

## BOOK REVIEWS

### CHROMOSOMES AND PLANTS

*Chromosome Botany and the Origins of Cultivated Plants.* By C. D. Darlington. Revised Second edition. Allen & Unwin. 1963. Price 36s. 0d.

This revised edition of *Chromosome Botany* differs from the first (apart from the startling increase in price) mainly in the addition of 20 new pages to the section on cultivated plants, though the remainder of the text has also been revised and a number of useful tables and figures based on the work of the past few years has been added. The new material on cultivated plants should be of interest to all botanists; but this part of the book, though very stimulating and well documented, is tantalizing in the incompleteness of its information, and still too compressed to be entirely intelligible to a reader who is not already familiar with the literature. Is it too much, for example, to ask that we should somewhere be told not merely the chromosome numbers and supposed countries of origin of emmer, *einkorn* and *durum* wheat, but also given some information on their appearance and economic status today? Nor is the author's style of exposition, which suggests that few problems remain, well suited to a field in which over every species there broods either a controversy or a mystery. Darlington purports to summarize Hutchinson's views on the evolution of the cottons, but he does not even mention what is for Hutchinson the most important problem outstanding—how to explain the apparent identity of one genome of the New World tetraploids with that of the Old World diploids. There is a real need for a comprehensive book on the origin and evolution of cultivated plants, and in many ways Darlington would be the ideal author, as there are few other men with a sound knowledge of genetics and cytology who share his interests in pre-history and archaeology and his courage in attempting to master such a complex field. But the ideal author needs also the power to sift evidence dispassionately and to present both sides of an argument fairly, and at this point some doubts must arise.

For the early part of the book remains, unfortunately, what it was in the first edition—an extraordinary mixture of judicious summary of well-chosen fact, cogent and often subtle argument, stimulating, if rash speculation, staggering *non sequitur*, and ill-mannered nonsense. The worst passages, in which the author presents a loaded caricature of orthodox taxonomy before it has been sanctified by chromosome studies, is reminiscent of nothing so much as Marxist journalism; a stereotype of the fascist hyenas of Kew is sketched and duly demolished. And even in the constructive passages (some of which are excellent) the tone is a curious one. Eventually one recognizes it: it is that of the hot-gospeller. For Darlington the study of plant chromosomes is not merely an interesting intellectual pursuit, not merely a means towards better vegetables and more luscious fruits; it is a way of life and a path to salvation. 'Have you studied the breeding system?' he asks, with a cold and accusing eye, much as a century ago he would have asked 'Are you saved?' It is no use for us to protest that we have studied the plant in the field and the herbarium, that we know all about its anatomy and its ecological tolerance, its biochemical constituents and the structure of its pollen grains. All this righteousness is as filthy rags; we cannot be justified by works. We are either for him or against him, and no compromise is possible; so, at least, he tells us on p. 37. 'Can we', he asks, 'add the chromosomes as an appendix to the otherwise sound work of museum classification? The answer is that we cannot. We must make it clear that the two systems are unavoidably in conflict. There can be no compromise between them. Either we follow a scholastic system . . . or we can follow an experimental system.'

C. D. Broad once remarked of behaviourism that it was such an exceedingly silly theory that only a very clever man could have thought of it. One is tempted to pay the same tribute to Darlington. The ostensible message of the book is that interesting information about plants can be obtained only by a study of their chromosomes, and that this study provides by itself a satisfactory basis for their classification, *all* traditional taxonomy being thrown aside as superficial and useless. What makes an acute intellect subscribe to a theory which is disproved by almost every other page of his book? When he writes, for example (p. 85) that '*Penthorum sedoides* has 16 chromosomes in . . . China. But the same species has 18 chromosomes when it reaches the eastern United States', what conceivable meaning can this statement have except in terms of the despised, classical morphological taxonomy? Darlington, of course, abuses the laws of nomenclature and their exponents, but if he were true to his principles he need not worry about them. For he would refer to plants not by Latin names but by cytological formulae. It would, of course, be a slight disadvantage that these formulae could be applied only to plants in the experimental garden—those that had been subjected to cytological analysis, or bred from such plants in one way or another. The fact that a wild cherry in the woods shared some morphological features with a labelled one in his garden would be irrelevant, for morphological comparisons are scholastic. In fact, of course, Latin names occur on almost every page of the book when they suit the author's purpose, and only on the occasions when they do not, as with *Brassica* and *Taraxacum*, does he sneer at them.

What has produced this extraordinary and deplorable situation? Darlington may have been bitten by a taxonomist in his youth, but the trouble lies deeper; this book is only an extreme example of a lack of

understanding of what should be the relation between taxonomy and cytogenetics. Löve & Löve, for example, are far more temperate than Darlington both in their claims and their controversial methods; but the dispute which continues over their attempt to impose a purely biological meaning on the species concept raises the same fundamental issues. Taxonomy and cytogenetics are too often quarrelling when they should be co-operating; and when they attempt to co-operate the results are often disappointing. I believe that the first is due to methodological misconceptions, and the second to factual ignorance.

The charge against the orthodox taxonomist who despises cytogenetics is so obvious that it needs no elaboration; such a man will be defended only by his like. But the cytogeneticist who goes out scalping taxonomists has beside him a crowd of physiologists, biochemists and scientific journalists yapping after the quarry. This is because of the fashionable misconception that in a scientific context the cause is more important than the effect. Some sciences seek out causes; they are therefore more fundamental; they are therefore more important. Those which chronicle events are trivial, old-fashioned and superficial. So the story goes. Now the cause is, of course, by definition more fundamental than the effect, but it is not for that reason more important. It is only because the effect exists that we look for the cause. Without the cause the effect is inexplicable; but without the effect the cause may be meaningless. Samuel Butler ingeniously argued that, from the point of view of an egg, a hen is merely a mechanism for producing another egg. But the hen will not see it like that, and neither will a man, except temporarily at breakfast. Nor can humanity at large be expected to regard plants primarily as boxes for chromosomes. Chromosomes are important, but they are important solely because they determine the characters of plants. If their genes never found expression they would simply be boring little blobs, and nobody would care twopence about the structure of DNA. But plants without chromosomes can be studied, granted with one hand tied behind your back, but not totally without profit as the history of botany up to 1880 shows.

I do not wish it to be thought that I am here censuring the enthusiastic cytogeneticist who lives, dreams, eats and drinks chromosomes and has thought for nothing else. Many people become obsessed by their specialities, and no great harm is done. But he should not try to impose his obsession on others. Morphology and taxonomy divorced from cytogenetics is incomplete and misleading. But cytogenetics divorced from morphology and taxonomy is tedious and meaningless.

The power-complex of the practitioners of the 'fundamental' sciences which make them so often announce an impending take-over of the derived and complex sciences (take-overs which always, for some mysterious reason, have to be postponed when the moment comes), and the consequent retreat of the practitioners of the older disciplines into an ignorant and obscurantist conservatism—this is one cause of the poor relations between taxonomy and cytogenetics. But another, I think, is the well-meaning efforts of those who would keep the two snarling dogs apart. I refer to the idea, tirelessly propagated by Gilmour for many years and now taken up by others in this country, that the categories of taxonomy and of biosystematics belong to different universes of discourse, and that they should be used quite separately, according to one's mood and purpose, rather than fitted together. From the purely formal point of view there is much sense in this, but if adopted uncritically as a general philosophy of taxonomy it offers too ready a temptation to the taxonomist to turn his back on cytogenetics and vice versa. For all the battering it has received I am convinced that the synthesis elaborated in the second quarter of this century and best recognized under the title of 'The New Systematics' was an achievement of great and permanent value; and that the systematist, whether or not he wants at times to talk of gametopodemes, can now, if he takes the trouble, give to his categories of species, subspecies and even genus a richer, more precise and more public meaning than he could before he knew of ecads and ecotypes, autotetraploidy and introgression. Anything which tempts the taxonomist to regard *Taxon* as intrinsically more relevant to his studies than is *Evolution* or *Hereditas*, or which tempts the cytogeneticist to regard the museum taxonomist as damned beyond redemption and to include the *Index Kewensis* in his *Index Librorum Prohibitorum* is surely to be deplored. Darlington is right, in most of his book, in at least wishing to weld together our morphological and our cytological knowledge of plants, even if he substitutes for the federalism that is needed a chauvinistic imperialism.

But even if all these misunderstandings were cleared away, and if the relationship between taxonomy and cytogenetics were everywhere what it is here and there—a co-operation based on mutual respect—there are still some disturbing features about the situation. It is, of course, a large task to count, characterize and interpret the chromosome complement of every plant in which the results are likely to be of taxonomic value, and one should not complain that the task is only begun. What is disappointing is that the accumulation of data does not appear to be proceeding in the way that is likely to be most fruitful. Apart from detailed studies on cultivated plants, which have an interest all their own but are only marginal to the main field of taxonomy, most lists of chromosome numbers tend to fall under one of three heads. One may find *Chromosome numbers of some Ruritanian plants*, published, as often as not, by the local Academy of Sciences; or else *A study of the Stirps litigiosa complex in Ruritania*, which is usually the expansion of a doctoral thesis

and is published wherever the supervisor can most easily place it; or, finally, *Chromosome numbers in the Coccolaceae, with notes on the evolution and affinities of the family*, published in a journal of genetics or general botany, often in America. Each type has its merits, and each its drawbacks; they will be referred to as A, B and C respectively.

The interest aroused among botanists generally (and consequently the prestige value to the author) is certainly greatest for C and least for A. C, we say, has a plan; it is of worldwide sweep; it makes a synthesis. A is an accumulation of facts of mainly local interest. This is fair enough in one sense, but it omits an important consideration. The entire value of C is probably on the surface; nobody will go back to it to quarry in it for facts to correlate with others as yet unknown. This is because, in nine cases out of ten, the origin of its plants is unknown and their identification uncertain. Botanic garden material has been used, and scarcely ever have voucher specimens been kept. When, therefore, it is alleged that the diploid number for *Pseudococcoloba emetica* is 100, all that is really meant is that a plant in a pot in a (usually named) botanic garden had 100 chromosomes in one of its root-tips, and that in the same pot there was a label on which had been written, on an authority that is unspecified, the name *Pseudococcoloba emetica*. The identification may have been right; but if it was wrong there is no means of ascertaining, or even guessing, what the plant really was. In A and B, on the other hand, we are nearly always told the *provenance* of the plants; local knowledge in A and specialist knowledge in B makes misidentification very unlikely; and the author of B is likely to have deposited voucher specimens in a herbarium. The results are, therefore, of permanent comparative value.

Is it possible to combine the wide range of A, the meticulous detail of B and the adequate documentation of both with the broader speculative and synthetic sweep of C? Probably not in a paper by a single author. But surely this should be our aim in planning the progress of the science as a whole. And the sad truth is that the organization of research in most countries, and in Britain in particular, makes this almost impossible to achieve. No university botanist with his name to make is likely to submit to the tedium of counting innumerable accurately identified and localized specimens simply as a contribution to a synthesis in the future; and it is difficult to find the necessary taxonomic and cytological skills united in a single person. Nor is it reasonable to ask the author of B to substitute for the 'neat' problem that will get him his doctorate the more urgent task of investigating the cytology of intermediates in a group where somebody has already produced a 'neat' solution. To elevate subspecies into species because two or three counts reveal different chromosome numbers in plants 'typical' of the different taxa, while we remain ignorant of the cytology of those intermediates whose existence made the taxonomist originally decide on subspecific status—this is, even on the assumptions of Löve & Löve, a questionable procedure; only when we have far more complete information on the correlation (or lack of it) between morphology and chromosome number can the argument about biological species fairly begin. The number of groups for which we have this information is woefully small.

And what of C? Can this type of paper be made more useful? The growing tendency of botanic gardens to specify the source of their seeds and of authors to preserve voucher specimens are both hopeful signs, but it will be a long time before they have much effect on a typical study of a tropical family. And it is natural for the cytologist to resent having to turn round and dabble in the unfamiliar world of drying-paper. Only a team can achieve the discipline, the planning and the variety of expertise that is needed; and the team would need to be composed, in part at least, of civil servants who do not fret at routine, and whose promotion is not dependent mainly on output of published work. Such a team might also help to close the gap between the cytogenetics of wild and of cultivated plants. Editorial work on *Flora Europaea* has revealed how often an imposing superstructure of speculation on the origin and evolution of cultivated plants is built on a foundation of ignorance of the cytology of their wild ancestors; in *Prunus*, for example, one learns with astonishment that, despite the numerous papers on the cytology of cultivated cherries, not a single count has been made on a wild tree of *P. avium*. And the *Flora Europaea* rule that only counts made on wild material of known European origin are included means that for some families there must be almost complete silence: in the whole of the Malvaceae, for example, only one count is available, published in an obscure but very useful paper of type A in Hungary.

The organization of botanical research in the British Isles gives little hope of assembling a team of this kind. Some of the 'Botanical Institutes' of the Continent might offer more hope, but even in countries like the Soviet Union where the organization would permit such a scheme there is little evidence of any serious or well-thought-out attack on a broad front on the fundamental questions of cytotaxonomy. Meanwhile, if we can only potter, let us at least see to it that we potter in such a way as to give our results the greatest permanent value. Even a statement as to who identified a plant, or what flora was used in assigning it a name will clear away many ambiguities. For Darlington's book, in spite of its limitations, shows more vividly than any other I have seen how great are the taxonomic rewards to be gained from cytological study if it can be pursued free from impatience and free from obsessions.

D. A. WEBB

*The Flowering Process*. Frank B. Salisbury. Pp. xii + 234 (with 17 photographs and 60 figures in the text). International Series of Monographs on Pure and Applied Biology, Plant Physiology Division, Vol. 4. Pergamon Press, Oxford, 1963. Price 50s. 0d.

The flowering of particular plants at particular times of the year is perhaps one of the first biological facts to be brought to the notice of schoolchildren, although the explanation tends to be treated in a religious rather than a scientific manner. Only when a plant flowers at more than one time of year does the situation arouse comment; proverbial comment in the case of gorse. Both temperature and daylength vary with the time of year. Although daylength provides an accurate basis for a biological calendar, it was not until 1920 that the phenomenon of 'photoperiodism' was discovered.

In *The Flowering Process* Professor Salisbury gives an account of how the change from a vegetative to a reproductive phase is controlled by environmental factors and discusses the present state of knowledge regarding the underlying physiological mechanisms. The excitement of being involved in this rapidly expanding field of research is successfully communicated, many of the experiments with cocklebur (*Xanthium pennsylvanicum*) described in this book having been carried out by the author and his students at Colorado State University. Although the book is very much concerned with experimental studies of flowering and is directed at University students, the introductory chapters should prove of much wider interest. Chapter 3, for instance, deals with the ecological significance of the environmental control of flowering, a topic which one suspects has received too little consideration from those interested in field studies. *Oxyria digyna* has been shown to include a number of genotypes each accurately adapted with respect to the daylength requirement for flowering to the latitude in which it is found.

At the end of the book Professor Salisbury has provided a list of plant species classified into 48 groups according to the response to temperature and daylength. This list will prove useful to experimental botanists, but perhaps less useful to British ecologists, since many of the plants listed are inevitably cultivated species. The various 'response types' would appear to have little taxonomic significance, since varieties of the same species may show marked differences in their flowering response to daylength or temperature. Despite the differing requirements for flowering, present experimental evidence suggests that the basic mechanism is the same in all plants. The photoreceptor involved in photoperiodism, 'phytochrome', and the elusive flowering hormone, 'florigen', would appear to be of universal occurrence.

B. FRANKLAND

*A New Illustrated British Flora*. Roger W. Butcher. Vol. 1, Lycopodiaceae to Salicaceae, Pp. vi + 1016. Vol. 2, Ericaceae to Gramineae. Pp. vi + 1080. Leonard Hill (Books) Limited, London, 1961. Price £4 4s. 0d. each volume.

The publication of a uniform series of excellent illustrations covering some 1825 species of British flowering plants and ferns is a most welcome addition to botanical literature. These line drawings are accompanied by short but adequate descriptions, identification keys, and an introductory section including definitions of the terms used. Dr. Butcher's work is intended as the successor to a series which has provided the standard introduction to field botany in this country for several generations.

Bentham's *Handbook of the British Flora* of 1858 was rearranged as a delightful illustrated edition in two volumes in 1865, but this proved too expensive for the general public, and further editions, right up to the last of 1925, came out in one cheap volume without illustrations. To meet a widespread need the wood engravings by W. H. Fitch and W. G. Smith from the illustrated edition were issued separately in 1880 under the title *Illustrations of the British Flora*, and these have been reissued, with some revision and additions, at frequent intervals to 1954. 'Bentham' and the companion illustrations have been a boon to a vast number of people. Pictures and text together assisted them to identify their plants, while a great many adopted the practice of colouring in the line drawings as each species was found, and thus impressed the characters on their memory and preserved a record of what they had seen.

The over-cautious revisions of these two works failed to keep pace with the rapidly increasing knowledge of our flora and led to the production by Dr. Butcher of *Further Illustrations of British Plants* in 1930. The 485 line plates by the late Miss Florence E. Strudwick with which this book was illustrated were outstanding for the careful selection of material, the accuracy and delicacy of the drawings, and the high standard of reproduction. With the two earlier volumes, the new book formed a series, complete at the time, which was portable and convenient. The aim of *A New Illustrated British Flora* is to combine the scope of all three volumes into one work. Most of Miss Strudwick's fine drawings have been used as they are. The species depicted by Fitch & Smith have been redrawn from fresh material for larger plates with additional dissections, and further species have been added. Bentham's *Handbook* has been replaced by a shorter text, and brief descriptions arranged beneath, or opposite, the species to which they refer.

The first 35 pages are devoted to an 'Introduction to Descriptive Botany' with an index to the terms used. This is followed by 82 pages of an artificial key to the species, of which a further 89 pages appear

in the second volume. An immense amount of labour must have gone into the production of this key, and clearly considerable care has been taken over the selection of characters, but its very size seems to defeat its purpose. Experience shows that beginners are daunted by long keys, and easily discouraged when they find that a single false step amongst so many will give them a totally wrong answer. They learn more easily when taught to recognize families and genera, and to use the shorter keys to genera such as those in the old Bentham. Dr. Butcher has tried to give them the best of both worlds by including references to the key in the indices to the volumes, but they will not find it easy to pick out from the *clavis* the stages they need. There is no synopsis of families.

Descriptions of genera appear with those of species with the illustrations concerned. The scientific names are mainly based on Dandy's *List of British Vascular Plants*, and English names are included. These are usually descriptive, with references to features likely to be helpful to beginners, but the way in which they have been introduced into the text is unnecessarily ugly and irritating. 'This *Round Prickly-headed Poppy* is a slender, little-branched, hairy, erect annual . . .', 'This *Prickly Long-headed Poppy* is a rather slender, hairy, almost simple or bushy annual . . .', suddenly changing to 'The *Opium Poppy*', 'The *Welsh Poppy*,' and reverting a few pages later to 'This *Cornish Fumitory*', are representative examples of the style. The descriptions are based on well-chosen characters given in uniform sequence so that comparison between species is facilitated, but they would have been easier to use if important characters had been picked out in different type. Thus, for example, the beginner naming a poppy will need to go right through the descriptions to discover that the capsule should be looked at first. Alternatively he could refer to the key via the index, but comparing the steps in the key on page 50 for example with the illustrations on pages 246 and 247 is unnecessarily cumbersome.

The final choice of species for inclusion in a book of this kind is very much a matter of personal opinion. The author decided to exclude those which grow only in the Channel Isles and this is logical, although many users of the book will regret it. His selection of aliens is reasonable on the criteria he has adopted. For critical species his selection is less defensible. For the larger groups he has made a praiseworthy attempt to compromise by illustrating a selection but the result is unlikely to be very helpful. Of 25 species of *Euphrasia* there are illustrations and descriptions of six, and there is no warning, for example, under *E. gracilis* that there is an allied species *E. scottica*, or under *E. brevipila* that there is *E. borealis*. In the north the one not illustrated is sometimes more plentiful. In *Hieracium* at least five of the drawings are not representative, and one (no. 1356) belongs to a different section. In other genera, such as *Thalictrum*, *Ranunculus*, *Erodium*, *Viola*, and *Saxifraga*, 'species' are illustrated which are not accepted in leading recent works. A botanist of the experience of Dr. Butcher is perfectly entitled to his own opinion on the validity of such taxa, but, in view of all the evidence which has been accumulated, it is very difficult indeed to justify such conservative treatment. To the advanced worker these additional accounts of no longer accepted 'splits' do not detract from the value of the work, since the source of the material is given in all cases, and the illustrations can be cited under other names. The beginner, however, will find them a handicap. The time he will spend trying to separate *Thalictrum montanum* from *T. collinum*, *Erodium lebelii* from *E. neglectum*, etc., and trying to match them up with accounts in 'CTW' and other books, will give him little encouragement. If indeed there is a case for trying to maintain some of these old names it is not appropriate in a book intended for a wide public. Other examples of the author's reluctance to adopt current usage are in the rejection of use of the grade of subspecies (for which he gives his reasons on page 27), and in referring to families as 'Natural Orders', which they are not. Minor errors which should have been corrected in proof are far too numerous.

The artists are to be most warmly congratulated on their work. With few exceptions the plates are excellent representations of the plants depicted, executed with accuracy and at the same time conveying the general impression of the appearance which is so important for easy recognition. The co-ordination of the work of eleven artists to avoid major differences in style must have been a most difficult task and Dr. Butcher has succeeded admirably. Abundant dissections and enlargements are included and the work will be especially valuable in providing a full series of the fruits and seeds of British plants. It is unfortunate that such a fine series of drawings could not have been produced in a more convenient form, but it is appreciated that the publishers had to face an unusually difficult production problem. These two clumsy volumes are each three inches thick, and together weigh 6 lb. 10 oz. Whereas their predecessors Fitch and *Further Illustrations* were easily included in the luggage of travelling botanists, the new work is too cumbersome even for the dashboard of a car. The volumes are so thick that they fail to open flat, and if thick paper was chosen for the benefit of people who colour in the outlines, they will find it difficult to work on them. Finally the price, eight guineas, will place it out of reach of many marginal botanists who would otherwise like to buy it. In size and cost the *New Illustrated British Flora* has repeated the objections to the illustrated edition of Bentham of just a century ago. In spite of this it should be in the library of every enthusiastic botanist.

J. E. LOUSLEY

*Huntia. A year book of botanical and horticultural bibliography.* Editor G. H. M. Lawrence. Vol. I, 15 April 1964. Pp. vi+222, 9 $\frac{3}{8}$  × 7 $\frac{3}{8}$  in.; 27 figs. in stiff covers. The Hunt Botanical Library. Carnegie Institute of Technology. Pittsburgh, Pennsylvania. Subscription \$7.50 (U.S.) a volume.

*Huntia* is a year book devoted to studies of the literature on systematic botany and horticulture, botanical voyages and explorations, early agriculture, medical botany and related subjects of botanical biography, iconography, and bibliography. Primarily it is a record of investigations at the Hunt Botanic Library, but papers from workers in other institutions will appear.

The contents of this first volume are divided into ten articles on various subjects, departmental studies, autograph letters and manuscripts, botanical portraiture, bibliographical notes and Hunt Botanical Library activities 1963. These are followed by notes on the contributors and a very full index.

The first article by the editor gives a very clear account of the year book's aims and a description of the Hunt Library and its publications. Then follows an obituary of Rachel McMasters Miller Hunt, with a portrait. Her life and the ideals that prompted her in forming the library are vividly portrayed. This is followed by an announcement of *Bibliographia Huntiana*, a project to produce a guide to the world's botanical literature, 1730–1840, under the general supervision of an advisory editorial board. It is proposed to produce some sixteen volumes quarto in the next ten years. A sample is given of L'Héritier de Brutelle and his *Sertum Anglicum*. A facsimile of this book was produced in the Hunt facsimile series in 1963.

Another article, by J. L. Heller, is on the early history of binomial nomenclature, some 37 pages long, with reproductions of pages from various authors. In footnotes may be found works consulted by the author. The presentation of facts brought together in one article will be found to be most useful to workers studying this subject.

Two other items are on David Fairchild, his life and a bibliography of his works. Two papers by I. MacPhail, an introduction to bibliography for botanists, and on Titford's Hortus, are most useful as showing how full bibliographical details may assist in discovering the date of publication of works.

The production is remarkable for its very high standard of typography and reproduction of the illustrations.

N. DOUGLAS SIMPSON

*Wild Flowers of Southern Africa—Natal.* Dr Winifred Wright (assisted by Penny Miller and a foreword by Professor R. H. Compton). Pp. xvi+168, with eight colour plates and over 200 line drawings. Nelson & Sons Ltd., Edinburgh, 1963 (28 January 1965). Price 25s.

The advertising 'blurb' on the dust jacket begins 'This is a real rambler's pocket book of the wild flowers . . .'. It must be admitted that such a book is needed for Natal and other areas of the Republic of South Africa. This one, however, is disappointing in both its text and illustrations. The colour plates are fairly good, but the line drawings which form its main part lack artistic merit and botanical accuracy. The article on 'Fertilization' (pp. 9–11) is chiefly remarkable for its inaccuracies, but this may be the result of a somewhat slipshod English style. On p. 13 we learn that 'Hybridization of the *Haemanthus* and *Watsonia* genera is very rewarding, *Watsonia densiflora* producing exceptionally lovely colours'.

A real rambler's guide to local South African wild flowers is still required.

A. A. BULLOCK