

New Series in Genetics

Annual Review of Genetics. Vol. 1. HERSCHEL L. ROMAN, LAURENCE M. SANDLER, and GUNTHER S. STENT, Eds. Annual Reviews, Palo Alto, Calif., 1967. xii + 334 pp., illus. \$8.50.

The appearance of *Annual Review of Genetics* is welcome. The editors have included 13 reviews, averaging 25 pages in length. Remarkably, most of these reviews are critical, briefly provide background for the immediate problems, avoid duplication, and offer some leads to the future direction of the fields discussed. Geneticists will be pleased at the range of topics; molecular, cytological, human, and organismic genetics are covered. The reviews "Bacterial conjugation and extrachromosomal elements" by Falkow, Johnson, and Baron and "Structural relationships between gene and protein" by Yanofsky will be especially valuable to the teacher of introductory genetics who wishes to be informed about the present contributions of molecular biology to the study of heredity. More specialized subjects in need of a contemporary review are also treated, including population (Lewontin), development (Ursprung), fungi (Emerson), and immunogenetics (Shreffler). Additional technical papers, on *Drosophila* biochemistry (Mitchell), nonrandom disjunction in *Drosophila* (Novitski), human genetics (Sutton), plant biochemistry (Nelson), and the breeding of plants (Sprague) and animals (Robertson), complete the first volume. Wolff's essay "Radiation genetics" may be singled out as a model of clarity and organization for such short technical reviews. Indeed, the overall quality of the contributions should encourage geneticists to make it a habit to read the *Annual Review of Genetics*. The only disappointment I felt was in the publisher's production of the volume, which has small print, somewhat crude illustrations, and a cheaper grade of paper than most technical books. Such trivial detractors, however, should not prevent the specialist from being absorbed in a few of these thoroughly competent reviews. The general geneticist, while finding some articles too difficult for his background, nevertheless will be enlightened about many remarkable articles he may have missed in the immense literature on genetics, which no single person can hope to read. There is obviously more to the contents of journal articles than their

titles reveal, and reading the *Annual Review of Genetics* is a good way to compile a selection to suit one's own interests.

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Enzyme Specificity

Design of Active-Site-Directed Irreversible Enzyme Inhibitors. The Organic Chemistry of the Enzymic Active-Site. B. R. BAKER. Wiley, New York, 1967. xvi + 325 pp., illus. \$13.50.

In 1959 Baker suggested the use of active-site-directed irreversible inhibitors for enzymes. The idea, like most germinal ideas, is basically simple. Since substrates and reversible inhibitors are attracted to the active site by non-covalent bonds, it seemed possible to synthesize a new compound similar to the substrate but containing a group capable of reacting chemically with an amino acid residue in the protein. The substrate-like features of the compound would guide it to the active site, and the reactive group would form a covalent link "gluing" the inhibitor to the site. The irreversible complex would then prevent any other catalytic action and thus irreversibly inactivate the enzyme. Baker's idea was influenced by the pioneering studies of Buchanan on azaserine, and "active-site-directed" or "affinity" labels have since been used for studying active sites of pure proteins in a number of laboratories, most notably those of Shaw, Singer, Westheimer, and Lawson. Baker, however, has from the beginning been interested primarily in the development of this method for chemotherapy, and in this book he examines the theory and practice of the method for that purpose.

The rational design of site-directed reagents requires an understanding of chemical modification techniques and of enzyme specificity. Baker wisely leaves the detailed organic chemistry to the ample references which are provided and devotes most of the text to the discussion of enzyme specificity and the principles of reagent design and testing. To design a reagent it is necessary to know what parts of the substrate are not essential to the binding so that their position may be used for the introduction of the potential

linking group. For example, the tolerance of the enzyme to bulky substituents at certain positions of the substrate may be a helpful clue for the addition of a linking group at one of these positions. Moreover, for chemotherapy it is important to design a compound which will react with only one of a large number of similar enzymes. These problems are discussed theoretically and in relation to individual enzymes.

To date the primary object of Baker's studies, that is, the successful treatment of a disease by the inactivation of an enzyme in the midst of a large number of similar enzymes, has not been achieved. When one considers the complexity of the task and the relatively small amount of information yet available on metabolic diseases, this failure is not surprising. What is presented is a description of those cases in which this type of approach has been pursued and an analysis of the results in terms of their probability of success, the reasons for failure, and the logic in experimental design. The book is not a general text and its organization is at times less than ideal, but it covers the subject in a comprehensive and interesting manner. It serves as a stimulus to a new field rather than as the final report on a mature one.

To those scientists who are interested in general in the specificity of enzymes and the extensive probing of active sites this book will be both stimulating and informative. To those interested in pursuing this exciting new approach to chemotherapy the book will be indispensable.

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Temperature and Organism

Thermobiology. ANTHONY H. ROSE, Ed. Academic Press, New York, 1967. xiv + 653 pp., illus. \$25.

The editor of this volume states that the rapid advances of molecular biology and ecology during the past decade warrant the publication of a new compendium on all aspects of thermobiology. The authors of the articles have indeed stressed these two areas. Their scope covers water structure through medical applications of thermobiology, certainly a wide-ranging review. It is