form. The resulting text is not very readable and the novice in this field would be well advised to start elsewhere. There are some ponderous sentences, such as "The crystallization characteristics of substances crystallizing from fusion are primarily a function of the crystallizing crystalline modification," which requires a number of readings for complete understanding. The chapter will be of use primarily as a reference for people already informed in the field.

The chapter on the Application of Differential Thermal Analysis to High Polymers limits itself insofar as discussion and examples are concerned to the high polymer field. This limited scope seems a bit unfortunate to this reviewer since applications in other important areas of organic analysis escape attention. This is not a fair criticism of Bacon Ke since he has defined the scope of his contribution in his title and has provided a very good treatment of his chosen subject. One wonders, however, whether the editors would not have improved the series significantly by arranging to include a broader coverage of Differential Thermal Analysis in the present volume. Substantial duplication will be necessary if the subject is reopened in a subsequent offering.

Volume 4 represents a useful addition to a generally excellent series of books on Organic Analysis. It is recommended reading for all those who wish to keep abreast in this area.

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Brookhaven Symposia in Biology. Number 13. Protein Structure and Function. Report of Symposium held June 6–8, 1960. Brookhaven National Laboratory. Office of Technical Services, Department of Commerce, Washington 25, D. C. 1960. ix + 266 pp. 17.5 × 25.5 cm. Price, $2.50.

The stated objective of the Brookhaven Symposia was to bring together workers from diverse disciplines with a common interest in protein structure and its interrelationship to the many functions performed by proteins. From these differing approaches has come a wide range of techniques employed in unveiling structural aspects of proteins. This, as much as the different functional types of proteins dealt with, is the noteworthy contribution of the publication.

Dealing with proteins of such widely varying functions as enzymes, hormones, viruses, antibodies and the structural protein, collagen, the papers can be conveniently divided into two groups for purposes of review. The first group concerns itself with the intramolecular bonds involved in maintaining the configuration of the protein molecule as well as its actual architecture. The second group is more specifically concerned with the relationship of the structure of the protein to its biological function.

In the former group, recent applications of physical-chemical tools have supplied the experimental basis for a majority of the reports. P. D. Boyer devotes a section of his paper on the disulfide groups in proteins to describing the use of nuclear magnetic resonance spectra on solutions of proteins. Both I. M. Klotz and H. A. Scheraga investigated hydrogen bonding, Klotz by using the infrared portions of the spectra, and Scheraga by means of the Linderstrøm-Lang method of deuterium and hydrogen exchange rates. One of the more interesting aspects of the paper by Klotz is his treatment of the role of the "apolar" or "hydrophobic bond" in maintaining protein configuration, which is based on analogy with model systems. The discussions following both of these papers will be of particular interest to the reader.

Three other papers which should be reviewed in this group include reports by P. J. Flory, H. K. Schachman and M. F. Perutz, and are concerned with the actual geometric form of the protein. Each has employed a different physical parameter for his measurements. Flory has used intrinsic viscosity, while Schachman points out the advantages in the use of interference optics and sedimentation equilibrium in the application of the ultracentrifuge for a study of proteins. Perutz reports on the application of three dimensional X-ray analysis to the hemoglobin molecule and details a complete contour map of a protein. A somewhat better correlation of the text and figures would have been helpful since, for the most part, one is not intelligible without the other. This particular presentation of the now-classical work is, however, very well done, outlining the methodology employed, information obtained and the reliability of the method as well as interpreting the results.

In the second group of papers, the emphasis has been placed on those structural aspects of the protein which are important for its biological function. Since the biological role of collagen appears to be structural, the studies of P. H. von Hippel and W. F. Harrington on the functional aspects of this protein were focused on those groups of the molecule which stabilize the protein configuration.

Although the covalent structure of ribonuclease has been established, the locus of enzyme activity or "active site" has not been delineated. W. H. Stein presented the approach of the Rockefeller group to this problem, which has been an attempt to modify the protein chemically in as precise a manner as possible and then observe the effects on enzyme activity. F. M. Richards and P. J. Vithayathil also investigated ribonuclease, but used the ribonuclease fragments which are obtained by digestion with the bacterial proteinase subtilisin, the "S-protein" and "S-peptide." Neither fragment has any enzyme activity itself, but combined they do show enzyme activity. The investigators studied the relationship of the fragments to enzyme activity and concluded that, in a functional sense, the "S-protein" may be the substrate binding site, while the "S-peptide" can act as the catalytic site. By chemical modification of the two fragments, they were able to further delineate the role of the various amino acid residues.

This concept of functional proteins being separable into two sites does not appear to be confined to enzymes. K. Hofmann, who used the same approach of systematic degradation and chemical modification, gave an excellent account of work on pituitary hormones. He points out that the hormone can be divided into an "active site" and an "attachment site." A somewhat similar situation exists for antibodies as well. R. R. Porter, in his report "The Active Fragments of an Antibody," points out that antibodies can be degraded by papain to an "antibody combining site" and an "antigenic site."

W. J. Ray, Jr., and D. E. Koshland, Jr., correlated the kinetics of enzyme activity with chemical modifications of the enzymes phosphoglucomutase and chymotrypsin. They employed a photoöxidation procedure for their chemical modification. Since this procedure is not specific in its effects on amino acid residues, they correlated the kinetics of enzyme inactivation with the kinetics of destruction of amino acid residues. J. M. Sturtevant also reported on chymotrypsin action which he investigated by following the kinetics of the reaction catalyzed by the enzyme. Finally, C. A. Knight has done a fine review of the work on the structure and function of the protein of the tobacco mosaic virus.

In general, although the caliber of the papers is not uniform, a major part of the work is well presented and should interest a wide audience. Represented at the Symposium were the physical chemist, immunologist, virologist, endocrinologist, enzymologist, crystallographer and protein chemist.

The volume contains accounts of original work, much of which has yet to be published elsewhere. Despite the relatively rapid publication, this volume has a complete subject index as well as an index of speakers.

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