onstrating the constancy of interfacial angles, but this is followed immediately by discussion of the gnomonic projection; the unprepared student will have to look elsewhere for instruction in elementary crystallography.

The 12 chapters are untitled, but the numerous section headings are assembled under appropriate chapter numbers in the table of contents. The scope can be roughly indicated by listing the principal subjects discussed in each chapter: (i) gnomonic and stereographic projections; (ii) stereographic and gnomonic nets; (iii) axial elements; (iv) symmetry, crystal systems, and classes; (v) polar and reciprocal lattices; (vi) the Barker method of identifying crystals from morphology; (vii) crystal calculations; (viii) matrix algebra in crystal calculations; (ix) crystal drawing; (x) reflecting goniometers; (xi) the latest designs of two-circle goniometers; and (xii) the interpretation of Laue photographs. The book concludes with a set of 51 questions, covering 11½ pages, to which answers are given (3 pages). For additional problems the reader is referred to the senior author's *A Thousand and One Questions on Crystallographic Problems* (Wolters, Groningen, 1952). The index (only 3 pages) is a bit skimpy.

The revised treatment in this book was determined by several important developments since 1946. R. L. Parker's (1956) gnomonostereographic projection is emphasized in chapter 2, and a net is provided for it; the authors state, "It seems almost certain that in the reasonably near future Parker's net will replace the well-known Wulff net for crystallographic purposes." In view of the appearance of *The Barker Index of Crystals*, in 1951 and 1956, to which the junior author contributed, chapter 6 has been revised and shortened; the reader is referred to the *Index* for details of the method. Chapter 8 is an entirely new chapter, based largely on the methods introduced by W. L. Bond. The brief chapter 12 is also new.

Though no mathematics beyond spherical trigonometry and matrix algebra is required, parts of the book will seem formidable to many. Matrix methods are used extensively, not only in chapter 8 but elsewhere as well. Many examples are given in detail, but easy ones are avoided. The particulars used to work out the first example in chapter 7, determination of the axial elements of anorthite, occupy 13 pages. In spite of such burdens, the book has the fine style one expects from the senior author, and it is enlivened by many forceful expressions of his opinions.

In the preface Terpstra and Codd write, "If this book should lead to an increase in the number of young investigators taking up the practice of crystallometry, the authors would feel themselves richly rewarded." In view of the competition offered by the many new fields of physical investigation, no such reward seems likely, but any who do plan to practice crystal measurement and the auxiliary techniques will find Terpstra and Codd's *Crystallometry* an excellent guide.

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Monumental Synopsis

Geology of the Atlantic and Gulf Coastal Province of North America. Grover E. Murray. Harper, New York, 1961. xvii + 692 pp. Illus. $24.

Grover Murray has compiled a monumental reference work on the geology of the Coastal Plain from Newfoundland to Honduras. He considers this entire area to be an active, growing geosyncline filled with Mesozoic and Cenozoic sediments that rest on a subsiding trough of Paleozoic and Precambrian rocks. The volume is primarily an orderly review of data fully documented by references to original articles; only in rare places has Murray "taken the liberty of theorizing about a particular topic or setting down ideas that known data suggest."

In plan, the discussion first considers the geology and geography of the highlands adjacent to the Coastal Plain and of the rocks that underlie the coastal-plain sediments, and then the general structural geology of the rocks within the Coastal Plain, with special reference to the fault systems and salt structures. A chapter on the stratigraphy and age relations of hundreds of lithologic units, ranging in age from pre-Jurassic to Recent, is followed by summary chapters on mineral resources, on physiography, and on climate, vegetation, and soils.

The chapters on faults and salt structures are particularly valuable because they bring together for the first time a wealth of information obtained in exploration for petroleum. Also especially interesting are thickness and facies maps for many of the geologic stages, as well as a series of maps showing the regional distribution of fuels, metals, and nonmetallic mineral resources.

The volume is illustrated with more than 100 photographs and nearly 400 maps and cross sections, most of which, the author says, were specially prepared for this volume. Many of the illustrations are not keyed to the text, and some include symbols that are not explained either in the legend or in the text. I wish Murray had discussed more fully the problem of the age and mode of origin of the Gulf of Mexico; some of the rocks and structural complications in the southern part of the Gulf province seem more closely related to the Cordilleran and Antillean geosynclines than to his postulated coastal geosyncline.

Murray presents here the first reasonably complete compilation that summarizes existing information on the Atlantic and Gulf provinces of North America, and he has documented it with a very valuable bibliography of more than 3400 references.

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Freud and the Iroquois

The Science of Dreams. An analysis of what you dream and why. Edwin Diamond. Doubleday, Garden City, N.Y., 1962. 264 pp. $4.50.

It is a curious fact that, although dreams have always fascinated people, they have been shunned by science. Not even Freud's monumental study, which may prove to be one of the most influential books of the 20th century, made the dream scientifically respectable. It remained for a chance observation that occurred in Kleitman's sleep laboratory at the University of Chicago in 1952 to make a science of dreams possible. The chance observation was the moving eyes of a sleeping infant. When Kleitman and his graduate student, Aserinsky, checked for the same thing in adults during sleep they found periods of rapid eye movements throughout the night. Kleitman guessed

correctly that these bursts of REMs, as they are called, meant that the sleeping person was dreaming. The first objective indicator of dreaming had been discovered. In the 10 years since that historic observation, the scientific study of dreams has begun to flourish in laboratories all over the world.

Edwin Diamond, a general editor of *Newsweek* and formerly its science editor, has written a highly readable and accurate account of this new science of dreams. Diamond, good reporter that he is, conveys to the reader the extraordinary drama and human interest of this discovery and its considerable consequences. But that is by no means all that is in this lively book. There is an incredible chapter in which Freud is bracketed with the Iroquois Indians and a lot of other fresh material that I have not seen in other books on dreams.

This is a book not only for scientists to recommend to their nonscientific friends but one which they themselves can read with enjoyment and profit. Considering the rate at which new information about dreams is accumulating, Diamond will have to revise his book every few years to keep it up to date.

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General Biology Textbooks

Biology. Its principles and implications. Garrett Hardin. Freeman, San Francisco, Calif., 1961. xi + 682 pp. Illus. $8.

Biology. An introduction to the science of life. C. J. Goodnight, M. L. Goodnight, and R. R. Armacost. Wiley, New York, 1962. vii + 460 pp. Illus. $6.95.

The revitalization of high school biology teaching, now occurring as a result of the versions of *BSCS High School Biology* courses developed by the American Institute of Biological Sciences' Biological Sciences Curriculum Study, has exciting implications for the teaching of biology in colleges. Neither of the college texts reviewed here was written in anticipation of this happy situation, but Hardin's *Biology* should nevertheless make a distinguished contribution of its own to liberal education. It is a thoughtful, broadly conceived, and thoroughly modern presentation of biological science. The text is divided into four parts: Part 1 is concerned with general principles. Here are introduced in lucid prose, with imaginative models and clear illustrations, the concepts of cellular biology, cybernetics, and evolutionary mechanisms which are then interlaced throughout the remaining parts of the book to provide an unusually well-integrated treatment of these subjects. Part 2 deals with plants, and emphasis here is on functional interpretation of structure. Discussions of ecology, energy cycles, and evolution are appropriately and effectively integrated with the general material of this section.

Fifteen of the 37 chapters are devoted to part 3, on animal biology, in which there is a review of the major phyla with extensive discussion of physiology, primarily human. Part 4 presents a balanced modern treatment of heredity. In addition to a 17-page index, there is a glossary and 12 short appendices consisting primarily of tables of quantitative data and mathematical formulas. A teacher's manual is also provided.

This is a biology text with very few peers. Perhaps its outstanding characteristic is the accessibility of its information to the student. This derives from a number of qualities, not the least of which is Hardin's superior style of writing, and includes the careful attention he pays to the human implications of the subject. Most appealing to the clasroom teacher, however, is his extensive use of the historical method. Following the "path of discovery," as Hardin calls it, not only provides insights into the attitudes of scientists at work but also creates the atmosphere for understanding and appreciating the nature of scientific "truths" and the ways in which these are discovered and stated. Other features are (i) the arrangement of the text which allows flexible use; (ii) the end-of-the-chapter questions and problems which are worthy of the name; (iii) on-the-spot derivations of new terms from their Greek and Latin roots (greatly to be encouraged); and (iv) the deep impression, made continuously throughout the book, that biology is an intellectually exciting and rewarding study.

Biology by Goodnight, Goodnight, and Armacost is also divided into four sections. The first section is concerned with defining science, protoplasm, and the cell; the second section, six chapters, describes animal structure and physiology, primarily human; in the succeeding four chapters the structure and function of higher plants are considered, and the plant kingdom is surveyed, while the last four chapters are devoted to genetics, evolution, ecology, and conservation. The text is written in clear, short sentences, and it is well illustrated with numerous line drawings and photographs. There is a 16-page index, an appendix containing tables of classification, and a glossary (no word derivations, however).

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New Books

Biological and Medical Sciences

American Drug Index, 1962. Charles O. Wilson and Tony E. Jones. Lippincott, Philadelphia, Pa., 1962. 846 pp. $6.75.

Aspects of Medical Investigation in Africa. Charles Wilcocks. Oxford Univ. Press, New York, 1962. 133 pp. 18s.

Biological Alkylating Agents. W. C. J. Ross. Butterworth, Washington, D.C., 1962. 242 pp. Illus. $10.50.

Biological Effects of Freezing and Supercooling. A. U. Smith. Williams and Wilkins, Baltimore, Md., 1961. 472 pp. Illus. $11.

Chemotherapie und Prophylaxe des Krebses. H. von Euler. Thieme, Stuttgart, Germany, 1962. 152 pp. Illus. DM. 25.

The Enzymes of Lipid Metabolism. P. Desnuelle, Ed. Pergamon, New York, 1961. 324 pp. Illus. $10. Proceedings of the Sixth International Conference on the Biochemistry of Lipids, held at Marseilles in 1960. The papers are in English and French.

Morphogenesis of the Vertebrates. Theodore W. Torrey. Wiley, New York, 1962. 610 pp. Illus. $9.95.

Physiology of Strength. Theodor Hettinger. Thomas, Springfield, Ill., 1961. 98 pp. Illus. $4.50.

Problems in Communication. Charles Watkins and Benjamin Pasamanick, Eds. American Psychiatric Assoc., Washington, D.C., 1961. 131 pp.

Rudolf Virchow Medical Society in the City of New York. Proceedings, vol. 19. Hans E. Bejach, Hans Lehfeldt, George Schreiber, Eds. Karger, New York, 1961 (order from Albert J. Phiebig, White Plains, N.Y.). 245 pp. Illus. Paper, $8.50.

The Seeing Eye. H. Asher. Duckworth, London, 1962. 278 pp. Illus. 30s.

A Survey of Cardiac Glycosides and Genins. J. Hampton Hoch. Univ. of South Carolina Press, Columbia, 1961. 94 pp. (tables).

Soil Management for Conservation and Production. R. L. Cook. Wiley, New York, 1962. 539 pp. Illus. $9.95.

The Structure and Biosynthesis of Macromolecules. D. J. Bell and J. K. Grant, Eds. Cambridge Univ. Press, New York, 1962. 132 pp. Illus. $5.50.