A. The greatest pressure on the nut will be between 9 and 10 times the maximum pressure on the crank pins. 2. Would a cast steel nut work better and cooler than a cast iron or gun metal one? A. With sufficient bearing surface, we think you will find cast iron a satisfactory material for the nut.

(27) W. H. asks: Is there any rule for the weight of green pine timber? What is the difference in weight between green timber and dry timber? A. It would be impossible to answer these questions very exactly, without experimenting in each special case. Dry white pine weighs about 25 lbs. per cubic foot, and green pine from 30 to 37.

(28) J. B. K. asks: 1. Which is the best for a base to plate on (for such articles as spoons and forks), nickel silver, white metal, or albata? A. All these alloys are good for the purpose. 2. Of what metals are these different bases composed? A. Nickel silver is a variety of German silver, of which many kinds are in use. The following is a good one for plating on: Copper 55, nickel 24, zinc 10, tin 3, and iron 2 parts. White metal consists of: Tin 82, lead 18, antimony 5, zinc 1, and copper 4 parts. Albata is another name for German silver.

(29) W. H. E. asks: What should be the number of revolutions per minute of a screw propeller in a model 3 feet 6 inches long, to gain the maximum speed? A. The question is tooindefinite. Probably you could not get a correct solution in any way but by experiment.

(30) W. G. M. says: 1. I have become near-sighted, my eyes being in different degrees affected. I can see to read well at the common reading distance, which does not seem to be the case with others I have noticed similarly afflicted. What has caused it, lamplight or too constantly looking at near objects? A. The natural eye has the power to cause the front of the crystalline lens to become more or less convex as objects looked at are nearer or farther from it. In your case that power appears to be lost by over exertion in looking at near objects. 2. Can my sight be restored? A. Probably it can, with proper care and rest. 3. In looking at distant objects I am compelled to partly close my eyes, when the objects become far more distinct. Why is this? A. In closing the eye, the light passes only through the central portion of the lens, and this part is of longer focus. 4. Will the use of glasses strengthen the eyes, or cause a growing necessity for them? A. If used constantly they will not be likely to remedy the defect. 5. Would their use have a tendency to make both eyes alike? A. Probably not. 6. Should they be worn continually? A. No.

(31) G. C. asks: Is the steamer Great Eastern constructed so as to be divided in any number of parts, each part to sail independently on entering a small harbor or in case of a rough sea? A. If itever was constructed in this manner, the matter was kept a profound secret.

(32) J. P. W. says: In *Science Record* for 1874, on p. 574, are directions for making a portable field camera obscura. I have followed the directions, but it will not work, as the lens will not throw the image downward. A. The difficulty probably is that the lens is not long enough in focus. The distance from the center of the lens to the mirror and thence to the paper should be the focal length of the lens. It will not be practicable to use a lens of a shorter focus than 2 feet.

(33) C. K. asks: 1. Will a good achromatic object glass of 2 inches diameter and 3 inches focus, with an eye lens of ¼ inch focus, make a telescope strong enough to see the phases of the planets Venus and Mercury? A. Yes. 2. Will it show the globular form of Jupiter and the ring of Saturn? A. Yes; with a steady atmosphere you should see the belts on Jupiter also.

(34) J. M. T. asks: 1. I wish to make a telescope. Which will be the cheapest, a reflecting or refracting telescope? A. In small telescopes there is not much difference. 2. What will an object glass, 2½ inches diameter, of 44 inches focus, cost me? A. About $20. 3. What power would it stand? A. A power of 150.

(35) C. R. says: It is desired to surround upright cylindrical stoves by shields to protect woodwork, etc., from the intense heat radiated. Can you suggest some simple and efficient form and material? There should be a door to permit the introduction of coal. A. Sheets of zinc will be the best, unless you require an ornamental effect. In the latter case, use Russian iron.

(36) J. M. G. says: A steamboat boiler is filled to top of steam chimney with water, and shows 5 lbs. pressure on the steam gage from weight of water in pipe connecting the gage with boiler. In testing the boiler to 60 lbs. water pressure, will it be necessary to show 65 lbs. on the gage in order to have 60 lbs. on the boiler? Will the gage show 5 lbs. more than a gage placed at the pressure pump? A. When there is a pressure of 60 lbs.; at the highest point of the boiler, underthe circumstances stated, the gage will indicate 65 lbs., and the gage in pressure pump will indicate a still higher pressure, if, as is generally the case, it is subjected to the action of a still higher column of water.

(37) A. N. asks: How can I write or draw on smooth plates of zinc, and afterwards etch the marks in with acid? A. Mix 1 part strong nitric acid and 100 parts water: pour over the plate, and let it run to and fro. Wash with water, and pour weak gum water over the plate.

(38) X. X. X. asks: How can I make a good oleate of soda? A. Oleic acid forms two classes of salts, normal and acid. The normal salts of the alkalies are the only soluble ones. They form soaps, and by the evaporation of their aqueous solution may be obtained in the condition of an amorphous mass. The isolation of oleic acid in a state of purity is a matter of some difficulty, owing to its tendency to combine with oxygen. To obtain pure oleic acid, olive or almond oil is saponified with potash; the soap is decomposed by tartaric acid, and the separated fatty acid, after being washed, is heated for some hours in the water bath, with half its weight of lead oxide, previously reduced to a fine powder. The mixture is then well shaken up with about twice its bulk of ether, which dissolves the oleate of lead and leaves the stearate; the liquid after standing for some time is decanted and mixed with hydrochloric acid; the oleic acid thereby eliminated dissolves in the the ether, and the etherial solution, which rises to the surface of the water, is decanted, mixed with water, and freed from ether by heat The acid may now be converted into soap by the addition of pure caustic soda, which is afterwards separated from its aqueous solution by the addition of chloride of sodium, and pressed to remove excess of moisture. Owing to the strong affinity of the liquid acid for oxygen, as prepared by the above method, it has a brownish color and a slight odor. See answer to A. B. C., below.

(39) A. B. C. asks: Can oleate of soda be made chemically pure? A. If absolute purity be requisite, try the following: Redissolve the oleate of soda, as obtained by the above method, in water that has been boiled for some time to expel all the air, and again decompose with tartaric acid in vessels filled with carbonic acid gas. Allow the acid to settle, decant the supernatant liquid, and wash with water free from air. Then add a large excess of strong ammonia, and, when solution is complete, precipitate with chloride of barium. The oleate of baryta thus formed is dried and boiled with alcohol. During this operation the salt melts and forms a viscous liquid, but a portion of it is dissolved, and is deposited in crystalline plates as the liquid cools; these are again crystallized from alcohol, and on decomposing them with tartaric acid pure oleic acid is obtained.

(40) W. S. D. says: 1. A church is being heated by a hot air furnace, but there is a fault in the ventilation, which is effected by one large pane in each window hanging on a swivel. When the church cools, there is a cold damp air, and the furnace draws cold air from the inside of the church. A. The supply of fresh air to the furnace should be taken from the exterior of the building, by means of an enclosed shaft, which may be constructed of matched boards for the most part, being of brick near the furnace. Place a valve, or shutter on pivots, within the shaft, to close it when required. Additional openings for ventilation should be provided at the ceiling.

(41) J. F. B. asks: 1. Is it necessary that the wires of a galvanic battery be copper, or will iron wire do? A. Not absolutely necessary; but as the conductivity of copper is about seven times greater than that of iron, it is better to use copper. 2. Is the vapor of a battery, consisting of copper zinc plates, poisonous? A. No.

(42) X. Y. Z. asks: 1. How is an ohm, in electricity, measured? A. An ohm, the unit of electrical resistance, is roughly equivalent to 1 foot 1·9 inches in length of German silver wire of No. 29 British Association gage. It would not do, however, to place much dependence on its accuracy as thus determined, as the resistances of various samples of wire vary considerably. Standard copies of the ohm are supplied by various foreign manufacturers of telegraph apparatus, and possibly, also, by some American houses. 2. How are the connections made in the open circuit system of telegraphy? A. The key is provided with both front and back contact points. At terminal stations the line is connected to the key lever; one pole of the battery and the back contact point are connected to earth, and the opposite pole of the battery to the front contact of the key. Except when the station is transmitting, the lever is allowed to remain constantly on the back contact.

(43) B. S. S. asks: 1. How long will a silver solution hold its strength? A. The cyanide solution should last for months if kept, as much as possible, from the action of air. 2. Ought it be bottled when not in use? A. Yes.

(44) C. R. asks: The quality of the magnet is destroyed by fire. Does this magnetic property of the iron impart itself to the fire? If not, what becomes of the magnetic property? A. The attractive property of a magnet is supposed to depend upon a peculiar arrangement of the molecules of which it is composed. Bodies capable of becoming magnetic offer more or less resistance to an arrangement of this kind. We may, therefore, assume that the molecules of a magnetic substance are in a state of strain. Heat reduces the conditions of restraint by imparting motion to the molecules, and thus allows them to resume their former position.

(45) C. A. H. asks: How can I make an electrical machine capable of giving the same power as a Bunsen battery? A. The ordinary electrical machine is not capable of producing a current equal to that from a Bunsen battery. A stick of shellac rubbed with flannel, however, will produce a greater tension, but the current from such a source is infinitesimal. A magneto-electric machine would cost more than the battery.

(46) W. R. asks: 1. What are the best width and thickness of single steel horseshoe magnets that will do to form a compound one? A. Make the width about $\frac{1}{20}$ of the length, and the thickness ¼ the width. 2. Of what size should single electro-magnets be to form a compound one? A. An electro-magnet, such as used for the sounders or registers in telegraph offices, will be found sufficient. 3. How shall I temper the magnets? A. For permanent magnets use the best, fine grained steel; temper as high as possible, and then draw, by heat, to a violet straw color. 4. How many feet of wire are required to saturate single bar magnets to form a compound 10 or 12 inches long? A. An electro-magnet, charged by two or three Daniell cells, will answer the purpose.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

L. L.—It is possible that the mineral was eucairite, with which it agrees in physical character; but the amount did not suffice to determine its chemical constitution. Will you send about 8 grains of the mineral, free from the gangue?—H. M. W.—Thescale consists chiefly of carbonate of lime and sesquioxide of iron. The color does not indicate anything injurious.—L. C. T.—Send us a specimen of your mineral, and we will tell you what it is.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

On a Car Brake. By M. M. S.
On Problems in Gunnery, etc. By R. H.
On a Cannon Musical Instrument. By H. M. B.
On Belting. By E. H. D.
On a Geometrical Problem. By J. D. L.
On the Mississippi Improvements. By B. J. B., and by O. P. S.
On the Moon. By J. A. S.
On Employers and Employees. By O. O. T. E.
On a Solar Phenomenon. By J. C.
On Another Explosion. By H. I. F.
On Transplanting Trees. By C. E. H.

Also inquiries and answers from the following:

C. A. W.—R. F. F.—D. L. W.—J. L. R. B.—F. W.—W. R.—C. D.—S. H.—A. F.—W. C. I.—E. W.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appea. should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who sells machines for recutting hand saws? Who sells pure bred poultry? Who makes brass castings? Who makes cider mills that grind and press at one operation? Whose is the best boiler for generating steam to heat water in a tank? Who sells platinum, and what is its cost? Who sells machinery for working small screw propellers by hand power?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

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DESIGNS PATENTED.

9,110.—PAPER BOXES.—F. W. Chandler, Brunswick, Me.
9,111.—CHAIRS.—C. A. Perley, Baldwinsville, Mass.
9,112.—DOOR PLATES.—J. S. Shaddnck, Huron, Ohio.
9,113.—URINAL.—W. Tweedale, Brooklyn, N. Y.
9,114.—GLASS PEDESTAL.—T. Atterbury, Pittsburgh, Pa.
9,115.—CURRY COMB KNOCKER.—C. E. L. Holmes, New York city.
9,116.—BUTTONS.—W. W. Knight, Brooklyn, N. Y.
9,117.—STREET LANTERN.—F. L. Pisch, New York city.
9,118.—POCKET BOOK CLASP.—S. Zinn *et al.*, N. Y. city.
9,119.—LAMP STANDS.—F. R. Seidensticker, West Meriden, Conn.

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