considerable interest are those by Rosenfeld (optical model), Breit (nucleon transfer reactions), and Blair (inelastic excitation of collective modes).

The conference discussions appear to be well reported, and there is a fine conference summary by Blair. Professional nuclear physicists will find this volume a necessity.

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Hydrobiology

Biology of the Seas of the U.S.S.R. L. Zenkevitch. Translated from the Russian by Sophia Botcharskaya. Interscience (Wiley), New York, 1963. 955 pp. Illus. $25.

Although Russian hydrobiologists established a high degree of competence and began a systematic study of the marine and brackish waters of the seas of their land before the Revolution, and have kept up this tradition to the present day, the vast bulk of the published literature has been inaccessible to most of us outside the Soviet Union. Not only is the language barrier formidable, but many of the journals and monographs are not in our libraries. One suspects that, with the great expansion of work in marine biology, access to this literature may be difficult in the Soviet Union too and that this well may be one of the reasons Zenkevitch undertook this unique summary of the literature. This book is not simply a review of literature; it is a critical, well-balanced analysis of a prodigious quantity of information, and its like is not to be found in any other country. It was originally published in 1947 as volume 2 of *The Fauna and Biological Productivity of the Seas.* A revised edition, *Biologiya Morei SSSR*, was published in the Soviet Union in 1963, the same time that the translation of the English edition was underway. This English version therefore is not an exact translation of the 1963 Russian edition (the arrangement of some parts and the tables and illustrations selected for use are not the same in the two versions), although both volumes have essentially the same scope and coverage.

The book is organized geographically, with accounts given of the northern (the Baltic and Arctic seas, including the Chukchi Sea), the southern (including the Caspian and Aral seas), and the far eastern seas (including the Bering Sea), in that order. Each section begins with a treatment of the general characteristics and the geological history of the area, followed by detailed discussion of the separate seas, with particular reference to quantitative studies. There is a wealth of information on numbers of species and specimens and biomasses of phytoplankton, zooplankton, and benthos for the various regions studied in detail, as well as data on physical and chemical factors. As the author regretfully notes in his preface, many theoretical and general matters relating to marine biology and ecology generally had to be omitted from this version. Also lacking is a discussion of the quantitative methods themselves. All Russian references in the 52-page bibliography have been translated.

This volume is so useful and welcome to English-speaking marine biologists that it seems impolite to complain about the quality of the translation. However, the translator is obviously not versed in the field, and there are spots which are more literal than necessary; indeed they are occasionally obscure. There are not too many typographical errors for a book of this size, and most of them will be obvious to the reader.

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National Clay Conference

Clays and Clay Minerals. Proceedings of the Tenth National Conference, held at Austin, Texas. Ada Swineford and Paul C. Franks, Eds. Pergamon, London; Macmillan, New York, 1963. xii + 509 pp. Illus. $15.

This excellent volume contains the papers presented at four symposia plus those presented at a general session of the Tenth National Clay Conference in October 1961. The first symposium was concerned with bentonites and Texas uranium deposits. Unfortunately, there is only an abstract of the first paper, which was concerned with Wyoming bentonites. The second paper, by Iiyama and Roy, gives the results of controlled syntheses of mixed-layer minerals; the results indicate that at pressures below 0.5 kb and 1 kb, mixed-layer structures with a random stacking result, whereas, at pressures of 3 kb, highly ordered mixed-layer phases can be obtained. In the third paper Weeks and Eargle consider the mode of origin of uranium deposits in the Southeast Texas Coastal Plain. In the final paper, Konta describes some improvements in his imbibometric method for identifying clay minerals.

Seven papers on the occurrence and origin of vermiculite were presented at the second symposium. Other papers consider the composition of vermiculites, and an excellent paper, by Norrish and Rausell-Colom, presents the results of a low angle x-ray diffraction study of the swelling of montmorillonite and vermiculite.

The third symposium was concerned with clay-organic complexes: the mechanics of the reactions leading to the formation of clay mineral-organic complexes, the structural aspects of the inter-layer complexes, and the hydration and swelling of such complexes.

At the final symposium eight papers on the industrial application of clay mineralogy were presented. They contain excellent summaries of the various industrial uses of kaolinite, montmorillonite, and attapulgite clays. Further, there are specific reports on the use of clay minerals in the ceramics and petroleum industries.

The 13 papers presented at a general session cover topics that range from the radiation damage of kaolinites to the occurrence and origin of the properties of various clay minerals. Finally, in an appendix, there is a history of the National Clay Mineral Conferences and a discussion of the plans that have been developed for future conferences.

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Engineering

Electronic Instrumentation. Sol D. Prensky. Prentice-Hall, Englewood Cliffs, N.J., 1963. x + 534 pp. Illus. $13.35.

Most of the important instruments used in technical laboratories today are considered in Prensky's very complete, logically presented, qualitative discussion, which those who have a minimum knowledge of electronics will find easy to follow. Thus, the book will serve as an excellent reference source for technicians and possibly could be used as a textbook in technical training courses.

A wide host of instruments are mentioned, and a brief description of their characteristics is given. The book provides a fine cross-section of the types of measuring instruments available, and deals to a lesser extent (though adequately) with some of the more common recording instruments.

However, I do not feel that this book could serve as an adequate textbook in an engineering science curriculum, because it does not deal with fundamentals and basic theory in sufficient depth to be useful to students working towards professional degrees; nor does it deal with modern usage of instrumentation systems. It does not, for example, dwell in depth on the more recent transducer developments; methods of tape recording and signal processes are not mentioned and, more importantly, the book does not deal with the control potential of instrumentation systems. In my opinion, the future of instrumentation—at least for the professional engineer—lies not in the measurement functions of instruments, but in the signal processing and control potential.

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Science and Archeology

Archaeology and the Microscope. The scientific examination of archaeological evidence. Leo Biek. Lutterworth, London, 1963. 287 pp. Illus. 45s.

Leo Biek, a physical chemist, is head of the Ancient Monuments Laboratory, Ministry of Public Buildings and Works, London. He and his small group try to keep just ahead of the bulldozers and other earth movers which, in advance of road building, pipelines, and urban expansion, are disturbing many of the still buried archeological sites of Great Britain. I have seen Biek's crowded workshop where heaps of rusted iron, bone fragments, potsherds, and artifacts made of all kinds of materials are brought for examination. The title of the book is figurative; the chapter headings are whimsical; the contents are in a way autobiographical. Biek tells how, with the help of experts from almost every branch of science and technology, he tries to wring from the scraps and oddments that are recovered from excavations every last bit of information they will yield. The book abounds in examples of knowledge gained from chemical analysis, radiocarbon analysis, chromatography, magnetic dating, and x-radiography.

The author is concerned with the basic philosophy behind the gathering of facts and their interpretation. He has a special interest in the effect of earth environment on both organic and inorganic materials and is concerned with such questions as why human and vegetable remains survive in some soils and almost completely disappear in others. In chapter 6, "Polyphenols ubiquitious," he tells of a pre-Conquest site in the Hungate district of York and of a Roman well in the Chew Valley where artifacts, especially those of iron, are surprisingly well preserved. This seems to be the result of the presence of tannates and phosphates in the soils. There is a long discussion of the relationship between podzolic profiles and the survival of artifacts. The last chapter is a summary of the modern scientific tools and investigative techniques now available, and Biek makes clear to the archeologist the kind of aid and assistance that he can expect from his scientific colleagues. The book is interesting reading. There is a good bibliography and an author index.

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Cuzco to Pizarro

Empire of the Inca. Burr Cartwright Brundage. University of Oklahoma Press, Norman, 1963. xviii + 396 pp. Illus. $6.95.

Empire of the Inca, volume 69 of the excellent series entitled "The Civilization of the American Indian," is a history of the Inca from their earliest legendary arrival in Cuzco to their final overthrow by Pizarro in 1533. Apparently the author, professor of history at Florida Presbyterian College, has not hitherto concerned himself with Peruvian studies, but his book is based on a complete and fresh evaluation of the primary sources, the Spanish Chroniclers. In his notes on sources, he states that he has generally eschewed reference to secondary works, with the major exception of those of John Howland Rowe. The result is an excellent and very readable history that considers the eight early, rather sketchily known reigns and continues through that of Viracocha Inca; following this the great Pachacuti and his successors are given a detailed treatment. To supplement the historical account, there is a chapter on basic forms of Peruvian religion and another on Peruvian creation myths that are important for an understanding of the ways in which the later Emperors took advantage of religious beliefs and mythology in strengthening their power and prestige.

Brundage, following Rowe, although quite independently, uses what might be called the short chronology of Inca history, in which the real expansion of the Empire does not begin until about the middle of the 15th century. This chronology, in contrast with those in vogue 30 years ago (which were based on historically less reliable sources), seems to have been now fully accepted by Peruvianists in this country. It is not only historically the most logical and believable chronology, but is strongly supported by archeological findings.

One of the factors that makes for readability of this highly scholarly work is the treatment of notes on the sources used by the author. They fill 61 pages, arranged by chapters and topics, all at the end of the book; thus the notes do not obtrude as footnotes or other distractions in the text, yet they fully document it. There is also a useful genealogy of the Inca dynasty, a list of dates of major events, and an index.

In summary, this is an important and most welcome addition to the literature on the Inca, and one that can be read with pleasure by anyone with an interest in the American Indian.

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Social Anthropology

The Structure of Chin Society. A tribal people of Burma, adapted to a non-western civilization. Illinois Studies in Anthropology, No. 3. F. K. Lehman. University of Illinois Press, Urbana, 1963. xx + 244 pp. Illus. Paper, $3.

The mountainous and other relatively inaccessible parts of Southeast Asia are inhabited by peoples, some of whom are not well known, with cultures that