ture. Her work does not close the study of Malagasy lemurs. It can serve as a model for equally detailed studies of other species, and it should encourage the safeguarding, with the combined help of all scientists, of the exceptional, but unfortunately threatened, territory for study that the natural reserves of Madagascar provide.

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Copper Proteins

The Biochemistry of Copper. Proceedings of the Symposium on Copper in Biological Systems (Harriman, N.Y.), September 1965. JACK PEISACH, PHILIP AISEN, and WILLIAM E. BLUMBERG, Eds. Academic Press, New York, 1966. 606 pp., illus. $23.50.

Symposium volumes rarely make good books. That this collection of papers and discussion succeeds, at least in part, is the result of two facts. First, the study of copper proteins has reached a point at which review is needed and new ideas are beginning to emerge. Second, profitable contact can now be made between biochemists and those physical chemists concerned with the nature of transition metal complexes. The lively interchange between these groups is evident in the discussions following many of these papers.

The book begins with a series of excellent papers on the bonding and structure of low-molecular-weight copper complexes. I particularly enjoyed H. Freeman's concise and detailed elucidation of structures determined by x-ray diffraction, which is appropriately followed by the work of Gurd and Bryce on interactions of cupric ions with myoglobin and model peptides. This approach, in which analogies between small complexes and protein complexes are stressed, is neatly complemented by papers by W. E. Blumberg and R. J. P. Williams, in which possible unique behavior of copper-protein complexes is emphasized. Unfortunately, this good introduction is immediately followed by a series of generally unrelated papers on physiological problems. While essential to a broad view, this material would have been much more appropriate near the end of the book, following the discussion of particular copper proteins.

The remainder of the volume is devoted largely to papers on individual copper proteins. Fortunately, there was an apparent effort to treat a few proteins in depth, rather than to survey the field uniformly. As a result, there are very successful sections on ceruloplasmin, cytochrome oxidase, and tyrosinase. Each of these series of papers is prefaced by an introductory review, and in the first two instances, the discussion of each group of papers is combined. It is unfortunate that two papers on Wilson's disease, which might reasonably follow the series on ceruloplasmin, are placed before.

The book will, of course, be of particular value to those working with copper proteins. But a broader audience will find, particularly in the first section and in the sequences of papers on ceruloplasmin, cytochrome oxidase, and tyrosinase, a good picture of the current interaction between the chemistry of metal complexes and the biochemistry of metalloproteins.

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Photochemistry

Mechanistic Organic Photochemistry. DOUGLAS C. NECKERS. Reinhold, New York, 1967. 334 pp., illus. $14.75.

The current activity in organic photochemistry has resulted recently in the publication of several books on the subject written from different points of view. This newest addition "is intended primarily for organic chemists and biochemists whose major interest is something other than photochemistry. Students at the senior or first year graduate level should find it useful." The book is therefore an introduction to organic photochemistry, not primarily a critical discussion of the subject for researchers in the field.

After a much-too-brief discussion of the nature of the absorption process and excited states, the author discusses photochemical reactions, grouping them into artificial categories based on the overall transformations involved (decomposition reactions, addition reactions, rearrangements, and so on). Numerous examples are given in useful tables, and each section is extensively referenced, particularly with respect to the recent literature through early 1966. The coverage is broad, including all standard reactions and several quite obscure reactions. Numerous applications for synthetic purposes are noted.

The author has chosen in most instances to present mechanistic conclusions without the data and observations that led to the conclusions. It seems to me that it would have been preferable to give the reader, particularly one unfamiliar with photochemistry, a better idea of the kind of experiments that have been carried out and the nature of the observations. For example, the extremely important area of energy transfer is treated superficially (barely six pages), and there is very little direct reference to experimental data to indicate the basis for the theory. It does not seem to me desirable to minimize the physical aspects of organic photochemistry, especially in a book whose title indicates a mechanistic orientation. Much current work involves kinetic studies, often no more complex than competitive kinetics based on a steady-state analysis, but there is not a single rate expression in the book, although values for rate constants (which will have little meaning for the reader) are occasionally cited. There seems to have been little need for this omission, for most of the prospective readers will have had at least an introductory physical chemistry course, including basic kinetics.

There are a number of topics in which more detail would be desirable, among them the role of twisted ("phantom") triplet states, photosensitized *cis-trans* isomerization and dimerization of olefins, photochemical formation of *trans*-fused bicyclo-[4.2.0]hexane ring systems, and the intriguing complexities of dienone and enone photochemistry (particularly with reference to the work of Jeger and Kropp). The author also overemphasizes his premise of the relationship of photochemistry and ground-state free-radical chemistry.

In general, the writing is clear, and there are relatively few typographical errors. Structural formulas are used extensively, but a number of figures are confusing. The book can be especially recommended to people with little interest or background in the more physical aspects of the subject who want to learn about the scope of organic photochemistry and its synthetic utility.

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