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 This is for our information and not for publication.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.

(9316) A. F. S. writes: I am a constant reader of your valuable paper, but to my memory I have not noticed anyone discussing the philosophy of cloud electricity. I believe the matter is a problem in most minds, and deserves attention. For example, why is it that lightning is rarely seen in the winter, and only occasionally in the summer? How is the energy accumulated? Here is what I have to say from observation. Witnessing some approaching storms in the summer, it could be observed that there was some difference as to the behavior of the clouds and their formation. If the latter appeared as a great dense blanket, though very threatening to the eye, and great gusts of wind preceding it, there was no violent effect either as lightning or rain. When these clouds would break up by hot and cold air disturbances, or if the storm appeared broken up, often one cloud above the other, there was much electrical display, as well as rain. These cloud bodies did not move uniformly; when the confusion was slight, there was chain lightning and no rain; when it was greater, great bolts shot into the earth, often followed by torrents of rain, probably due to the sudden cohesion of the water particles. Clouds, I should infer, are always electrified by wind friction, but their normal potential is continuous but low, so long as they move uniformly; when different divisions pass each other, magnetic induction is established, and great intensification of their charge results. I believe that cloud electricity is unlike that of our glass disk generator. It is water electricity as generated in boilers and the lungs, and is identical with vital energy, because its magnetism alone influences the living body. I wish to hear from others as to this; also how can a thunder-bolt splinter a wooden house and then drive a section of its foundation a half inch into the hard dry ground? The spark has no weight, but it takes many tons to duplicate such a feat. A. Your note concerning the electrification of the clouds and the action of lightning has points of interest, but we are not able to see any effect of magnetic induction in these phenomena; nor that lightning and the energy of a living being are identical. The mechanical force of lightning is by all considered to be due to the rending and heating of the air and its rushing back into the space from which the passage of the electric discharge has driven it out. These actions are not electrical any more than a boiler explosion is electrical.

(9317) S. T. C. says: I desire to know what amount (if any) of water may be carried off by dry air if some was forced into water and allowed to escape (through conducting pipes) some distance from the water. A. Saturated air at 72 deg. Fahr. contains 0.0012 pound of water per cubic foot, and by using ordinary dry air of 50 per cent moisture, 1,000 cubic feet of air will absorb and carry off 0.6 of a pound of water; and if the temperature of air and water is raised to 100 deg., about 1¼ pounds of water may be evaporated per 1,000 cubic feet of air. By raising the temperature of the water to 125 deg., 3½ pounds of water may be evaporated per 1,000 cubic feet of air.

(9318) L. H. asks: I have a 3-horse-power vehicle gasoline engine with electric igniter supplied by six No. 2 carbon porous cup cells and 9-inch plain spark coil. The ignition has never been satisfactory, and has given me no end of trouble, and as I cannot get satisfactory answer from the manufacturers of the engine, I want to get an expert's answer to a few questions. I think the electrodes are made of iron or steel. What do you think would be the best arrangement to supply a spark to this igniter? How could my battery as described above be improved to give best results? What kind of a spark coil would give the best spark, and how many cells would it require? Considering that I run my engine only a part of the time, and sometimes it stands idle for days, but when I do want to run it, it is important that it should go good, which is very uncertain as arranged now, would not an improved auto-sparker be a good thing for my engine? How much of the engine's power would the auto-sparker require? A. A six-cell battery with a 9-inch spark coil should be faultless in electric power for operating a gasoline engine, if its individual parts are in proper condition. The system is largely in use and giving satisfaction. The other system with a jump spark is so different that it will require much change, such as a new plug, an induction coil, which may be used with the same battery, or by a small dynamo. We advise a thorough examination of the parts, beginning at the battery. See that the battery is cleaned and given a fresh charge, and test it by a break contact of the wires, then connect the coil and test it in the same way, which should give a brighter spark. Then take out the plug and thoroughly clean every part; take out the spindle, and remove any carbon or dirt that might cause a short circuit. Connect the plug with the battery and coil, and test the break spark by hand, and if there is still a fair spark, it should be in good order. Reconnect to the engine, and give it a final test trial. The contact points of the electrodes should be of platinum, and if not, and the faces are corroded, they may be of steel, and should be dressed smooth and slightly rounded for perfect contact. We apprehend that your complaint, which is not stated in detail, is due to short circuit of the current at the spark end of the plug by a deposit of carbon on the intervening surface between the electrodes. Frequent cleaning is needed in this as well as other sparking plugs. The auto-sparker, or jump spark system of ignition, is much in use and is very satisfactory. The power required to operate the auto-sparker is very small, probably not one-eighth of a horse power.

NEW BOOKS, ETC.

SIMPLE METHODS FOR TESTING PAINTERS' MATERIALS. By A. C. Wright, M.A., B.Sc. London: Scott, Greenwood & Co. New York: D. Van Nostrand & Co. 1903. 16mo. Pp. 163. Price $2.50.

The materials employed in painting are peculiarly liable to sophistication, and it is not uncommon to find one substance entirely replaced by another of lower value. This book is designed to enable the painter and dealer to test and value the materials they buy, and the manufacturer and dealer the samples submitted to them, in the simplest manner, both in regard to practical properties and composition.

THE HANDYMAN'S BOOK OF TOOLS, MATERIALS, AND PROCESSES EMPLOYED IN WOODWORKING. Edited by Paul M. Hasluck. London: M. D. Cassell & Co., Ltd. 8vo. 760 pages, 2,545 illustrations. Price $4.

The author is a well-known amateur mechanic who has added very largely to the literature of the subject. The author believes that the present volume is by far the most exhaustive book on the subject hitherto produced, and an examination of it would seem to confirm this view. While some of our tools are slightly different and are used differently here than in England, still the differences in practice do not render this book of little value to the American reader. It is a book which will delight the amateur mechanic, as it is virtually a cyclopedia of practical handicraft in wood.

HISTORY OF AMERICAN STEAM NAVIGATION. By John H. Morrison. New York: W. F. Sametz & Co. 1903. Ins. 8vo. Pp. 630 Price $4.

It is surprising that we should have passed into the twentieth century before any serious effort was made to write the history of American steam navigation; for although it is true that our present rank as a maritime nation is altogether incommensurate with our enormous industries and commercial interests, our contribution to the development of steam navigation has been a most generous one. The task of writing this history has been undertaken on a very complete scale; and the 630 pages of this book cover the subject so completely, that one feels satisfied on laying it down that there is no fact of any importance connected with the subject with which the book has not made him conversant. It opens with a chapter on the experimental stage, in which the early development of steamship navigation is traced, from the attempts of John Fitch, of Connecticut, to the establishment of the steamship on a practical business basis. Then follows a most fascinating chapter on navigation on the Hudson River. Cuts of the most famous "fliers" for the past fifty years are given, together with a description of the vessels and their best passages. It is surprising to learn that half a century ago a boat like the "Francis Skiddy" made the trip from New York to Hudson, 116¾ miles, at a speed per hour of 23.04 miles. In this connection, reference should be made to a chapter at the end of the book on high speed, in which the absurdity of many claims for high speed is shown. The author in testing these records looked up the logs of the various vessels, and by corrections for tides, etc., was able to show that the best passages of certain ships were many miles below the average speed with which they had been popularly credited. The book is divided into chapters on the development of navigation on western rivers and the various well-known lines on the Sound and elsewhere. Under the head of "Ocean Steamships" a fitting tribute is paid to the efforts of the United States to establish and maintain the famous Collins Line. The other chapters on coastwise steamship lines, steam ferryboats, and the lighthouse and steamboat inspection service are of great value and interest.

INDEX OF INVENTIONS

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