(38) H. T. R. asks: What boat ever made the fastest time from New York to Albany? A. It is stated that the trip of the Chauucey Vibbard from New York to Albany in six hours and twenty minutes, April 18, 1876, is the fastest on record. If any of our readers possess records of faster time over this route, we would be glad to hear from them.

(39) R. J. K. asks: How fast will a 15 foot boat go with a screw propeller 12 inches in diameter and 18 inches pitch, a boiler 12 x 20 inches, cylinder 1½ inches, bore 3 inches stroke. A. Probably between 3 and 4 miles an hour.

(40) R. S., Jr., asks: What size engine, boiler, and propeller would work to the best advantage in a small boat 15 feet long and 5 feet beam, and what speed may I expect to obtain in smooth water? A. Boiler 24 inches diameter, 3½ feet high. Cylinder 2½ by 3 inches. Propeller, 18 to 30 inches diameter, 30 inches pitch. Probable speed 5 to 6 miles an hour.

(41) J. W. W. asks: Can you send me a prescription for weak kidneys? A. You should consult a physician.

Is an improvement in link motion for steam engines patentable? Are any links on locomotives patented? A. Certainly it is. There have been many patents relating to link motion, and it would be well for you to study up the subject and become acquainted with the most advanced practice before attempting to effect improvements.

(42) E. H. R. asks: Is it safe to carry 120 lbs. steam on a boiler of the following description: Diameter 48 inches, length 26 feet, four 12 inch flues. Thickness of the boiler iron $\frac{3}{16}$ of an inch. A. We do not think that this figure allows a sufficient margin for faults of construction and deterioration by use.

(43) J. C. asks; Why do propeller shafts break? A. In such cases as have come to our notice, the cause was insufficient strength, either by reason of being too small, or on account of imperfections.

(44) A. A. McN. asks: What is the horse power of a 4 x 8 steam engine when worked up to its fullest capacity, also if the length of stroke is 7 and the cylinder 4, has it the same power as a 4 x 8? A. See p. 33, vol. 33.

(45) R. W. K. says: I have a steam boiler 30″ x 42″, 18 2″ tubes (party from whom I bought it said it was a 5 horse power boiler); how large an engine, screw, and boat could this run, and what speed? I have a small 2 cylinder oscillating engine, each cylinder is 2″ x 2″. How large a boiler should I use to run my boat (12 feet x 3½ feet) with side wheels, for safety? A. See pp. 33 and 225, vol. 33.

(46) B. C. M. says: I think G. W. W., July 28 (31), would find the information he desires in Thomas Oxley's "Gem of the Astrial Sciences," in which the author treats at length on the construction of planispheres.

(47) Machinist says: Suppose a piece of inch iron was cut with two threads, one right and the other left handed, commenced opposite and of the same pitch, would the screw enter a nut cut with the same threads, the same pitch? A. Yes, but if the threads were fine and of small pitch, the thread in the nut would be nearly obliterated.

(48) T. E. asks: What is enamel made of, and how is it put on iron? A. Enamel is a species of vitreous varnish, colored with metallic oxides, applied in a thin stratum to metallic surfaces. In small articles it is fused on the surface by the flame of a blowpipe and in larger articles by means of the heat of a furnace. Ordinary enamel is common glass fused with oxide of lead. Hollow ware is enameled by a mixture of powdered glass, borax, and carbonate of soda, mixed, fused, cooled and ground. The ware is cleansed with acid, wetted with gum water, the powder dusted on, and then fused by heat carefully applied.

(49) L. D. asks for a good ink that has a pale color when first written, then turning to a deep black. A. For 1 quart of ink take Aleppo galls 4 ozs., soft water 1 quart; macerate in a clean corked bottle for ten or twelve days with frequent agitation; then add 1¼ oz. gum arabic dissolved in a wine glassfull of water, ½ oz. lump sugar. Afterward add 1½ oz. sulphate of iron; agitate occasionally for two or three days, when the ink may be decanted for use, but it is better if the whole be left to digest together for two or three weeks. When time is an object, the whole ingredients may be put into the bottle at once and agitated daily until the ink is made, and boiling water may be used instead of cold.

(50) S. T. asks for the process of making an impression of a photograph on glass. A. In photographing on glass the clean plate is first coated with a thin, uniform film of collodion (gum cotton dissolved in ether and alcohol) containing a little ammonium iodide or bromide, and often similar salts of cadmium. While the film is still moist, the plate is immersed in the dark in a bath of silver nitrate dissolved in water. This causes the film of collodion to become filled with insoluble iodide and bromide of silver, and in a few minutes the plate is ready to be placed (wet) in the camera and exposed therein for half a minute, more or less. On removal from the camera it is treated in the dark room, first with a strong aqueous solution of ferrous sulphate (copperas), which developes the picture, and then, after washing, immersed in a fixing bath, which may be either a solution of sodium hyposulphite, or of potassium cyanide. The photograph is finished by washing with water, drying, and coating with a film of transparent varnish. In the Woodbury and similar processes for preparing glass photographic transparencies, the picture is printed with a fatty ink from the impression in a plate of zinc of a photographic gelatin bichromate film. Consult Vogel's "Chemistry of Light and Photography."

(51) J. L. & Co. ask: By what method can we temper the blades of our steam shears, so that they will stand to cut old saw blades or any thin tempered steel? A. Harden as for ordinary tempering and draw the temper to a bright straw color.

(52) J. C. says: I have an engine which requires lining up on the crosshead. Having no adjustable gibs I pour in Babbitt metal, which does not answer. I want some harder metal which can be poured and will not cut the guides. A. You can harden Babbitt metal by melting it and adding a quantity of antimony.

(53) G. L. L. says: What is the new process of coating old table knives so they look like silver? A man has been collecting knives and plating or coating them so they look like silver. He claims they will last for years and that it is neither silver or nickel but some kind of metal which is kept secret and that no battery is used. A. The coating may be of tin, or an alloy of this with some other metal, applied to the clean blades by simply dipping in a bath of the molten metal under suitable conditions. We cannot say positively, from your statements. Such a coating would not be very durable.

It has been our custom for thirty years past to devote a considerable space to the answering of questions by correspondents; so useful have these labors proved that the SCIENTIFIC AMERICAN office has become the factotum, or headquarters, to which everybody sends, who wants special information upon any particular subject. So large is the number of our correspondents, so wide the range of their inquiries, so desirous are we to meet their wants and supply correct information, that we are obliged to employ the constant assistance of a considerable staff of experienced writers, who have the requisite knowledge or access to the latest and best sources of information. For example, questions relating to steam engines, boilers, boats, locomotives, railways, etc., are considered and answered by a professional engineer of distinguished ability and extensive practical experience. Inquiries relating to electricity are answered by one of the most able and prominent practical electricians in this country. Astronomical queries by a practical astronomer. Chemical inquiries by one of our most eminent and experienced professors of chemistry; and so on through all the various departments. In this way we are enabled to answer the thousands of questions and furnish the large mass of information which these correspondence columns present. The large number of questions sent—they pour in upon us from all parts of the world—renders it impossible for us to publish all. The editor selects from the mass those that he thinks most likely to be of general interest to the readers of the SCIENTIFIC AMERICAN. These, with the replies, are printed; the remainder go into the waste basket. Many of the rejected questions are of a primitive or personal nature, which should be answered by mail; in fact, hundreds of correspondents desire a special reply by post, but very few of them are thoughtful enough to inclose so much as a postage stamp. We could in many cases send a brief reply by mail if the writer were to inclose a small fee, a dollar or more, according to the nature or importance of the case. When we cannot furnish the information, the money is promptly returned to the sender.

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

J. J. S.—The clay may be used for brick and tile making, etc. It is too impure for fine pottery.—C. W. G.—The clay is of a low quality and would not probably pay to mine for market. It might be used in the vicinity for the manufacture of bricks and some kinds of pottery. The other specimen is not logwood extract but asphalt.—S. L. P.—It consists principally of oxide of iron. The glimmering particles are magnetite. The specimen in bottle will be noticed subsequently.—G. G.—It is iron pyrites. See p. 7, vol. 36, SCIENTIFIC AMERICAN.—D. C. S.—It is magnetite—magnetic oxide of iron.—H. C.—It consists of lime carbonate and a little clay, sand, and oxide of iron. Properly calcined it might yield a good lime or cement, but it does not excel as a polishing powder.—D. L. P., Curaçao, South America.—The sample of cave earth much resembles bat manure, as the per cent of organic matter and ammonia is very small. It contains a large quantity of phosphates—principally calcium phosphate—together with some lime carbonate, a little iron and silicates—clay and sand. If treated with oil of vitriol so as to form the superphosphate it would be of some value as a fertilizer, alone or mixed with others. Its value could not be named even approximately, until a quantitative analysis determines its composition.

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 Puzzle of Ropes and Pulleys. By A Subscriber.
On Bacteria. By F. G. Fairfield.
On How to Draw an Octagon. By I. M.
On a Lightning Draughtsman.

Also inquiries and answers from the following:
A. A. R.—P. G. H.—W. C. C.—M. B. M.—T. D. S.—J. A. McC.—J. M.—E. M.—H. F.—J. W.—E. F.—O. C.—C. B. C.

HINTS TO CORRESPONDENTS.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries fail to appear 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.

Inquiries 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 makes covering for steam pipes, to prevent radiation of heat? Who makes steam road engines? Who makes steam pumps? Who makes instruments to assist the hearing of deaf persons? Who makes kerosene lamps suitable for lighting cotton mills? Who makes a utensil for scrubbing, made of iron rings?" 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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[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city.

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10,096.—GLASSWARE.—J. Jones, Pittsburg, Pa.
10,097.—RANGES.—F. M. Lawrence, Portland, Me.
10,098.—HEATING STOVES.—J. A. Lawson, Troy, N. Y.
10,099.—PLAYING CARDS.—A. J. Manning, N. Y. city.
10,100.—BUTTONS, STUDS, ETC.—J. W. Miller *et al.*, Newark, N. J.
10,101.—SHEARS.—M. Renz, Naugatuck, Conn.

[A copy of anyone of the above patents may be had by remitting one dollar to MUNN & Co., 37 Park Row, New York city.]