cycles in continental (fluvial and lacustrine), transitional, and marine (epicontinental and geosynclinal) environments. Rhythm, cycle, and cyclothem are considered synonyms in this analysis, with the understanding that the last always refers to sedimentary deposits. The authors note that cycles have been recognized in units ranging in size from as small as silt and clay laminae to the order of geologic systems. To restrict the scope of their subject, geologic systems are excluded from consideration.

By and large, this book provides a very good source to find what is known —at least in what might be described as the Atlantic geologic community— about cycles in sediments, for surely all the important general papers are referred to in this book. In addition, many particular studies, the kind that are the hardest to find yet are often the very ones that are most useful, are described. Certainly the bringing together and organization of this literature is the most important contribution of Duff, Hallam, and Walton; the "why" of cycles, however, remains as difficult to assay as ever. In spite of this, the authors feel —and I agree—that "the search for and the discussion of cyclic sedimentation has an important role to play in understanding geological successions."

The book is attractively printed, appears to be largely free of errors, and has some good illustrations, mostly line drawings. But at $23.50 it is greatly overpriced.

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Humphry Davy. HAROLD HARTLEY. Nelson, London, 1966. viii + 160 pp., illus. 35s. British Men of Science.

"Brilliant fragments"—so the Swedish chemist J. J. Berzelius described the contributions to science of Humphry Davy, pioneer of electrochemistry, discoverer of the alkali and alkaline-earth metals, and inventor of the miners' safety lamp. If the fragments were brilliant, the man was even more so. The progress from a frugal provincial childhood to wealth, a baronetcy, and the presidency of the Royal Society; from obscure beginnings, through the friendship and encouragement of Wordsworth and Coleridge, to the company of cabinet ministers and royalty: this was no ordinary path even for the most gifted members of the lower middle class in Regency England. Small wonder, then, that Davy continues to attract the biographers (at least two further studies are in preparation to add to the three already published in the last 15 years!).

The particular contribution of Sir Harold Hartley's brief popular biography is to take Davy's science seriously: "readers," Sir Harold warns, "will find more chemistry than anecdotes in these pages." Indeed they will, and Davy's major experimental triumphs are fully and carefully described. That the description is set within the by-now-unfashionable reference-frame of "positive science" may disturb the purist, but not the sympathetic reader, who will enjoy the many perceptive asides that flow from Hartley's 70 years of reflection on Davy's colorful and complex character.

To criticize this present work for its failure to place Davy's experiments in intellectual context, and to suggest that Boscovichean atomism was the essential key to his science, would show both a lack of sympathy with the author's aim and an over-simple view of the currents of scientific thought in early 19th-century England. Yet, while savoring the enjoyable sketch the present work provides, one may certainly hope that the other biographers now at work will probe more deeply into Davy's own scientific motives and explore more thoroughly the particular intellectual and social milieu that enabled him to become the first of a now-familiar line of scientific entrepreneurs and self-made men.

In such an enquiry his early contacts with Gregory Watt, Thomas Beddoes, and the extraordinarily gifted Lunar Society group would repay close examination. So would his exploitation of the Hotwells Pneumatic Institution, and the publicity value of the newly discovered "mind expanding" properties of laughing gas. His meteoric rise to fame at the Royal Institution also invites careful study, as do his persistent attempts to discredit French chemistry in the midst of the Napoleonic wars. But these are controversial matters, and require much detailed research. In the interim, Sir Harold's book makes a welcome introduction to the fascination of Humphry Davy as man and scientist.

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Reptiles

Lizard Ecology. A symposium, Kansas City, Mo., June 1965. WILLIAM W. MILSTEAD, Ed. University of Missouri Press, Columbia, 1967. xii + 300 pp., illus. $7.50.

Interest in the ecology and the physiological ecology of small reptiles has been increasing rapidly during the past few years. This apparently is due in part to the relative stability which has finally been achieved in systematic herpetology and the discovery that small reptiles lend themselves particularly well to field and laboratory investigations. The volume under review clearly reflects this increasing interest.

The symposium was well attended, and highly acclaimed by those who did attend. The names of the 15 persons participating by invitation in this symposium read like a Who's Who of those active in this expanding field. The contributions are grouped in the three general areas where most current work in lizard ecology is now being done, Population Ecology, Social Behavior, and Physiological Ecology. Each section includes an introduction and three papers, followed by an edited version of the discussion that followed the formal presentations. The editing of the discussions has been most skillfully performed. The usual chaotic and ungrammatical flow of half-stated ideas and incomplete thoughts often delivered so effectively with gestures and facial expressions is not here. But the personalities of the speakers emerge clearly and they express themselves unreservedly on controversial ideas unsupported by adequate evidence. These discussions are particularly stimulating. Brief excursions are made into such subjects as "innate dispersers," refractory reproductive periods, blazoning of gravid females, value of behavioral characters in the systematics of genera, compulsive feeding, nest-site territorialism, head-bobbing and stereoscopic vision, oxygen transport, and the value of thermal models.

Unlike those in most symposia, many of the papers present first reports of original research. There is, however, considerable variation in this respect. The opening paper, by Donald W. Tinkle, summarizes a tremendous amount of research reported on here for the first time, covering a five-year study of various facets of the population dynamics of the side-blotched lizard *Uta stansburiana.* A number of other papers are similar in scope, among them the exhaustive account by

R. Ruibal of the comparative behavior of West Indian anoles, K. S. Norris's thoughtful discussion of color adaptation and thermal relationships in desert species, and Dawson's interesting exposition of the physiological responses of lizards to temperature.

While much of the current work on lizard ecology appears in the herpetological journals, a great deal is scattered, and to date no reviews or summaries have appeared, although one is in press. The interested scientist has been at a distinct disadvantage in his attempts to explore this new literature. This symposium fills this gap, and even if more general review works should be forthcoming, the serious lizard ecologist will turn again and again to the major contributions which appear here. For this reason the tables and graphs which are so liberally used are particularly welcome.

It should also be pointed out that the entire symposium as it appears in this book was carefully and effectively planned out and presented. This isn't a loose collection of papers covering a wide range of subjects, but a highly selected and integrated presentation of the ecological research most energetically being pursued at the present time.

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Biological Macromolecules

Conformation of Biopolymers. Papers read at an international symposium, Madras, India, Jan. 1967. G. N. RAMACHANDRAN, Ed. Academic Press, New York, 1967. Vol. 1, xiv + 425 pp., illus., $19.95; vol. 2, x + 356 pp., illus., $14.75.

As is well known, proteins and nucleic acids are polymers of relatively simple molecules joined together by chemical bonds to give long chains. Their biological functions are directly dependent on the conformations in which the chains exist—that is, on the specific manner in which the chains are folded and twisted in space. The folding and twisting are brought about by the action of various kinds of intra- and intermolecular forces, such as hydrogen bonds and van der Waals forces, involving both the polymer molecules themselves and the solvent molecules that surround them. The study of the conformations of biological macromolecules is not easy, but powerful tools are available and a great many people are involved in efforts to apply them to the problem. Recent progress has been rapid, but it will surely be many years before we have answers to many of the questions that can now be asked.

The two volumes under review contain 48 papers, all of which are progress reports on recent research in the laboratories of the participants in the Madras symposium. Of the 48 papers more than three-quarters are concerned with problems related to protein conformations; the remaining papers deal with the somewhat simpler problems of the conformations of nucleic acids and polysaccharides. Some of the papers contain material that will be of interest to biochemists in general, but most of them are clearly intended for the specialist.

Emphasis has been placed on the following particular physical and theoretical approaches to the problem of protein conformation: the restrictions imposed on conformations by steric repulsions and by the potential energy of interaction between nonbonded atoms along the polymer chain (three papers); the interpretation of optical rotatory dispersion and circular dichroism (six papers); and the statistical mechanics of polypeptide and protein chains and cooperative transitions between different conformations of these chains (four papers). Nine papers are devoted to the special conformational problems encountered in polymers containing large amounts of proline, and in particular to the unusual and fascinating protein collagen. Relatively little space is devoted to the vast amount of detailed information on protein conformations that is now rapidly becoming available through the application of x-ray diffraction to crystalline globular proteins. Only passing attention is given to the confusing and vexing—but important—question of the role of the solvent in determining macromolecular conformations.

The Madras symposium was presided over by Linus Pauling. His interesting historical account of the study of protein structure at Caltech serves as an introduction to the collection of papers.

These volumes will be a useful addition to all libraries intending to maintain a reasonably complete coverage of current work on the physical chemical study of biological macromolecules.

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Identification Guide

The Particle Atlas. A Photomicrographic Reference for the Microscopical Identification of Particulate Substances. WALTER C. MCCRONE, RONALD G. DRAFTZ, and JOHN GUSTAV DELLY. Ann Arbor Science Publishers, Ann Arbor, Mich., 1967. xvi + 406 pp., illus. Boxed, $125.

A few weeks before receiving *The Particle Atlas* for review I saw the advertising brochure describing in glowing terms this "scientific achievement to add new reliability to your library or laboratory." "Here is the way you can identify almost any particle you can detect," it continued. I am tempted to quote more from this masterpiece of the advertising art in "full color," but my readers are probably more interested in the contents of the book itself.

Let us start by saying that the atlas is a beautiful book. The printing house strove for an "art book" type of presentation, and with reasonably good success (in the review copy there are two or three pages on which the blues are somewhat out of register). The book contains over 500 color micrographs of all kinds of particulate substances, the particles ranging in size from only a few microns to about 100. All the techniques which can enhance color in the light microscope have been exploited. The micrographs are shown at magnifications ranging from 40 to 500, with two at 900. The authors would have done well to omit these last ones, which are vivid unintentional illustrations of the so-called "empty" magnification.

For whom is the *Atlas* produced? The foreword identifies the potential users as persons working in air-pollution control, industrial hygiene, clean-room monitoring, and criminalistics (*sic*). To this list the advertising folder adds about ten other groups, among them workers in agriculture, food processing, metallurgy, and parenterals. Whoever the prospective users may be, the authors must expect them to have little knowledge of microscopy, for they have included a 23-page elementary presentation of such subjects as the refractive index, crossed polars (I dislike this expression, which seems to be gaining favor in certain circles), dispersion staining, measurement of physical properties, x-ray powder diagrams, the electron microscope, the electron microprobe, and so forth. On the whole the presentation seems suitable for those without college training.