

sometime an English translation will make this work even more accessible to our students. A study of it is most heartily recommended to the mathematician who is interested in the applications of theory to numerical practice, to the applied mathematician who has to perform computations, and to the teacher of secondary mathematics who thinks that with Horner's method the last word on the solution of equations has been said.

ELIJAH SWIFT

Les Applications Élémentaires des Fonctions Hyperboliques à la Science de l'Ingénieur Électricien. By A. E. Kennelly. Paris, Gauthier-Villars, 1922. vii + 151 pp.

This book covers the subject of a series of lectures delivered in France by the author as exchange professor, representing a group of American universities. The same topic has been covered by Professor Kennelly in a previous work (in English) published in 1912 by the University of London Press. The differences are so slight that an American student would naturally prefer the one written in his own language.

The aim of both books is to spread more widely the fact that cable problems are best understood in terms of hyperbolic functions,—of real variables for the case of direct current with distributed leakage, of complex variables in the case of alternating currents with distributed earth or parallel-wire capacitance. This aim is very heartily to be commended. The author's method of solving alternating current problems by considering the corresponding problem with direct current, and then by replacing resistances by complex impedances is also easily the best. In some text-books this method is not used as consistently and thoroughly as it should be. It enables the principles of the wave-filter, for example, to be stated very easily by means of the two principles of the addition of impedances (admittances) of series (parallel) conductors. It is probable, however, that this method finds its way more frequently into lectures than into text-books. In this connection the reviewer would advise a more frequent use of four-terminal impedances (current between AB in terms of voltage drop from C to D).

Either of the two books would also be a useful source of problems in the elementary theory of the complex variable.

In some ways the book under review suffers from condensation. In particular, the remark that the hyperbolic angle of a sector can be measured, not only by twice its area, but also "par la longueur de l'arc hyperbolique AP , rapportée à la longueur croissante du vecteur OP " is not clear until one observes, in the earlier book, that by this is meant the integral with respect to the arc of the reciprocal of the radius.

The book under review contains a brief study of transient currents which is not contained in the earlier work.

Finally mathematicians may have their attention called to Appendix F of the earlier book in which is shown an interesting relation between continued fractions of a certain class and hyperbolic functions. The student is referred to a paper by the author in the *ANNALS OF MATHEMATICS*, vol. 9 (1908), p. 85 et seq.

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