which are liable to settle upon the fire sheet, and cause it to burn or bulge from overheating. See Davis' work on boiler incrustation, which we can furnish for $2.00.

(6) J. L. D. asks the best method of raising a large quantity of water by windmill a short distance, say 6 or 8 feet, for irrigation. A. A common lift pump with a cylinder equal in capacity to the power of the windmill is the most economical.

(7) T. J. T. asks whether the ordinary photograph camera will answer for taking tin types. A. Yes, but y u require a special plate holder. 2. How are tin types made? A. The prepared plate, which may be purchased from dealers in photo materials, is coated with collodion, then immersed in a sensitizing nitrate of silver bath, and while wet exposed in the camera. Development is made by flowing the plate with a solution of sulphate of iron and acetic acid. It proceeds rapidly. The plate is next washed, and the unacted upon silver is dissolved off by immersing the plate in a bath of cyanide of potassium. After fixing it is slightly washed, rapidly dried over a spirit lamp, slightly colored with dry colors, varnished by flowing, and is ready for delivery. Tin types can be made out of doors. The position of the picture is always reversed.

(8) M. W.—There are always openings for persevering, energetic men in every branch of engineering in the United States, as well as in Great Britain. We do not know that there is a choice among the many branches. The name apprentice is now scarcely known in the United States. The English system is not practiced here. Young men enter engineering establishments on a business basis of usefulness. Our technical schools manufacture theoretical engineers by scores, who then have to travel the practical road by business employment with engineering firms.

(9) J. S. M. asks the cause of a bird gun leading. How does it affect the shooting, and what is the simplest receipt for removing and preventing it, by one in the country? A. The leading is caused by the friction of the shot on a dry barrel. A greasy wad will prevent it. A fine steel scratch brush with oil will remove the lead. Such a brush may be purchased of any gunsmith.

(10) W. B. D.—Scouring brick may be made by mixing sand with a small percentage of clay and baking. The quantity and heat required may be easily ascertained by trial. Mucilage and gums may be used, but they are not equal to clay as a cement for scouring brick. A very small portion of Portland cement might be made available, to avoid the baking process.

(11) A. H. B. asks how to make a paper mould for stereotyping, and how to make it so that it will stand heat without breaking apart. A. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 310, 191. Also Wilson's book on stereotyping, $2.00, which we can furnish.

(12) C. W. B. asks if it is possible to cut through the casehardening on a casehardened axle with a diamond cutter; if not, can it be done by any other method without drawing the temper? A. It can be done with an emery wheel or with a piece of copper charged with emery.

(13) R. B. says: I have some ground glass which I wish to bring to a very high polish; what am I to use, and how? A. You cannot polish glass that has been ground on an emery wheel or grindstone. It should have a dead finish with the finest washed flour emery on a lap of metal, zinc or lead; or if the glass is large, use a rubber of metal. Then half polish with ground pumicestone on a leather rubber. Then polish with rouge on a buckskin rubber, moist. 2. Which is the best to use for grinding glass on—emery wheel or grindstone? A. Use either one, wet; the emery wheel cuts fastest.

(14) W. A. R. writes: In conducting the exhaust from a steam engine into a large tank of water for the purpose of warming the same, should the pipe used for that purpose increase or diminish in size, or remain the same for the entire distance (about 150 feet)? Should the pipe rise, fall, or remain horizontal? And at what point in the tank should it enter to obtain the best results? A. The exhaust pipe should be in the form of a coil suited to the size of the tank, with a descent in its course to enable the water to flow off in the same direction of the steam. A decrease in size would be proper if the water should remain cold enough to gradually condense the steam. Sometimes the water in the tank may become very hot from not being used, when the decreased size of the pipe would throttle the exhaust and make a back pressure in the engine.

(15) G. E. D.—The Great Eastern is composed of two continuous shells, an outside one and an inside one, about 3 feet apart, divided by bulkheads into compartments for safety. These compartments can be entered by manholes in the inner shell, which are closed by plates. The interior is also divided into compartments by decks and bulkheads like other iron ships. As a ship, the hull is one piece.

(16) T. P. B. asks how zinc amalgam is made for milling purposes; how the zinc is made to unite with the quicksilver and form a solid amalgam which may be broken when cold and added to quicksilver. A. Melt the zinc, and pour with a small spill from a height of 2 feet into a pail of water. This will chill it in shot and thin particles. Then dry and mix with the quantity of mercury desired for the amalgam in an iron ladle. Heat the ladle until the zinc is dissolved. Do not allow the heat to rise to the evaporating point for mercury.

(17) F. F. asks how the sound of the voice is transmitted over the telephone wire. A. In the electric telephone the transmitter transfers the vibrations of the air caused by the act of speaking, through the medium of the electro-magnet, into electric transmissions pulsating in harmony with the diaphragm of the transmitter. The electric transmissions reproduce through the electro-magnet of the receiver precisely the same pulsations as were uttered to the transmitter. There is no other physical connection of the equivalent pulsations between the terminals.

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