

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. 4111.**—For a machine for planing and sanding hardwood floors.
- AUTOS.—Duryea Power Co., Reading, Pa.
- Inquiry No. 4112.**—For manufacturers of agricultural and horticultural machinery.
- Morgan Emery wheels. Box 517, Stroudsburg, Pa.
- Inquiry No. 4113.**—For machinery for manufacturing aluminium.
- "U. S." Metal Polish. Indianapolis. Samples free.
- Inquiry No. 4114.**—For firms who fit up dock yards for government work.
- Coin-operated machines. Willard, 284 Clarkson St., Brooklyn.
- Inquiry No. 4115.**—For dealers in numbers and letters for placing on houses and streets.
- Blowers and exhaustors. Exeter Machine Works, Exeter, N. H.
- Inquiry No. 4116.**—For makers of portable machine saws for felling trees.
- Mechanics' Tools and materials. Net price catalogue. Geo. S. Comstock, Mechanicsburg, Pa.
- Inquiry No. 4117.**—For the manufacturers of a gasoline or kerosene engine called the Abenique.
- Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.
- Inquiry No. 4118.**—For manufacturers and inventors of vending machines.
- Let me sell your patent. I have buyers waiting. Charles A. Scott, Granite Building, Rochester, N. Y.
- Inquiry No. 4119.**—For dealers in powerful and first-class telephone transmitters and receivers.
- Metal cut, bent, crimped, embossed, corrugated; any size or shape. Metal Stamping Co., Niagara Falls, N. Y.
- Inquiry No. 4120.**—For makers of filtering tubes for water.
- WANTED.—Foundry foreman. Address with references and salary required. Foreman, Box 773, New York.
- Inquiry No. 4121.**—For makers of auto-trucks for hauling lumber.
- Machine Work of every description. Jobbing and repairing. The Garvin Machine Co., 149 Varick, cor. Spring Sts., N. Y.
- Inquiry No. 4122.**—For manufacturers of iron specialties.
- 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. 4123.**—For a machine for destroying quack grass.
- Manufacturers of patent articles, dies, stamping tools, light machinery. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.
- Inquiry No. 4124.**—For the manufacturers of the machine for cutting paper covers for milk bottles.
- Crude oil burners for heating and cooking. Simple, efficient and cheap. Fully guaranteed. C. F. Jenkins Co., 1103 Harvard Street, Washington, D. C.
- Inquiry No. 4125.**—For copper wire with an insulation that will stand a temperature of about 500 degrees F. or more, the insulating material not to increase the diameter of the wire more than about 75 per cent.
- The largest manufacturer in the world of merry-go-rounds, shooting galleries and hand organs. For prices and terms write to C. W. Parker, Abilene, Kan.
- Inquiry No. 4126.**—For the manufacturers of the "front-cut rear-delivery automobile harvester."
- We manufacture anything in metal. Patented articles, metal stamping, dies, screw mach. work, etc. Metal Novelty Works, 43 Canal Street, Chicago.
- Inquiry No. 4127.**—For makers of power machinery for making fish nets.
- Experienced mechanical draughtsman wanted. Permanent employment assured to rapid and accurate draughtsman. Mill Work, Box 773, New York.
- Inquiry No. 4128.**—For the inventor or manufacturers of a machine used for foaming headache powders.
- 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. 4129.**—For manufacturers of Home Savin's Boxes.
- Contract manufacturers of hardware specialties, machinery stampings, dies, tools, etc. Excellent marketing connections. Edmonds-Metzel Mfg. Co., 778-784 W. Lake Street, Chicago.
- Inquiry No. 4130.**—For dealers in pigments, also for dealers in glazed stone and glass bottles.
- WANTED.—A competent superintendent, with a knowledge of drafting, for a growing manufacturing business in automobile parts and gears. Address Superintendent, Box 773, New York.
- Inquiry No. 4131.**—For dealers in machinery for use in optical plants.
- The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$5 Munn & Co., publishers, 361 Broadway, N. Y.
- Inquiry No. 4132.**—Wanted, catalogues, price list and trade discounts for wire, fittings, sundries and complete plants.

NOTICE TO TUNNEL CONTRACTORS.

Sealed proposals marked "Bid for Tail Race Tunnel" will be received by the undersigned until noon, May 11, 1903, for the construction of a tail race tunnel for the Toronto and Niagara Power Co., of Toronto, Ontario. Plans and specifications for this work are on file, and can be seen after March 30, 1903, at the company's offices at Home Life Building, Toronto, Ontario, and Niagara Falls, Ontario, or office of F. S. Pearson, No. 29 Broadway, New York, Room 230. The right is reserved to reject any or all proposals. Frederic Nicholls, Vice-President and General Manager, Home Life Building, Toronto, Ontario.

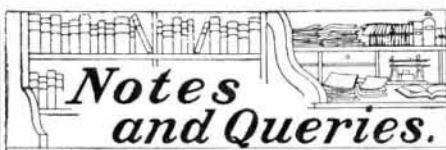
Inquiry No. 4133.—For manufacturers of machinery for making steel lead, lead pipe, lead syphons or traps for sewerage work and collapsible lead tubes for holding india rubber solution, toilet preparations, etc.

Inquiry No. 4134.—For manufacturers of spring wire covered with black silk.

Inquiry No. 4135.—For manufacturers of roofing and school slates.

Inquiry No. 4136.—For makers of cups that will melt from 3,000 to 6,000 pounds of iron in 1½ to 2½ hours.

Inquiry No. 4137.—For manufacturers of webbing suitable for halters for horses.



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.

(8978) R. T. B. writes: Will you please inform me if 1,000 feet of natural gas as measured by meter, meter being fed from gas mains where the pressure is four ounces, will measure the same number of feet when the pressure is but two ounces in the gas mains? If not the same, what will be the difference in the number of feet? A. The meter will give the largest volume of free gas at the higher pressure; and if you are buying gas at 4-ounce pressure by meter, you will obtain more free gas than if measured under 2-ounce pressure. The difference is only about 0.005 of the volume as measured by the meter.

(8979) F. P. asks for SUPPLEMENT, No. 600, containing a 1 horse power dynamo which can be turned by two or four men. Will you please let me know if by the application of any mechanical movement, it could be turned by one man for a couple of hours? A. There is no possible way in which a man can do 1 horse power work for even a moment. Engineering authorities agree that a strong man can do about ¼ of a horse power of work. And there is no machine possible by which a man can increase the horse power of work which he can do. On this point there is much popular ignorance of the function of a machine. A machine may enable a man to move a weight which he could not otherwise move, but he must move it with proportionate slowness. Thus, if a man could just move a weight of 300 pounds one foot a second, by the aid of a machine he might move a weight of 1,200 pounds, but he would only move it with a velocity of 3 inches per second, disregarding the friction. Or on the other hand, he might by a machine move a weight of 100 pounds, and could then move it 3 feet a second. But by no possible application of machinery could the man's work become greater than 300 foot-pounds per second. Of course, this is a mere illustration, since no man could do as much as 300 foot-pounds of work per second. A horse power is 550 foot-pounds per second, and a man's power does not much exceed 70 foot-pounds per second. It will be evident then that if a dynamo requires 1 horse power to drive it, not less than eight men would be required to do this work, for any length of time.

(8980) G. L. asks: 1. In making estimates on atmospheric pressure, using as one atmosphere 15 pounds and two atmospheres 30 pounds, what would be the pounds pressure at 3, 4, etc., up to 25 atmospheres? A. The air pressure is any number of atmospheres less one, multiplied by 15. Thus, 10 atmospheres less 1 is $9 \times 15 = 135$ pounds, and so on. 2. What would be the degrees of heat required (without loss) to get 1, 2, 3, etc., up to 25 atmospheres of steam from water at 32 degs. and 60 degs.; and the increase of pressure at each change in same sized chamber? A. The total number of degrees from 32 degs. to 212 degs. in steam at atmospheric pressure is 180 degs. Fahr.; at 2 atmospheres by gage, 240 degs.; 3 atmospheres, 273 degs.; 4 atmospheres, 291 degs.; 5 atmospheres, 305 degs.; and so on at a decreasing rate, each atmosphere being 14.7 pounds. See steam table of pressures, temperatures, heat units, etc., in Haswell's "Engineer's Pocket Book," \$4 by mail.

(8981) S. B. asks: 1. Will you please tell me a good way to amalgamate a "Daniell zinc" for Fuller battery? A. A battery zinc is amalgamated by first dipping it into diluted sulphuric acid; acid 1 part, water 10 parts. Pour the acid into the water with constant stirring. When the zinc is well cleaned, dip it into mercury, or apply mercury to it in some other way. If the mercury does not readily adhere to the zinc in any spots, dip again into the acid and rub the mercury upon the bare spots. 2. What causes the following troubles? I have four carbon sal-ammoniac (open-circuit) batteries; in cool weather they become very weak, but in warm weather they work all right. A. If your cells do not work well in a cold place, try them in a warm place.

(8982) G. H. S. asks: 1. Please tell me if it is necessary to have alternators running in synchronism before connecting them in parallel, and if so, why? A. Alternators are brought into synchronism before they are connected in parallel. If a machine has a low armature reaction a heavy cross current may be produced if they are out of step. If the

armature reaction is high, there is less danger of a heavy cross current due to lack of synchronism, or difference of wave form. This is treated at some length in Cudin's "Standard Polyphase Apparatus and Systems." 2. What is a "copper voltameter," and how shall I measure the strength of a current by means of such an instrument? A. A copper voltameter is a jar containing two copper plates and a solution of copper sulphate. When a current is sent through the jar, one plate increases and the other diminishes in weight, in proportion to the strength of the current and the time it flows. One ampere will deposit 0.0003281 gramme in one second. The instrument is not used for measuring currents practically. The amperemeter has taken its place. A zinc voltameter was once employed as an electric meter, but this has given place to the recording wattmeter.

(8983) L. D. G. asks: If a cannon is exploded by electricity on an island a thousand miles from any living being, does it produce sound? A. The answer to your inquiry depends upon the definition given to "sound." It has two definitions. One is: "Sound is the sensation produced in the mind through the ear by certain rates of vibration of elastic bodies." In this sense a sound does not exist unless there is an ear to receive and transmit the sensation to the brain. The other definition is: "Sound is a mode of vibration capable of affecting the auditory nerve." In this sense a sound exists wherever there is a vibrating body whose vibration would affect the auditory nerve, if there were an ear to receive these vibrations and transmit them to the brain. Sound is, in the first sense, physiological; in the second sense, it is physical. In the first sense of the word the cannon on a desert island does not produce a sound. In the second sense of the word the cannon does produce a sound, whether any ear is near enough to hear it or not.

(8984) F. W. G. asks: 1. How many pounds pressure is there at a faucet, if 17 quarts of water pass through a 3-16-inch hole, and 22 quarts through a ¼-inch hole in one minute? A. Seventeen quarts of water passing through a 3-16-inch hole per minute indicates a pressure of 18 pounds per square inch; 22 quarts passing through a ¼-inch hole, 10 pounds pressure per square inch. At 18 pounds pressure you will need a 7-16-inch nozzle for a quarter horse power. At 10 pounds pressure you will need a ¾-inch nozzle. 2. Can I get one-quarter horse power at such pressure? If so, please state what size wheel I must use. A. See SUPPLEMENT, No. 1049, for illustrated description of small water motors and their power; 10 cents mailed. 3. I have an Edison electric motor taken out of a phonograph, the same style as is illustrated in Hopkins' "Experimental Science," page 731. The armature has forty coils. Can I use the armature in a sheet-iron field, like the simple motor, page 498, in Hopkins' "Experimental Science"? Will it be as powerful as the simple electric motor? A. The armature from the phonograph is suitable for the sheet-iron field, page 498, "Experimental Science." Use No. 16 cotton-covered wire for the field pieces.

(8985) C. O. G. asks: Could you give me the recipe for a pocket battery suitable for a small induction coil? A. A paste for a dry cell may be made by taking oxide of zinc, 1 part; sal-ammoniac, 1 part; plaster of Paris, 3 parts; chloride of zinc, 1 part; water, 2 parts. All these, by weight, are mixed. The sal-ammoniac should be first dissolved in the water; the other chemicals are not very soluble.

(8986) W. G. L. says: May I ask one or two questions regarding the construction of a kaleidoscope? 1. If the diameter of the box containing objects to be reflected is 4 inches, what length should cylinder containing the reflectors be? A. The length of the tube of a kaleidoscope seems to be a matter of choice simply. We have one nearly 4 inches in diameter and 8 inches long, and one 2 inches in diameter, which is much longer, while another comes between the two both in length and diameter. 2. What kind of a glass is best for reflectors—smoked glass or mirror glass? A. A common glass painted black on one side is most often found in these instruments. We never saw one with a plate of mirror. 3. For a 4-inch diameter disk, would three or four reflectors be the more effective? A. Whether two or more reflectors be used is determined by the figure to be formed in the instrument, and not by its size. If two reflectors are used, placed at an angle, the field is star-shaped, with as many points as the angle of the glasses is contained in 360 deg. If three pieces of glass are used, an equilateral triangle is formed in the center of the field of view, and at each of its angles are to be seen five other triangles like it. We have never seen four plates used as reflectors. The whole thing costs so little besides time to make that you can best determine for yourself the various effects by a paste pot and some cheap cardboard. 4. The outside disk is ground glass, and the inside one plain. Are the reflectors (rather the end of the reflectors) supposed to touch the inside disk, or merely close to it without actual contact? A. It can make no difference whether the ground glass disk touches the reflectors or not. The colored objects are not in view except when they are in the angle of the reflectors, and this is but a small part of the angle of the box in which they roll about.

(8987) C. P. asks: 1. Can oxygen be condensed in small quantities? A. Oxygen can

be compressed to any extent desired. It is compressed in large quantities every day. 2. How much space would one-half hour's supply occupy in cubic inches? A. From 18 to 20 cubic feet of oxygen will be required by an average man for a half-hour's full breathing; 20 cubic feet compressed to one cubic foot would have a pressure of 300 pounds per square inch. 3. Is oxygen used practically for any purpose? A. Oxygen is used for certain purposes, though generally it is sufficient to use it as it exists mixed with nitrogen in the air. It is employed undiluted in the manufacture of platinum articles; in the calcium light; for purifying illuminating gas; and in medicine. It would be more extensively employed if it could be produced more cheaply. 4. Do divers still use air pump or oxygen? A. Divers have the air pumped down to them. 5. Is oxygen very expensive? If so, about how much? A. Compressed oxygen may be had for about 15 cents per cubic foot.

(8988) J. C. McC. asks: I would like to know if an incandescent lamp requires more current toward the end of its life than at the beginning. A. If an old incandescent lamp is to be kept up to candle power, more voltage must be put on to force the necessary current through it, since its resistance has increased by the decrease in the size of the filament. With no increase of pressure the light of the lamp decreases, since less current flows. It is poor economy to use such a lamp. It should be replaced by a new lamp. Most users of lamps keep them in service too long.

(8989) T. K. asks: Is it not a fact that since the earth was thrown off from the sun, or since the sun first appeared to shine upon the earth, there has been but one continuous day and night, which never "ends and begins," as the common saying is and the almanacs state? A. In a sense the fact is as stated, but it is not the common sense. If is a matter of common experience that day and night succeed each other at the place where we live. The earth presents one-half to the sun all the time. This half is every moment changing. This half is the half upon which it is day. Night is caused by the shadow of the earth, which extends away into space from the sun. When we enter this shadow, we have night. This is the common and universal usage of the words "day" and "night." There is no day or night for the earth outside of the earth's atmosphere. The energy of the sun does not become light till it strikes some material. Then its vibrations are changed so the eye may perceive them when they enter the eye.

(8990) F. S. L. writes: 1. What is meant by the sparking limit of the load of a dynamo? A. We do not know what "sparking limit" is, unless it be the distance beyond which a spark will not pass through the air. 2. What causes sparking? A. Sparking is caused by difference of potential. 3. What causes the neutral points in a dynamo to shift when a current is flowing in armature conductors? A. The rotation of the armature causes the lines of force in the space between the poles to be curved in the direction of the rotation, hence the brushes must be rocked forward till the position of least sparking is found. 4. What limits the output of a constant potential dynamo? A. The rise of temperature in the wires, as also the resistance of the external circuit and other minor causes, limits the output of a dynamo. Why do carbon brushes spark less than copper brushes under the same conditions? A. A brush in the neutral position, and with good contact with the armature bars, does not spark.

(8991) L. G. says: Please tell me what amount of water can be evaporated per pound of coal in the following manner: 1. Surface evaporation in a tank 10 feet by 10 feet and 12 inches deep? A. The surface evaporation from a tank depends upon the surface extension of its bottom, to enable it to absorb the greatest amount of the heat of combustion. The greatest possible amount of evaporation may be from 12 to 13 pounds of water per pound of coal. 2. Surface evaporation in a tank 10 feet by 5 feet and 24 inches deep? A. There will be but little difference as to the depth, after the water has been raised to the assigned evaporating temperature. 3. Boiler evaporation at 10 pounds pressure? A. Boiler evaporation at 10 pounds pressure is about 11 pounds water per pound of coal. 4. Boiler evaporation at 100 pounds pressure? A. Boiler evaporation at 100 pounds pressure, 9 to 10 pounds. What amount of water can be converted into steam per pound of coal in the following manner: 5. By ejecting water with a temperature of 222 degs. Fahr. into space? A. About 6 per cent of the volume, according to the condition of the atmosphere. 6. By ejecting water with a temperature of 312 degs. Fahr. into space? Are there any books that will give this information? A. About 12 per cent of the volume, according to atmospheric conditions. See a book on heat by Box, \$5 by mail.

(8992) W. L. asks: What is the pressure in pipe organ bellows per square inch? Is there a difference in pressure for the reed and flute stops? A. The usual pressure in the bellows of a pipe organ varies from 3 pounds to 7 pounds, and possibly to 9 pounds per square inch. The great, swell, and choir organs usually have three pounds. The solo, trumpets, and tubas may run to 5 pounds, 7 pounds, and even to 9 pounds. Reed and flute stops do not have different pressures, as is shown by the