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Review

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rapid music of the piano. The explanation of equal temperament should surely be accompanied by a reference to the fact that it is attained in practice with sufficient accuracy by tuning the fifths and octaves correctly.

The subject of sound has been worked out with such thoroughness by Helmholtz and Lord Rayleigh that the new work is naturally confined to details. Amongst the references to recent work quoted by Prof. Lamb we note the experiments of Krigar-Menzel and Raps, who found that a string plucked at one point actually passes through the shapes predicted by theory, and the investigations by Lord Rayleigh which show that our perception of the direction of a sound depends on the difference of phase between the waves which reach our two ears. It is hardly necessary to add that in our opinion this treatise will prove a most valuable addition to the library of every student of mathematical physics. F. J. W. W.

**The Elements of the Theory of Algebraic Numbers.** By L. W. REID. Pp. 454. (New York: Macmillan.) 1910.

Prof. Reid's object can best be stated in his own words in the preface: "It has been my endeavour to lead by easy stages a reader, entirely unacquainted with the subject, to an appreciation of some of the fundamental conceptions in the general theory of algebraic numbers. With this object in view, I have treated the theory of rational integers more in the manner of the general theory than is usual, and have emphasised those properties of these integers which find their analogues in the general theory. . . . The theorems and their proofs have therefore been so formulated as to be readily extendable in most cases to the general realm of the  $n$ th degree, and it is hoped that a student who wishes to continue the study of the subject, will find the reading of works on the general theory, such as Hilbert's *Bericht über die Theorie der Algebraischen Zahlkörper*, rendered easier thereby."

The only other book on similar lines is Dr. J. Sommer's *Vorlesungen über Zahlentheorie* (Leipzig, 1907), and a comparison between the methods of these two authors may be interesting. Reid's book is twice as thick as Sommer's, but Sommer's is more closely printed, and probably contains nearly the same quantity of print. Reid is occupied up to page 155 with rational numbers, and then treats in turn algebraic numbers of the forms

$$x + yi, \quad x + y\sqrt{-3}, \quad x + y\sqrt{2}, \quad x + y\sqrt{-5},$$

and ends with some chapters on the quadratic realm in general. Sommer plunges at once into the quadratic realm, and treats also of the cubic realm, and of a species of realms of the fourth degree. Reid's book resembles French mathematical books in its clear and easy style, while Sommer's book is in the more solid and condensed style of the Germans. There can be no doubt that Reid's easy stages are better for the beginner, and the many numerical examples fully worked out will also be helpful to him. It is a pity that Prof. Reid could not find room for the genera in quadratic realms, having regard to the great importance genera possess in the more advanced theory, but still a line had to be drawn somewhere. A list of additional Errata has been published, and any purchaser of the book, who has not got this list, may obtain it from Messrs. Macmillan & Co.

A. E. WESTERN.

**Exercises from Algebra for Secondary Schools.** By CHARLES DAVIDSON. Pp. vi. + 320. 1911. (Cambridge: Univ. Press.)

This book is a reprint of the examples from Dr. Davidson's well-known algebra for secondary schools, and as such needs little comment. The author and his publishers have done their work excellently, and the book will be found useful in those cases where it is thought better not to place the usual subject matter in the hands of the pupil. Exercises on the exponential and logarithmic series and on convergency of series are included, as well as many good sets of miscellaneous examples.

H. G. M.

**Algebra (Part II.)** By K. J. CHOTTORAJ. Pp. 486. 1910. (Chottoraj.)

This volume is intended to meet the requirements of students preparing for the Intermediate and Previous Examinations of Indian Universities under the New Regulations, and covers the second half of the ground usually taken-up to the Exponential and Logarithmic Series. Though errata are numerous and the