cize this chapter because of these omissions, one cannot fault the authors on what they have written, for they have done a fine job of presenting the inorganic structural chemistry of mercury.

A. J. Bloodworth's chapter on organomercury compounds covers its topic well and gives an excellent account of the preparation of these compounds, their reactions, and their use as reagents in synthesis. The discussion is well organized by reaction type. The chemistry is presented concisely and clearly. In particular, the excellent discussions of the mechanisms of the various processes in which a mercury-carbon bond is formed or broken will help the reader to obtain a good understanding of the chemistry involved. The section on the applications of organomercurials in synthesis singles out for detailed consideration the solvomercuration-demercuration of alkenes and alkynes, which has been applied with good advantage to the synthesis of diverse functionally substituted organic compounds, and the use of α-haloalkylmercurials as divalent carbon-transfer agents. The useful catalytic and stoichiometric organomercurial–transition-metal-based synthetic conversions, especially those involving palladium complexes, should also have been discussed in this section: such transition-metal-catalyzed processes are the "new wave" of synthetic organomercury chemistry. A notable omission in this chapter is the novel class of "pseudo-organomercurials" in which mercury is bonded not to carbon but rather to its congeners, silicon, germanium, and tin. These compounds, of which $[(CH_3)_3Si]_2Hg$ is a single representative, have a fascinating chemistry of their own and certainly deserve a few pages.

The final chapter, by K. H. Falchuk, L. J. Goldwater, and B. L. Vallee, covers the biochemistry and toxicology of mercury and its compounds. The toxicological effects of mercury and its derivatives result from the interactions of these substances with thiol, selenol, phosphate, and amino and carboxyl functions in amino acids, proteins, enzymes, nucleic acids, and various cellular components. These interactions are discussed in three short sections. The account of the toxicological aspects of mercury metabolism nicely supplements the section on mercury as a poison in the first chapter. Although this final chapter is short, it presents enough of the essential features of the subject to satisfy most chemists. More extensive discussions will be found in Goldwater's book and in *Mercury in the Environment* by L. T. Friberg and J. J. Vostal.

In summary, this book may be recommended as one that presents a reasonable and quite readable overview of modern mercury chemistry. Its price, unfortunately, will not attract the individual purchaser.

DIETMAR SEYFERTH
Department of Chemistry, Massachusetts Institute of Technology, Cambridge 02139

Robinson and His Researches

Further Perspectives in Organic Chemistry. Papers from a symposium, Feb. 1977. Elsevier/Excerpta Medica/North-Holland, New York, 1978. viii, 212 pp., illus. $19.75. Ciba Foundation Symposium 53 (new series).

This symposium, organized by G. W. Kenner, commemorates Robert Robinson and surveys the impact of one of this century's greatest chemists on some aspects of contemporary bioorganic chemistry. Robinson had a lot to say about biosynthesis long before the experimental methods needed to study it were available, and it is fitting that reviews by A. J. Birch and A. R. Battersby cover recent laboratory findings on polyketides, alkaloids, and porphyrins. Robinson's role as a "minor prophet"—a phrase he used in the title of his recent volume of memoirs—is indeed verified by many of the results reported recently. Biogenetic synthesis and transformations are covered by D. Barton and S. V. Ley (phenols), R. Ramage (terpenes), G. E. Evans, M. G. Gardon, D. A. Griffin, F. J. Leeper, and J. Staunton (polyketides), J. M. Brown (micellar catalysis), and R. Breslow (proteolytic enzyme models). Robinson's other great love was the rationalization of reaction mechanism by means of electronic and steric effects, and these aspects of his work are revisited and amplified by M. J. S. Dewar (quantum theory) and J. Baldwin (rules for nucleophilic ring closures).

The main dishes in this feast of contemporary chemistry are interspersed with lively discussions by a group of experts gathered for the occasion, which include some fascinating and often divergent commentaries (which would have delighted Robinson) on the synthesis of peptides (inter alios Kenner, Chain, Todd, Woodward, Prelog, Eschenmoser), antileukemic lignans (Raphael), and organometallics (Birch). Lord Todd provides both the grace and the benediction. The excitement and challange of many facets of organic chemistry are conveyed successfully in these pages.

In reviewing such a free-flowing and obviously enjoyable occasion it is perhaps inappropriate to inject a critical note, but for the uninitiated it should be pointed out that neither the papers nor the discussions could be comprehensive. To take but one example, during the discussion of polyketide assembly (pp. 146–147), reference to the recent work of Lynen (see *Eur. J. Biochem.* **55**, 561 [1975] and other papers cited therein) would have cleared up many of the issues raised. This is but a minor criticism that should not prevent the organizers from a repeat of the occasion a decade from now. For the present, the reader can only marvel at the profound influence of this rugged pioneer. From both the historical and the contemporary standpoint, all students of organic chemistry should read this volume, together with *The Structural Relations of Natural Products* by Robinson and *Perspectives in Organic Chemistry* edited by Lord Todd and published in 1956 to commemorate Robinson's 70th birthday.

A. I. SCOTT
Department of Chemistry, Texas A & M University, College Station 77843

Modeling Soil Processes

Solute Movement in the Soil-Root System. P. H. NYE and P. B. TINKER. University of California Press, Berkeley, 1977. xiv, 342 pp., illus. $23. Studies in Ecology, vol. 4.

In 1840 Justus Liebig wrote, "A rational system of agriculture must be based on an exact acquaintance with the means of nutrition of vegetables, and with the influence of soils and action of manure upon them." It is the contention of the authors of this welcome book that only in the past 20 years or so have we come within reach of that objective. It is hard to quarrel with their statement that the agricultural chemists and the plant physiologists seem scarcely to communicate with each other. The main method of investigation of soil nutrient questions has been field experiments that are

designed and interpreted by the statistical methods developed for this purpose by R. A. Fisher. This has been a highly successful approach, and forms the basis of modern fertilizer practice. However, for scientific purposes, it was overemphasized since it led agricultural chemists to be satisfied with correlations and regressions between fertilizer responses and chemical extracts, and inhibited the search for more fundamental and detailed explanations of their results.

Field plot fertilizer trials are among the most sacred of cows in agronomic research, but the contents of this book make a compelling argument for a more rigorous approach to soil-plant research.

Until very recently, concepts of soil chemistry and soil fertility have been based upon equilibrium chemistry. It has become increasingly clear that the rate of many important chemical and biological reactions in soils is limited by the physical properties of the soil. The soil is not really a well-mixed system. Diffusion and mass transport are the physical mechanisms by which soil solutes move to reacting sites, and these are processes more familiar to the soil physicist than to the soil chemist or biologist. A few soil chemists have been willing to follow the unpopular course, and perhaps among the most intrepid of these has been P. H. Nye, the senior author.

The first part of the book deals with the coupling of the mathematics of diffusion and convection in soils to that of ion uptake in plant roots, with due attention to the myriad of soil chemical reactions. Those processes that depend primarily upon diffusion can be described remarkably well. Where convection becomes important the theories are less satisfying. An important reason for this is that we still lack a coherent model of water uptake by roots, and the nonlinearities in the system make spatial and temporal averaging very risky. Our knowledge of feedback mechanisms in the plant is obviously inadequate. The mineral nutrition of single plants and the movement and uptake of solutes under field conditions, which are considered in the last third of the book, are still in an embryonic stage of development, but there are many promising lines of research.

It is too much to hope that large numbers of expensive and repetitive field plot trials will now be abandoned in favor of deterministic studies, for, as Max Planck wrote in 1936, "An important scientific innovation rarely makes its way by gradually winning over and converting its opponents; it rarely happens that Saul becomes Paul. What does happen is that its opponents gradually die out and that the growing generation is familiarized with the idea from the beginning." Deterministic studies are the wave of the future, and those who are teaching the growing generation will find this an invaluable book, as will all who are doing research in soil science, plant physiology, and terrestrial ecology.

W. R. GARDNER
Department of Soil Science, University of Wisconsin, Madison 53706

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