fragments of anhydrous borax (borax glass) are added to the contents of the scorifier. As soon as the lead has melted the door of the muffle is opened and the scorification proceeds until the ring of slag closes over the lead button. The scorifier is then removed and poured into a smoked iron mould. If, after breaking away the slag, the button is found to be small enough, it is immediately cupelled; if not it must be returned to the scorifier and reduced in size by scorification. The cupellation is the same as with the crucible beads. 2. I inclose clipping from an exchange which does not correspond with processes given in your paper from time to time for the manufacture of nitroglycerine: who is correct? A. The statement that nitroglycerine is a compound of glycerine and prussic acid, is incorrect.

(23) S. E. asks: For what is realgar used, and what is it worth? Is there a good market for it? A. It is used in the manufacture of certain pyrotechnic preparations, such as Bengal lights (niter 27, sulphur 7, realgar 2); also in the manufacture of orpiment and other arsenical compounds. It is quoted at 20 cents per lb.

(24) W. H. C. writes: 1. I have finished the two sections of the secondary coil of an induction coil, ½ size of that given in SUPPLEMENT, No. 160. Connecting one Watson cell I find no result from the secondary wire, no spark or feeling when I touch the terminals with my tongue. The fine wire broke three times by accident; each time I soldered, using muriatic acid as a flux. I should think that, though I have no insulating medium between the two sections, I would have some results. A. Use battery enough to vibrate the interrupter strongly. Two cells of Grenet would answer. If you do not then get a spark you should examine the connections and test the insulation. Possibly your condenser may be at fault. 2. Ought not one Watson cell to be enough? A. One Watson cell is not enough. Use at least four.

(25) H. P. asks: What are the proportions given to the air chamber of a pump? A. From 4 to 8 times the capacity of the pump.

(26) A. D. writes: Referring to the phonograph described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 133, will you give more definite instructions regarding the construction of this little wooden spring, size, force, and kind of wood? A. The accompanying

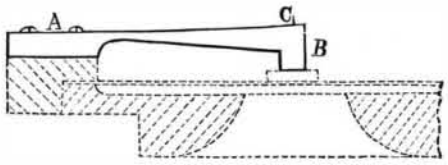

diagram gives the exact size and proportion, A being the portion attached to the mouth piece, B the portion that rests upon the diaphragm, and C the needle. The width should be about 3-16 inch and the end, B, should rest with some pressure on the small soft rubber block placed against the diaphragm. Any wood that springs well will answer. Holly is perhaps as good as anything.

(27) H. S. W. writes: 1. I contemplate building a small stern wheel steamer, dimensions: length, 50 feet, beam 9 feet, deck 12 feet, between decks 6 feet, height of cabin 7 feet, center 8 feet. She will be sharp forward instead of round, as our larger vessels are. Her boiler is 42 inches diameter, height 7 feet, engines 6 inches diameter, 24 inches in length. Are my proportions right? Is my boiler large enough for the boat? A. Your boiler is ample to drive the boat, and having about 180 feet surface should supply the engines. 2. Are my cylinders too large or small? A. Cylinders not too large; you might make them 6½ inches. 3. Would it be possible for such a boat to make the trip from New Orleans to the Suwanee River, in Florida? A. Yes with care and prudence.

(28) C. C. W. writes: I have a clinker built boat, 18 feet long, beam 4 feet 6 inches, draught at stern 18 inches; about 12 inches of this is extra keel. I have two high pressure engines, plain valves, set on the quarter; cylinders 2 inches by 4 inches working in ¼ expansion, carry 40 lb. steam, revolutions of engines 125. What would be the correct size of screw to run in shallow streams, and what would be a correct pitch of screw? A. 24 inches diameter and 2 feet 8 inches pitch. 2. I wish to know on what principle does the boiler injectors and inspirators work, or rather, how can an injector feed a boiler under 80 lb. steam, as they have to inject water into boiler against a pressure of 80 lb., and have only the same force to do the work? A. We cannot explain clearly the principle of the injector within the limits of "Notes and Queries." Consult some good book on engineering; that it does feed boilers with their own pressure there is no doubt.

(29) M. W. C. asks: 1. What knowledge of mechanics or machinery is requisite to the obtaining of an engineer's certificate to run a steam launch 20 or 25 feet long? A. Sufficient theoretical to understand the principle of operation of the steam engine and sufficient knowledge of the use of tools to be able properly to adjust the parts. 2. Is it necessary that a pilot license should be had to run such a launch? If so, what requisites are necessary to the obtaining of the same? Can one person take out both licenses? Are such licenses necessary for running a steam canoe such as was described in the AMERICAN a short time since? A. For reply to your other queries apply to the steam boat inspectors in your city.

(30) E. P. asks (1) for a cheap method of waterproofing cotton factory cloth suitable for a tent. A. See SCIENTIFIC AMERICAN, volume 39, p. 331 (9). 2. In the sentence "port the helm," does it mean to put the tiller to the port side? A. Tiller to port side.

(31) G. F. P. asks: 1. In the improved forms of dynamo-electric machines now made for producing the electric light, is the same current that supplies the carbons made use of to excite the fixed electro-magnets, or is it usual to have two series of armature coils? A. Usually, but not always. 2. Would a resistance of five ohms introduced in the working circuit of such a machine, by causing the current to traverse a considerable length of wire in the coils of the fixed electro-magnets before reaching the carbons, impair to any extent the brilliancy of the light with a machine capable of consuming rods ⅜ inch square? A. Of course the introduction of resistance into the circuit will impair the light, and the greater the resistance the more will the light suffer.

(32) F. & Co. ask: Can you give us any information of a way of bleaching resin? A gentleman informs us that proto-chloride of tin will do so. Is there anything injurious in introducing it into soap, it being first dissolved in water? A. Brown resin may be converted into yellow resin by simply boiling it with water for about 10 minutes. Its appearance may be somewhat improved by adding to the water about one per cent of stannous chloride. The trace of the latter adhering to the resin, after washing, will not prove injurious in soap.

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

A. J.—Mr. M. von Lill, of Vienna, has lately analyzed some wolfram steel, generally known as Mushet's special steel, and has found it to contain: Iron, 87.120; manganese, 1·043; copper, a trace; wolfram or tungsten, 9·9888; carbon, 1·239; silica, 0·330; phosphorus, 0·039; sulphur, 0·008; total 99,767.—H. A. F.—The rock contains no precious metals, lead, or copper. It has no economic value.

COMMUNICATIONS RECEIVED.

On Small Propellers. By P. H. W.
On Alum Baking Powder. By E. B. F., Jr.
On the Microphone without a Battery. By A. C. R.

[OFFICIAL.]

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