ing cast solid metal throughout, and the third having a wrought iron shaft 4 inches in diameter cast in the middle the whole length of the shaft: which of the three will stand the greatest weight in the middle, if the shafts are suspended at bothends? A. The third.

(51) C. W. W. asks for a white fusible alloy that will take a fine impression when cast in plaster of Paris moulds? A. Lead 9 parts, antimony 2 parts, bismuth 1 part. This alloy expands as it cools and brings out a fine impression.

(52) G. N. asks for a process by which brass can be kept a bright color? A. In ½ pint of best alcohol dissolve ½ lb. of best seed lac. Warm the work and apply the dissolved lac, with a soft fine brush.

(53) C. L. asks how the process of enameling or glazing is done on cast iron? A. The enamel is made of powdered flints, ground with calcined borax, fine clay, and a little felspar. The mixture is made into a paste with water and brushed over the metal to be glazed, which has been previously cleaned and made bright with dilute sulphuric acid, and washed clean. While the glaze is still moist it is dusted over a mixture of felspar, carbonate of sodium, borax, and a little oxide of tin. The glaze is gradually dried and then fused in a muffle at a red heat.

(54) F. W. W. asks: Can you give me a recipe for making white ink, to write on a black or blue surface? A. With some papers an aqueous solution of bleaching powder with a little gum will answer. A solution of oxalic acid thickened somewhat with filtered dextrin solution has also been used. Or use a solution of gum arabic and sugar in water, through which has been diffused finest precipitated chalk or ground starch.

(55) N. H. says: I bought a piece of corned beef and cooked it. The following night I opened the refrigerator in the dark and the beef lighted up with a phosphorescent light. What was the cau e and is the meat healthy to eat? A. The phosphorescence noted was very probably due to the saccharine matter or salts used in curing the meat. A change of temperature, which induces crystalization in solutions of these, often gives rise to the phenomena, after removal from strong light. The meat may be fit to eat.

(56) Mrs. G. W. L. asks for a recipe for canning green corn so it will keep? A. Among fruits, etc., green corn is one of the most difficult to preserve by canning. The following is the method in use by many of the large canning establishments. The corn, after removing from the cob, is filled into the clean cans so as to leave no air spaces. These are placed in a large oven or other airtight vessel, and subjected to hot steam under pressure. The harder the corn the longer the exposure required to thus cure it; it is said that in some cases as much as eight hours is requisite, but usually much less than this. A large vessel of boiling water, in which the cans are immersed, may be used instead of the steam oven, but is not so effective. On removal from the oven or water bath, as the case may be, each can (they must be filled to the cover with fruit) has the cap with a very small hole tapped in its center immediately soldered on. As soon thereafter as the can stops blowing, as the escape of steam and air through the vent is termed, the hole is quickly soldered. This must be done before the air begins to enter. Other fruit is cured and canned in like manner—tomatoes rarely require longer than 15 to 20 minutes steam curing. Where the pits are left in fruit a longer time is requisite to completely destroy all fermentative germs.

(57) J. F. C. asks, 1, for a quick process of bleaching cotton thread? A. In practice the following is found one of the best: The cotton is banked for 8 hours in a lye made from 6¼ lbs. soda crystals and 2 lbs. 3 ozs. quicklime. After washing out it is passed into a chloride of lime (bleaching powder) solution for two hours, and then at once into weak sulphuric acid for 20 minutes. Use 11 lbs. chloride of lime and 23 fluid ozs. sulphuric acid. These quantities are for 220 lbs. of cotton. The cotton is then washed in running water, and taken once or twice through a hand-warm soap beck, using for the above weight 2 lbs. 3 ozs. palm oil soap. 2. Is there more power in the same quantity of water after night than there is in daytime? A. No.

(58) J. H. D. S., in giving an account of a table knife that was left for a few days in the remains of a water melon, and found nearly eaten up or consumed, asks what acid there is in the melon to cause this? A. Carbonic, and the various vegetable and organic acids rapidly corrode iron or steel in the presence of air and moisture. In substance, over 89 per cent of the common, well-ripened watermelon consists of water. In summer weather the decay of broken melon, when once begun, is very rapid, and is accompanied by the formation of carbonic, acetic, and other peculiar organic acids. Under such favorable conditions it is not surprising that the knife was eaten by the melon.

(59) F. W. S., of Toronto, asks how to make a buff wheel for polishing steel? A. Turn up the wooden disk to form the wheel on the mandril on which it is to run. Cover the periphery of the wheel with good glue, prepared as for gluing wood, stretch the leather around and confine it with shoe pegs driven in about two inches apart. When dry turn off true with a sharp chisel. Give the leather a coat of glue and roll it in the emery, so as to make it retain it by being imbedded in the glue. Set the wheel dry until the glue is hard and it is ready for use.

(60) M. D. asks: 1. If limestone was put into a retort, what would be the gas that would pass off if heated red hot? A. Carbonic anhydride, often called carbonic acid; a gas composed of 12 parts carbon and 32 parts oxygen (by weight) in a state of combination. 2. Could one bushel of lime be so prepared as to absorb all of the carbon gas in three bushels of lime? A. No. 3. Would the carbon improve the cementing quality of the lime? A. No. It would have the opposite effect. 4. If charcoal was put into a retort and heated to a red heat, would it give off one quarter as much carbon gas as it would if it was wholly consumed? A. Freshly and thoroughly carbonized charcoal, if heated in a retort, would not yield a notable quantity of gas unless supplied with air, oxygen, steam, etc. With a plentiful supply of the former, carbonic acid would result; with air the same, but mixed with nitrogen; with steam the principal productwould be carbonic acid, hydrogen, and carbonic oxide—the latter gas is very poisonous and inflammable. The amount of gas would be directly proportional to the quantity of charcoal burned. 5. If charcoal was heated red hot and then cooled off, would it regain its carbon gas from the atmosphere? A. Charcoal is capable of absorbing about 35 times its bulk of carbonic acid. This it gives out on heating, and on cooling may absorb again. 6. Is not carbon gas heavier than the air? A. Yes, about half as heavy again. 7. What acids will dissolve carbon? A. It is insoluble in acids, but is oxidized by nitric acid. 8. Will not water boil quicker in a copper dish than in an iron dish, other things being equal? A. Yes, a little.

(61) F. P. asks how to make a faradic battery? A. For faradic currents you will require a small induction coil in addition to the batteries you mention, which are constructed on the correct principle. To make an induction coil, wrap a thick cylindrical penholder back and forth—after the manner of spooled thread—with about a hundred feet of good copper wire, a fifth the size of telegraph line wire, and insulated by winding with silk or cotton. Wrap tightly around this coil a sheetof thin oiled paper, and over this bind, in a manner as before, five hundred or more feet of the finest insulated copper wire obtainable. Then force out the penholder, being careful not to tear the insulation of the wire, and fill its place with a bundle of soft iron wires. Connect the battery wires (one from the zinc and the other from the copper) with the free ends of the thick wire in the coil; then, on making or breaking the battery circuit, temporary induced currents will be caused in the fine wire, and may be utilized by attaching wet sponges to the free ends of the wire and permitting them to come simultaneously in contact with the body while the instrument is working. The batteries must be excited with weak sulphuric acid. A simple interrupter for the primary circuit is a file attached to one end of the coil wire, while the free end (from the battery) is rasped over the rough part of the file. The withdrawal, more or less, of the soft wire core diminishes proportionately the intensity of the secondary currents.

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

L. F.—It is gypsum—a calcium sulphate.—J. M. F.—It is a variety of bituminous coal, yielding considerable ash. The freshly mined shale may be of some value for fuel and gas making.—J. W. E.—Your minerals do not come to hand. Send another specimen.—C. T.—It is mispickle, or arsenical pyrites—a combination of sulphur, iron, and arsenic.—We have a number of packages of minerals, etc., without mark to designate the senders.

COMMUNICATIONS RECEIVED.

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

On the Sea. By D. G. E.

On Engines and Boilers of Screw Tug Boats. By D. L.

On Reforms. By R. H. L.

On Whence Came our Dry Land. By A. B.

On a Combat between a Squirrel and a Snake. By I. E. E.

On the Formation of a Sea in Sahara. By T. M. M.

On Rafts Floating Faster than the Current, etc. By W. M.

On Looking Backward Forty Years. By ——.

On Much Needed Postal Conveniences. By W. J. McG.

On Experience for Sixty Years. By ——.

On Employment of Capital. By ——.

Also inquiries and answers from the following:

O. H. S.—F. H. B.—J. F.—J. B.—E. H.—M. A. L.—J. W. D.—W. S.—T. T. P.—C. H. L.—A. K. & Co.—C. P.—T. W. S.—C. B.—C. H. M.

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 inquries 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.

Hundred of inquiries analogous to the following are sent: "Who makes small engines suitable for running sewing machines? Who makes and sells wire rope? Who sells suitable instruction books for stationary engineers?" 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.

INDEX OF INVENTIONS

FOR WHICH

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AND EACH BEARING THAT DATE.

[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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10,146.—PATTERN IN SUITINGS.—N. Frye, Andover, Mass.
10,147.—HANDLES OF SPOONS AND TABLE CUTLERY.—G. Gill *et al*, Derby, Conn.
10,148 to 10,150.—CARPETS.—John Hamer, Matteawan, N.Y.
10,151.—MATCH SAFES.—W. Hamilton, New York city.
10,152.—ADVERTISING CARDS.—J. D. Holt, Philadelphia, Pa.
10,153, 10,154.—CARPETS.—T. J. Stearns, Boston, Mass.
10,155.—IRON GATE AND RAILS.—W. Tweeddale, Brooklyn, N. Y.
10,156.—WALL POCKETS.—D. Raup, Watsontown, Pa.

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