ELECTRICAL TESTING.

Laboratory and Factory Tests in Electrical Engineering. By George F. Sever and Fitzhugh Townsend. Second edition, revised and enlarged. Pp. xii+269. (London: A. Constable and Co., Ltd.; New York: D. van Nostrand Co., 1908.) Price 10*s*. 6*d*. net.

IT is almost unavoidable that a book on laboratory practice, written by men whose duty it is to plan and superintend the work done by students, must savour somewhat of the instruction sheets which at universities are supplied to the laboratory classes. It is equally unavoidable that such instruction cannot be given in perfectly general terms, but must be adapted more or less to the syllabus in use at each particular university, and to the plant provided for the laboratory. Thus a work on laboratory tests may be exceedingly useful to students working at the particular laboratory to which it refers, but whether students at other institutions will be able to derive much benefit from it is doubtful. The advanced student and the scientific engineer, who is already in practice, will probably also be able to derive some advantage from the book under review, but he would reap the same advantage with less mental labour from any elementary text-book on electrical engineering. The words "factory tests" in the title must be taken to mean that the tests used in a particular laboratory may more or less also be used in a factory. This is, of course, true of all work carried out in a modern well-equipped laboratory, and, therefore, not a distinctive feature of the methods described in the present work.

It is certainly difficult to compress into 260 pages the whole subject of electrical testing, and want of space may be the reason why the authors have treated certain subjects in a very brief—one is almost tempted to say sketchy—manner, but I think they have not been judicious in the matter of curtailment, inasmuch as they have shortened or omitted altogether the exposition of general principles. On the other hand, they have unduly expanded the mere routine of testing. As an example of sketchy treatment of fundamental matters, take the Heyland diagram on p. 172 of the induction motor, which is given on the assumption that the motor has neither ohmic nor iron losses, and the various vectors are indiscriminately referred to as representing magnetomotive forces, currents, flux, or electromotive forces, without a word of explanation. That such treatment of a difficult subject must have seemed to the authors themselves somewhat unsatisfactory may be gathered from the following sentence, which occurs on p. 173:—

"This diagram has been so fully discussed in the literature of the induction motor that it is not thought necessary to reproduce the proof of it here."

Just so. The authors assume that the fundamental principles are known, and content themselves with giving mere rules for testing.

The book is divided into three parts. The first deals with preliminary measurements and with tests of continuous-current machines. In the second part we come to alternating-current machines and transformers, and then follows the third part, which bears the title "Electrical Measurements." This title is rather misleading, for here we find such subjects as the determination of the leakage coefficient of a dynamo, the Hopkinson method of testing for permeability, Ewing's hysteresis tester, Ewing's magnetic bridge, the plotting of the hysteretic loop—all subjects which one would rather call magnetic, not electrical, tests. However, a title which only fits part of the contents is not a serious matter, but that some electrical tests are treated in a very superficial manner is a decided drawback. Thus the Wheatstone bridge, which logically ought to have found a place in the first part, is dismissed in two pages of letterpress and a very imperfect diagram, whilst no mention is made of Varley's bridge or Thomson's double bridge. The potentiometer fares even worse. The diagram on p. 250 is crude and incomplete, and it is no help to the reader to be told on p. 251 that "for commercial use the potentiometer is usually arranged in some compact and convenient form." It is precisely the instrument as practically used with all its refinements that the reader expects to find in a book on laboratory and factory testing.

The third part also deals with tests on batteries and photometric work. Since both these subjects together occupy barely nine pages, it is clear that the treatment can only be very superficial. One feature of the book which strikes the reader as peculiar is that the authors omit in most cases to mention the origin of the methods they describe. Thus, Scott's name is not mentioned in connection with the change from three- to two-phase circuits, nor is Heyland's name mentioned when describing his diagram. Quite apart from the consideration that it is only fair to give credit where it is due, the suppression of such references is inconvenient to the reader. Certain discoveries, inventions, methods, or tests are known under the names of the men who first published them, and are usually identified in this manner. By omitting such means of identification, the young student loses touch with the subject he is supposed to acquire.

GISBERT KAPP.

SCHOOL ALGEBRAS.

(1) *Elementary Algebra—A School Course.* By W. D. Eggar. Pp. viii+324+28. (London: E. Arnold, n.d.) Price 3*s*. 6*d*.

(2) *A New Algebra.* By S. Barnard and J. M. Child. Vol. i., containing Parts i., ii., and iii., with Answers. Pp. x+371. (London: Macmillan and Co., Ltd., 1908.) Price 2*s*. 6*d*.

(3) *Algebra for Secondary Schools.* By Dr. Charles Davison. Pp. viii+623. (Cambridge: University Press, 1908.) Price 6*s*.

(4) *The Eton Algebra.* Part i. By P. Scoones and L. Todd. Pp. xxv+184. (London: Macmillan and Co., Ltd., 1908.) Price 2*s*. 6*d*.

(1) THIS book covers most of the ground required for boys who are not specialising in mathematics, with exercises in logarithms and a short chapter on trigonometric ratios. There are tables of