

automatic graphs of refractive index gradient against distance through the boundary. A detailed study of the optical errors in these self-plotting methods has long been wanted, and is now provided, for one of them, in Svensson's monograph. The treatment is based on considerations of diffraction, but it does not attempt to go right back to Maxwell's equations. Instead, it assumes that the diffraction encountered is analogous to one of the familiar types, and thence deduces expressions for resolving power, etc. This procedure seems, on the face of it, to be more 'practical' than convincing, and a more fundamental attack, if at all possible, seems desirable.

The rest of the monograph contains a description of the latest Tiselius-Svensson apparatus, and some new and extensive experimental data chiefly concerned with the effects of various buffer ions on analyses of synthetic mixtures and of normal sera. These data demonstrate that, with the precautions recommended theoretically, the analytical errors can in fact be made small. This is very reassuring and will add much to the value of electrophoresis as a standard analytical technique.

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BEE-KEEPING

Plants and Bee-keeping

An Account of those Plants, Wild and Cultivated, of Value to the Hive Bee, and for Honey Production in the British Isles. By Dr. F. N. Howes. Pp. 224 + 32 plates. (London: Faber and Faber, Ltd., 1946.) 12s. 6d. net.

Honeybees and their Management

By Dr. Stanley B. Whitehead. Pp. 153 + 48 plates. (London: Faber and Faber, Ltd., 1946.) 12s. 6d. net.

THESE two books for bee-keepers are well presented, written in an agreeable style and furnished with many new and attractive illustrations, hard to come by in war-time.

Dr. Howes is a practical botanist, a member of the staff at the Royal Botanic Gardens, Kew, where he has had exceptional opportunities of observing the use made by bees of many plants, both common and uncommon, under conditions there applying. He has a double qualification, for he also understands bee-keeping; and in writing about plants in bee-keeping, his scientific training has enabled him to show wise discrimination in the selection and presentation of evidence derived from a very mixed bag.

His book is one for which bee-keepers have long waited, as there has been much confusion and superficial observation in the past for lack of sound botanical knowledge. Bee-keepers who have been advocating the wider planting of flowering trees, ornamental shrubs, herbs and other plants to increase the honey harvest now have available the correct botanical names not only of the species but also important information about the varying merits of particular recognized varieties.

The opening section deals with plants from the point of view of the bee-keeper; it covers nectar secretion, the problem of quality, pollen (all-important for bee-breeding), pollination (important for securing good and abundant fruit and seed), the growing of bee plants and some useful notes on hedges and wind-breaks.

The second section deals in great detail with some thirteen principal sources of honey in Great Britain.

It is interesting to note the presence in this list of the blackberry, a plant often undervalued, for it has a long flowering period and is a reliable source from year to year owing to its deep-rooting habit. The titles of ling and bell heather on Plate 10 have been interchanged; this is possibly the only real mistake in the book, and is scarcely likely to be repeated as in the classical example of the exchange of titles in the illustrations of the hind legs of the queen and drone, an error which found its way undetected by the authors into two important works on natural history.

The last and longest section deals with a large number of sources of nectar and pollen having utility, especially where grown in considerable quantity. There are to be found in this section references to several sources not previously recorded, an important contribution to which Dr. Howes has modestly given insufficient emphasis. One would like to see these plants treated separately and decked with illustrations, as the botanical descriptions do not convey much to the average bee-keeper.

The controversy about the quality of honey from privet should be settled. Dr. Howes quotes the current view that the honey is objectionable. On the other hand, some claim to have taken considerable quantities and find it of good colour and flavour. I have taken enough to scent the air strongly around the hives for days together, and have experienced a bitter flavour which, however, disappeared in a few months. I cannot say for certain that the bitterness was definitely due to the privet content.

Dr. Whitehead's book is of a different character; for it is one of the many instructional books on bee-keeping. The author has set out to avoid the errors of tradition and lore, and has successfully avoided many which are in currency. In what he presents, however, he has relied too much on his limited personal experience, which is the more surprising as in an annotated bibliography he shows a nice appreciation of the merits and utility of the more important recent works. The advice given on important matters involving methods of management is not that usually given by teachers of wide experience and high reputation; moreover, the instructions given for important manipulations are inadequate to secure success.

In details there are a number of errors, some of which are mentioned below. The acid part of the bees' venom is not formic acid. Figures relating to the water content of honey require revision, especially in relation to fermentation, also the egg-laying of queens in Great Britain, the temperature for feeding syrup, the spacing of wires in the queen excluder, the depth of the Langstroth shallow frame and the sweetening power of honey (lactose in particular rating much above sucrose). Fortunately, under good management, a stock of bees does not raise queen cells annually. A nucleus should not be sent by train with a queen cell in it, and one sold should have a queen laying properly. Bees actually prefer water containing a little salt, and the addition of 1 part in 1,000 helps to keep down the growth of algae. The National hive is in fact widely and successfully used for the production of sections. For heather work it is advisable to use a rack taking only twenty-four so as to allow some extra side protection, or hanging frames can be used.

Subject to some careful revision of detail, this book should prove a useful and attractive addition to the literature available.

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