

BOOK REVIEWS

Darwin's Biological Work, Some Aspects Reconsidered. P. R. Bell, J. Challinor, J. B. S. Haldane, P. Marler, H. L. K. Whitehouse, J. S. Wilkie. Edited by P. R. Bell. Pp. xiii+343, with six plates and 49 text figures. Cambridge University Press, 1959. Price £2.

The centenary of the publication of *The Origin of Species* has focussed attention again on this, the major aspect of Darwin's work. It has also resulted in the publication of various books about Darwin, and yet another can be justified only if it is of outstanding merit. This collection of essays is an attempt to show the diversity of Darwin's interests, and the result is rather uneven. To write a review of 100 years' work for the intelligent layman as well as the scientist is a task that few can measure up to, and not all the contributors have succeeded. However, I read this volume with considerable enjoyment, and think it should be present in any biological library.

Of the six essays, one is of particular interest to readers of *Watsonia*; that on cross and self-fertilization in plants. Before dealing with this a few comments on the rest would be apposite.

Bell's review of the development of work on tropisms in the last hundred years serves to show how original Darwin's ideas were in this field, and also how much has been achieved since. Challinor's discussion of palaeontology emphasises that many of the gaps that Darwin found in the fossil record have not yet been filled satisfactorily. Wilkie, in his discussion of the work and ideas of two of Darwin's distinguished predecessors, Buffon and Lamarck, brings out once more the fact that Darwin was really the great synthesizer who presented in a truly original way the ideas that had been fermenting in men's minds for decades.

J. B. S. Haldane contributes an excellent brief sketch of natural selection. It does illustrate the difficulty of trying to suit two types of reader, however. He includes a 'sketch of Genetics' that is too brief to help the layman and superfluous for the trained biologist. Incidentally, the primrose is referred to as *P. veris* in this paper!

Perhaps the most successful contribution, in the sense that it should be easily understood by the non-scientist, while at the same time it will hold the interest of the biologist, is Marler's review of the progress made in the study of animal communication since the publication of *The Expression of the Emotions in Man and Animals*.

It is unfortunate that the discussion of cross and self-fertilization in plants is in some ways the least satisfactory in the book. There are serious omissions of recent work; one gets the impression that the author has not consulted much literature since 1956, and since the volume was published in November 1959 this cannot be due to the publisher's deadline.

On p. 241 the difference in site of pollen inhibition in two groups is discussed. In the *Parthenium-Crepis* type inhibition is on the stigma; in the *Nicotiana-Veronica* type it is during growth down the style. No reference is made to Brewbaker's (1957) discovery that the site of inhibition can be correlated with the time of division of the germinative nucleus in the pollen grain. Plants with the *Crepis-Parthenium* system show inhibition before germination of the pollen on the stigma and have tri-nucleate grains, whereas plants with the *Nicotiana-Veronica* system generally produce longer pollen tubes in incompatible crosses and have binucleate pollen grains. Brewbaker suggests that the site of inhibition may be related to the level of metabolic reserves in the pollen grain.

Homostyly is mentioned (p. 242) without any reference to Dowrick's (1956) work on *Primula obconica* in which she discussed the production and behaviour of homostyles in detail.

Incompatibility in the Hymenomycetes is discussed without mention of Raper's (1958) discovery that the two incompatibility genes A and B in *Schizophyllum commune* each comprise two loci and that crossing over within the "A" pair can produce incompatible reactions, which are, furthermore, the same as some naturally occurring mating types. A new discovery of this importance deserves mention in a critical review.

It is stated that the commonest cause of the death of the young embryo in interspecific crosses is "a lack of harmony between the embryo and endosperm." This view has been put forward in the past but it is by no means established that this is the case.

If Muntzing's suggestion that perennials may have evolved from annuals because perennial species often have double or higher multiples of the chromosome numbers of related annuals is quoted, surely it should be pointed out also that more recently Stebbins has put forward the view that the presence of vegetative reproduction and the perennial habit in diploid organisms makes them more likely to develop polyploidy. Plants with such characteristics can pass through the "bottleneck of sterility" which may ensue after the onset of polyploidy.

In addition to these and other omissions, the quality of the photographs in Plate V is inexcusable, some

are barely in focus, and in addition they are incorrectly labelled. The legends to photographs i and ii are transposed, and the flowers in photograph vi are in the reverse position to that stated.

The book has one final infuriating feature (to this reader). This is the method of listing references by number at the end of the book, and referring to them in the text by a small index number, often without even stating who the author is. If space saving is the aim, it must be negligible in a volume of this size. If this method is thought to be convenient, then it is a failure. There is no index.

S. R. J. WOODSELL

Excursion Flora of the British Isles. A. R. Clapham, T. G. Tutin and E. F. Warburg. Cambridge University Press, 1959. Price 22s. 6d.

Although the publication of Clapham, Tutin & Warburg's *Flora of the British Isles* has been one of the landmarks of postwar British botany, the need has long been felt in this country for a more concise Flora which could be accommodated in the average sized pocket. This has been admirably met by the work under review which bears the title of an *Excursion Flora*.

The problem in writing an *Excursion Flora* is largely one of selection – for many features have to be omitted or modified so as to bring the text down to manageable proportions. Fortunately the number of species involved in the British flora is sufficiently small to have allowed a spacious format, closely resembling that of the larger *Flora*. As the authors note in the foreword, space has been saved by restricting the number of species described in detail (mainly to those common in lowland parts of the British Isles), by the shortening of the descriptions, and by the omission of such features as pollination mechanisms, life forms, chromosome numbers and extra-British distribution. Species not described are, however, included in the keys. The result does not much resemble the more traditional *Excursion Flora* where brevity is usually achieved by cutting out or abbreviating generic descriptions, the combination of species keys and descriptions in some way or other, and a liberal use of abbreviations. The authors rightly stress, however, the importance of adequate descriptions as part of taxonomic practice, a point which raises the question of the public at which the *Flora* is aimed. Certainly Universities have been set a problem by the availability of both the larger and the *Excursion Flora* for their students. I imagine that many will have made possession of the *Excursion Flora* a minimum requirement while recommending the larger *Flora* as a necessity for advanced students.

For the professional or dedicated amateur botanist possession of both *Floras* is desirable since the *Excursion Flora* is in many ways more up to date, including recent additions to the British *Flora* and incorporating many taxonomic alterations (at both generic and specific level) and nomenclatural changes. Here a few criticisms may be levelled against the authors: since many users will wish to correlate the two *Floras* it is unfortunate that more care has not been taken to facilitate this. Thus, for example, *Dactylorhiza* is separated from *Orchis* in the new *Flora* but there is nothing to indicate that *Dactylorhiza incarnata* is the same as *Orchis strictifolia* of the larger *Flora*. No synonyms are given in this case and the index lists only *Orchis (Dactylorhiza)*. Yet in other cases where the specific epithet is retained unchanged, the synonym is given in both the text and the index, e.g. *Anchusa arvensis* (L.) M. Bieb. (*Lycopsis arvensis* L.).

Some species such as *Cochlearia micacea* have disappeared without trace; other species have been remodelled, such as *Calystegia sepium*. We must look forward to the next edition of the larger *Flora* or to separate publications for the explanation of the various alterations made.

Species aggregates are used occasionally but in some cases the aggregate is numbered as though it were a species and the component species unnumbered (e.g. *Dryopteris filix-mas* agg.). In other cases, e.g. *Dactylorhiza maculata* agg., the component segregates are (correctly) numbered. In *Alchemilla* the *vulgaris* aggregate is indicated in the key but the species are numbered normally. In the case of *Polypodium vulgare* L. we are told that it is an aggregate containing three British species, distinct morphologically and cytologically, without details. *Euphrasia officinalis* L. is given as *sensu lato*, and noted as divisible into other species. These are small points in themselves but a more consistent usage in the case of aggregates would cause less confusion.

Misprints and minor inconsistencies (such as both Bieb. and M. Bieb. as abbreviations) are few. A major lapse is the omission of the *Gentianaceae* from the family key.

While the printing does not conform to the highest standards of the Cambridge Press, the type and paper are excellent and the imitation buckram binding very serviceable. At a price of 22s. 6d. the book is remarkably good value.

V. H. HEYWOOD

The Making of the Broads : a reconsideration of their origin in the light of new evidence. J. M. Lambert, J. N. Jennings, C. T. Smith, C. Green and J. N. Hutchinson. Preface by H. Godwin. Pp. 153, with 7 half-tone plates and 63 maps and diagrams. R.G.S. Research Series, No. 3. 1960. Royal Geographical Society and John Murray. 25s. 0d. Available from the Royal Geographical Society, 1 Kensington Gore, London, S.W.7 at 26s. 2d. including postage.

This book records the evidence for one of the most unexpected recent discoveries concerning the history of British vegetation : that the Norfolk Broads are Man-made features, dug out by hand in Medieval times. In the past it has generally been assumed that the Broads had a natural origin; and in fact an hypothesis for a natural origin of the Broads was put forward, with some misgivings, by two of the present authors as recently as 1951. In the course of their work, they found certain features that were difficult to explain if the Broads had indeed evolved naturally. Subsequent more numerous and more closely-spaced borings showed everywhere that the Broads occupy steep-sided and more or less flat-bottomed basins in the surrounding valley peats, in some cases with straight steep-sided balks of the same peat standing above the general level of the floor of the basin. It became clear that the Broads could scarcely be accounted for except as a vast series of artificial peat-cuttings. The presentation of the massive stratigraphical evidence obtained by Dr. Lambert and Dr. Jennings occupies almost half the book. Some idea of the scale of the work is given by the fact that the stratigraphical results are based on some 2,150 borings, distributed throughout the Broadland valleys.

In part II, C. T. Smith sets out extensive contemporary evidence for medieval peat digging in the Broads, vividly corroborating Lambert and Jennings's stratigraphical conclusions. The earliest records of turbarry are from the mid-twelfth century. For the next two centuries there is abundant evidence of a flourishing turf industry in all the main areas where Broads exist at the present day. In the latter half of the fourteenth century a change in the words used to describe areas which were formerly turbarry suggests that these were becoming wetter; and at the same period there is evidence of decline in the sales of peat, and of increasing difficulty in its extraction. By the fifteenth century peat was being won in few places, and there by dredging; and the documents suggest that the turbarries had largely given place to open water and fen. Rough calculations show that, given several centuries for the work, the digging out of the Broads by hand is within the bounds of practical feasibility.

In part III, C. Green and J. N. Hutchinson give an account of archaeological and stratigraphical investigations which impinge on the theme of the first two parts. They show that after the Romano-British marine transgression Broadland was first densely populated by Danish settlers at the end of the ninth century; and that in late Saxon and early Norman times the area stood some 13 feet higher relative to sea level than now : submergence has been a gradual and progressive process from about the time of the Norman Conquest to the present day.

The diverse specialities of the authors, and the variety of their evidence, are symptomatic of the way in which the conclusions of peat stratigraphy and vegetational history interweave with those of ecology, geography, archaeology, history, and other kindred subjects. The inevitability with which the diverse lines of evidence converge on the main conclusions makes this book a fascinating and very satisfying example of scientific investigation and exposition. It will give food for thought to all who are interested in the Broads, botanically or otherwise; and it provokes respect for our forbears whose spades moved some nine hundred million cubic feet of peat and gave us an attractive and interesting addition to the diversity of our country.

M. C. F. PROCTOR