

## BOOK REVIEWS

**The Physiology of Flowering Plants:** 2nd Edition: by H. E. Street and H. Öpik. Edward Arnold Contemporary Biology Series. 1976. 280 pp. £9 net, boards. £4.50 net, paper.

This is an updated and revised version of the original 1970 edition. Within the limits of 280 pages the authors have endeavoured to cover the whole field of the physiology of flowering plants, including water relations, photosynthesis, nutrient uptake, translocation, resistance to stress, and all aspects of growth and development from germination to seed set. The emphasis is placed on the physiology of the whole organism, and biochemical events at the cellular level are discussed only in relation to the growth function of the whole plant. As the authors themselves point out, such a comprehensive coverage in a book of this size can only be obtained at the expense of experimental detail and critical evaluation of the concepts presented. The text, therefore, represents a largely descriptive account of the field with some experimental data given in the figures and it should be regarded only as a skeleton background for further

reading by the student. To this end selected references to original papers are given for each chapter. However, even with the addition of these references some sections are so cursorily covered (for example, seed dormancy in 1 page, vernalization and photomorphogenesis in less than 2 pages each) that one must question their value.

After reading through the text and comparing it with the first edition, the reviewer is struck more by the lack of advancement of our understanding of the basic mechanisms underlying many physiological processes than by the progress made in five years. However, a considerable amount of new material has been added and several new topics are included (e.g. photomorphogenesis and biological rhythms). There has also been a revision of terminology, particularly in the description of plant water relations. However, despite a useful conversion table to SI units given at the end of the book, outdated units are still employed in the text; this is unfortunate since most teachers attempt to use the correct units and students are easily confused.

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**Uptake of Ions by Plant Roots:** by D. J. F. Bowling. Chapman & Hall, London, 1976. £6.50.

After the recent spate of weighty symposium reports, monographs, and encyclopaedic volumes on ion transport in plants, it is something of a relief to receive a book, pitched at a fairly advanced level, yet of modest dimensions and, by today's standards, reasonably priced. The title is somewhat misleading inasmuch as Dr. Bowling covers transport across the root and distribution in the xylem as well as ion uptake. He has confined his attention largely to work that has been done on entire root systems or intact plants, and little is said about the extensive research on the large-celled algae and other simpler experimental systems. Storage tissue slices even appear to be beyond the pale, despite the fact that they are often taken from roots and in the hands of numerous investigators have contributed a great deal to what we know (or think we know) about ion uptake. Another curious anomaly is the absence of any discussion of ion transport in mitochondria, whether derived from roots or not, except for a brief reference in relation to Mitchell's chemi-osmotic mechanism.

Because of the narrowness of the approach such fundamental topics as membrane transport and the relationship between ion uptake and metabolism, which for obvious reasons have been little studied in intact roots, receive very short shrift. This detracts seriously from the usefulness of the book for the postgraduate researcher and advanced undergraduate for whom it was written.

As might be expected, the author is most at ease when

he is writing about his own immediate field of research, and for me the chapter on transport across the root is the most informative as well as being the longest. Considerable emphasis is placed on the work of the author and his collaborators and there is a real danger that readers may gain a false impression of the magnitude of the contribution that the Aberdeen group has made to knowledge in this field. One would have liked to see the account balanced by some reference to the considerable reservations that several experienced electro-physiologists have expressed about the interpretation of electro-potential measurements on multicellular systems.

In this book Dr. Bowling treats the uptake and movement of ions in a vascular plant as a catena of four linked processes: movement of salts in the soil to the root surface; uptake by the root; transport across the root; and movement in the xylem to the shoot. He suggests that the overall rate of salt uptake at any time must depend on the rate of one of the component processes. In contrast to water transport through a plant which is normally controlled in the leaf, one suspects that the limiting step in ion transport is often at the root-soil interface, but the evidence is by no means yet conclusive. Further estimates of ion fluxes in various places in the plant, made under contrasting environmental conditions, are needed before this question can be settled.

There is an up-to-date bibliography of some 350 literature citations and a brief subject index which astonishingly does not include any plant names or mention a specific ion.

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