Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. **In every case it is necessary to give the number of the inquiry.**
MUNN & CO.

Marine Iron Works. Chicago. Catalogue free.

Inquiry No. 1468.—For manufacturers or dealers in aluminium gas and steam fittings.

TURBINES.—Leffel & Co. Springfield, Ohio, U. S. A.

Inquiry No. 1469.—For manufacturers of aluminium tubing.

"U. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 1470.—For manufacturers of aluminium novelties for advertising purposes.

WATER WHEELS. Alcott & Co., Mt. Holly, N. J.

Inquiry No. 1471.—For manufacturers of compressed air plants for cleaning carpets, furniture, etc.

Yankee Notions. Waterbury Button Co., Waterb'y, Ct.

Inquiry No. 1472.—For manufacturers of unplated jewelry, trinkets, etc.

For bridge erecting engines. J. S. Mundy, Newark, N. J.

Inquiry No. 1473.—For manufacturers of castings for gasoline engines.

Gasoline Lamps and Systems. Turner Brass Works, Chicago.

Inquiry No. 1474.—For machinery for making oval wood dishes or butter crates.

"Perfect aluminium solder. Amer. Hdw. Mfg. Co. Ottawa, Ill."

Inquiry No. 1475.—For coin-mailing cards.

Machine chain of all kinds. A. H. Bliss & Co. North Attleboro, Mass.

Inquiry No. 1476.—For process of re-surfacing postal cards.

Handle & Spoke Mchy. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

Inquiry No. 1477.—For manufacturers who furnish jobbers' goods to sell to agents and to the mail trade, who will ship direct.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

Inquiry No. 1478.—For manufacturers of brass and aluminium castings for small model engines.

For Sheet Brass Stamping and small Castings, write Badger Brass Mfg. Co., Kenosha, Wis.

Inquiry No. 1479.—For machinery for making common cob pipes.

Rigs that Run. Hydrocarbon system. Write St. Louis Motor Carriage Co., St. Louis, Mo.

Inquiry No. 1480.—For manufacturers of iron and wire fencing.

Ten days' trial given on Daus' Tip Top Duplicator. Felix Daus Duplicator Co., 5 Hanover St., N. Y. city.

Inquiry No. 1481.—For manufacturers of the "School Boy's Pride" shoe,

FOR SALE.—Patent office reports, from 1853 to 1871, inclusive, bound in cloth. Address Patent, P. O. Box 773, New York City.

Inquiry No. 1482.—For manufacturers of novelties for the mail order business.

For Machine Tools of every description and for Experimental Work call upon Garvin's, 149 Varick, cor. Spring Streets, N. Y.

Inquiry No. 1483.—For manufacturers of brush-making machinery.

FOR SALE.—Woodworking plant suitable for all kinds of wood work for less than cost of machining W. S. Holland, Pasadena, Cal.

Inquiry No. 1484.—For manufacturers or dealers in gum copal.

Designers and builders of automatic and special machines of all kinds. Inventions perfected. The W. A. Wilson Machine Company, Rochester, N. Y.

Inquiry No. 1485.—For machines for making buttons for the furniture trade.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York.

Inquiry No. 1486.—For a machine for picking hair for mattresses.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, $4. Munn & Co., publishers, 361 Broadway, N. Y.

Inquiry No. 1487.—For a system for furnishing water to dwellings where there are no water works.

WANTED.—First class draftsman on marine engine work. Gas Engine and Power Co. and Charles L. Seabury & Co., Cons., Morris Heights, New York City.

Inquiry No. 1488.—For a machine on the style of a "nickel-in-the-slot" for turning off a certain quantity of water.

WANTED.—Men with moderate capital to take exclusive agency for sale of aluminium gas tips and gas novelties. Sample lot sent on receipt of 25 cents in stamps. Gas Tip and Self-lighter Co., 298 Broadway, New York.

Inquiry No. 1489.—For manufacturers of the "Grisson Speed Reducer."

☞ Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.

Inquiry No. 1490.—For the manufacturers of the "Automatic Banjos" with the slot attachment.

Catalogues and best export prices wanted from manufacturers of office, theater, bank and church furniture. Have large contracts on hand to supply above, and prefer American manufactures. Please send by registered mail. F. F. Kurtz, Odessa, Russia.

Inquiry No. 1491.—For manufacturers of aluminium goods.

WANTED.—First-class man as superintendent of factory employing 500 hands. One thoroughly familiar with all lines of work entering into the construction of such goods as cash registers, etc. Must be practical, highly recommended, good systematizer and possess the ability to get work out rapidly and cheaply. A first-class opening for right party. Mills, Box 773, New York.

Inquiry No. 1492.—For a small outfit for casting type.

Inquiry No. 1493.—For machinery for making butchers' skewers and round wooden toothpicks.

Inquiry No. 1494.—For a manufacturer, in Canada, of small malleable castings.

Inquiry No. 1495.—For address of parties making rotary brushes.

Inquiry No. 1496.—For manufacturers of pressure gauges of special nature.

Inquiry No. 1497.—For the latest improved burglar alarm.

Inquiry No. 1498.—For manufacturers of household novelties.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.
References to former articles or answers should give date of paper and page or number of question.
Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.
Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.
Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.
Scientific American Supplements referred to may be had at the office. Price 10 cents each.
Books referred to promptly supplied on receipt of price.
Minerals sent for examination should be distinctly marked or labeled.

(8386) S. C. M. writes: In attempting to make the electric motor described in "Experimental Science," I ran up against a difficulty in that part described on page 501, where it tells you to space off the armature core into *twelve equal divisions*, etc. Now, if you use in each coil 8 convolutions of No. 18 cotton-covered copper wire, each coil will be ½ inch in width. Now I inclose diagram showing that if the coils touch each other on the inner circle of the armature you cannot get but 9 coils on the armature, the remaining space being not quite large enough for the tenth one. As the book is copyrighted by you I thought I would refer the matter to you and ask for explanation of the difficulty. A. The motor which you are building from plans in "Experimental Science" was built exactly as described before the book was printed, as was all the apparatus described in the book. And the number of coils were put upon the armature which the book calls for. You should wind 19½ turns of No. 18 cotton-covered wire to the inch instead of 16, as you state. The difficulty is that you have not wound the coils with sufficient skill.

(8387) H. S. asks: 1. Will you kindly explain in Notes and Queries how the dynamo of SUPPLEMENT No. 600 can give a 10-ampere current, as stated, when the armature is wound with No. 20 wire, which, according to the rule of 520 square mils per ampere, would carry a little in excess of 3 amperes only? A. S. P. Thompson, in "Dynamo-Electric Machinery," says: "Modern practice allows from 2,000 to 3,000 amperes per square inch, in conductors of ring armatures, and even up to 4,000 amperes per square inch in those of drum armatures. But in the magnet coils only about 2,000 amperes per square inch." This will increase your 3 amperes to about 5 amperes on each side of the armature, or 10 amperes in all. 2. In following Sloane's rules for designing armatures for a machine to charge a 10-volt storage battery I get an induction of 1 volt per 8 feet 4 inches with a core 3 inches by 4 inches. This is so low as compared with Hering's assumption of 1-1.4 volts per foot, both of these conditions being with a field (assumed) of 20,000 lines per square inch. Is it explainable simply by the difference of size of machines? A. Different types of machines have different lengths per volt. We have seen one well-known machine given at 12 feet 4 inches, and another at 1 foot 7 inches per volt. 3. I have a motor built for use for centrifugal sedimentation work, field wound with No. 13, armature with No. 16. This machine on 10 volts runs 1,400 t. per m. I wish to increase the speed to 2,000. Can I do so by winding the armature with coarser wire? As it is now at 1,400 t. per m. it consumes about 2 amperes. A. Try the motor with more pressure. It may speed up without over-heating. Try it with a resistance in shunt across the poles so as to increase the current, which it will take at the same pressure. If neither method succeeds in bringing the speed up to what you wish you will have to rewind with coarser wire.

(8388) U. S. W. asks: 1. Will the motor illustrated under Fig. 485 in "Experimental Science" and run by a plunge battery such as Fig. 394 be capable of furnishing power for an automobile on a small scale that will carry a person weighing not more than 125 pounds? A. No. Motor cycles are provided with motors with from 2 to 4 horse power. This gives power for ascending a steep grade. 2. What determines a man power, and how is it measured? A. A man power is not a definite quantity as a horse power is. It is variously estimated at from 1-10th to 1-7th of a horse power. The rate at which a man lifts his weight up a flight of stairs will give one mode of estimating a man power. A man lifting weights or shoveling will furnish another mode.

(8389) R. W. S. asks: 1. What is the voltage of a Ruhmkorff induction coil giving ½-inch spark? A. The voltage required to force a spark ½ inch long through air varies with the form of the terminal. A longer spark can be thrown between points than between balls. From 16,000 to 18,000 volts may be given as a probable mean value of voltage for ½-inch spark. 2. What is the proper number of cells for such a coil to produce a spark ½ inch long, and how should they be arranged? A. Two or three bichromate cells will work such a coil. They should be arranged in series. A proportionately larger number of cells of another sort, according to the voltage of the cells, is required.

(8390) J. A. R. writes: I have a 16-light 110-volt shunt-wound dynamo that ran for two months, giving good service. I started it up one night after standing idle for two or three weeks. After running for ten minutes carrying 8 amperes at 110 volts and the lamps at apparently full candle power, the voltage commenced to fall gradually until it reached zero, since which time the machine has been as dead as the traditional "door nail." Resorting to short-circuiting or "tickling" fails to energize. Exploring the field with a compass shows absolutely no polarity, the north pole of the needle being feebly attracted alike to both poles of the machine. With an 8-light machine (your SUPPLEMENT No. 600) as an "exciter" I can raise the lamps to about ½ candle power, but it will not excite its field from the shunt. With the assistance of a friend who built the 8-light machine and who has also rebuilt an Edison 3-kilowatt machine that had been destroyed in a fire, both of which have been doing good work for several years, I have been trying to solve the problem, but have failed. Can you suggest a remedy through your "Answers to Correspondents" column? A. Your machine behaves as if there were a break in the field circuit; but there are many other causes of failure to generate. They are fully stated, with the remedy, in Crocker and Wheeler's "Dynamo Tender's Hand-Book," price $1 by mail.

(8391) C. H. L. asks: 1. I am making a small electric motor to run with battery. Armature is of drum type, having 12 segments, and is 2 inches diameter and 2½ inches long. Fields are bi-polar, and "end on" toward armature. What size and how much wire must I use on each to make the motor safe to connect to an ordinary 110-volt light socket? I want to put two layers of wire on the armature. A. You cannot wind a motor to run with a battery and also connect with the 110-volt lighting circuit. You would better wind it for one use only. 2. How shall I charge a bichromate battery having a 1-gallon cell, carbon cylinder and porous cup? How much current will such a battery give, and for how long? A. The cell will have 1.8 volts pressure when freshly charged. The number of amperes it will give depends upon the resistance of the external circuit. It will give about six hours of rather heavy use. Our SUPPLEMENT No. 792, price ten cents, gives all particulars for this battery.

(8392) A. S. C. asks: 1. Would like to know whether there is any formula for determining the proportion of the total number of lines of force found within a given distance from center of the magnetic field in the case of bar electromagnets; and if there is such formula, where it can be found. A. These are matters of importance in designing dynamos and motors and are treated in books upon that subject. Among the best is Thompson's "Dynamo-Electric Machinery," price $6; with American Supplement, $7. 2. Would also like to know what primary current, volts and amperes is generally calculated to be used to produce a 1-inch spark from coil? A. To throw a spark through the air one inch requires from 28,000 to 30,000 volts. The amperes are inappreciable, or at least a fraction of one ampere. 3. Also, what size wire and how much and what current will make the strongest electromagnet with a core of annealed iron stovepipe wire, 1 inch in diameter and eight inches long? A. Wind eight layers of No. 12 B. & S. cotton-covered copper magnet wire upon the core. Shellac each layer well. Eight cells of bichromate plunge battery will bring it to its full power. For battery and its construction, see SUPPLEMENT 792, price ten cents.

(8393) J. B. J. asks: I have a fan motor which I wish to run on 10 or 12 sal-ammoniac cells. The motor is ⅛ H. P.; it is designed to run on 110 volts, 1 ampere, 2,000 R. P. M. It is of the shunt-wound Riker type. I wish to know if the windings should be changed. The field coils are of No. 38 wire, and the armature coils (24 in number) are of No. 34 or No. 36 wire. A. The motor will require to be rewound to run with a battery. You would better refer to the builders as to the changes to be made.

(8394) A. W. asks: How can I tell when Babbitt metal is hot enough to pour, when it is heated, to pour small boxes, also large boxes? A. Babbitt metal should be poured just when it is perfectly fluid, which may be known by gently shaking the ladle or stirring with a stick. It should not be red hot, as then it shrinks and is liable to make blowholes. If it is to be poured on a wooden core in place of an iron or steel core or journal, it should not be hotter than will run freely. The different grades of Babbitt metal do not melt at the same temperature, so that a little experience is required in using the different grades.

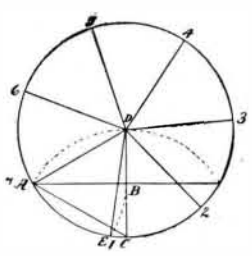
(8395) J. W. S. writes: Some four years ago I conceived the idea of restoring the vacuum to Crookes tubes without repumping. Knowing at the time that heat applied, especially at the cathode terminal, would facilitate the discharge of the current through the tube, I could not see why prolonged heat would not further reduce the vacuum, and perhaps permanently reduce it. I took my tubes, which were entirely beyond my control, and placed them in a hot oven, mounting them on wooden supports. I left them in the oven for 15 or 20 minutes, and found on removing them that the vacuum was so very much reduced that it took several hours' continuous running to render them effective. Since then I have used this method continuously. I have taken tubes that have been rejected as worthless, and brought the vacuum so low that it required much running to bring them back to effective work. Care must be used in placing the tubes in the oven; also in removing them.

(8396) G. S. writes: 1. I have a few questions here which I wish you would answer in the SCIENTIFIC AMERICAN for September 7, 1901. A. Your letter was received September 3. The issue for September 7 was in print at that time, else you could not receive your number on its date. An answer to an inquiry should not be expected under two or three weeks. 2. Have you a SUPPLEMENT telling how to make a simple-construction yet effective 110-volt dynamo, with illustrations of the work, and telling how to wind the magnets and the armature? A. SUPPLEMENT No. 865 gives plans for a 110-volt dynamo; price ten cents. 3. Can you run incandescent lamps on the same circuit with an electric furnace. A. Yes. 4. How many volts does it take to run an electric stove? A. One can be operated upon a current with any number of volts. 5. If a dynamo gives 6 volts running it steady, how many amperes and ohms would it have. A. No one can tell. The amperes must be measured by an ampere meter. 6. Please name and explain the different ways in which dynamos are wound? A. Series, shunt and compound wound. In the first the entire current passes through the field coils on its way to the external circuit. In the second the current is divided, a small part going to magnetize the field and the rest going to the external circuit. The third is a combination of the other two. 7. How many volts does it take to run a 1 horse power motor? A. Volts are only one factor of power. Power is measured by volts multiplied by amperes, which are watts; 746 watts are 1 horse power. 8. Could you run an automobile at a good rate of speed with a 1 horse power motor? A. No. 9. How many volts does it take to make a watt? A. A watt is one ampere flowing at a pressure of one volt.

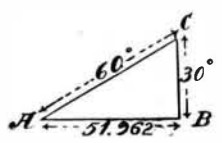
(8397) E. P. H. asks: 1. Can a steel electromagnet be made as strong, or stronger, than a soft iron electromagnet of equal size, current the same? A. The soft wrought-iron core will be the stronger. 2. What per cent of magnetism can a steel electromagnet be made to retain? A. The same amount which the same steel would retain as a permanent magnet. The strength of a permanent magnet varies greatly with different sorts of steel. 3. Could a permanent field dynamo be made more effective by putting a coil on fields? A. Yes. 4. If a solid steel ring be magnetized by placing a coil continuously around it, would any given point be + or — to an adjacent point? A. There would be little or no external magnetism. The magnetic flux would traverse the ring and would not emerge into the air. 5. Could a solid ring be magnetized in sections alternately + and — ? A. Yes. A dynamo with coils and pole pieces around a ring is such an arrangement. 6. What is the action by which an iron bar is driven out of a helix? A. It is repelled by the currents which are set up in the bar by the action of the main current. 7. Must the helix have a hollow iron core to get this "popgun" action? A. No. See SUPPLEMENT 762 and 763, price ten cents each, for valuable articles upon this and similar experiments. 8. In a double-expansion rotary steam engine can the cylinders be so proportioned as to each utilize 50 per cent of the available energy of steam? Or what is the nearest to equalization possible, and how should cylinders be proportioned to obtain it? A. For an equal division of the power of a two-cylinder rotary engine the expansion area of each cylinder should be in proportion to the initial and expansion areas of a theoretical indicator card for any given pressure and cut-off. This may be obtained by dividing an indicator card diagram into two parts of equal area; when the position of the dividing line will represent the proportional areas of the primary and secondary cylinders. 9. Why does a chicken bob its head while walking? A. The thighs of a bird's legs are within the skin of the body and are held very closely to its sides. Practically the only motion of its legs is one parallel to its backbone. The longer axis of its body is horizontal and swings sidewise as the bird walks. This gives a jerking motion to its neck in the other direction in order to preserve the equilibrium as much as possible. In birds with long bodies and short legs like the goose this waddling gait is very apparent. A man can imitate it by swinging the arms with the legs in walking. Swing the right arm forward when the right leg is advanced and the left side in the same manner. A man then waddles like a duck. 10. Why does it peck corn from alternate sides? A. Because the corn is on both sides. The hen has a flexible neck and a quick eye on each side of its head to detect food. You may be sure she does not pick up corn on each side alternately unless the grains attract her attention in that way. We do not think any rule can be laid down

for the hen on this point. She just goes ahead and picks up the best grain she can see, even if the last kernel was on the same side as this. 11. What number or numbers of SCIENTIFIC AMERICAN or SUPPLEMENT contain articles on liquid air? A. We can send you 22 numbers, at ten cents each, containing articles upon liquid air. 12. What other up-to-date literature can I get on the subject of scientific nature? A. Hardin's "Liquefaction of Gases," price $1.50; Sloane's "Liquid Air," price $2.50, both by mail. 13. In constructing an acetylene lamp, what should be the relative sizes of water and carbide chambers? A. For the chemical action 64 parts of carbide by weight require 18 parts of water also by weight. If you would keep the gas reasonably cool, a much larger proportion of water must be used.

(8398) P. H. T. writes: I send you a drawing of a circle divided into seven nearly equal parts. A professor of mechanical drawing, to whom I submitted it, said that as far as he knew it had never been done before. At the suggestion of friends I send you the drawing for insertion in the SCIENTIFIC AMERICAN, if you see fit to do so. The accompanying calculations show its accuracy within 0.5340, thus making it practically correct as far as mechanical drawing is concerned. My age is 13 years.



A CIRCLE DIVIDED IN SEVEN EQUAL PARTS. THE PARTS ARE NOT THE EXACT SEVENTH, BUT ARE WITHIN 0.53° OF BEING EXACT.



$A\,C = 60°$ $60^2 = 3600$

$B\,C = 30°$ $30^2 = 900$

2700

$\sqrt{2700} = 51.962+$

$\frac{1}{7} \times 360 = 51.428+$

0.534°

$A\,B$ is within 0.534+° of being the exact seventh of the circle.

A. We think your work very creditable to you considering your age. It is a new discovery for you, even if others may have found the same method of approximately dividing a circumference into seven parts.

(8399) B. R. asks: 1. The quickest and most accurate methods of preparing a normal sulphuric and a normal caustic soda solution? A. To form a normal solution of sulphuric acid add 98 milligrammes of the acid to a cubic centimeter of water. For caustic soda solution add 40 milligrammes of the sodic hydrate to a cubic centimeter of water. 2. Also kindly inform me what the desirable qualities of a lithographic stone are? A. No person can tell the quality of a lithographic stone without an actual trial. No lithographic stone of any importance has been found in this country. Consult a practical lithographer. 3. Kindly recommend a hook on physiology and one on hygiene. A. Foster's Physiology, price $4.50. A good school textbook would perhaps meet your needs, such as Blaisdell's, price $1.50.

(8400) W. McE. asks: Would you kindly give me, through your paper, a receipt or idea how the paste in storage cells is mixed, and if the paste in the positive is black lead or plumbago, and in the negative red lead, and are the plates connected with wire, or is the wire simply connected on one end to the positive and on the other end to the negative, or is each plate positive or negative connected by wire, or does the lacquer make the circuit between the positive and negative plates, and is the lacquer made out of sulphuric acid and water and bichromate of potash, and are the lead plates ordinary lead or chemically cured lead? A. The plates of a storage cell are made of ordinary lead cast into such a form as is desired. The paste is dilute sulphuric acid, 1 part acid and about 9 of distilled water and lead oxide, which is pressed into the openings in the lead plate usually with hydraulic pressure. The liquor of the cell is dilute sulphuric acid. The cell is now formed and put to use. The internal circuit is from the positive plate to the negative plate; thence out through the wire, through the external circuit and back to the negative pole of the battery. All this and much more can be learned from Salomon's "Accumulators," price $1.50 by mail.

(8401) S. E. W. asks: 1. Could not a 16-cell caustic potash battery composed of the large cells shown in "Experimental Science" be used to run the "simple motor" described in the same work? A. Yes. 2. Would not a battery of this kind last longer and be more economical than the bichromate battery? A. We do not think so. 3. Is the potash sold for making soap, under the name of lye, suitable for charging this battery? A. It will probably answer the purpose. 4. If so, what would be the formula for the solution, by weight? A. Sixty parts by weight in 100 parts of water. 5. What size wire should be used on the field and armature of the "simple motor" to adapt it to a 110-volt current? A. Use No. 28 B. and S. on field and No. 30 on armature.

(8402) J. G. von H. asks: Is the induced current in an induction coil direct or alternate? A holds it is alternate by relying on his galvanometer. I claim it is direct, but intermittent, because if it were alternate it would be impossible to charge a Leyden jar. Who is right? A. When a condenser is used, the induction coil gives an intermittent discharge, always in the same direction. The discharge in the reverse direction is suppressed. It is in this way that X-ray tubes have an anode and a cathode with a coil. If the current were alternating, these terms would not apply. You are right.

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October 8, 1901,

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