

sistencies met with in alternating current work. The only serious criticism that may be offered is that it attempts rather too much. For example, in Problem 55, on p. 275, the student is asked to calculate the self-induction of a long three-phase transmission line, and in the next question to calculate the corresponding reactance. He might be led to expect that this result would give him the drop of the line, whereas it does not, because the mutual induction between the lines and the difference in phase between the currents in the lines are not taken into account. One might also be inclined to criticise the amount of space devoted to the subject of armature windings for alternators. This is defended in the preface, as a useful mode of teaching polyphase current technology. In practice an oscillograph demonstration of phase differences would be much more illuminating. The order of taking up the subject, too, strikes one as rather unnatural. It is surely a mistake to leave out any reference to the physical nature of self-induction and capacity until reactance has been studied.

The argument from the concrete example to the abstract theory is much used in America and elsewhere, and possibly has advantages for engineering students; the danger of it is that the student, when he can calculate what he wants to calculate about his machines, will often never bother to find out the reasons for his methods; he will become a rule-of-thumb man instead of a scientifically trained engineer. The danger is a very real one, which must be combated if engineering students are to become useful in engineering development work, the work for which engineering colleges should strive to train their men. In spite of minor defects, the book may be recommended as a satisfactory text-book for students of electrical engineering in the early stages of their training.

#### OUR BOOKSHELF.

*The Electric Dry Pile.* By C. E. Benham. Pp. 37. (London: P. Marshall and Co., 1915.) Price 1s. net.

THIS little book is a reprint of articles published in the *English Mechanic* during the present year. The dry pile, built up in the same way as Volta's moist pile, was the invention of Jean André De Luc, who first described it in *Nicholson's Journal*, 1810. It was constructed by piling up in a glass tube a series of paper discs, coated on one side with silver leaf and on the other with thin leaves of zinc. A continual difference of potential was found to exist between the terminals. Modifications were introduced by various workers,

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notably Zamboni and Singer. The latter devised the form of apparatus now in the Clarendon Laboratory of the Oxford University Museum. This is arranged to ring a small bell, and its period of activity now extends to seventy-five years. Mr. Benham gives detailed instructions for setting up a dry pile of 2000 pairs, and describes a number of interesting experiments that may be carried out with its aid. The chief original feature is the use of two ready-made coated papers in the construction of the pile. The work would have been of greater scientific value if some quantitative results had been included.

*War Map of Italy and the Balkan States.* 30 in. × 40 in. (Edinburgh: J. Bartholomew and Co., n.d.) 1s. net in case, or 2s. 6d. on cloth in case.

THIS map covers an area extending from Geneva in the west to Odessa and Asia Minor in the east. On the north it reaches Vienna, and takes in Malta on the south. Insets, on large scales, of the Dardanelles, Constantinople and its environs, and Trieste and its surroundings are provided. Each separate State is distinguished in colour, and railways are shown. The map, which may be highly recommended, can also be obtained on rollers and varnished for 6s.

*All About Zeppelins and other Enemy Aircraft.* By F. Walker. Pp. 32. (London: Kegan Paul, Trench, Trübner and Co., Ltd., 1915.) Price 6d. net.

It appears, from the preface, that "this little book is intended to explain fully, to a person of average intelligence, the nature and construction of enemy aircraft . . ." The author is a civil engineer, if one may so interpret the letters appearing after his name, but it is clear that his engineering training did not include an adequate course in aeronautics, or even freehand drawing, otherwise one might have been spared the many inaccuracies to be found in the book, and the still more remarkable sketches (signed "F. W.") purporting to represent aircraft. Fig. 20, page 25, is said to show "a British biplane in flight." It is in reality a very poor sketch of the Wright biplane of 1908, to the under-carriage of which the artist has added a misrepresentation of four wheelbarrow wheels. A somewhat better sketch of a rear view of the same machine is introduced in the following words: "Several of the Allies' biplanes have two propellers, as shown by the front view of a machine, Fig. 21."

Figs. 22 and 23 purport to be sketches of a "Taube" and an "Aviatik" respectively. Mr. Walker seems to have had misgivings, for he says: "But the details of these are so constantly changing, and the fact that they are utterly wrecked on reaching the earth, that we can only present the outward appearance in flight" (*sic*). It is difficult to believe that the delightful humour of these drawings, and of many of the statements in the book, is unintentional.