

Book Reviews

The Proteins. Composition, Structure and Function. Volumes I and II. Second Edition. Edited by HANS NEURATH, Department of Biochemistry, University of Washington, Seattle, Wash. Academic Press, Inc., 111 Fifth Ave., New York, N. Y. Vol. I: 1963. xi + 665 pp. 16.5 × 23.5 cm. \$22.00 (regular); \$19.50 (subscription). Vol. II: 1964. xiii + 840 pp. 16.5 × 23.5 cm. \$26.00 (regular); \$24.00 (subscription).

These two volumes of the second edition of the "The Proteins" are the first of four volumes planned. In the decade since the first edition was published, there has accumulated an enormous mass of excellent data on the amino acid composition, sequence, and the three-dimensional structure of proteins. New methods have been developed for the chemical synthesis of peptides, for studying the intramolecular bonds and interactions of proteins, and the relation of their structure to function. This new edition will be widely welcomed by all who are trying to keep well informed in these areas of protein and polypeptide chemistry.

The topics for this multi-authored treatise have been well selected and carefully integrated. This second edition is not a mere revision of the first edition. With only a single exception, all the chapters in both volumes were written by authors who did not contribute to the first edition. The first volume deals largely with methods of amino acid analysis, peptide and protein synthesis, sequence analysis, and intramolecular bonds of proteins. The second volume contains chapters on the conformation of polypeptide chains in proteins, the interaction of protein molecules with ions and other protein molecules, polyamino acids as protein models, and X-ray analysis of protein structure. In both volumes there is an emphasis on the relationship of the composition and structure of polypeptides or proteins to their specific activity or biological function.

Volume I contains six chapters. The first by A. Light and E. L. Smith is a critical review of amino acid analysis in which basic procedures are described and preferred methods for analysis of intact proteins, free amino acids, or protein hydrolysates are discussed. An addendum by G. R. Tristram and R. H. Smith lists the amino acid composition of 42 protein preparations. The second chapter by K. Hofmann and P. G. Katsoyannis is devoted to the synthesis and function of peptides of biological interest. Following an excellent critical discussion of the principles and reagents for peptide synthesis, there is a well-documented description of the synthesis of selected biologically active peptides and a stimulating discussion of structure-function relationships. The chemical aspects of protein synthesis are reviewed by J. S. Fruton in the third chapter. Emphasis is placed on the chemical and enzymatic aspects of protein biosynthesis rather than the coding problem. Concepts and experimental approaches for the determination of the primary structure or amino acid sequence of peptides and proteins are discussed in Chapter 4 by R. E. Canfield and C. B. Anfinsen in the order that they would present themselves to the investigator. Chapters 5 and 6 deal with intramolecular bonds in proteins. R. Cecil reviews the role of sulfur in proteins and the analytical methods used in its study. H. A. Scheraga discusses noncovalent bonds in proteins from a thermodynamic point of view.

The editor states that "the second volume should be contiguous with the first as it deals with fundamental properties of proteins, both in solution and in the solid state." In it are five chapters that deal with the conformation of polypeptide chains in proteins both in solution and in the solid state; the interaction of protein molecules with small ions or with other protein molecules; and the properties of polyamino acids as protein models.

The first chapter in Volume II, Chapter 7, by J. A. Schellman and C. Shellman deals with the possible conformations of polypeptide chains in proteins when in solution, experimental methods for determining conformation, and the results obtained from investigations with synthetic polypeptides. Chapter 8 by J. Steinhart and S. Beychok treats the interactions of proteins with hydrogen ions, other small ions, and molecules. Acid-base dissociations of proteins and the bonding of small uncharged molecules, such as water, urea, undissociated organic acids, steroids, and alcohols, to protein molecules are considered from both a theoretical and an experimental point of view. Chapter 9 by J. W.

Nichol, J. L. Bethone, G. Kegeles, and E. L. Hess deals with interacting protein systems. The investigation of interaction between protein molecules and other macromolecules is of importance in providing a basis for biological processes such as protein polymerization, enzyme substrate, or antibody antigen combinations, and protein-nucleic acid complex formation. The authors discuss the physical chemistry of interacting systems and methods for obtaining characteristic parameters. The behavior of interacting systems in transport experiments and interaction effects in other physicochemical measurements is reviewed. Chapter 10 is an excellent review by E. Katchalski, M. Sela, J. I. Silman, and A. Berger on polyamino acids as protein models. Although these Israeli workers have written several reviews on polyamino acids, in this author's opinion this chapter is outstanding. It begins with a review of the synthesis and chemical properties of polyamino acids. This is followed by sections on the conformation of polyamino acids in the solid state and properties in solution. The last half of this chapter is a detailed summary of the biological properties of polyamino acids. The editors are to be complimented for including this chapter on polyamino acids, for the studies on amino acid polymers have contributed much to our knowledge of protein chemistry. The final chapter by R. E. Dickerson is on X-ray analysis and protein structure. The author states that the purpose of this chapter is to set forth the results which have been achieved by X-ray analysis and to show how the results were obtained. It includes discussions of the results obtained with a variety of both globular and fibrous proteins as well as of work in progress.

In this reviewer's opinion the second edition is well conceived and clearly executed. It exceeds the high standards set by the first edition. Many aspects of protein structure can be most easily seen from drawings or models and although this edition contains such illustrations, more would have been welcome. Literature citations are numerous and each chapter has a long list of references. The second edition is considered a comprehensive treatise on the composition, structure, and function of proteins which will be of real value to those advanced students and research scientists who want to keep well informed in these rapidly advancing fields of biochemistry, biophysics, physical chemistry and related areas.

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Pteridine Chemistry. Proceedings of the Third International Symposium held at the Institut für Organische Chemie der Technischen Hochschule Stuttgart, September 1962. Edited by WOLFGANG PFLEIDERER, Institut für Organische Chemie der Technischen Hochschule Stuttgart, and EDWARD C. TAYLOR, Department of Chemistry, Princeton University, Princeton, N. J. Pergamon Press, Ltd., The Macmillan Co., 60 Fifth Ave., New York 11, N. Y. 1964. xx + 535 pp. 16 × 23.5 cm. \$15.00.

The Proceedings of the Third International Symposium on Pteridines has had a long gestation period (the meeting was held September 1962); however, the product has a polish unusual in publications of this sort. The symposium was bilingual, and the original German or English has been retained throughout the text; only the provision of English abstracts of all papers defers to the linguistic failings of the English-speaking world.

Unavoidably, the publication is dated, but it provides a substantial and comprehensive survey of the state of pteridine chemistry, biochemistry, and biology as of 1962. The role of the folate cycle in methionine biosynthesis (Buchanan), the origin and nature of the pteridine intermediate for folate biosynthesis (Jaenicke, Wood, Forrest, Wacker, and discussion by Buchanan), the biogenesis of riboflavin (Plaut), the reactions and pteridine coenzyme for the oxidation of phenylalanine (Kaufman), and the role of tetrahydrofolates as coenzymes (Huennekens) were presented so well that only a little supplementary reading in the current literature would be required for an up-to-date picture. On the other hand, the fine structures of the various pigments of the drosoperin and sepiapterin series seem as elusive as ever (Viscontini, Forrest).