

tion to the advanced part of the theory of numbers is already recognized to be of lasting importance. A more elementary introduction to the ideas there presented, as well as applications to algebraic numbers, are given in Minkowski's *Diophantische Approximationen*, which appeared in 1907 and was reviewed for the *BULLETIN* by the present writer, February, 1909 (volume 15, pages 251-252).

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Algebra of Quantics. By E. B. ELLIOTT. Second edition. Clarendon Press, Oxford, England, 1913. xvi + 416 pp.

THIS new edition of Professor Elliott's well-known work on algebraic theory presents more changes in typography than in content or method. Although the material has been considerably increased (by one eighth is the author's liberal estimate), the number of pages has been actually decreased. This has been accomplished by more compact printing, the adoption of a new method of writing fractions, and the insertion of many important equations in the body of the text instead of printing them in separate lines. These changes do not add to the appearance of the text, and surely not to the delight of the reader, to whom the outstanding equations were of great assistance in reference. The change from d to δ in writing partial derivatives strikes the eye at once. Paragraph numbers are practically unchanged.

Conservatism marks this new edition. Professor Elliott has not abandoned the English methods for German symbolism. In a majority of paragraphs there is no change, and most of the others have only slight verbal changes or an added sentence to clear up obscurities or to suggest further deductions. Chapters V and XV alone present important modifications. In Chapter V, on binary quantics, there is considerable rearrangement, and material has been added on "Invariants as functions of the differences of roots." A half dozen added pages are devoted largely to establishing the conditions under which $F(a_1, a_2, \dots, a_p)$ can be expressed as a function of the differences of the arguments and to proving some properties of this function. The author notes that this should have been in the first edition. Chapter XV, on restricted substitutions, has undergone the most changes and contains the most new material. The half dozen paragraphs on Boolean systems for the linear form, the quadratic, the