

summary of the work on the genetics and cytology of Tetriginæ (Orthoptera), and includes details of X-ray work on *Apoteitix*, on parthenogenesis and the inheritance of colour-patterns.

(2) Mr. Lawrence modestly describes "Practical Plant Breeding" as a guide-book for the enterprising gardener. This function it will most certainly perform, but it can be recommended to a wider public. Chapters iv and v contain within fifty pages an account of Mendelism and the

cytological basis of inheritance excellently suited for elementary students. The chapters on the technique of hybridization and on methods of plant improvement are as appropriate for the enterprising university teacher as for the enterprising gardener. Mr. Lawrence's style is easy and clear. The book, and the technique it describes, should be introduced into the botany departments of all universities still at the 'six-lectures-on-evolution-and-heredity' stage.

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## Bessel Functions

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Part 1: Functions of Orders Zero and Unity. (British Association for the Advancement of Science. Mathematical Tables, Vol. 6.) Prepared by the Committee for the Calculation of Mathematical Tables. Pp. xx+288. (Cambridge: At the University Press, 1937.) 40s. net.

THE worthy completion of a long and arduous task will always draw from the beholder the tribute of an almost personal gratification. Our sympathy and interest are at once enlisted by the opening sentences of Prof. E. H. Neville's preface to the latest volume of the British Association mathematical tables, Volume 6, a table of Bessel functions of orders zero and unity: "It is with the satisfaction of keeping a long-anticipated engagement that a Committee of the British Association issues its first volume of tables of Bessel functions. Half a century ago, the Committee decided that the tabulation of Bessel functions was the most useful undertaking that it could promote". Our sympathy is deepened when we read that Prof. Alfred Lodge, who had been one of the original Committee of 1889 and to whom this handsome volume is dedicated in terms of grateful affection, died on the very eve of its publication.

The tables appear to the reviewer to be as much above praise as they are beyond criticism. In the course of a most valuable and interesting account of the constructing and multiple checking of the tables (an account which includes a list of errors discovered in pre-existing tables of Bessel functions) Dr. L. J. Comrie, a member of the Committee, states that in the reading of proofs not a single compositor's error was found in some 280 pages containing just under a million figures. He expresses the belief that the tables are completely free from error; and no one has a better right to be believed in such a matter.

The tables are principally of the functions (to use the most accepted notation)  $J_0(x)$ ,  $J_1(x)$ ,  $Y_0(x)$ ,  $Y_1(x)$ ,  $I_0(x)$ ,  $I_1(x)$ ,  $K_0(x)$ ,  $K_1(x)$ , of the last two multiplied by  $e^x$  and  $e^{-x}$  respectively, and short tables of  $e^x$  and  $e^{-x}$  themselves. In addition there are tables of the first 150 zeros of  $J_0(x)$  and  $J_1(x)$ , with the value of the other of the two functions for each zero; and a similar table of the first 50 zeros of  $Y_0(x)$  and  $Y_1(x)$ . The most extensive tables, occupying some 170 pages, are those of  $J_0(x)$  and  $J_1(x)$  to ten decimal places, from  $x = 0$  by steps of 0.001 to  $x = 16$ , then by steps of 0.01 to  $x = 25$ . Those for  $Y_0(x)$  and  $Y_1(x)$  are from  $x = 0$  by steps of 0.01 to  $x = 25$ ; those for  $I_0(x)$  and  $I_1(x)$  are to eight decimal places, from  $x = 0$  by steps of 0.001 to  $x = 5$ ; those of  $K_0(x)$  and  $K_1(x)$  are to ten places, from  $x = 0$  by steps of 0.01 to  $x = 5$ ; the products of these by exponential functions carry the range to  $x = 10$ , then by steps of 0.1 to  $x = 20$ . Interspersed are pages of formulae and recurrence relations, asymptotic series and tables of auxiliary functions. All tables are supplied with second central differences; and the last four pages provide Everett and Bessel interpolation coefficients, with a short description of how to use them.

It is pleasant to read of the generous co-operation of Prof. K. Hayashi, who allowed the Committee to use his own published tables, and of Prof. H. T. Davis, who provided the Committee with a 15-decimal manuscript table of his own, and renounced publication of this in favour of the Committee.

Nothing remains but to congratulate the Committee. Table-making is an art in which beauty and utility are interfused and indivisible. This book more than maintains the high standard set by its predecessors in the series. It is gratifying to learn that a second volume of Bessel functions, of other integral orders, is "in an advanced state of preparation".

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