haps many more besides me, why it is not adapted for a dynamo. Is it on account of the Gramme ring armature, or is it because of not enough coils on armature? Of course, one reason is, as you have answered before, use finer wire on field and armature. A. The field core is too slender and long; for a dynamo a massive field is far preferable. There may be much trouble anticipated in making it self-charging. We advise you to try separate excitation of the field with a battery. Possibly you may get it started, and by connecting the field into the circuit first and then disconnecting the battery, it may keep on working. 2. What is the difference in constructing a high or a low speed dynamo and motor? A. In a motor or dynamo a strong field or an armature with many turns gives relatively slow speed and vice versa. 3. How many ohms resistance will bring current of eight light dynamo as described in SUPPLEMENT, No. 600, down to zero? A. An infinite resistance.

(6733) **Customer asks: 1. Will you** kindly define the term "an ampere hour," as applied to electricity used by a customer for incandescent lighting? A. An ampere expresses the rate of flow of current; an ampere hour means a current flowing for one hour at the rate of one ampere. The company is assumed to maintain a definite voltage. As you pay for electric energy, this maintenance of voltage supplies the factor requisite. 2. If I make an agreement with a company for incandescent light "at a price or sum not exceeding one-half cent per ampere hour by meter," what can I demand from the company—how much electric lighting for my half cent? A. You do not state the voltage. At 110 volts, one ampere hour should mean two 16 candle power lamps for one hour. If at 55 volts, then it should mean one-half the quantity. 3. If the agreement does not specify the voltage or candle power to be supplied, what strength of light in my house could I reasonably demand from the company? A. The answer to No. 2 expresses it. The voltage is always ascertainable. There is no secret about it. A very slight drop in voltage cuts down your light enormously without reducing the bills in anything like the same proportion.

(6734) **F. R. B. asks the rule for finding** gearing for cutting threads on a screw cutting lathe. A. Read from the lathe index the number of threads per inch cut by equal gears and multiply it by any number that will give for a product a gear on the index; put this gear upon the stud, then multiply the number of threads per inch to be cut by the same number and put the resulting gear upon the screw. Example.—To cut 11½ threads per inch. We find on the index that 48 into 48 cuts 6 threads per inch, then

6×4=24, gear on stud,

and 11½×4=46, gear on screw.

Any multiplier may be used so long as the products include gears that belong with the lathe. For instance, instead of 4 as a multiple, we may use 6.

Thus, 9×6=54, gear upon stud,

and 11½×6=69, gear upon screw.

(6735) **J. L. D. asks (1) for formulæ for** finding the area of an ellipsoid or spheroid. A. If prolate, area=8·88 r $\sqrt{R^2+r^2}$, in which R represents the major and r the minor axis. If oblate, interchange R and r and apply the same formula. This may be used as a working formula. If a table of natural sines or logarithmic functions is at hand, use for more accurate work the following:

$$S = 2\pi b^2 + \frac{2\pi a b}{\varepsilon}\sin^{-1}\varepsilon$$

in which a = semi-transverse axis

b = semi-conjugate axis

$$\varepsilon = \frac{\sqrt{a^2 - b^2}}{a}$$

This is for the prolate spheroid; for oblate interchange a and b. 2. Also for the volume of same. A. Multiply square of revolving axis by the fixed axis and this product by 0·5236. These formulæ are not directly deducible from the equations named in your letter.

(6736) **T. G. asks: 1. Will electro-plating** with nickel or with silver affect the properties of a permanent magnet? A. No, except as the polishing or scratch brushing would impair the magnetism. 2. If not, will it be best to plate the steel before it is magnetized or after it has been magnetized? A. Plate polish, etc., at first, and magnetize afterward. 3. Can iron or steel, after being heavily plated with nickel or silver, be used in contact with wines and alcoholic liquors in general, without being affected by and without having any influence on the above liquids? A. Silver would be less affected than nickel; we should not advise reliance to be placed on the latter.

(6737) **R. W. S. asks: 1. What is the** electromotive force and the current of the common gravity battery? A. Allow 1 volt and 4 ohms resistance. The resistance is subject to wide variations according to strength of solutions used. 2. Can you give me recipe for a good depolarizing fluid for a carbon battery?

A. Water.....100 parts.
Sodium bichromate.....16 "
Sulphuric acid.....37 "

All by weight. Use the bichromate in powder. Be careful to inhale none of it in powdering, as it is very dangerous.

(6738) **R. A. C. writes: I am going to** make a storage battery; the jar will be 4 inches high, 2⅝ inches wide, and 1½ inches thick, and will be divided into four cells; each cell will contain two lead plates 4 inches long and 1¼ inches wide. Will you please tell me how long the battery will light a three candle power lamp? A. For each square inch of positive plate immersed in a single couple allow 0·03 ampere, and for each cell allow 2 volts, and ten hours running. The lamp will need 5·5 to 7 volts and 1 to 1·50 amperes.

(6739) **J. C. H. says: Can you give me** formula in your Notes and Queries for cleaning smoky and dirty wall paper and leaving it as bright as new? A. To clean wall paper, rye flour and wheat flour are mixed together into dough, which is then partially cooked or baked and the crust removed. Common salt, powdered or pulverized naphthaline, corn meal, and burnt umber are then added in the following proportions: 1 pound rye flour, 1 pound wheat flour, 1 ounce common salt, ½ ounce solid naphthaline properly pulverized, 1 ounce corn meal, ⅛ ounce burnt umber. The composition is formed into a mass about the proper size to be grasped in the hand, and for plain wall paper, painted walls, etc., the composition should be drawn in one direction over the surface to be cleaned.

(6740) **G. E. H. writes: I have a chloride** of silver cell made by rolling a piece of commercial sheet zinc in the form of a cylinder 4 inches long and ¾ inch in internal diameter, and soldering a circular piece of zinc in one end and the cylinder down the side where the edges of the zinc meet, so as to make a watertight cell, into which is placed, after amalgamating the zinc, a cylinder of chloride of silver 3 inches long and ⅜ inch in diameter. The silver chloride is cast on a silver wire and is suspended in the cell in such a manner as to prevent it from touching the zinc and causing short circuiting. The space in the cell is filled with a weak solution of sal ammoniac and water and the end sealed with pitch. 1. Is the solder used in this cell liable to cause local action to any great extent? A. No. 2. Is 1 ampere too much current to take from this cell for a period of 5 minutes each day, and how long should the cell last at this rate of discharge? A. Yes. If you can get as much as that out of it, it will soon polarize it. Arrange a number of cells in parallel. 3. What weight of silver is required to make a cylinder of chloride of silver 3 inches long and ⅜ inch in diameter? A. About 300 grains.

(6741) **W. M. H. asks: 1. How would** acetylene answer as a substitute for the oxyhydrogen light in the magic lantern? A. It answers very well where high power is not required. It gives a very white light, but not as powerful as the oxyhydrogen. 2. If practicable, would it be better to generate the gas from the solid article as wanted or would it be more economical and satisfactory to use a cylinder of the liquid gas such as is described in the SCIENTIFIC AMERICAN October 19, 1895 (see Notes on Atlanta Exposition). A. Generate the gas from the solid article. An apparatus is described in the SCIENTIFIC AMERICAN of January 4, 1896. A very simple one is given in the SCIENTIFIC AMERICAN of March 30, 1895. 3. If the article is used in the liquid state, what is the best way of regulating the amount of gas consumed? A. Use a stopcock of first class construction, and regulate by hand. 4. Is it safe to ship it in either form on board ocean vessels, and what effect would passage through the tropics have upon it? A. Calcium carbide is perfectly safe if packed in airtight and watertight cases. The liquefied acetylene is not altogether safe under all conditions.

(6742) **H. K. W. asks: 1. Where can I** obtain a dynamo for one 8 candle lamp? A. Consult our advertising columns. Any dealer in electrical goods will supply it. 2. What power will be necessary to run such a dynamo? A. It is safe to allow ⅛ horse power. 3. Where (in what book) can I get information necessary to make as small a dynamo as indicated above? A. The SCIENTIFIC AMERICAN SUPPLEMENTS treat of this subject in great detail—giving many dynamos of various sizes. We refer you to them.

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