sible for the reaction, must be raised. Of further compelling interest are observations, previously published, of Schwartz and Beldotti and of Walford which suggest the possibility of *escalation* of transplantation disease to malignant lymphoma in mice. The transcribed discussions after each paper are excellent and add much intellectual zest to the proceedings.

This is a book that can be highly recommended. The challenge, intellectual stimulation, and excitement of current biology are all here. Would that examples from these chapters be incorporated into undergraduate and even secondary-school biology curricula. Here, indeed, are challenges to the young, eager mind, worlds to conquer. This workshop approach, oriented toward a defined, interdisciplinary problem, would seem to offer many advantages over the usual series of 10-minute scientific papers at meetings.

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## Chromatography Updated

**Chromatography**. ERICH HEFTMANN, Ed. Reinhold, New York, 2nd ed., 1967. xlii + 851 pp., illus. $27.50.

This book brings up to 1965 the literature survey on thin-layer, paper, ion-exchange, gas, and liquid chromatography, electrophoresis, and gel filtration. Fundamentals and applications in biochemistry, nutrition, and pharmacology are reviewed, as well as chromatographic methods for the separation of inorganic ions, phenolic compounds, nonhydrocarbon gases, and hydrocarbons.

Of the 40 authors, 20 contributed to the first edition; 11 nationalities are represented, so the coverage of the international literature is good. No previous chapters have been deleted, and chapters on paper chromatography, thin-layer chromatography, and the separation of antibiotics have been added. Except for chapter 1, all chapters have been rewritten. It is, in fact, a new book. The format is pleasing, the figures effective, the type attractive, and the paper good. There is no author index. This edition is supplementary and complementary to the first edition. It is a generally useful compendium of the state of the art up to 1965 which is likely to be needed by all serious students of chromatography and which should be available in libraries.

This having been established, some criticisms are in order.

The historical introduction is disappointing. It highlights developments only to 1949. This is a serious omission, for since 1949 the advances in ion exchange, gas chromatography, thin-layer chromatography, and gel filtration have been phenomenal. In fact, the entire content of the book concerns fundamental improvements that have been made since the time the historical introduction leaves off. Of particular note has been the evolution of theories of chromatography at the hands of many brilliant theoreticians. Historically this has been a real breakthrough, for thanks to the theoreticians chromatography is on a much more rational basis than it was in 1949, and future developments will have their origins in the insights and predictions made by theory. A good opportunity was missed to indicate the gradually growing unity of general concepts and approaches that are now being recognized as applicable to all chromatography.

Considering the important role that theory has played and will play, it is also disappointing to find that each theoretical treatment grinds its own ax. For example, chapter 3 is based on the stochastic concepts of Giddings. Chapter 9 details that of van Deemter, Keulemans, *et al.*, which had its origins in the mathematical analysis of Lapidus and Amundson. Chapter 12 presents the theory of Glueckauf. No attempt is made to reconcile these theoretical expositions (and they can be reconciled). As a result the reader is left with three (at least) apparently unrelated sets of ideas, symbols, and units which, unless he has more than ordinary curiosity, will remain unrelated. The criticism above is valid, but it is minor. However, future writing will be forced to give greater attention to theory, and theory should bear a closer relationship to the state of the art.

One notes also the virtual absence of any reference to data processing. The conversion of analog data to digital form for further processing is of major concern and is even now an integral part of chromatography. Only one brief, casual reference to this important aspect of chromatography was noted.

A third criticism is of the apparent lack of information of some specialists concerning significant events in other fields. For example, on page 88, the statement is made that normal glass tubing will withstand a pressure of approximately 10 pounds per square inch, whereas in fact pressures of from 200 to 800 pounds per square inch have been used with glass tubes in ion-exchange chromatography since 1959, and pressures in this latter range are now routine in many laboratories.

A serious defect in most such texts as this is that they do not report, even briefly, on the significant developments, and they can be great, that take place between the time of writing and the time of publication. One may philosophically accept the proposition that a text is out of date before it is published. But need it be? A brief addendum to each chapter submitted at the time galley proofs become available would do much to dispel this difficulty.

In part 2, Applications of Chromatography, the treatments are generally of a high order. The chapters on the chromatography of proteins and on the separation of nucleic acids and related substances are particularly good. The chapter dealing with the separation of amino acids and peptides places a major emphasis on paper chromatography and in consequence is rather inadequate in its treatment of ion-exchange methods.

The comments above notwithstanding, and in spite of the unevenness that is characteristic of books with many authors, the text is a worthwhile record of advances in the field.

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## An Important Friendship

**Darwin and Henslow: The Growth of an Idea**. Letters, 1831–1860. NORA BARLOW, Ed. University of California Press, Berkeley, 1967. xii + 251 pp., illus. $6.50.

There is no doubt that the Reverend Professor John Stephen Henslow (1796—1861) had a great if indirect impact on the development of science. It was Henslow's influence and instruction that enabled Charles Darwin to develop his interests in natural history, and it was Henslow who was responsible for Darwin's being offered the place of naturalist on the famous voyage of H.M.S. *Beagle*. Thus Henslow did much to advance the theory of evolu-