the Japanese people (page 31), the role of the Russians and communism in 20th-century China (page 294), the influence of Sun Yat-sen (page 306), the Communist victory in postwar China (page 443), and the stature of Chiang Kai-shek (page 444).

He believes the East "yielded, recovered, and has now found its feet again, though it must grope slowly and painfully for new paths of life. Whether it finds them, and how and with what consequences both to itself and the outer world, will determine the shape of the history of the next hundred years" (page 482).

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Researches in Geochemistry. Philip H. Abelson, Ed. Wiley, New York; Chapman and Hall, London, 1959. x + 511 pp. Illus. $11.

This impressive volume on various aspects of modern geochemical research presents 23 short essays that are the outgrowth of a series of seminars held at the Geophysical Laboratory of the Carnegie Institution of Washington and at the Johns Hopkins University. Philip H. Abelson (director of the Geophysical Laboratory), editor as well as contributor, has done an excellent job of bringing together in one volume some of the recent developments in the field of geochemistry. It would be presumptuous for one person to attempt to evaluate each contribution, for these essays cover a broad spectrum in the fields of chemistry and physics applied to geology. I will, therefore, mention briefly the subjects discussed and offer some general comments on the volume as a whole.

Geochronology of crystalline rocks based on the lead-uranium, rubidium-strontium, and potassium-argon methods is reviewed by Tilton and Davis. Methods and evaluation of C^{14} age determinations are given by de Vries. Reed discusses the techniques and application of activation analysis, with special emphasis on the U-Pb-Th-He abundances to explain the age discrepancies found for meteorites. Libby reports that the short half-life of the tritium produced in atomic bomb tests can be used to determine water balance and cycles in the atmosphere and ground water. Two additional review papers within the field of nuclear geology clearly show that isotope ratios in naturally occurring materials can be used to estimate temperatures of mineral formation and degree of chemical equilibria and, in some cases, may suggest genesis of certain mineral deposits. Epstein discusses O^{18}/O^{16} variations as applied to thermometry and chemical equilibria, and Ault reviews the present data on S^{32}/S^{34} to show that fractionation can be directly tied to certain geological processes.

Two papers discuss theoretical limitations of the chemical environment during formation of ore deposits as related to the physical chemistry of the ore fluids. These are papers on magmatic gas phase, by Krauskopf, and on chemical environment of low temperature ore transport, by Barton. Thompson gives further theoretical treatment to metasomatic processes and proposes application of the phase rule to this problem by assuming local equilibrium. The often overlooked problem of reaction rates and metastability in low-temperature and low-pressure environments is summarized by Garrels.

Arrhenius discusses the source and history of pelagic sediments deposited on the ocean floor within the last 10,000 years. Keith and Degens illustrate the possibility of distinguishing between ancient marine and fresh-water sediments by use of trace-element ratios. The chemistry of the evolution of petroleum is treated by Hanson, and Abelson summarizes his recent researches on the stability of organic compounds during geological time.

Reports on laboratory studies on synthesis of selected mineral groups play an important part in this book. Kullerud's work on sulfide systems illustrates the rapid strides taken in understanding the physical-chemical relationships between the common sulfide minerals of ore deposits. Experimental studies of carbonate systems are reported by Goldsmith. Boyd has overcome the difficult problem of hydrothermal synthesis of amphiboles, and his studies shed light on the pressure-temperature conditions of the amphibolite facies. Eugster's work on hydrothermal synthesis of ferrous-ferric silicates illustrates the importance of reduction and oxidation in certain metamorphic facies. The effectiveness of combining detailed mineralogical work with phase studies on specific geological problems is demonstrated in the paper by Milton and Eugster on mineral assemblages of the Green River formation.

MacDonald reviews the current concepts of the earth's chemical composition as deduced from seismic data, the abundance of the elements within the earth's crust, meteorites, and the surface of the sun. He suggests that the earth has a composition similar to that of chondritic meteorites, with an iron-silicon core and a chemically differentiated mantle whose composition lies between that of dunite and that of basalt. The role of high pressure on chemical equilibria and transitions to denser polymorphs below the earth's crust is discussed by Clark. Hawkes' essay on geochemical prospecting describes the practical application of geochemistry to the solution of geological problems. Chayes presents experimental evidence on diffraction effects of short-range ordering in layered sequences which may be a serious problem in determining temperature-dependent order-disorder changes in the subsolidus regions of silicate systems by x-ray diffraction techniques.

These short articles average about 21 pages each and contain a total of 859 cited references. Unfortunately, there is neither an index nor a summary. The editing of this book is outstanding; I was unable to find any serious errors or omissions. Abelson's efforts to compile this excellent collection of papers will be welcomed by workers in the field of geochemistry and by geologists who find it difficult to maintain contact with this modern research. An interesting aspect of this book is the emphasis placed on nuclear geology and thermodynamics by scientists in this country as compared to the Fennoscandian and Russian approaches, wherein geochemical research is concerned mainly with the distribution and abundance of elements in nature. This trend in the United States is undoubtedly related to the rapid advances made in instrumentation as a result of basic research in physics and chemistry.

Abelson begins the preface by stating, "A major revolution in research activity in earth science has been going on for the past decade." This revolution has left the geologist a little breathless and somewhat dismayed, but the papers comprising this volume constitute a tremendous stimulation and challenge. These great advances in geochemistry and geophysics now make it necessary for the geologist to close the widening gap between concepts derived from laboratory research and theoretical analysis and the application of these concepts to field problems. These advances point clearly to the great need for more detailed information on the mineralogy and petrol-

ogy of sedimentary, igneous, and metamorphic rocks to supplement the theoretical and experimental findings. Further experimental work in the fields covered by the book demands a detailed geological framework to test conclusions and to provide guidelines.

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Introduction to Human Anatomy. Carl C. Francis. Mosby, St. Louis, ed. 3, 1959. 548 pp. Illus. + plates, $5.75.

This is a textbook on human gross anatomy. The material is divided into five units. The first, "The body and body tissues," contains chapters on the body as a whole, surface anatomy, and cells and tissues. The skeleton, joints, and muscles constitute the second unit, "Posture and movement." Unit three, "Integrative mechanisms," is devoted to the nervous system, special sense organs, and the endocrine system. "Maintenance of the body tissues," unit four, is the most extensive; it covers the circulatory, lymphatic, respiratory, digestive and urinary systems, plus the skin and subcutaneous tissues. The fifth unit, "Reproduction," is a discussion of the male and female reproductive systems. There is a glossary of anatomical terms, but the anatomical position is not defined in either the glossary or the text. The Basle Nomina Anatomica terminology is used almost entirely instead of the new anatomical terminology (Nomina Anatomica Parisiensia) adopted in Paris in 1955.

The book is well illustrated with black and white as well as colored figures, many of them drawn from actual specimens. Some of the statements are not strictly true—such as that the specific sex features in the skeleton are confined to the bony pelvis (page 113); that a healthy adult lung completely fills the pleural cavity (page 385); and that most of the abdominal organs are completely clothed by peritoneum (page 410). The descriptions given of the endocrine function of the liver (page 42) and of the pineal body (page 302) are perhaps not wholly accurate. However, these are small points, and the book should be a useful text for teaching human anatomy to nonmedical students.

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Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

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