a dynamo be changed into a motor? A. As a rule, any good dynamo for generating a direct current can be used without change as a motor. 8. How long will 100 gravity (telegraph) cells run a 16 candle power incandescent light (50 volts)? A. It is impracticable to run a 16 candle power 50 volt lamp with 100 gravity cells. 9. How long will 200 cells do it? A. It is impracticable to run incandescent lamps with any number of gravity cells. 10. How many gravity cells would be necessary to charge a storage cell of dimensions 12× 12×12, and how long to do it? A. For charging a storage battery cell, four cells of gravity battery are required. It takes from 7 to 8 hours to charge a storage battery.

(3213) C. E. N. and H. W. McC. ask a recipe for fastening paper to the face of an iron pulley and how to make a good belt glue. A. Scratch the face of the pulley with a rough file thoroughly, so that there are no bright or smooth places. Then swab the surface with a solution of nitric acid 1 part, water 4 parts, for 15 minutes, then wash with boiling hot water. Have prepared a pot of the best tough glue that you can get; stir into the glue a half ounce of a strong solution tannic acid, oak bark, or gall nuts, as convenient to obtain, to a quart of thick glue; stir quickly while hot and apply to the paper or pulley as convenient, and draw the paper as tightly as possible to the pulley, overlapping as many folds as may be required. By a little management and moistening of the paper it will bind very hard on the pulley when dry, and will not come off or get loose until it is worn out. Use strong hardware wrapping paper.

(3214) W. R. asks: 1. How many sulphate of copper batteries would be needed to charge a storage battery for running an 8 candle power electric lamp? A. You will require 4 cells of gravity battery to each cell of storage battery. 2. Should the storage cells be arranged in multiple arc during charging process? A. It is probably best to make the storage and gravity cells up separately, as above suggested. 3. How long will they run above lamp before running out, if used 6 hours daily? A. Storage batteries will not run large lamps for much more than six hours daily. 4. In what time can they be charged after the first thorough charge? A. It requires from seven to eight hours to charge a storage battery. 5. What is the best arrangement for the sulphate of copper cells? Is the Edison-Lalande battery a suitable cell for running an electric lamp? How many of these cells would it take to run an 8 candle power Edison lamp? Where can I find a full and extensive treatise on this last type of electric battery? A. Write the Edison Manufacturing Company, Orange, N. J., with reference to the Edison-Lalande battery.

(3215) E. L. asks if there is a school, preferably in the eastern part of the country, where a young man can take a short special course in electrical engineering without being required to pass the examination in the languages and higher mathematics which the regular colleges require? A. A special course in electrical engineering such as you specify would be best obtained in an electric manufactory or works of some kind. A college could not give a good course to the exclusion of mathematics. You might address Columbia College, of this city, Cornell University, Ithaca, N. Y., and the Stevens Institute of Technology, Hoboken, N. J., for information as to any special or elective courses they may have in electricity.

(3216) C. W. writes: 1. Have you a paper or book on watch finishing? A. We can supply you with the following books on the subject you mention. The "Watch Maker's Hand Book," by Saunier, price $3.50. "A Treatise on Watch Work," by Nelthropp, $2 50. "The Watch and How to Repair It," $1. See page 53 of catalogue, which we send by mail. 2. Would it hurt a person to take brucine internally? A. It is a deadly poison, one of the worst known to man. 3. Is there any difference between brucine and brucin? A. No; it is only a question of spelling.

(3217) E. B. asks for a cement or composition. Kindly favor with a cement and how to apply it to join a close-grained, hard, white marble slab, 8 inches deep by 2 inches thick, 4 feet long, rough-broken into two pieces about the middle of its length, forming a side piece for cradle of a grave, and being always exposed to the inclemency of the weather. A. You might try a cement formed of oxide of zinc mixed with a strong solution of chloride of zinc. It will have to be applied quickly to each half of the stone, and the pieces joined before the cement sets. It will probably be well to experiment on a small piece of stone before applying the cement to the marble.

(3218) J. S. M. asks, What size of wire is suitable for winding field and armature of dynamo described in SUPPLEMENT, No. 161, made size of cuts? A. It depends entirely upon what you intend to do with the machine. For general purposes, however, we think No. 20 on the armature and No. 18 on the field magnet would do for a series machine. 2. What can be put in whitewash for outdoor to increase its adhesive qualities? A. Try skimmed milk. 3. Has there been a genuine history of Stanley's travels in Africa published, and by whom? A. Scribner & Co. of this city publish Stanley's books.

(3219) N. J. asks: 1. Could you give me the recipe for a glue that will withstand water as well as oil and alcohol? A. Marine glue is made by softening pure India rubber (unvulcanized) in benzole or naphtha. To one part of rubber originally used add ten to twenty parts of pulverized shellac, mixing it with the benzole. Rub the mixture well in a mortar, transfer to a cup, and warm upon a water bath (or use a glue pot for this); apply by melting with a warm iron or wire on the surfaces to be united. Do not use a flame. Common glue may be melted with water and one-tenth its weight of bichromate of potash. Exposure to light makes it insoluble. 2. Could you tell me whether such a glue is in the market? A. Marine glue is sold by dealers in microscopic supplies.

(3220) F. C. writes: There is a preparation that when put on the glass of a cheap microscope shows animalcules, bacteria, etc. I think it is some highly fermentive substance like yeast, but have experimented without any success. If you can give me any information about it I will be exceedingly grateful. A. Try old flour paste allowed to stand for several days. Infusorians are quickly developed in an infusion of hay and water.

(3221) T. W. J. asks (1) for directions for softening stone, so that it can be moulded into any desired shape, and again become hard as before. A. Stone cannot be softened as you describe. 2. What liquids (or chemicals) will produce the most intense heat? A. Sulphuric acid and water produce heat far above the boiling point. The acid should be added slowly to the water. There is always danger in doing it.

(3222) J. H. R. asks: How can I detect adulteration in bone meal, or whether it is pure or adulterated? A. The only reliable way is by analysis. It should dissolve without effervescence in nitric acid, but this is a very imperfect test.

(3223) T. L. P. writes: In my daughter's house, being built from plans furnished by your architectural bureau, the floors, which are of white oak, have become disfigured by black stains, probably where damp iron in some way has been in contact with them. I suppose it is tannate of iron. Can you suggest some means of removing this discoloration? A. Try hydrochloric acid diluted with ten volumes of water. If this is not strong enough, try weak solution of oxalic acid. The idea is to use any remedy as weak as possible.

(3224) O. C. K. asks: What advantages and disadvantages are connected with the use of balanced valves on steam engines as compared with the ordinary slide valve actuated by an eccentric attached to crank shaft? A. The advantages are comparative freedom from wear and ease of movement. There being but little friction on the steam chest face, the perfect fit of both faces is maintained, saving leakage, which is a source of economy in running and repair. The gain in power is very small. The disadvantages are only found in their complicated construction and liability to become deranged by inattention to adjustment, the balancing requiring steam tight yet free moving joints. Both kinds being moved by eccentric and rod, there is no difference outside of the steam chest.

(3225) M. E.—New York, Brooklyn, and Berlin are we believe the only cities that have general systems of elevated street railways. In other cities there are spurs of elevated tracks, or viaducts, on which trains pass to depots, etc.

(3226) D. W. S. asks: 1. Will you please tell me how the lights should be connected in circuit of eight light dynamo (SUPPLEMENT, No. 600) so I can use one or more at a time? A. The lamps should be connected up in multiple arc; the field magnet of the dynamo should have about four more layers of wire, and the machine should be connected up as a shunt dynamo. 2. If I should build a machine after the same pattern for 16 lights, and connect lights in multiple, could I burn one singly, the machine running normally? A. Yes; if connected as a shunt machine, with the field magnet winding properly proportioned. 3. Also, can I sell this machine when finished, without infringement of any patent rights? A. This machine when built with a wire armature core does not infringe any patent.

(3227) A. F. F. asks: 1. What sized wires are used in the induction coil of the Blake transmitter? What is the length and width of the core, and of what is it made? Are both coils copper? Is the primary coil insulated? Is there anything placed between the two coils? A. Use No. 36 wire for the secondary and No. 20 for the primary. Use two layers in the primary and 10 or 12 in the secondary. Make the core of the coil of a bundle of fine annealed wire ¾ of an inch in diameter and 3 inches long. The primary and secondary wires are insulated, and the two coils are separated by three or four thicknesses of writing paper wound around the primary. 2. What is an auxiliary magneto bell? Will it work on a line 1½ miles long without using the regular magneto? A. An auxiliary magneto bell is an additional bell put into a telephone circuit. It requires a magneto to operate it.

(3228) F. W. S. writes: A recent fire destroyed our entire stock; our safe preserved our books very nicely. Being enabled to unlock it readily by the combination, we now wish to know from a source of good authority if this safe would still preserve our books through a like fire, and if not, why? A. The preservative qualities of a safe depend chiefly upon the amount of water contained in the filling. Hence for this purpose plaster of Paris, alum, and other salts that hold a high percentage of water are used. If a safe is exposed to a high heat for a considerable time, a portion of the water will be driven out of the filling, and consequently the safe will be impaired.

NEW BOOKS AND PUBLICATIONS.

MASSAGE, THEORETICAL AND PRACTICAL. By Douglas Graham, M.D. Pp. 342. New York: J. H. Vail & Co. 1890.

This is the second edition of a book first published in 1884. It has been revised and enlarged, and the present volume is designed to cover a full description of the best mode of applying massage and its physiological effects as a remedial agent for a far greater number of ailments than it has commonly been supposed to be available for. The effects of massage upon the internal organs, upon complaints peculiar to women, and upon affections of the nervous system, are treated with especial particularity, while rheumatism and joint affections and many other complaints are shown to be beneficially subjected to this treatment, the general comfort and satisfaction derived therefrom making this method of cure, wherever it can be employed, a really enjoyable one.

TO INVENTORS.

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