

difficulties, and reserved their energies for the technology. The physicist may be assumed to learn his electron-physics elsewhere, but is it fair to the engineer to show him on p. 20 a graph from which the most probable energy of a (conduction) electron in a metal is seen to be about $2eV$, at room temperature, but then to tell him on p. 84 that the most probable electronic energy in a metallic conductor is kT ? Again, on p. 111 it is stated that a class *B* push-pull amplifier is biased to zero standing current. Does not the student deserve a more realistic treatment, even if that requires some further explanation of the actual shape of a valve characteristic?

Sections 4, 5 and 6, on microwave devices, special-purpose tubes, and materials and construction, are at a much higher standard, and it is perhaps significant that most of the chapters in these parts give some reference to other published work, while the earlier chapters do not. The chapter on switching and scaling tubes is particularly valuable.

As must always happen in a rapidly developing subject, history has overtaken the authors. They have covered travelling-wave tubes up to the stage of using a velocity-jump to reduce beam noise, and they have a chapter on transistors; but they do not deal with the maser, which involves concepts of sufficient importance to be studied by anyone interested in the fundamentals from which the future of electron technology will spring. The general impression is that this book is good on electron technology but does not deal with principles as well as one is led to expect from a book which claims to cover physics as well as technology.

D. A. BELL

PLANT MORPHOLOGY

Comparative Morphology of Vascular Plants

By Adriance S. Foster and Ernest M. Gifford, Jr. (Series of Books on Biology.) Pp. xi + 555. (San Francisco: W. H. Freeman and Company; London: Bailey Bros. and Swinfen, Ltd., 1959.) 9 dollars; 76s. 6d.

THE aim of the authors of this very attractively produced text-book is, as stated in the preface, to give not only a purely factual description of the main groups of vascular plants but also to indicate the general principles and objectives of comparative morphology. They express the hope that the text will "in some measure orient and vitalize the teaching of plant morphology".

The general plan of the book is a little unusual. The first six chapters are described as "orientation chapters" and deal with the principles and problems of comparative morphology. Some of the topics briefly discussed are: the criteria used in phylogenetic interpretations, the stelar theory, alternation of generations, the telome theory, the phylogeny of sporangia and gametangia, embryogeny. A brief account of the aims and methods of experimental morphology is also given. Although this arrangement has some advantages, it seems probable that these general discussions would be more useful if they followed, rather than preceded, the descriptive chapters.

The main part of the book covers the whole of the so-called Tracheophyta. It deals in turn with the Psilopsida, Lycopsida, Sphenopsida and Pteropsida, the last-named being a group which will appear

heterogeneous to many botanists. The descriptions of the various phyla are excellent, and include some account of fossil representatives and of the cytology. As the field covered is so wide, it is, however, inevitable that some aspects should be treated very briefly. As might be expected from the research work of the authors, the chapters on the Gymnosperms and Angiosperms are particularly interesting and lucid. Many references are made throughout to standard works and other literature, and the references are listed alphabetically at the end of each chapter.

The book is fully illustrated by line drawings and photographs. For the most part these are excellent and closely related to the text. No magnifications are, however, given for any of the figures, and in some instances the specific name of the plant illustrated is omitted from the legend. These omissions tend to lessen the value of otherwise excellent illustrations. Many of the line drawings are described as being "redrawn" from various sources when it would have been better to use the phrase "based on". This is so in examples where the copying has not been precise (though not misleading), or where shading has been introduced or a pictorial background added. In one instance, photographs are said to be "redrawn".

The book may be recommended to students as giving a good general picture of evolutionary trends within the Tracheophyta. At the same time it indicates, though perhaps without sufficient emphasis, the difficulty, and often the impossibility, of reaching final conclusions in phyletic morphology. The references to recent work on morphogenesis, experimental morphology and cytology should be of value to students as indicating lines of research of great intrinsic interest apart from their possible bearing on the many persisting problems—or "abiding mysteries" as the authors call them—of comparative morphology.

S. WILLIAMS

ELECTROPHORESIS IN THEORY AND PRACTICE

The Principles of Electrophoresis

By René Audubert and Serge de Mende. Translated by A. J. Pomerans. Pp. viii + 142 + 16 plates. (London: Hutchinson and Co. (Publishers), Ltd., 1959.) 25s. net.

Electrophoresis

Theory, Methods and Applications. Edited by Milan Bier. Pp. xx + 563. (New York: Academic Press, Inc.; London: Academic Books, Ltd., 1959.) 15 dollars.

IT must be admitted that many people who employ electrophoretic methods have little more than a passing acquaintance with the principles involved in the techniques they are using. These two books should enable everyone to know what they are doing, whether they undertake moving-boundary, paper or most other variations of electrophoresis. Both these books cover the whole field and so conveniently bring together information which hitherto has been scattered.

Audubert and de Mende's volume forms a useful theoretical introduction; the principles of electrophoresis are set out clearly and systematically and the translation has been well done. Beginning with the general properties of electrolytes, the book passes on to colloidal systems, electrokinetic potential and electrophoresis. Then follow sections on the principles