Gate Park, San Francisco, as "certainly the loveliest of all the species of *Ceanothus*, with its large sprays" of flowers of a lovely bright blue, each about $\frac{1}{4}$ in. across. It is grown at Kew on a wall facing east, but suffered from frost in the spring of 1932, and Mr. Bean thinks it will probably be seen at its best nearer the south coast.

Of other genera represented in gardens by well-known species, many novelties are described, including 29 of *Berberis*, of which 3 are figured; *Betula* 7; *Buddleia* 11, *Ceanothus* 7, *Pyrus* 26, *Prunus* 16 and *Pittosporum* 11.

Of the New Zealand genus *Olearia* (daisy bush), of which the hardy *O. haastii* is the best known, twenty-four species are described, most of which, unfortunately, are hardy only in the mildest parts of Britain.

The genus *Rhododendron* comes in, of course, for the greatest attention, the account of it occupying 91 pages (out of the total 517), 173 species or hybrids being described and 14 figured.

The value of the book is indicated by the fact that a second edition has just been published.

Mathematics and Agriculture

Mathematical Treatment of the Results of Agricultural and other Experiments

By Prof. Dr. M. J. Van Uven. Pp. vi+310. (Groningen and Batavia: P. Noordhoff, N.V., 1935.) 9.50 f.

WE have become accustomed in Great Britain, mainly through the writings of Prof. R. A. Fisher, to the idea that accurate field experimentation in agriculture and cognate sciences is only possible through bringing certain principles of experimental design, mainly mathematical in character, to bear on the problem before the experiment is carried out, and then building up an arithmetical technique, based on the theory of statistics, for the working out of the data resulting from the experiment.

Dr. M. J. Van Uven, who is professor of mathematics in the Agricultural University of Wageningen, Holland, has been associated for many years with agricultural experimentation, and in this book he is concerned to place before readers a careful exposition of the mathematical and technical methods which are needed. He is not writing for the worker who merely desires a formula for the working out of a mean or a standard error. On the other hand, he wishes to be understood by a reader with only a modest equipment of mathematical knowledge. The result is a book, the first half of which is a carefully written and particularly full treatise on least squares. No appeal is made to other than straightforward algebra, but even so the book is by no means easy reading. The general subject is the adjustment of observations, direct and indirect, in one or more variables, including the choice of the representative value, the calculation of mean error of single observations, and of functions of these, and an elementary exposition of probability.

In the second part the author takes up the study of field experiments, beginning by showing how yields of plots can be adjusted when there is a regular fertility distribution. When this condition is not satisfied, he shows how to separate out the systematic and accidental causes of variation by means of an analysis of the variance of the yields. He considers the case of two treatments on alternate plots, and describes his method of working out the standard error of the difference between the treatment means. He recognizes, however, that such an arrangement is far from ideal, and proposes instead that the original plots should be divided to accommodate the number of treatments it is desired to test. This makes the trial one of a larger number of plots of smaller dimensions, but the author does not say how the treatments should be arranged within the plot, whether at random or systematically.

A long description follows of Fisher's methods of block trials, including as a special case the Latin square. There is much to interest the reader here in the exposition of the algebra of the method, and its various ramifications, but the author does not point out that one of the essential features of the methods is the random arrangement. Indeed his examples are systematically arranged, although he does point out, in the case of the Latin square, that some re-arrangement would be advisable to prevent the same treatment occurring down the diagonal.

The author returns to least squares in the last chapter, dealing with the adjustment of direct conditioned observations, and four appendixes are added dealing in detail with points arising in the text. The last, indeed, gives the complete technique of solution for normal equations.

The book is well and attractively printed, and there are few misprints. J. WISHART.