

terms "curl" and "div," which are scarcely to be ranked as symbols. It may be seen that the system of the late Professor Gibbs is perhaps the only one in which the matter of a complete, consistent, and practical notation has been carefully thought out to the end.

E. B. WILSON.

Wissenschaftliche Grundlagen der Elektrotechnik. Von GALILEO FERRARIS. Deutsch herausgegeben von LEO FINZI. Leipzig, B. G. Teubner, 1901. xii + 358 pp.

THE title of this work could not have been better chosen. The lectures on which the book is founded were delivered at the Reale Museo Industriale at Turin and were intended for technical students. Yet the scientific foundations of electric, magnetic, and electromagnetic theory have been placed so emphatically in the foreground and the details of the applications so thoroughly omitted that the work serves also the purpose of an introduction to modern electrical theories. The style is everywhere of the simplest with the emphasis always on the physical conceptions involved. The author begins without assuming on the part of the reader any greater preparation than the elements of the calculus and he builds up carefully, one at a time, the conceptions connected with vectors, electricity, magnetism, and electromagnetism, until at the close of the book he is able to present the elements of Maxwell's theory.

The chief original work of Ferraris was on the magnetic fields arising from the composition of alternating currents of different phases. His memoir entitled "Rotazioni elettrodinamiche," which was published in 1888, is a classic and of value no less for its practical applications to the construction of alternating current motors than for its theory. One might look for an elaborate treatment of this subject in the book before us. As a matter of fact only small mention of it is made, doubtless because the author has in mind the necessity of laying the general foundations rather than of going into details even upon the questions which might interest him most.

The concluding chapter on Maxwell's theory, Hertz's experiments, and Poynting's theorem could have been rendered even more clear by a greater insistence on the notions of curl and divergence; but as it stands it is useful as a guide for those who would follow the theory in its original Cartesian form. The appendix in which are discussed the scientific and practical

C.G.S. systems of units and the dimensions of the quantities occurring in electromagnetism is worthy of the rest of the book and a fitting end to a work which has seemingly no fault and a multitude of virtues.

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NOTES.

AT the fourth regular meeting of the San Francisco Section of the AMERICAN MATHEMATICAL SOCIETY the following officers were elected for the year 1904: chairman, Professor R. E. ALLARDICE; secretary, Professor G. A. MILLER; members of the programme committee, Professors M. W. HASKELL, IRVING STRINGHAM, and G. A. MILLER.

THE opening (January) number of volume 5 of the *Transactions* of the AMERICAN MATHEMATICAL SOCIETY contains the following papers: "The subgroups of order a power of 2 of the simple quinary orthogonal group in the Galois field of order $p^n = 8l \pm 3$," by L. E. DICKSON; "On certain invariants of two triangles," by J. G. HUN; "Isothermal systems of geodesics," by E. KASNER; "Zur Gruppentheorie, mit Anwendungen auf die Theorie der linearen homogenen Differentialgleichungen," by A. LOEWY; "On the group of the sign $(0, 3; 2, 4, \infty)$ and the functions belonging to it," by J. W. YOUNG; "On the definition of reducible hypercomplex number systems," by S. EPSTEEN; "A simple proof of a theorem in the calculus of variations (extract from a letter to Mr. W. F. Osgood)," by E. GOURSAT.

WITH the January issue the *Mathematical Supplement of School Science* assumes an independent existence as a bimonthly journal under the title *School Mathematics*. It remains under the responsible editorship of Professor G. W. MYERS, who will be assisted by a board of associate editors. It is intended to make the journal an exponent of the teaching of mathematics in the United States.

BEGINNING with the January number, there will appear in the *American Mathematical Monthly* a series of articles by Dr. E. B. WILSON on "Spherical geometry," presented in the spirit