Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in the following week's issue

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 This is for our information and not for publication.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.

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.

(4719) H. H. B. asks: What is it that makes telegraph wires hum on a cold stormyday when there is no apparent wind blowing? A. There is wind blowing across the wires somewhere in the neighborhoo , or the striking of the wires by the rain makes the humming.

(4720) W. H. T. writes: Please give rule for setting a carriage axle, and what receipt can you give for heating iron through in the shortest time? A. The bottom of the taper axle should be horizontal or parallel to a straight line through both axles. For very light carriages some prefer to have the underside droop a little, so that the wheels tend to run toward the shoulder. Iron should not be heated in the shortest time for its good. We have no receipt but a forge fire for heating iron in the shortest time.

(4721) W. C., Wichita, asks: Can soft pine floors be polished to look like hardwood, so that rugs may be used instead of carpets, and how? A. Soft pine if freshly laid makes a good surface for polishing, and according to the selection of the wood by its grain may be made quite ornamental. A floor that has been used should be made perfectly clean, and if possible planed. Then a coat of boiled linseed oil, well rubbed into the floor and dried, gives a good surface for wax polishing, which may be made by dissolving a half pound of beeswax in a quart of turpentine. With this rub the floor to a polish with a hard brush or a coarse flannel rubber.

(4722) M. B. asks where he can get aluminum steel or nickel steel, also state if it is adapted for tune (musical instruments). A. Aluminum and nickel steel are not as yet regularly on sale. Their manufacture so far has been experimental, and with steel works supplying steel for ordnance and armor plate. A few trials have been made for tools, but manufacturers do not see enough in it to induce its introduction to the market as tool steel. Probably it will make good music wire, as it is said to be slightly harder than carbon steel.

(4723) H. H. says: I would like to ask how large a boat an engine with a cylinder 2½ by 3 inches stroke would move at the rate of about 8 or 9 miles per hour. I would like to make the boat of sheet metal if it will not be too heavy. I expect to carry about six persons. Do you think No. 18 iron would be too light for the sides of the boat, if it were well braced? Please state what would be best for a boiler for such a boat. Would ⅛ sheet copper be heavy enough if I make a porcupine boiler with the shell 8 inches in diameter and copper tubes brazed into it? Would you recommend this form of boiler for the purpose? A. Your engine is suitable for a 16 foot boat with a 15 inch propeller, with which you may make 7 miles per hour. You will find difficulty in making good lines for your boat with metal, unless you have the proper dies to press the metal into form for a boat. No. 18 will be thick enough. Your boiler should have 24 square feet of fire surface. You cannot make a porcupine boiler by brazing in the tubes. It makes the metal soft and the joints will not be reliable. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 702, for illustrated description of small pipe boilers.

(4724) J. J. G. writes: If I fill a tub say half full of water and place it on the scales, and then put into the tub a fish weighing say twenty pounds, will the tub, fish, and water weigh any more than the tub and water did before the fish was put into it? I mean to take a live fish. A. The tub and water will weigh as much more as the weght of the fish, whether it be alive or dea . Anything that has weight, if placed in the water, adds its own weight to the water. 2. Will a log or boat drifting in tide water go faster than the water that propels it? A. The boat or log may drift slightly faster than the surface current, for running water does not move with the same velocity throughout its depth, but moves faster just below the surface than on the surface and at the bottom. With anything floating with some depth, the faster undercurrent will propel it faster than the surface current. 3. Will you please tell me how to braze iron with brass or copper? A. For brazing iron, cut small strips of sheet copper or brass, make the surfaces to be brazed clean, and rub the surfaces with borax or wet them with borax ground to paste in water. Wire the parts together, apply a strip of the copper or brass to the edge of the joint on the upper side, and apply borax to the solder. Heat slowly to the melting point of the copper or brass, which will draw entirely through the joint.

(4725) C. A. R. asks: 1. How many volts does it take to run a 16 candle power Edison lamp? A. The standard Edison lamp is 110 volts. 2. Can you tell me of some cheap book that tells how to make a storage battery that will run a 16 candle power lamp? A. Any storage battery will run a 16 candle power lamp, provided you have enough cells to produce the required electromotive force. It will require 26 cells to run one or two 50 volt 16 candle power lamps. You will find such a storage battery described in "Experimental Science," also in the SUPPLEMENT. 3. Can you run a lamp with bichromate of potash for any length of time, and how many cells would it take? A. You can run a lamp by bichromate batteries, but it is an expensive and troublesome method of making light. 4. Can an electroplating dynamo be used for running a lamp with success? A. The electromotive force of an electroplating dynamo is too low for electric lighting purposes. 5. Can you tell me of any cheap book that tells how to make and cast carbon plates? A. You will find a description of a method of making carbons in "Experimental Science."

(4726) W. O. S. asks how the windows of a store can be kept clear from steam in cold weather. A. In order to have clear glass in show windows, the air behind the glass must be of about the same temperature as the outdoor air. The windows may be made completely clear by a second window to completely inclose the show window back of the goods. The inclosure to have small ventilators at bottom and top, which can be closed when necessary to prevent the entrance of dust.

(4727) T. B. P. writes: One night during the recent cold spell, on going to my window, I noticed that considerable moisture was collected on the panes. Nearly opposite the house is an arc lamp. When I truned my head in its direction, I was astonished to see three separate and distinct rainbows, seemingly clustered around the light as a center. Each bow was clearly defined, and there was a clear space between each one. I have never seen or heard of a rainbow of this description, and had never supposed that such a formation was possible on a plane surface. A. If the moisture was frozen, the phenomenon to which you refer was that of diffraction. The colors are caused by the passage of light over the fine edges of the crystals. You will find this matter described in the SCIENTIFIC AMERICAN, vol. 64, page 281, also in "Experimental Science."

(4728) I. H. L. asks how steel is blued. Such as watch and clock hands, rifle barrels, etc. A. The bluing of watch and clock hands is done by polishing the surface and heating upon a hot iron plate and cooling in water as soon as the proper color is obtained. For the bluing of rifle barrels see SCIENTIFIC AMERICAN SUPPLEMENT, No. 830, "Gun Wrinkles."

(4729) J. M. R.—The object you describe is a fungus known to science as *Corynites Ravenelii*. It belongs to an order which includes several genera, the species of which are popularly called "stink horns," on account of their shape and their offensive odor.

(4730) H. J. D. asks if the electric motor in SUPPLEMENT, No. 641, can be used as a dynamo. How fast should it be driven? If so, what power of an engine would be required and what electromotive force, and how many amperes of current would it give? A. The electric motor to which you refer can be used as a dynamo by substituting a cast iron field magnet for the wrought iron one, but we would advise you to follow some other form of machine for a dynamo. No calculations have been made to show what electromotive force or current the motor would yield if used as a dynamo.

(4731) S. K. G. asks: What causes the so-called "burning out" of an incandescent lamp? Is it always the result of the burning and breaking of the filament, caused by its life limit being reached, or is it sometimes caused otherwise? Also, does this burning out destroy or partly destroy the vacuum in the glass bulb, or does it remain as perfect as ever? A. The burning out of incandescent lamps is generally due to the disintegration of the carbon by the current. It is, however, sometimes caused by a leak in the bulb and the burning out or actual consumption of the carbon due to the presence of oxygen. The failure of the carbon filament does not necessarily affect the vacuum.

(4732) J. E. Q. asks: 1. What is the easiest and quickest way to remove the copper coating on arc light carbons, without injury to the same? A. You can remove the copper from carbons by means of nitric acid. After the copper is dissolved wash the carbons thoroughly with water. 2. How is insulated copper wire wound on curved field magnets, the outside being so much greater than the inside curve? A. The coil of wire is allowed to spread on the outside.

(4733) J. B. D. asks: How can I construct an inexpensive telephone for communication between a couple of rooms? A. Over two short tin tubes 1½ inches in diameter stretch moist diaphragms of parchment, and secure them by means of fine copper wire or strong thread. Pierce the diaphragms at the center, connect them by a strong thread passing through the perforations and knotted on the inside of the diaphragms. This will form an effective acoustic telephone.

(4734) Y. M. C. A.—Hard-drawn iron wire has more resistance than soft iron wire. Taking the resistance of copper as 1, the resistance of iron would be a little more than 6, and of German silver 13. We can furnish copies of recent patents at 25 cents each. To become an electrical engineer, you should attend one of the electrical schools, or the electrical department of one of the colleges. A mixture of litharge and boiled oil makes a cement in which there is no moisture. Oxide of zinc mixed with a solution of chloride of zinc makes a hard cement which is practically dry as soon as it sets.

(4735) N. L. asks: What solution is best to preserve wood from warping or drawing when exposed to rain and weather? A. Nothing better than thorough oiling with linseed oil to keep wood from warping.

(4736) F. J. O. asks: Which consumes the most power—a bevel gear or a mule stand? They are used to transmit power from one shaft to another acting at right angles. A. "Mule" loses more power than good bevel gear. Friction of the two pulleys, friction of belt and creepage is the cause of loss of power.

(4737) J. R. W. asks how to make soft solder take to chilled cast iron. And also how to soften chilled cast iron. A. Use pure tin, or 2 parts tin, 1 part lead for solder; flux with muriate of zinc and ammonium chloride. It is well to rub the rough surfaces, if it is a fracture, with a brass wire brush, so as to give a coating of brass. The soldering is apt to be very unsatisfactory. (Tinner's soldering acid.) Soften chilled iron by long annealing in an iron box charged with pulverized charcoal.

(4738) F. L. S. says: We have a set of hay scales and sometimes we have to weigh wagons that are too long to go on them. Can we get the correct weight by weighing one end at a time and then adding the two weights? A. Weighing a wagon as you propose will be approximately correct.

(4739) A. R. P. asks: Where can I learn something about the formation of dust balls in old violins? A young friend of mine has found such a ball in his violin, and thinks he has heard they are not uncommon in old instruments. Are they mentioned in any scientific book or treatise? A. We have no literature referring to dust balls in violins. One of the oldest dealers in violins in New York thinks it a mere accident from allowing the violin to be exposed to dust, and the vibration gathering the dust that accumulates on the inside, in time forming a ball.

(4740) D. C. writes: We are located in the vast gently undulating prairie, and have fine spring water, generally found in the slight depressions. Often we need to locate the origin of these springs, but find it next to impossible. Will you kindly instruct us how to, without extensive digging? Except for these gentle undulations, we must go one or several miles from the spring to find an elevation of 50 to 100 feet above them. A. The slight depressions in the land where springs occur are only the seepage points from the local surface water of the immediate neighborhood. It is seldom that they have a deep origin, although considerable elevation of land at a moderate distance will add to the flow of sprirgs along the valley lines of depression of the land.

(4741) S. T. writes: I have a house painted and sanded. It has at least 8 coats of paint and sand on it. It has begun to blister. Will you please let me know the best way to get the paint off the woodwork so that I can repaint it and make it look nice? Some of our painters here say burning is best. That is a very slow process. Would it not be best to take it off with some kind of acid? A. Probably the burning process is best and quickest. The blowpipe burner with a broad flame should be used, and with a broad scraper the paint will be quickly removed. Potash lye may be used, but is not so satisfactory as burning.

(4742) E. P. W. writes: I wish to know the exact horse power it will take to pump water in a suitable sized cylinder, with an opening of one-half inch constantly open, and maintain a pressure in cylinder of one thousand pounds pressure per square inch. Will a dynamo of one hundred horse power run an electric motor of one hundred horse power? Suppose they were side by side, what loss would there be in horse power between dynamo and motor? A. You will require 12 horse power in maintaining the jet under the pressure named. The friction of a pump to do the work will require at least 4 horse power more, or 16 horse power in the steam cylinder of the pump. There will be from 10 to 15 per cent difference in the horse power of the two motors as described.

(4743) F. G. S. asks: What capacity have large steamers or vessels for pumping water out of the hold in case of leakage, or about what amount of water in gallons per minute? A. The large ocean steamers have pumping capacity for 3,000 to 8,000 gallons per minute.

(4744) W. H. C. says: In the South Kensington Museum, London, there are some old steam engines over one hundred years old. Could you inform me in your columns how the cylinders were bored, as there were no slide rests nor boring machines in those days, and as they are quite large, they would be difficult to bore with a hand tool? A. Cylinders for steam engines were made of considerable size nearly two hundred years ago. The first one used in America, in the copper mine near Newark, N. J., previous to the Revolution, and now in Newark, is about 30 inches diameter by 4 feet stroke. The cylinders of the early-timers were bor and face with boring bars, and may have been done by hand power. The reboring of cylinders with a boring bar is now accurately done by hand power. The men that invented and built the first steam engines were equal to designing and building the necessary tools for doing the work.

(4745) Machinist writes: Please advise of the result from using a boring bar under the following conditions: The work to be fastened to the carriage of engine lathe and fed forward to the single cutting point of a fixed cutter in a boring bar, revolving on centers of lathe, as often used in machine shops. The lathe to be in a normal condition excepting the tail stock, which will be set over more or less, within the capacity of lathe, as provided for by set over screws on tail stocks of lathes. Will a hole bored under above conditions be cylindrical or otherwise? A. A hole bored under the conditions named will not be a cylinder, and with the small angle attainable in lathes for variation in line from the center, the amount of distortion will be mathematically small, yet it will be elliptical in form, with its longest axis in the vertical. The plane of revolution of the cutter being at right angles vertically and at an angle horizontally, the difference in the two diameters may be readily computed from the elements of a right-angled triangle, or demonstrated geometrically by increasing the angle in a diagram. A delicate calipers should show the difference with a considerable set-over of the back head.

(4746) L. H. asks how to temper springs for shotgun locks. A. For hardening and tempering gun lock springs, a charcoal fire should be used with very little blast, so that the temperature of the fire will be low enough to prevent overheating the thin parts. Take the spring by its shank in a light tongs and dip it in a pan of lard oil, place it over the fire, heat gradually until the oil takes fire, then carefully cover with the live charcoal and heat to a full cherry red evenly over the whole spring, then plunge edgewise in the pan of oil; remove before it is quite cold and place over the fire and heat slowly until the oil takes fire, then plunge in the pan of oil.

(4747) W. P. S. asks how to cast lead type. I want to set up a quantity of type and make a mould and cast the metal so it will print as well as the type. Let me know how to make type metal. A. You will find the process of stereotyping and the necessary machinery illustrated in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 191 and 310. A good metal for stereotyping is made of 9 parts lead, 2 parts antimony, and 2 parts bismuth. This makes a very fluid metal for amateur work.

(4748) D. L. G. writes: I say that bichromate of potash batteries and gravity batteries are secondary batteries. B. says that they are primary batteries, and that a Burnley dry battery is a secondary battery. A. Bichromate of potash batteries, gravity batteries, and the Burnley battery are all primary batteries. It is stated, however, that the Burnley battery may be recharged or restored by submitting it to a strong current for a time.

(4749) J. E. E. writes: Please state through your paper what is best to use for active material to put on the lead plates in a storage cell. Also what to use to dip the incandescent lamp in to color the glass various colors. A. For your plates use a paste of red lead mixed with a dilute solution of sulphuric acid (acid 1 part, water 10 parts). Incandescent lamps can be colored for temporary use by dipping them in colored lacquers or into colored aniline.

(4750) E. E. W.—The experiment with the dog conducted at the Edison laboratory, to which you refer, was made with magnets steadily excited from continuous current; but experiments have been tried with alternating current and with alternating magnets on the head of a person, without marked results.

(4751) H. H. N.—T become a first-class electrician, one of the first requisites is a good knowledge of mathematics. Without this you cannot expect to proceed very far. Of course, the better way to gain a practical knowledge of electricity is to take a course in one of the technical schools; but if this is impossible, you might study electrical works and at the same time demonstrate every problem as you proceed by an experiment.

(4752) L. H. D. asks: 1. How is oak sawed to be quartered? A. Quarter-sawed oak is made by sawing across the center at right angles, cutting the log into four quarters. Then saw each quarter into boards at 45° to the quarter cuts and across the rings. 2. Does the process incur much waste? A. There is greater waste than by the ordinary cuts. 3. Is oak 30 inches in diameter better than 12 inch or 15 inch for that purpose? A. The largest logs give the least percentage of waste and make the best quarter-cut lumber. 4. Is sound, large white oak less hard in the heart than near the outside of the tree? A. The heart wood is harder and more durable. 5. Is there any objection in forcing water up hill to have the pipe follow the undulation of the ground, or must it be a gradual rise to the highest point, a distance of 1,500 feet? A. There is no objection to following the ground grade in laying a water pipe, provided it is well protected against frost and plugs put in at low points to facilitate drainage if required.

(4753) N. B. T. asks: How large a meter shall I want for thirteen 3 foot burners and a gas stove with four holes and an oven and broiler? Is a 5 light large enough? A. You would do better to use a 10 light meter. If all your burners, stove, and broiler were going at once, the 10 light would be none too large.

(4754) E. S. asks: Is there any way to prevent the soft water from condensed steam dissolving the iron of steam heating pipes? I am having trouble with my pipes leaking from this cause. A. The water of condensation is to a considerable degree a solvent of iron of the quality used for making pipe. Such iron is not pure, containing slag and particles of some unknown substance that seems to have a galvanic action, producing pock holes that sometimes eat through pipes in from three to five years. Again, where the water runs along the bottom of wrought iron pipes, channels are cut partly by solution and partly by attrition, which are known to cut through a pipe in four or five years; while, on the other hand, the vast bulk of steam heating pipes are in use all the way up to twenty-five years with only an occasional leak from internal causes. The cause is largely in the quality of the iron of which the pipe is made. The use

of homogeneous or steel pipe is probably the only remedy. The same pitting and cutting is known to affect iron boiler tubes, and is a source of much trouble with vertical tubes with internal circulation, although the water is not pure and soft as from condensed steam.

(4755) Z. asks: How can I remove the acid from beef tallow so that it will not corrode iron when used as a lubricator? A. Boil or melt and stir into very hot water a small quantity. Test the water with litmus paper to see if it contains acid. If so, then treat the tallow before you use it in the same way, adding a slight excess of caustic soda to the water, and heating and stirring thoroughly. The tallow will separate on cooling.

(4756) J. S. asks: Is water absolutely non-compressible? Or can its bulk be reduced by any known method? A. Water is slightly compressible. No substance is non-compressible at existing temperatures.

Replies to Enquiries.

The following replies relate to enquiries published in the SCIENTIFIC AMERICAN, and to the numbers therein given.

(4655) In query No. 4655, where X. Y. asks for an acid or spirit that will soften glass so he can bore holes in it with an awl, "well, hardly;" but your advice is good as to a diamond drill or glass tube and emery. But please allow me, for the benefit of X. Y. and others, to give a cheap and simple receipt (if we may call it such) of drilling holes in glass with a common steel drill by using turpentine, the same as you would oil in drilling iron or steel. I have bored some holes as large as ⅜ inch by this process and have never had any trouble when my drills were hard and speeded high.—J. T. PRETTYMAN, M.E., Portland, Ore.

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For which Letters Patent of the United States were Granted

March 7, 1893,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

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Beer, draught lager, Beadleston & Woerz 22,605
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Boots and shoes for men, boys, and youths, Hanan & Son 22,587
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Furs, A. Jacobson & Bro 22,589
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Hams, bacon, smoked meats, and shoulders, Jersey City Packing Co 22,595
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