



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 This is for our information and not for publication.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 30 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(9435) H. W. M. asks: 1. How many pounds of magnet wire are used in the making of an induction coil for one-inch spark? What numbers of wire are used on the primary and secondary coils? How thick is the core, and which is wound on first, the secondary or primary coil? Which is used - single silk-wound or double silk-wound wire? What is the lowest voltage that can be used and what is the highest voltage that can be used without injuring the coil? How many layers of primary and secondary wire are used, and how many wires long are they? A. An induction coil giving an inch spark can be made from 1 1/4 pounds No. 36 silk covered copper wire, if properly wound. The primary may be No. 14 cotton covered magnet wire wound in three layers. The core may be 7 inches long and 3/4 inch in diameter. Single silk will doubtless answer for the covering, and double cotton. All wires are to be thoroughly saturated with paraffine. The primary is first wound, as its name implies. We would advise that you buy Norrie's "Induction Coils," which we can furnish for \$1, and study the subject carefully, or you may waste costly material and get little for your pains, since you do not seem to have had much experience in such work. Q. How many men are equal to one horse-power, the men being of average weight? A. A man may be taken at from 1.10 to 1/2 of a horse-power for a day's work. For a few minutes a man can do more work than that.

(9436) A. P. G. asks: Several cells of dry battery were attached to a common electric bell, such as is used for door bells; the wire was then cut and the ends immersed in a dish of water, and the bell refused to work. Water being a conductor, why would it not carry the current and ring the bell? A. Water is not a good conductor of electricity, and there is no reason why an electric bell should ring when the wires are cut. Water is used as a resistance to prevent the flow of electricity in heavy currents. A water rheostat is a common device for this purpose. Thompson gives the resistance of pure water as more than a million times as great as that of copper. Ordinary water has not so great a resistance as this, but it has enough to prevent it from being classed as a conductor.

(9437) E. B. asks: Will you please inform me whether the south magnetic pole is of the same strength as the north magnetic pole? That is, is the earth the same as a bar magnet, having its two poles at the north and south magnetic? Also, when a ship is sailing south, before it crosses the magnetic equator is the compass affected by the north magnetic pole, and after crossing the magnetic equator is the compass then affected by the south magnetic pole? A. The location of the south magnetic pole of the earth has never been determined with precision. An expedition is now engaged in the effort to locate the north magnetic pole. It is prepared to be absent three years. We may on its return have definite knowledge concerning the matter. At present we can only say that the north magnetic pole is in British America, to the north of Hudson's Bay. The two magnetic poles are of the same strength. The earth behaves magnetically as if it had a bar magnet within it some 4,000 miles long, making an angle with its axis, and this magnet slowly oscillating, causing the declination of the needle. Both poles of this magnet attract and repel magnetic needles on the surface of the earth. This attraction and repulsion are not affected by the position of the compass. If it is in the northern hemisphere, the north pole attracts its north and repels its south end, and the south pole of the earth does the same. So also a compass in the southern hemisphere is affected by both the north and the south pole of the earth. The dip of a compass needle is affected by the pole to which it is nearer. In the northern hemisphere the north end of the needle dips, and in the southern hemisphere the south end of the needle dips, but the swinging of the needle in a horizontal plane is not caused by the pole of the hemisphere in which the needle is, to any greater extent than by the other pole of the earth.

NEW BOOKS, ETC.

POOR'S READY REFERENCE BOND LIST. Containing All Important Facts Required by Investors, Bond Experts, Bankers, and Others Relative to the Bonded Indebtedness, Interest Charges, etc., of the Leading Railroad Systems in the United States. New York: Poor's Railroad Manual Company, 1904. 8vo.; pp. 94. Price \$2.

This is a supplement to Poor's Manual of Railroads. As the above descriptive title indicates, the pamphlet contains information of great value to the investor—information compiled directly from the official returns. The tabulation gives the following facts: The name of the company and description of bonds; the date of issue; the date of maturity; amount outstanding on or about December 1, 1903; annual charge and rate of interest, where payable, and when; the property covered; the amount of bonds outstanding per mile of road; and the trustees. There is an index, which makes any required bond in the table readily accessible.

THE LIGHTNING CONDUCTOR. The Strange Adventures of a Motor-Car. Edited by C. N. and A. M. Williamson. New York: Henry Holt & Co., 1903. 12mo.; pp. 344. Price \$1.50.

While far from being a technically perfect novel, "The Lightning Conductor" more than makes up, in brightness, breeziness, and originality, for any defects in form. It is a capital story of romantic love pursued amid the ups and downs of an automobile trip through sunny France. There are masquerades and misunderstandings, and the expected happy ending to it all. The writers seem to have aimed to do for modern life what Agnes and Egerton Castle have done for romancer times. They have certainly succeeded in investing the present with that glamor usually monopolized by the past. The incidental descriptions of scenery and architecture are happily worded, and convey vivid and pleasurable impressions to the mind of the reader.

HOW TO LIVE FOREVER. The Science and Practice. By Harry Gaze. Chicago: Stockman Publishing Company. 12mo.; pp. 205. Price \$1.25.

While our inventors are experimenting with aeroplanes and motors, Mr. Gaze would solve the problem of aerial navigation simply by evolving wings from human shoulder-blades by auto-suggestion. This will serve to illustrate the extreme attitude of the writer, if the title of the work be not sufficient indication. There are many good rules, the observance of which would no doubt tend to prolong life; there is also some teaching which seems to us pernicious. As to the great problem which the author claims to have solved, most men, fond as they are of life, would agree with Stephen Phillips, when he makes Ulysses say, "I would not take life save on terms of death, That sting in the wine of being, salt of its feast."

THE HAYFIELD MOWER AND SCYTHE OF PROGRESS. By the Mower-Man. Volume I, Numbers 1 to 26. Boston: The Hayfield Mower, P. O. Box 1765, 1904. 8vo.; pp. 175. Price \$1.25 net.

Nothing escapes the attacks of this Mower and Scythe. The snob, the hypocrite, the oppressor, have the feet cut from under them at every revolution of the wheels. The follies of our public school system, the dishonesty of our political system, and the injustice of our industrial system, all turn their worst sides for our inspection as the Mower lays them low. Although we may not always agree with the inexorable Mower-man as to what is or is not ripe for his determined assaults, yet we cannot fail to find a stimulation in watching him work. There is always a malicious pleasure to be taken in seeing the other fellow get his deserts; but when the Mower is in the field, we must choose our vantage ground with particular care. We advise the observer to wear cast-iron shoes, and to move quickly, otherwise he may get his own toes shaved by the knife.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending July 19, 1904

AND EACH BEARING THAT DATE [See note at end of list about copies of these patents.]

Table listing inventions with patent numbers, including Acid ester and making same, sulfo, Sapper & Reubold, Acid, making omega cyamethyl anthranilic, O. J. Graul, etc.

Main table listing inventions with patent numbers, including Bed, W. E. Collier, Bed rail fastener, W. Storch, Bench block, T. G. Lewis, Binder draft attachment, J. S. Randall, etc.