

A sixth contribution provides a counter-theme, isotope effects in biological systems (Katz and Crespi): it contains some fascinating and almost totally unrelated material.

The quality of the contributions, which the distinguished senior editor and his colleague succeeded in attracting, is excellent. However, one cannot help wondering whether the volume which emerged is quite the one that was intended or whether someone oversimplified its title. One accepts that there was bound to be selection in what could be included in a single volume. But the general title of the book would lead the purchaser to expect a representative selection of isotope effects in chemical reactions. He would be disappointed in that respect. The reactions discussed are all taken from organic chemistry, and it is therefore almost inevitable that isotope effects on rates are considered much more fully than those on equilibrium constants. These restrictions are regrettable, especially in view of overlap between several of the contributions. Most chemists are at least aware that kinetic isotope effects provide useful information in organic chemistry. The contributions which isotope effects have already made to inorganic chemistry and the great scope that exists there (including, in that context, the chemistry of organo-metallic and coordination compounds) and in geochemistry are not so well known. Isotope effects on equilibrium constants (not only for acid-base equilibria in solution, which are reasonably excluded) promise to become an increasingly important tool in the study of interactions in the condensed phase. They are of practical importance to the production of isotopes.

In brief, this is an invaluable book for those already dedicated to the study of kinetic isotope effects in organic reactions for whom it will be essential reading. It is more doubtful whether it will do much to stimulate interest outside the circle of initiates and thereby lead to a wider appreciation of the powerful methods and beautiful theory of isotope effects. A fine volume has been produced: an opportunity has been missed.

V. GOLD

Polyamines

Introduction to Polyamines. By Seymour S. Cohen. Pp. ix+179. (Prentice Hall: Englewood Cliffs, New Jersey, 1971.) n.p.

SEYMOUR COHEN has been studying polyamines for a number of years and this book comprises four lectures that he gave on the subject at the Collège de France. Their publication, although

valuable as a summary of present knowledge, does have a didactic purpose because the author believes that polyamines constitute an underrated group of compounds. The book begins with an interesting description of the discovery and characterization of polyamines. Subsequent chapters are concerned with polyamines in prokaryotes and eukaryotes and their possible roles in cell physiology and, finally, with the molecules as organic cations in relation to nucleic acids.

Studies with mammalian systems have shown what seems to be a stoichiometric relation between polyamine concentration and the RNA contents of the cells. Stimulation of cell growth, and hence RNA synthesis, is accompanied or preceded by the synthesis of polyamines, a process which itself requires prior synthesis of the specific enzymes involved. With respect to bacterial physiology, Cohen himself has been concerned to try and relate changes in polyamine content and synthesis to concomitant changes in RNA metabolism. But it is fair to state that we still do not know if polyamines, present in all cells in millimolar concentrations, function solely as general cations, possibly contributing in addition to maintenance of the intracellular pH, or whether they have specific roles in relation to nucleic acid structure and function. This book should stimulate further interest in polyamines, thus contributing to the solution of the problems presented by the author.

G. TURNOCK

Roots of Chemistry

Teaching the History of Chemistry. Edited by George B. Kauffman. (A Symposium, San Francisco, California, April 1968.) Pp. 222. (Akademiai Kiado: Budapest, 1971.) £3.25.

THOSE who hold almost any view of how, when, or whether the history of chemistry should be taught will find support for it in this volume, which consists of eighteen papers read at a symposium at a national meeting of the American Chemical Society, and six other papers. They range from descriptions of the courses offered in particular colleges or countries, through general recommendations, to contributions to the history of chemistry or its historiography. The most apparent division between the authors is that some are chemists interested in history while others are historians whose field is the history of chemistry.

Chemists have long been interested in the history of their science, and Dr Solov'yev from Moscow indicates how in nineteenth-century Russia two differ-

ent interpretations of the past were used by opponents and supporters of structure theory, both claiming to be in the main stream. Most participants agree that chemistry used to be taught historically, but is now taught logically; and to many of the chemists courses in the history of chemistry bring a unity to the subject by indicating the common roots of its different branches, bring awareness of the process of discovery, and suggest that what is now taken for granted may in the future be exploded. Some urge separate courses in the history of chemistry, while others believe that chemistry will cease to seem colourless and over-factual when its presentation is enlivened with anecdotes and case-studies; we even find one lively account of a class being guided to discover phlogiston. Arguments can be found here for teaching history early in the course so that the student at once gains in perspective, and for teaching it late so that he knows a fair amount of chemistry already. Some authors see it as essential to a proper understanding of the concepts and methods of present day chemistry, while for others it is a valuable liberal element to be fitted in with economic and political history to broaden the chemist's outlook. But beneath all this there is a certain pessimism; as one author puts it, "the attitude of most chemists is one of indifference to anything so clearly expendable as this luxury item".

The historians, who are unlikely to be teaching only the history of chemistry and very unlikely to be teaching only chemists, take a rather different view. To them histories of chemistry written by and for chemists tend to seem parochial, in that they often ignore other sciences, and Whiggish in that they concentrate on the winning side in all past disputes. Attempts are made here: to seduce us into looking back at chemistry before Boyle; to integrate the history of chemistry with other branches of history; to remind historians of science that chemistry is not a branch of physics; and above all to make us pursue—and presumably teach—the history of chemistry for its own sake and not because it is useful for something else. While several of the chemists recommend case-studies to illuminate such philosophical points as the relation of facts to theories, one of the historians, Dr Tredgove, suggests that philosophers of science have nothing useful to say to the historian of chemistry, and that the history of chemistry has been distorted by concentration on philosophically-interesting but not very important events like the overthrow of the phlogiston theory. The symposium was, in short, clearly worth printing—it is a pie from which there are many plums to be pulled.

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