used in this field, will find this book highly rewarding, however. Graduate students in physics and chemistry searching for experimental or theoretical research problems most certainly will not be disappointed after studying in detail the authoritative articles in this book.

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Ancient Building Material

Stone. Properties, Durability in Man's Environment. E. M. WINKLER. Springer-Verlag, New York, 1973. xiv, 230 pp., illus. $33.70. Applied Mineralogy, vol. 4.

Early cave man has been identified as such from that domicile of his which was fabricated from the rocks by nature's processes. Modern man quarries and artificially constructs his stone "caves" on top of the surface of the earth. Geologists are thoroughly familiar with rocks on the outcrop and at depth, but many of us know comparatively little about stone, the primary building material obtained from the earth's crust. Winkler's book fills a long-existing gap between classical petrography of native rocks and documentation on those constituents and properties of rocks which make them useful, durable, and pleasing as building materials. The book is easily readable and will be informative to geologists, stone producers, engineers, architects, ecologists, and stone conservators.

Winkler's viewpoint (and book) is distinctive in another way—he writes of stone in man's environment, rather than solely in the geologic environment. From this enlarged and interprofessional perspective the essential features common to rock and stone are given with reference to igneous rocks, clastic and chemical sedimentaries, and metamorphic rocks. The broad view is maintained as properties of stone arising from their solid phases, interstices, cements, and thermal and optical (light transmissivity) behavior are discussed. Natural deformation of stone by unloading, plastic deformation, pressure release (rock bursts), and shock waves due to blasting during quarrying and in buildings after incendiary and nuclear bombing are surveyed.

Colors of stone are considered with regard to genesis, nomenclature, and esthetics. For example, warmer tones in sedimentary rocks typically are converted to colder tones in metamorphic rocks. Reflectivity and polish may enhance the beauty and utility of one stone whereas another is most pleasing in fractured, sawn, or native surface.

From an approach unconventional to geology the decay, weathering, and durability of stone are extensively treated. Instead of focusing on the altered daughter product, Winkler treats of what alteration does to the original stone. He includes such agents and processes as dissolution, bacterial activity, chelation, microplants, interstitial expansion by ice and dissolved salts, osmotic pressure, organic physical effects, fire resistance, and urban versus rural versus desert climates. Ecology and humanity are not neglected. Silicosis, its symptoms, physiology, and prevention, is considered much more fully than with the cursory dismissal usual in geologic literature. Stone conservation is the subject of the 13th and final chapter, but some 12 pages of useful information on mineral properties and American Society for Testing Materials specifications and a glossary are appended.

Each chapter is closed with a helpful summary. The book is well illustrated, including several full-color plates and a beautiful full-page picture of the harmonizing stone front of the Notre Dame Memorial Library. A caliper measures the thickness of the printed pages as 13/32 inch—at a list price of $33.70, the shelf index is approximately $83 per inch. Winkler has produced an excellent book on stone; the publisher's price impels one to think of gold.

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Japanese Protein Chemistry

Proteins. Structure and Function. M. FUNATSU, K. HIROMI, K. IMAHORI, and K. NARITA, Eds. Kodansha, Tokyo, and Halsted (Wiley), New York, 1973. Two volumes. Vol. 1, x, 382 pp., illus. $19. Vol. 2, x, 270 pp., illus. $14.50.

The last decade has seen impressive developments in the analysis of protein structure and function. With the information that has become accessible through x-ray diffraction, high resolution magnetic resonance spectrometry, rapid kinetics, and genetic analysis and through the continuous refinement and improvement of the more classical physical and chemical methods, it has become possible to construct sophisticated structure-function models of a number of proteins. Although these models are still not yielding any complete answers concerning the dynamic action of proteins in living cells, they have made it possible to formulate the questions at a high level of mechanistic detail.

The scientific community has been kept up to date about the conceptual, theoretical, and experimental achievements in this field through a flood of accounts, first in the journals and then in digested form in textbooks, lectures, and an awesome quantity of treatises and reviews.

The review literature has become rather repetitive and stereotyped, and a new two-volume work entitled *Proteins: Structure and Function* was consequently received by this reviewer with only lukewarm enthusiasm. A glance at the table of contents suggested that this one might be a little different, however. In addition to well-established "stars" such as trypsin (dealt with by T. Inagami) and lysozyme (K. Hamaguchi and K. Hayashi), there are chapters on phage lysozyme and endolysin (A. Tsugita and Y. Ikeya-Ocada), ribonuclease T (K. Takahashi) and its substrate analog complexes (T. Oshima and K. Imahori), all in volume 1, and, in volume 2, on amylases (K. Hiromi), stem bromelain (T. Murachi), ricin (M. Funatsu), threonine deaminase (M. Tokushige), ribulose diphosphate carboxylases (T. Akazawa), and amino-terminal acetyl groups in proteins (K. Narita).

The objectives of the editors in putting together this rather unusual collection of subjects were to present aspects of research on protein structure and function ranging from detailed analysis of the most studied and best understood proteins to physical, chemical, and biological probing of less completely characterized ones; to illustrate, by encouraging each author to deal primarily with his own work, the variety of approaches taken to problems within the field; and to make the contributions of Japanese protein chemists more widely known. Although I don't think that separate books are required to achieve this last objective (especially after noting the well-known accom-