

book should give incorrect or misleading information; the authors' aim "at spanning the gulf which too often divides pure theory and practical engineering" will not be realised if the student is obliged to unlearn much that they teach him when he becomes a practical engineer. We do not profess to be experts in the whole subject of electrical engineering, and cannot criticise the whole book, therefore, on the same lines as we have criticised the section on lamps; but the authors, by writing such a book, lay claim—at least so far as fundamentals are concerned—to be such experts, and if we find them at fault at one part we are led to suspect the whole.

The book covers the whole electrical field; the arrangement is that usually adopted, opening with electrostatics and magnetism, and passing on to electric currents. The diagrams and illustrations are for the most part good, but the process blocks (fortunately few) come out badly on the class of paper used. There are numerous exercises for the student to work out at the end of each chapter.

M. S.

OUR BOOK SHELF.

Gas-engine Theory and Design. By A. C. Mehrtens. Pp. v+256. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1909.) Price 10s. 6d. net.

THE writer of this book is an instructor in mechanical engineering in the Michigan Agricultural College. His aim, he tells us, has been to prepare a book for all who are interested in gas engines, whether students, draughtsmen, engineers, or engine operators.

This is an ambitious aim, and we may well doubt the possibility of its being carried out in such a small compass; but there can be no doubt that the cardinal virtues of simplicity and conciseness of language which any such intention must require are here presented in no usual degree. The reviewer does not remember any book hitherto written on the gas engine which presents its subject with such lucidity.

The chief entry to be made on the debit side of the account is that the extent of the field covered is far too great. It will be found, on perusing the volume, that it not only deals with the history and present position of gas-engine invention, and with the properties of the gases and fuels used, but also with such a big subject as the design of engine details and the dimensions of parts. Students usually learn their physics and machine design independently of the steam or gas engine, and a book on the gas engine which includes a great deal of what has already been studied separately is wasting space. The result in so small a book as this is that the truth and applicability of a great number of formulæ are taken for granted, which may account for the poor compliment paid to them by the author on p. 123, where he remarks:—

"A number of formulas will be given in the following paragraphs, but machinery cannot be designed by formulas alone. The author has frequently found that empirical, and other, formulas would sometimes come within 500 per cent. of the correct result."

There are also the inevitable slips of a "first edition," but they are not numerous. The author should, however, make a point in the next edition of correcting his description (on p. 33) of carbon monoxide as an unstable compound; his omission on p. 39,

in the discussion of the apparent suppression of heat on explosion, of any reference to the increase of specific heats admitted on p. 25; the error in saying (on p. 44) that it is usual to increase the compression pressure in an engine which is to run on kerosene, and he should also correct the general confusion of the table on p. 167. It is difficult to understand what the author means in his description (on p. 52) of the working of the gas producer by the remark:—"The limit of the ratio of steam to coal by weight is about 1 to 40."

Although, as has been stated, the author has attempted to get too much into so small a volume, it must be acknowledged that he has produced a book at once interesting in treatment and clear in language.

La materia radiante e i raggi magnetici. By Prof. A. Righi. Pp. vii+308. (Bologna: N. Zanichelli, 1909.) Price 8 lire.

IN a recent number of NATURE a brief account was given of Righi's "magnetic rays," this being the name applied to a peculiar luminosity near the cathode of a vacuum tube, when the latter is placed in a longitudinal magnetic field. Righi supposes that this luminous column is due to electrically neutral doublets, which are not in sufficiently stable equilibrium to be looked upon as atoms or molecules, which owe, in fact, such stability as they possess to the action of the magnetic field. Several papers on this subject have been published by the author, and the main object of the present small volume is to give a connected account of the whole research. About one-third of the book is devoted to an extremely lucid and interesting summary of our present knowledge concerning the corpuscular theory of matter, written in a style which, as far as possible, is free from technical terms. The remainder, except for three short mathematical appendices, deals with the evidence for and against the existence of neutral doublets or magnetic rays. Here, while very suggestive, the experiments are not altogether convincing—this is evidently the opinion of Prof. Righi himself—but this is due in great measure to the difficult experimental conditions. While no one experiment can be said to have demonstrated the existence of magnetic rays, the results as a whole certainly tend to support the author's view. One point might have been treated more fully, viz., the conditions under which a magnetic field lowers the potential difference at the terminals of the discharge tube. Experiments are described, in some of which an increase, in others a decrease, of potential is brought about by the magnetic field, but it is not clear to what difference in the conditions this is due.

R. S. W.

Brassolidæ. By Dr. H. Stichel. (Das Tierreich, 25 Lieferung.) Pp. xiv+244. (Berlin: R. Friedländer und Sohn, 1909.) Price 15 marks.

THIS is a very elaborate monograph of a comparatively small group of butterflies found only in Tropical America. They form a subfamily of the great family Nymphalidæ, and are most nearly allied to the great blue Morphidæ, but differ from them by their stouter bodies, darker colours, and the closed cell of the hind wings, which are generally ornamented with three large eye-spots on the under-surface. Their flight is crepuscular, while that of the Morphidæ (which are represented in the East Indies as well as in Tropical America), is diurnal.

In 1823, Latreille and Godart, in the second part of "Papillons" in the "Encyclopédie méthodique," were acquainted with only twenty-three species now referred to the Brassolidæ. Of these, twenty-one formed the bulk of the second section of the genus Morpho, while the remaining two species were