that may be transmitted by the respiratory route to man. Such studies are necessary to understand (i) how microorganisms remain alive and are disseminated in the air, (ii) what environmental factors alter the ability of such organisms to produce disease, and (iii) how important the agents are in maintaining a healthful atmosphere.

The techniques of aerobiology are presented in six chapters which cover such topics as the production of aerosols and the bioassay of airborne pollution. Various types of aerosol chambers and their uses are described in detail in four chapters. Nine chapters are devoted to an analysis of concepts and results obtained in experimental aerobiology. These cover the various aspects of microbial survival, aerosol immunization, and the significance of aerobiology in hospitals, dental clinics, and veterinary medicine. A glossary and a good index are presented.

The book is easy to read, the figures and illustrations are clear and serve a purpose, and the chapters are well documented with recent references.

Even though aerobiology may be in an early stage of development, everyone concerned with clean air or air pollution can learn from the data presented in this volume.

J. R. PORTER
Department of Microbiology, University of Iowa, Iowa City

Protein Chemistry

Enzymes and Isoenzymes. Structure, Properties and Function. Vol. 18 of the Fifth Meeting of the Federation of European Biochemical Societies, Prague, July 1968. D. SHUGAR, Ed. Academic Press, New York, 1970. x, 362 pp., illus. $14.50.

This book has been excellently edited by D. Shugar. The first ten papers are contributions from participants in the symposium entitled Relation of Enzyme Structure and Activity (organized by J. I. Harris and B. Keil). Papers 11 through 35 comprise the symposium entitled Isoenzymes, Their Properties, Structure and Function, which was organized by G. Pfleiderer and B. Večerek. The subject matter is somewhat heterogeneous, but this defect is compensated for by the articles themselves, which provide clear and concise discussions of various enzymes.

The first group of papers give a rather comprehensive view of the current knowledge of the structure and function of pig and lobster muscle glyceraldehyde 3-phosphate dehydrogenases, yeast and liver alcohol dehydrogenases, and the cytoplasmic aspartate transaminase from pig heart. Other papers in this group present specific information on rabbit muscle aldolase, muscle-type lactic dehydrogenase, trypsin, and pepsin. The molecular evolution of some of these proteins is considered. Harris and co-workers observe that the amino acid sequence of glyceraldehyde 3-phosphate dehydrogenase is strongly conserved, which suggests that the three-dimensional structure and enzymic mechanism of action likewise are conserved during evolution. In contrast, Zwilling and Pfleiderer note many divergencies between bovine and invertebrate trypsins and suggest that proteases might be most variable owing to adaptation needs arising through their contact with the exterior environment in the digestive tract. Noteworthy too is the review by Braunstein, who presents extensive data and references on the molecular mechanism of action of aspartate transaminase, a pyridoxal phosphate-enzyme.

The second group of papers gives an excellent accounting of the currently available data on lactic dehydrogenase isoenzymes. Some other enzymes that exist in multiple molecular forms are discussed more briefly. These include malate dehydrogenase, a hormone-sensitive lipase, alkaline phosphatase, α-amylase, β-galactosidase, creatine kinase, and aldolase isoenzymes. A general paper by Tepper and Hommes treats "Changes in activity and isoenzyme patterns of glycolytic enzymes in the developing rat liver." Other papers discuss some factors that affect isoenzyme distribution within a single tissue and the tissue distribution of various enzyme forms. For example, Hellung-Larsen and Andersen present kinetic studies of changes in lactic dehydrogenase patterns of human lymphocytes induced by variations in pO_2. The heterogeneity of human alkaline phosphatase is described by Moss, who discusses thoroughly the differentiation of this enzyme in human tissues, the heterogeneity of the enzyme within a single tissue, and the possible origin of these variations. Schapira and co-workers discuss results obtained for aldolase, lactic dehydrogenase, and creatine kinase in diseased muscle. In these cases it was noted that the isoenzyme patterns appear to resemble that of embryonic muscle, which shows a predominance of the brain type; the authors point out that this may be an expression of dedifferentiation at the molecular level through repression of the synthesis of the most specific forms of the enzymes.

In conclusion, this book will be useful to investigators engaged in protein chemistry and in studies of the structure, properties, and physiological significance of isoenzymes.

ANN GINSBURG
Laboratory of Biochemistry, National Heart and Lung Institute, Bethesda, Maryland

Blood Hormone

Erythropoietin and the Regulation of Erythropoiesis. SANFORD B. KRANTZ and LEON O. JACOBSON. University of Chicago Press, Chicago, 1970. x, 330 pp. $9.75.

Considerable evidence has been amassed over the past 20 years to establish now with certainty the existence of a circulating principle, erythropoietin, that controls erythropoiesis in vertebrate organisms. Krantz and Jacobson review, in a comprehensive and often critical manner, physiological, biochemical, and clinical aspects of erythropoietin and the regulation of erythropoiesis. More than 1400 references are listed, and it is difficult to find a pertinent article in the erythropoietin field in the last 20 years that has not been cited. Consideration is given to the factors that influence production of erythropoietin, its metabolism, site (or sites) of formation, and chemical properties as well as its loci and mechanisms of action. Of particular interest are recent indications that: (i) erythropoietin is a glycoprotein with a molecular weight of 60,000 to 70,000 and although highly purified is not as yet entirely pure; (ii) the kidney in mammals serves as the primary site for the production of a precursor or activator of erythropoietin; (iii) the stimulating action of erythropoietin on erythroid cell differentiation is mediated most likely through transcriptional and translational effects concerned with the production of hemoglobin and other proteins in the hematopoietic precursor cell (erythropoietin committed cells) and probably in more distal components of the erythroid cell line as well; and (iv) hormones of the adenohypophyseal-target organ axis influence erythropoiesis by altering the production of erythropoietin, effects that may arise in part from the ability of anterior hypophyseal, gonadal, thyroidal, and adrenal cortical hormones