See Sloane's "Arithmetic of Electricity," \$1 by mail. 3. Please tell me if it is proper to say amperage or ampage. I have heard the word pronounced both ways. A. Amperage.

(6476) J. F. B. writes: Will you give me the approximate diameter of a windmill that will develop about one horse power with a twenty mile per hour breeze? Also what would be the increase in power power. The increase of power will be a

power with a 22 mile wind.

(6477) A. C. M. asks if two of the simple electric motors described in "Experimental Science' can be put on one shaft, and what horse power they would develop together at full capacity, also how many volts and amperes would the two motors require at full 1893. load, and whether each motor should be connected separately. A. You can connect as described, and get nearly two-tenths horse power at eight volts and eight or nine amperes.

(6478) W. B. asks: What is the best way to produce the greatest amount of heat by electricity? If possible, give several ways of producing heat by electricity, and state which is the best to create the greatest amount of heat. A. All methods of producing heat by electricity are based on the arc or on plain incandescence of a conductor. For examples of the first we refer you to our Supplement, Nos. 904, 905, 901, 986, 610, 840, 635; for the latter method, used on the large scale in electric welding, we refer you to our SUPPLE MENT, Nos. 582, 682, 768, 892.

(6479) D. J. F., Newfoundland, writes: 1. What is a ship's metacenter, and how is the same found? A. The metacenter of a vessel is the point of intersection of the vertical line passing through the center of gravity of the vessel, when in its position of equilibrium, and a vertical line through the center of gravity of the water displaced when the body is careened or heeled over through any given angle, as of a vessel rolling in a sea. It is found by computing the center of gravity of the vessel as it floats when at rest, and the center of gravity of the mass of water displaced at any angle at which the vessel may be careened. The point of meeting of a vertical line from this last point at the angle of careening and the central line of the vessel is the metacenter. The height of this point above the center of gravity of the vessel is the measure of its stability. See Haswell's "Engineer's Pocket Book" for examples, \$4 by mail. 2. rosemary, 1 drachm. Melt together. Glycerine may be How is the contour of the keel of a ship found, when the substituted in part for the oil and rose water. From ou same is not straight, as is very often the case in wooden vessels? Is it found from the keelson? If so, how? which contains several hundred formulas for cosmetics, And provided the ship be laden, how is it found? A. | perfumery, toilet preparations, etc. Irregularities in keel alignment can be approximated by examination of the lines of the keelson. When irregularities are suspected, the keel blocks are made adjustable to bring them to a bearing. With a loaded vessel the problem becomes complex and may require the service of a diver. 3. How is the dead rise, which governs the height of the bilge blocks which support a ship in dry dock, found? A. The bilge blocks should be adjustable in height and angle and also be movable to their proper bearing when the keel touches the keel blocks. The dead rise must also be found by examination inside or outside. 4. Is any treatise or book published giving directions for dry-docking ships? If so, please give the name, price, and where procurable? A. There is no work on dry-docking of ships. We have one copy of Stuart's "Naval Dry Docks of the United States," now out of print, price \$6.00.

(6480) G. D. asks: Could you tell me why a permanent magnet was used in a telephone? thought it was to give tension to the diaphragm. A. It is far more sensitive than an unpolarized core

(6481) C. W. C. asks: 1. Is the large plunge battery, Fig. 394, in "Experimental Science," sufficient to run a one horse power motor? A. No. 2. Is the dynamo described in SUPPLEMENT, No. 600, with proportions and directions given, suitable for a motor? And if so, could it be driven with above battery, and what power would it have? A. It makes a good motor and can be run with about three times this battery, and would give about 1/4 horse power for a short time only. of wave to be produced, p=any whole number. By taking The power would soon diminish. 3. How long would p=1 you will get the length for the fundamental, and the the battery run at full power on one charge? A. It would depend on the current taken from it. It would decrease rapidly after the first half hour.

(6482) H. K. M. asks: 1. How many brations per second, which you can take from any table horse power will it take to equal 1 kilowatt, or what is of the diatonic scale. Thus I is expressed in feet or a the relation between 1 horse power and 1 kilowatt? A. fraction of a foot. When the ratio of diameter, length 1 horse power is equal to 0.7459 kilowatts. 2. You give :: 1:12 ceases to exist or to be exceeded, an arbitrary a receipt for cleaning clothes, in Scientific American, 'formula must be used. Consult Ganot's "Physics.' of March 16, page 166. Does it make any difference ho this should be mixed? If so, which should be mixed A. It makes little or no difference how the ingredients are mixed. 3. In your columns you advertise the "Kombi." Is it a success? How long will one last, and what will be expense of having negatives finished? A. Address the advertisers. They will give you all the information desired.

(6483) C. A. C. asks: 1. Which will work on the longest line (the line being metallic circuit) a Blake or a Hunning transmitter? A. We cannot undertake to pronounce upon the relative merits of the two transmitters. Both are good. The Hunning's transmitter is described in the Scientific American, vol. 64, No. 4. 2. What is the internal resistance of ordinary gravity batteries? A. Two to four ohms. 3. Some of the Scientific Americans tell how to make storage batteries. A. See Scientific American, vol. 62 No. 10; vol. 65, No. 22; vol. 68, No. 9; vol. 69, No. 20; and our Supplement, Nos. 838, 845, and 997. 4. What is a two phase alternating dynamo? A. A dynamo of the simple alternating current type produces a single phase current. By special connections it may be made to give polyphase currents. In Walmsley's "Electric Current," \$3 by mail, page 458 et seq. the production of polyphase currents is very well explained. A two phase dynamo gives a two phase current.

15 candle power incandescent lamp, as well as a 16 can dle power lamp, can be bought, the first one needing only about 15 volts to make it give the proper light, and the second one will require some 50, 75, it give the proper light? See E. S. Greeley's Catalogue N. Y. A. The low voltage lamps are of proportionally lower resistance; hence they pass more current, so that with additional wind pressure, say of five and ten per the watts per candle power are the same in all. The cent? A. An 18 foot mill should be equal to 1 horse watts is the unit of rate of work—the volt is merely the unit of electric pressure. 2. How is the aluminum the ratio of the velocity of the wind. Thus 10 per cent | iodine battery made, what are the elements and charging fluid, and what is its lasting power and quality, both to 20 m. is 22 miles, and —=1·1, the square of which is with regard to material as well as electricity? A. Carbon and zinc are the electrodes; the excitantis a paste of the control of the con fluid, and what is its lasting power and quality, both bon and zinc are the electrodes; the excitantis a paste of aluminum chloride, zinc oxide, manganese dioxide and water; the depolarizer is iodine sulphide or a mixture of iodine and mercuric oxide. The battery proved unsatisfactory on the time test. The voltage was 1.4 to 1 65. An illustrated paper on the subject appeared in the Journal of the Franklin Institute for March and April,

> (6485) E. A. Le S. asks: Where can I find the results of a complete analysis of common sea water? A. The following is of sea water from the British

Water	.963-745
Sodlum chloride	. 28.059
Potassium chloride	. 0.766
Magnesium chloride	. 3.666
Magnesium bromide	. 0.059
Magnesium sulphate	. 2.296
Calcium sulphate	. 1.406
Calcium carbonate	. 0.033
—8c	chweitzer.

(6486) P. C. S. asks: How can a Leyden jar be disruptively discharged so you can get a current vibrating with extreme rapidity? If a two quart jar were charged by a battery and then discharged as above, would the current be dangerous, or will it run one of Tesla's coils? A. The ordinary discharge of a Leyden jar is of the character you describe, but as the entire duration of the discharge is very short, it cannot be used for a Tesla coil.

(6487) J. M. B. says: Will you have the kindness to give a receipt for making camphor ice? Also do you publish a book on manufacturing perfumery and cosmetics? A. 1. Oil of sweet almonds, 2 ounces; spermaceti, 4 ounces; white wax, 2 ounces; camphor 1/2 ounce; melt them over a water bath, run in moulds of proper size and form. 2. Expressed oil of almonds and rose water, each 1 pound. White wax and spermaceti, each, 1 ounce. Camphor, 2 ounces. Oil of "Cyclopedia of Receipts, Notes and Queries," price \$5,

(6488) C. H. asks: How many B. T. U. (or heat units) are there in one gallon of alcohol as compared to one gallon of coal oil? A. For a pound of alcohol the thermal units are 12,929; for a pound of petroleum, 27,531: You may take refined coal oil as of about twice the heating power of alcohol.

(6489) A. C. asks: 1. Of what number of wire and what size must I make an induction coil to lift one-third of a pound, and how much battery will be required to operate six of them at once? A. The size depends on the current you propose using. A core of one-quarter inch area must be charged with about 9,000 lines of force per square inch of section to have the desired traction, requiring perhaps twenty or thirty ampere turns. The question of leakage so complicates solenoid and straight bar calculations as to affect considerably their reliability. The ampere turns can be given by low potential batteries with low resistance coils or vice versa 2. How large and at what distance apart shall I make noles in a tube 9-16 inch in diameter to make notes of a diatonic scale, the same to be made like a small boy's cane whistle? A. Arrange them on the principle that the undulations of the notevary with the length of the pipe as determined by the position of the holes. For narrow

(1:12) stopped pipes the formula is L=(2p+1)—and for

open pipes $L = \frac{p}{2}$; in which L=length of pipe, l=length other values of p will give the harmonics; lis obtained

by the formula $l = \frac{1120}{n}$ in which n =the number of vi-

Query No. 6406. — In your answer to R. K. B., February 23, 1895, No. 6406, I am inclined to think his trouble does not lie with dirty contacts, but with an improper adjustment. I have frequently met with the same trouble, and bell would ring when several pushes were given successively. The successive pushes I believe give an accumulative series of vibrations to the bell hammer, and if synchronized properly will finally set the bell ringing. In such cases I generally investigate the adjustment screw and find it a little too far from the contact on the spring of the vibrating armature Thos. D. Giliespie, Pittsburg.

TO INVENTORS.

An experience of nearly fifty years, and the preparation tents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequaled facilities for procuring patents everywhere. A synopsis of the patent laws of the United Statesand all foreign countries may be bad on application, and persons contemplating the securing of patents, either at home or shroad, are invited to write to this office for prices which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office Scientific American, 361 Broad way. New York.

(6484) A. L. asks: 1. How is it that a INDEX OF INVENTIONS | Flushing drain pipes of sinks, washbasing, etc...

For which Letters Patent of the United States were Granted

April 2, 1895,

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Incubator, F. Frey	536,617 536,783
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Prisoners from escaping, device for preventing, J. R. Wherry. Puller. See Stump puller. Pump, self-measuring oil, J. H. Welch	536,720 536,979 536,674 536,807 536,768 536,916 536,611 536,952
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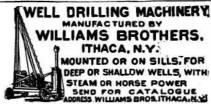
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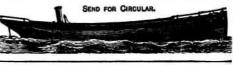


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