value of the English language translation since their remains are significant in delineating stratal sequences in some geologic provinces.

Notwithstanding these deficiencies, as well as several glaring typographical errors, a few upside down photomicrographs, and an inferior binding, all of which make this weighty volume less attractive than the more compact German edition, a clear presentation of the principles of micropaleontology and microstratigraphy is provided in the introductory chapters on basic terminology and the historical development, collection, preparation, and examination of fossils and their intra- and interregional value in correlation.

It is hoped that volume 2, on the Ostracoda and other well-known microfossils, soon will be available in English, for the wealth of material in its 453 pages is indispensable to the academic and commercial microscopist.

JOSEPH J. GRAHAM
Department of Geology,
Stanford University

Classic Papers on Genetics

Papers on Human Genetics. Samuel H. Boyer, IV, Ed. Prentice-Hall, Englewood Cliffs, N.J., 1963. x + 305 pp. Illus. $9.

In line with the current fashion of collecting, for ready reference and study, classic papers in a discipline, Boyer, a member of the very active Johns Hopkins group, has put together his selection of the contributions to human genetics which have oriented and stimulated the science. Those of us who have had the privilege of reading most of these papers when they first appeared find it a real pleasure to have them available under one cover. For the relative newcomer in the field, the collection should be of great value in developing an understanding of the origins, intuitions, inferences, pitfalls, deductions, and rigid investigations which have combined to bring human genetics to the outstanding position that it holds today.

Part 1 contains Weinberg's demonstration of equilibrium and Lenz's exact treatment of the role of consanguinity, classic papers indeed.

Part 2 deals with human blood groups and presents Landsteiner's original contribution (1901) as well as the Hirschfelds' historic paper on racial distribution. The Rh factors are represented by the works of Levine and Stetson and by that of Landsteiner and Wiener. A paper by Watkins and Morgan considers group-specific substances. I wish Bernstein's very basic and important contribution had been included.

Part 3 is concerned with studies of biochemical genetics: the original papers on alcaptonuria, phenylketonuria, and galactosemia; a series of papers on the hemoglobinopathies; and a selection of contributions on the serum proteins. Although population genetics is not given a specific part in the volume, some of the papers in part 3 deal with this phase of human genetics.

Part 4 is devoted to recent papers on human chromosomes and the anomalies that result from their aberrations. Mary Lyon's excellent contribution to the problem of sex chromatin and gene action is included here.

Part 5 deals with mutation and contains papers by Penrose and by Schull and Neel.

Part 6 is a reprint of Leslie Dunn's provocative presidential address made to the American Society of Human Genetics (1961).

An interesting vignette by the editor precedes each selection and adds immeasurably to the value of the collection.

LAURENCE H. SNYDER
University of Hawaii

Analytical Chemistry

Ionic Equilibria in Analytical Chemistry. Henry Freiser and Quintus Fernando. Wiley, New York, 1963. xiv + 334 pp. Illus. $4.95.

Everyone who teaches analytical chemistry knows the feeling of resignation with which he approaches the topic of equilibrium calculations. He struggles with freshmen and sophomores, again with seniors, yet again with graduate students. The difficulty arises because ionic equilibria cannot be reduced to one simple all-purpose formula, nor are they amenable to rigid mathematical treatment. Even simple acid-base problems include hydrogen-ion concentrations to the third or fourth power, and to describe the titration of zinc ions with EDTA in an ammonia buffer, for example, requires 10 equilibrium constants. That most practical situations can be described quite adequately by simple approximate equations saves a chemist from going crazy, but it is the art of making these approximations that baffles the student.

For a very long time there has been a need for a book devoted exclusively to the calculations of ionic equilibria, and now that this book has been written, the authors, Henry Freiser and Quintus Fernando, deserve the heartfelt thanks of all teachers of analytical chemistry. The book is written for students who know a little physical chemistry but who have no special knowledge of electrolytic solutions. Activity coefficients and the calculation of "concentration quotients" from thermodynamic equilibrium constants are considered in chapter 3, and the problem of approximations to solve high-order equations in chapter 4. Here an error of ±5 percent is arbitrarily selected as that to be allowed in calculations in this book.

To judge the validity of approximations one must know the orders of magnitude of the various ionic and molecular concentrations. To show these concentrations the authors have made generous use of logarithmic graphs, including potential-*p*H diagrams. Acid-base, oxidation-reduction, and complexation equilibria, as well as separations by precipitation, solvent extraction, and ion exchange are discussed. Each chapter has a very fine set of problems, including some that are worked out in the text, and the tables of equilibrium constants and standard potentials at the end of the book are unusually extensive.

There is one strange omission from the literature citations: "Hydrogen Ion Concentration" by J. E. Ricci (1952), which is surely the definitive work on acid-base equilibria in aqueous solutions. The problems of liquid-junction potentials and activities in mixed electrolytes are not mentioned, and these will make the allowed error of 5 percent unduly optimistic for many practical cases. Hydrogen-ion concentrations, rather than activities, are calculated. Of course the calculation of single-ion activities requires extra-thermodynamic assumptions, but these are implicit in the whole concept of *p*H.

My main criticism is that the book might have been more clearly written. Complicated equations are used where simple ones would suffice; there seems