seven errors occur in Table 2–1, where the translations of certain specific epithets are given.

The historical chapter on botanical classification is interesting and of considerable value until a discussion of phenetic and phylogenetic classifications is embarked on. Here, the author is led into serious errors; for example (page 36): "In the phenetic system, the arrangement of the taxa of plants according to their relative evolutionary position is made on the basis of the apparent relationships observed among available plants or plant materials". This is far from the truth, for the whole purpose of a phenetic system is to classify on the basis of observed characters, without any reference to evolutionary position.

On the other hand, the fourth and fifth chapters are well reasoned and clearly written. The fourth chapter deals with variation patterns, isolating mechanisms, aneuploidy and polyploidy. The fifth chapter describes the sources of variation, clearly differentiating phenotypic from genotypic variation and dealing well with each.

Taxonomic characters are listed in the sixth chapter, but the author has not really been allowed enough space to do justice to these, especially to the newer techniques of chemotaxonomy and serotaxonomy, while studies on fine structure are not mentioned at all. The seventh chapter deals with the evaluation and presentation of data and mentions hybrid indices, polygonal graphs and scatter diagrams. Brief notes on numerical taxonomy are also included.

Finally, the eighth chapter gives short descriptions, illustrated by drawings and diagrams of twenty-five flowering plant families, with an average of one family per page. These are quite well presented, though of course not much can be said about each family in such a short space and only the plants thought of as "typical" can be mentioned at all. Incidentally, the so-called angiosperm classification on page 96, modified from that of Bessey, is not really a classification but a phylogenetic tree, and as such might be rather confusing to the student, for whom this book is intended.

The suggestions for further reading are far ranging in subject, but of the thirty-four references to books (excluding state floras) only six were published outside the United States, while only one of the eleven periodicals is a non-American one. There is no bibliography as such, even though the text has numerous references to authors and dates of publication.

No doubt the author was strictly limited by the size of this book, which forms part of a series, and for that reason could not hope to go into greater detail in all the aspects of taxonomy he has tried to cover. It would surely have been better, however, to omit the descriptions of the twenty-five families in the eighth chapter altogether and to have used the space so provided to enlarge other sections. The chemotaxonomy, serotaxonomy and taxometrics sections would well repay expansion and it would be valuable to provide more actual examples of the points described; and surely, in a book of this sort, species concepts ought to be discussed or at least receive passing mention.

J. G. HAWKES

PRODUCTIVITY OF FORESTS

Methods for Estimating the Primary Production of Forests

By P. J. Newbould. (International Biological Programme Handbook No. 2.) Pp. viii+62. (Oxford and Edinburgh: Blackwell Scientific Publications, 1967.) 7*s*. 6*d*.

THIS booklet consists of forty-seven pages of text and ten pages of references; it is intended to serve as a guide to the methods that may be recommended "to scientists who themselves do not think that they have better methods" (as E. B. Worthington says in the foreword) for the "general investigations of primary production" in woodlands which form part of the International Biological Programme; thus it concerns the annual yield of timber, branches, leaves, roots, and so on. The recommendations are mostly sound, as indeed they ought to be in view of the many specialists who contributed to the original draft, and should be useful to the planner of investigations into such matters, provided that he makes full use of the references, heeds the many important but often inconspicuous warnings that are issued by Professor Newbould, and has a sound grasp of the statistical principles of sampling.

Perhaps a fuller discussion of the relative importance of the various sources of error would have been welcome, and also a clearer relation of method to purpose; for example, tables which it is both legitimate and desirable to use when ascertaining relative yields of a single plot during successive periods of time may be grossly misleading if used for comparing the yields of plots in different environments. Again, it is suggested that a period of between three and five years is probably adequate for measuring the growth of all-aged forest; it all depends on the purpose. In Europe a period of ten years is no more adequate for giving a reliable estimate of mean increment than it would be for giving a reliable mean rainfall. This, however, may be asking for too much in so small a space, and the critic is disarmed by the admission that the work could undoubtedly be improved, together with a request for suggestions to this end.

Here, then, are some suggestions. The old and well-tried method of measuring the volume of irregular branches by immersing them in water is worth mentioning. There is a large amount of information available on the pattern of density of wood in tree boles, and this should be consulted before sampling them for density; partition into sapwood and heartwood is not necessarily the best procedure. Foresters, when measuring sample plots, usually measure the volume of bole and, sometimes, of branches, greater than some conventional "timber size" (in Britain 9·5 in. girth); it would be useful if biologists, when measuring the amount of wood in a forest, measured separately from the rest the same components as those measured by local forest research departments; this would facilitate the comparison of foresters' and biologists' work, greatly to the advantage of biologists.

EUSTACE W. JONES

VEGETATION MAPPING

Vegetation Mapping

By A. W. Kuchler. Pp. vi+472. (New York: The Ronald Press Company, 1967.) $15.

WITH few exceptions, mainly in Europe, mapping of vegetation has proceeded largely in isolation from other ecological activities. This book will probably bring to the notice of many ecologists for the first time the amount and interest of the work that has been going on in this field. It is therefore welcome in a broader context than is indicated by its ostensible purpose of providing a handbook and guide to the procedures and technicalities of producing vegetation maps.

The author of this book is a leading practitioner of vegetation mapping, who is particularly well qualified to bring together the diverse literature of the subject. He has succeeded in producing what will be a definitive guide to this field, at least in English speaking countries, for some time.

The book opens with an interesting "Historical Sketch" of the development of vegetation cartography. The second section of the book is concerned with "Some Basic Considerations". This is somewhat disappointing. Before units of vegetation can be mapped, a clear conception of the nature of these units is necessary and one expects some discussion of the thorny problems that surround