in a tightly corked bottle, and label *poison* conspicuously. One caution is necessary: Do not bend over the solution so as to inhale the odor, nor dip the fingers in it; if one of the articles drops from the hook, better empty the solution in another vessel.

COMPRESSING LIQUID METAL.—We have already alluded, in these columns, to the importance of compressing metals while in a liquid state, to increase their strength when cold. A late number of *Van Nostrand's Magazine* contains a lengthy article on this important practical fact, in which the writer thinks the practice of casting under pressure is likely to be extensively adopted in the manufacture of steel. The process of cold-rolling has been found to increase the strength of bar iron in some cases as much as 100%.

BEAUTIFUL BLACK COLOR FOR BRONZE.—A strong concentrated thin solution of nitrate of silver is required for this purpose. It should be mixed with an equal solution of nitrate of copper, and well shaken together. The pieces which require coloring are dipped into this solution and left for a short time. When taken out, they should be equally heated till the required black color makes its appearance.