Designs.

DESIGN FOR A CHAIR.—W. F. WITTICH, Cody, Wyo. In this instance the designer has produced a new, original, and ornamental arrangement of a chair in a very skillful and graceful manner. The whole frame is made up of antlers. The seat and back upholstered, and the latter shaped like an inverted shield, in the upper part of which a circular clock is inserted.

DESIGN FOR A ROSARY.—H. F. NEHR, New York, N. Y. The ends of the main length of this beautiful article, are brought together and fastened in a heart, pendent from which is a short continuation of the above mentioned length holding at its extreme lower end a neat and chaste crucifix.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

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. 7570.—For manufacturers of continuous distilling apparatus.

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

Inquiry No. 7571.—For manufacturers of machines for making shoe laces, corset laces, etc.

Drying Machinery and Presses. Biles, Louisville, Ky.

Inquiry No. 7572.—For manufacturers of large springs, such as are used in music boxes.

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

Inquiry No. 7573.—Wanted, address of parties doing pressed metal work.

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

Inquiry No. 7574.—For manufacturers of hand wagon wheels.

WANTED.—Patented specialties of merit, to manufacture and market. Power Specialty Co., Detroit, Mich.

Inquiry No. 7575.—For manufacturers of electrical novelties or burglar alarms and supplies.

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

Inquiry No. 7576.—For manufacturers or dealers of plate glass; also address of firm making fancy picture and mirror frames.

I sell patents. To buy, or having one to sell, write Chas. A. Scott, 719 Mutual Life Building, Buffalo, N. Y.

Inquiry No. 7577.—For manufacturers of rubber-covered casters.

WANTED.—Purchaser for Monazite, Molybdenite and Wolfram. Apply Monasite, Box 773, New York.

Inquiry No. 7578.—For manufacturers of small vacuum pumps.

FOR SALE.—U. S. Patent Right No. 730,757. Rotary roasting oven for drying grain or baking cereal foods. Address J. B. Galbreath, Decatur, Mich.

Inquiry No. 7579.—For manufacturers of white and colored door knobs.

A practical man wishes to invest $2,000 in a well-established machine shop. Must bear investigation. Investment, Box 773, New York.

Inquiry No. 7580.—For manufacturers of blanching machines.

I have for sale the patent of a Folding Umbrella sure to sell at sight. Offers solicited. Mrs. A. Studams, 732 Federal Street, Camden, N. J.

Inquiry No. 7581.—Wanted, address of parties who handle repairs for Swiss music boxes.

WANTED.—Ideas regarding patentable device for water well paste or mucilage bottle. Address Adhesive, P. O. Box 773, New York.

Inquiry No. 7582.—For manufacturers of practical rotary or turbine gas engines.

FOR SALE.—Paying up-to-date metal working plant. Best location; good building. $75,000, or will sell large interest to right man. Chance, Box 773, New York.

Inquiry No. 7583.—For manufacturers of blotting paper.

I have for sale the U. S. and all foreign rights of new patent Improvements in Water Tube Types of Boilers. Great economizer. J. M. Colman, Everett, Wash.

Inquiry No. 7584.—For manufacturers of lenses such as are used in miniature cameras.

WANTED.—A Young Man familiar with drafting to assist superintendent in an iron casting plant. Good opportunity for advancement if capable. Draftsman, Box 773, New York.

Inquiry No. 7585.—For manufacturers of chain-making machinery.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery tools and wood fibre products. Quadriga Manufacturing Company, 18 South Canal St., Chicago.

Inquiry No. 7586.—For makers of the instrument called the "Leak Finder," used for locating leaks in underground water mains.

Absolute privacy for inventors and experimenting. A well-equipped private laboratory can be rented on moderate terms from the Electrical Testing Laboratories, 548 East 80th St., New York. Write to-day.

Inquiry No. 7587.—For machines to make stapled and drawn push brooms.

Manufacturers of all kinds sheet metal goods. Vending, gum and chocolate, matches, cigars and cigarettes, amusement machines, made of pressed steel. Send samples. N.Y. Die and Model Works, 508 Pearl St., N.Y.

Inquiry No. 7588.—For makers of rubber pillow ventilators.

WANTED.—A man of experience; capable of running a factory that is manufacturing heavy machinery. Should have $25,000 to invest in the business which can be shown to be profitable. We don't want the money without the man. The experienced man is the first essential. Address Heavy Machinery, Box 117, Station A, Hartford, Conn.

Inquiry No. 7589.—For makers of typewriter parts, such as machine parts.

Notes and 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.

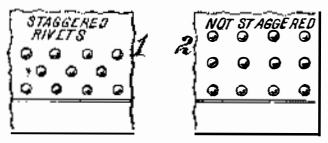
Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

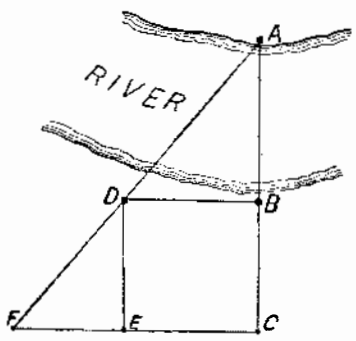
Minerals sent for examination should be distinctly marked or labeled.

(9849) W. C. N. asks: 1. What is quarry water (or sap)? What effect has it on stone, and how is it gotten rid of? A. We would say that quarry water or sap is the



water or moisture which is absorbed in stone cut from the portion of a quarry which is below the level of the ground water in the territory surrounding the quarry. Many kinds of stone are sufficiently porous to absorb a considerable quantity of water in this way. Quarry water may be got rid of by allowing the stone to season or dry out by exposure to the atmosphere. 2. Also define these terms used in construction: "Needles," "chases," "staggered." A. "Needles" are the vertical struts which are used to support or jack up a wall temporarily when the underpinning is taken out. "Chases" are cavities or recesses left in walls to receive pipes or wires. The term "staggered" is used to describe methods of spacing different articles, such as the rivets in a riveted joint of a boiler. When each rivet in one row comes opposite the space between the rivets in the adjoining row, the rivets are said to be "staggered." Fig. 2 shows three rows of rivets which are not staggered. Fig. 1 shows three rows of rivets which are staggered.

(9850) L. L. says: Some years ago the SCIENTIFIC AMERICAN gave a very simple way of measuring approximately the width of a river without any other instrument than a measuring tape. A. Select a tree or other conspicuous object on the farther bank of the



river, as *A*. Select another tree or stake on the near bank of the river, as *B*. Measure off any convenient distance—say one or two hundred feet—from *B* to the point *C*, which shall be in the line *AB*. Select a third tree or stake, as *D*, and complete on the ground the parallelogram *BCED*. Then find the point *F* on the ground which is in line with *EC* and also in line with *DA*, and measure the distance from *E* to *F*. Then *AB* will equal *BD* multiplied by *BC* divided by *EF*.

(9851) D. L. asks: 1. Kindly explain through your magazine how, by experimenting with a pendulum, it has been calculated that the gravity force of the earth is 289 times as great as the centrifugal force at the equator. A. The force of gravity at any place is determined from the time required by a pendulum of known length at that place to make one oscillation. The centrifugal force of the earth at the equator is determined from the length of the day, or the velocity of rotation of the earth at the equator. This gives the value of centrifugal force as 0.1112 of the mass of a body at the equator, which makes the body lighter by this amount. The force of gravity at the equator is 32.0902. Hence if there were no centrifugal force, the weight of a body would be the sum of these two, or 32.2014, which is the real mass of the matter of the body. Hence centrifugal force lightens a body 0.112/32.2014, which equals 1/289 very nearly. You can find all these matters demonstrated in the library of the university of your city. The librarians will assist you to find what you need, or the professor of mechanics or astronomy will advise you. Watson's "Theoretical Astronomy" will contain it. 2. From an infinite or very great distance, in an astronomical sense, our earth will attract a body with an ultimate velocity of 7 miles a second at the moment it would strike the earth. How can I find the corresponding velocity with reference to the sun and the moon? A. You will find the solution of the problem of fall from infinity in Watson as above, or in Young's "General Astronomy," Section 429. We can send you the book for $3.25. 3. If we imagine a tunnel through the earth and through its center (or 8,000 miles long), then letting a body fall into it, what would be the maximum velocity, and at what point in the tunnel would that velocity be attained? A. A body falling through the earth as you describe will have its highest velocity at the center of the earth. The finding of the velocity is a problem of analytical mechanics, to which we refer you. 4. If a bullet sent out from a rifle and in a perpendicular direction will reach a height of one mile, how far would it go at an angle of 30 degrees with the horizontal plane? A. If a bullet will rise a mile in a vertical direction, it will rise to the same distance when rising at an angle of 30 degrees to the horizon. 5. What would be the weight of a cubic foot of water at a depth of 8 miles? A. The compressibility of sea water is 44 millionths per atmosphere at 12 deg. C.; that of pure water at the same temperature is 47 millionths, while at the freezing point it is 50.3 millionths. The temperature would vary considerably as we descend in water. Upon this datum you can calculate the density at a depth of 8 miles. We must say that your questions remind us of an examination paper in college, and we never liked to take examinations.

(9852) F. L. J. asks: 1. In your issue of August 5, 1905, Query 9722, there is described an experiment with a cent and a spool. I have tried this carefully several times, but without success. Kindly give me more complete directions. A. Your failure with the spool and cent experiment is perhaps due to your having the cent too far from the end of the spool when you begin to blow. The pins should be driven into the spool so that the cent is less than a sixteenth of an inch from the spool. When you blow, the cent will then be pushed up against the spool and held there till you stop blowing, the spool being held vertically down. A disk cut from a calling card and as large as the end of the spool or larger will be drawn up from a greater distance below the spool. 2. How can I make a small transformer for transforming 110-volt alternating current to direct current of about the same voltage? A. A transformer of the ordinary sort will not change an alternating to a direct current. You require a motor dynamo for the purpose, if you wish to obtain any considerable current. For small currents you may use an electrolytic rectifier. 3. Why are permanent magnets made of steel, while the cores of electro-magnets are made of soft iron? A. If an electro-magnet is always to be magnetized in the same way, and it is not necessary to demagnetize it suddenly, the core is not made of iron but of steel. Many dynamos and motors have the field cores of steel. When an electro-magnet is to be demagnetized suddenly, as when the armature is to vibrate like that of a telegraph sounder, the core should be of soft iron in order to demagnetize it suddenly, and make the click quick and sharp. 4. Why are electro-magnets always wound with a great deal of fine wire? A. Electro-magnets are not always wound with many turns. They are wound with the calculated number of turns to produce the degree of saturation necessary for their work. 5. Would they not give as good results if wound with a few turns of heavy wire, provided the number of ampere turns was the same in each case? A. Electro-magnets are not wound with any coarser wire than can be avoided, in order to keep the current as low as possible for the work to be done. The heating is in proportion to the square of the current, hence with twice the current there will be four times the heating. For this reason a larger number of turns of finer wire are better than a smaller number of turns of coarse wire. 6. Can the speed of an induction motor be lowered with a resistance in series with it? A. The speed of an induction motor may be altered in a number of ways. One of these is by a controller similar to that of a trolley car in the motor circuit. These methods of control are quite fully explained in Oudin's "Polyphase Apparatus and Systems," which we can send you for $3.00.

(9853) J. C. H. writes: I saw an article No. 9806, page 306, dated October 14, 1905, in which R. L. I. asks a question about potential energy, and your editor says he did not know the definite answer. The following solution is the most plausible. When the coiled spring is placed in the tube and acid put on, a certain portion is dissolved, say the millionth part of a cubic centimeter. This gives a millionth part of a cubic centimeter in which the remainder of the spring can uncoil and exert its energy. In this way the dissolved portion is always giving room for more expansion. The questioner asks whether the heat in the coiled spring is greater than in an uncoiled one. This difference is so small and would amount to such an infinitely small amount, that it could be left out of question. A. If the explanation of the case of the coiled spring dissolved in acid as given above satisfies our correspondents, we are quite satisfied that they should adopt it. It is a case for quoting Mr. Lincoln's famous certificate of recommendation of something which was presented to him: "If this is the sort of a thing a man would like, this is just the thing he would like." We should not expect the spring to behave that way. We should expect it to grow weaker as it became thinner during its solution till at last it would have no elasticity left with which to uncoil. Its reaction against the band which held it would diminish till nothing of the steel was left.

(9854) W. B. S. says: In the edition of your paper of July 15, 1905, question No. 9693, F. L. asks whether a bullet dropped from the muzzle of a rifle would reach the ground quicker than one fired from the rifle at the same elevation with the rifle held perfectly horizontal. I understand your answer thereto, but to my mind it does not explain all the factors entering into the problem. For instance, the bullet fired from the rifle is acted upon by two forces, i. e., the propelling force of the powder which forces the bullet in a direction diagonal to the pull of gravity, and the pull of gravity; whereas the bullet dropped from the muzzle of the rifle is acted upon by the one force only, i. e., the pull of gravity. It thus seems to me self-evident that when the bullet is fired from the rifle there is a force behind it which in a degree counteracts the pull of gravity, that is, this horizontal force would tend to keep the bullet in the air longer than would be the case without this force. Moreover the bullet traveling in a horizontal direction would consume the extra time necessary to cover the horizontal distance, whereas the bullet dropping from the muzzle would have only the perpendicular direction to the earth. Why would it not then require less time for the bullet to travel the perpendicular than the oblique distance? Would the speed of the bullet fired from the rifle or the resistance of the atmosphere enter into the problem as factors? A. The problem of the motion of a rifle ball shot horizontally and another dropped vertically is a very old one, and there is no disagreement among scientific men regarding it. All the books say the same about it, that both balls keep in the same horizontal plane as they move. The force of the powder drives the bullet horizontally and has no influence upon its downward motion. It falls by gravity alone, just as the one dropped vertically does. As you say, there are two motions in the bullet which is shot and one in the one which is dropped. This statement makes the whole matter plain. The writer has performed the experiment probably thousands of times, and never with any deviation in the result. Both balls strike the ground at the same time. Neither the difference in the speed of the two bullets nor the resistance of the air is concerned in the motion of the bullets. Gravity draws each down the same distance in the same time.

(9855) O. F. N. writes: Question No. 9806, asked by R. L. I., about the energy of a coiled spring, seems to me to be of great importance. The energy must be somewhere, even if the spring is dissolved in some acid. That is my opinion. I have formed theories about that which I hesitate to advance, as I am inclined to believe that you would not publish the same, as these theories seem to be against your own judgment that nobody knows it. A. We are not looking for theories as to the energy of the coiled spring dissolved in acid, but for facts. Has anyone measured the recovery of the energy during solution, to tell us what becomes of it? One speculation is no better than another if given by a person who has not experimenetal evidence to offer in support of his inference. It is not a question of our own judgment, but one of experimental evidence. Anyone having experimental evidence on the matter can have a hearing.

(9856) G. B. asks: In projecting a lantern slide upon a screen with a single double convex lens the lines on the picture, when viewed close to the screen, within a foot or two, give the colors of the rainbow. If, however, the observer goes back ten or twenty feet more from the screen all this color effect immediately disappears. Will you please explain why this color effect is not equally visible at this distance. I understand, of course, if a chromatic lens is used there will be no such color effect. What I do not understand is why, when you see it so plainly at a foot away, you cannot see it equally plainly at 10 feet, although all the other parts of the picture are equally visible at either distance. A. The lines of a picture are visible to the eye when a line subtends an angle at the eye of about a minute of arc. This is the limiting angle of vision without optical assistance. When one stands one foot from the screen on which is a picture with lines projected by an ordinary convex lens, the lines fill more than this angle. So also do the interference fringes on the edges of the lines. At 20 feet distance from the screen a space twenty times as broad is required to fill the same angle as was filled by a line at one foot distance from the screen. All which is in the wider space is combined in the eye at 20 feet into an image of the same size as was occupied by the line at 1 foot. The color fringes then are combined into white light again, and only the black is seen. If one uses an opera glass at 20 feet the colored fringes are restored and are as visible as at the 20 feet divided by the magnifying power of the glass. If a glass magnified five diameters the lines and fringes appear as when seen at a distance of 4 feet. The restoration of the colors by the opera glass constitutes rather a pretty optical experiment.