too small, how should motors in SUPPLEMENT 1195 be wound so as to act as dynamos also? A. The winding of a motor does not need to be changed to make it generate as a dynamo. 5. Is there any special danger on an electric automobile, whether still or moving, in a thunder-A. An electric automobile is not exposed to any more danger in a thunder-storm than any other. We do not recall ever hearing of any person being struck by lightning upon a railway train. 6. In the inclosed sketch, if Uis a one horse power motor, with 3-inch pinion meshing into 30-inch gearwheel, connected to 18-inch rod, JH, and this joined to 6-foot lever, HF, working on fulcrum, G, five feet from power end, what horse power will be obtained at A on the bent axle, DCABE, which is connected to lever, HF, by 18-inch rod, A F? A. With the arrangement you describe you will have at the end of the train of wheels and levers one horse power less whatever has been lost in friction at the several bearings. No one can calculate this. It must be found by experiment, and will depend upon the condition of the machine. 33,000 foot-pounds of work done in a minute. It is not affected by the speed of motion nor by the weight lifted. If the speed is great a less weight will be lifted by a horse power; and if the weight is great, the less will be the speed. Your arrangement reduces speed and increases pressure, or weight lifted, but the amount of power remains the same. The 30inch gear moves one-tenth as fast as the gear which drives it, and the end, F, of the lever moves one-fifth as fast as the end, H. Hence F moves one-fiftieth as fast as the small gear on the motor.

(8260) J. F. C. asks: What is the fraction of power lost in the current produced by a generator which runs a motor, the connecting wires being not longer than 10 yards? That is, what is the relative power of motor feet? Will it require a greater capacity of and generator? Both are the same size. What size of a booster would be required to have both equal? A. A motor only thirty feet from it will be necessary to use a mechanical air the dynamo which furnishes the current for running it has little or no drop of potential from that of the dynamo, and needs no booster. The only loss is due to the heating of the coils by the current.

(8261) B. H. G. asks: Please inform me through your Notes and Queries the principle and details of the radiometer? A. The radiometer is a heat instrument. Light has no connection with it. It consists of a glass globe, usually about two inches in diameter, exhausted to a suitable degree. Within is a steel pivot upon which revolves a cross arm carrying four vanes of aluminium, one face of which is blackened by carbon. When heat falls upon the vanes the black faces absorb more than the bright and are hotter. The molecules of air coming in contact with the black faces are heated more than those coming in contact with the bright faces and rebound with more force. The reaction of this rebound causes the vanes to revolve with t black faces in the rear. The globe itself; has been made to show a tendency to rotate in the opposite direction to the vanes, this being due to the bombardment of the inner surface of the glass by the stream of molecules which rebound from the vanes. Thus the radiometer is a heat engine, transferring heat from the black side of the vanes to the surface of the glass opposite. A satisfactory explanation of the phenomenon is given in Barker's "Physics," price \$3.75 by mail. See also Supplements 13, 37, price ten cents each. 2. Please state also whether energy exists in light, and to what extent. A. Light and heat are now classed together as radiant energy by scientists, and the energy of both is measured by absorbing some material and determining the heating effect it produces. The energy of light as light has not been measured by any mechanical effect which it can produce.

(8262) G. B. W. asks: 1. Does the magnetic field of an inductor dynamo rotate just as if the field coil were fastened to the inductor? A. No; we think the type you name does not. 2. In a slotted armature does the field have to cross an extra wide air gap due to the depth of the slot? A. No; the air gap is smaller in a slotted armature. The lines follow the iron in preference to the air, and do not pass out at the bottom of the slots. 3. Does a conductor cut the lines of force or do the lines of force cut the conductor? That is, do the lines of force break on one side of the conductor and reunite on the other when it is swept through the field on the armature of dynamo? A. Lines of force are not like threads, to be cut. They are not of material substance, and are not cut in any such sense. The wire passes through the field and is resisted in doing so with a force which has a certain value and effect in generating an electric current which is well expressed by the convention of imaginary lines. The lines are as imaginary as the earth's equator. 4. Is there an arc lamp which does not throw shadows because of the up-and-down rods by the side of the carbon? A. Lamps have been made which do not throw shadows. There need be but a small conductor to carry the current to the lower carbon.

(8263) W. B. asks: In issue of June 1 Notes and Queries No. 8198, 5,846 deg. F. is given as the latest figure for the melting point of platinum. Is this misprint for 3.846? A. No; the error in the melting point of platinum arose from using a temperature which was in Fahrenheit degrees as if in Centigrade degrees. The melting point of platinum is 

C., which would be equivalent to about 3200 deg. to 3992 deg. Fahr.

(8264) S. C. asks: 1. Please 1et me know the amount of iron wire which is neces sary for the core of the armature of the simple motor described on page 500 in "Experimental Science.". A. About a pound of wire is required. 2. Would the carbon plates made by the process given on page 705 be all right for the plunge battery on page 401? A. Yes, if well made; but we do not advise an amateur to attempt the manufacture of carbons. He cannot obtain very good results, and they are very cheap in the market. 3. How much bichromate of soda is required for one charging of the same battery? A. To every 6 quarts of water take 3 pounds of sodium bichromate and 1 quart of strong sulphuric acid.

(8265) F. S. L. writes: I would like to know how to make a sparker or a spark coil, and in what way it differs from an induction coll. I want to make a spark coil to use to ignite an acetylene gas jet. A. Spark colls are made about ten inches long. The center is a core of iron wire as in an induction coil It may be % inch in diameter. Insulate the core by wrapping it with paper which may be soaked in parasine. Fit heads upon the ends of the core to hold the winding and wind four to six layers of about No. 12 B. & S. double cotton-covered wire upon the core. Insulate the layers with paper. This coll is put in series with a battery, and upon breaking the cir-cuit a spark is produced at the break which lights the gas. There is no secondary coil. In this is the difference between a spark and an induction coil.

(8266) J. L M. asks: What is the most practical and least expensive process to produce, as near as possible, an absolute vacuum in a chamber containing about four cubic power to empty a large space than it will a smaller one? A. To exhaust so large a space pump. It is not possible to produce an absolute vacuum by any means of exhaustion. It will, however, not require any greater power to empty a large reservoir. It will require more

(8267) A. L. N. asks: 1. Are there any known substances, preferably metal, which allow some kind of gas to pass through, about the same as light through glass? If so, which? A. We do not know any such metal or substances. The molecules of any gas are much too large to pass between the molecules of a metal. Red-hot cast iron will allow some gases escape through it, but not with the with which light passes through glass. 2. Are there any known substances, preferably metal, which will change temperature, when immersed in some gas? If so, which? A. Powdered anti-mony or heated copper foil will burn with the evolution of light if dropped into a jar of chlorine gas.

(8268) E. V. V. writes: I have had some little trouble in convincing a man that ice forms on the bottom of a running stream of water, but having seen the same I know I am right. Would you kindly answer same in your valuable paper? A. Anchor ice is often to be seen fastened to the stones on the bottom of a stream, and also to the timbers around a mill. Very frequently mills are stopped by the anchor ice during a very cold

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8	Nut lock, T. E. Shortell.  Oar making machine, W. T. Jones. Oats process, rolled, J. D. & H. R. Nagel.  Offset webs, method of using, J. L. Firm Oil, etc., apparatus for distributing or feeding coal, J. G. Branch.	677,768 677,789 677,736 677,755 677,560
0	ore bucket dumper and chute, L. Collier Ore roasting furnace, J. Roger Ores, apparatus for the treatment of, J.	677,701
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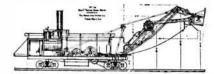
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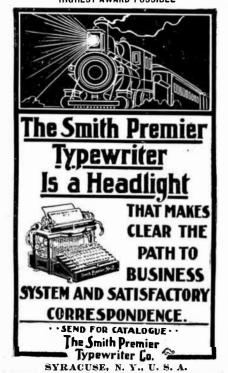
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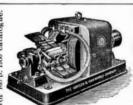




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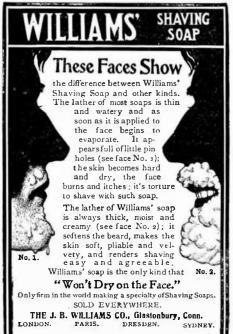
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