chemically different types of oil in West Texas, the geometry of porous and nonporous rocks in several major groups of oil fields, and ground water flow through the West Texas subsurface. At the end of the volume are five excellent papers (not oriented to West Texas) discussing the origins of ground water, carbon dioxide gas accumulations, rare-gas isotopes from spontaneous fission, sulfur isotope anomalies, and the disposal of radioactive wastes.

The standard reviewer's cliche, "this symposium volume gives an up-to-date summary of the field," cannot be applied to *Fluids in Subsurface Environments.* Although the laboratory of every large oil company is actively working on the problems addressed in this volume, only the paper by Silverman is a contribution from a major petroleum laboratory. Further, the candor of Silverman's paper is marred by his illustrating and discussing an oilfield (pp. 62 to 64) without identifying the field by name, location, or age of the rocks. However, the editors are to be commended for assembling a useful volume despite the industrial restrictions on releasing information and interpretations. This symposium volume is unique in covering the wide range of fluids recoverable by drilling in sedimentary rocks. Those who would like to drop such neologisms as *criconden-bar* and *salaquifer* into future discussions would be well advised to procure a copy.

KENNETH S. DEFFEYES
Oceonography Department,
Oregon State University

Mineral Resources of Africa

A comprehensive compilation of mineral resources data for Africa has long been needed by both technical and nontechnical persons concerned with the development of that continent. In writing the volume reviewed here, **The Mineral Resources of Africa** (Elsevier, New York, 1965. 766 pp., $40), Nicolas de Kun has fulfilled this need by preparing part 1, Industrial Development and Mineral Economics (pp. 1 to 211), in a form that will be useful to the nontechnical audience, particularly economists and other social scientists, and part 2, Economic Geology (pp. 211 to 740), in a more technical fashion for use by geologists and mining engineers.

In part 1, a general section of Africa's share of world resources and production precedes discussion of the distribution of African output and resources in terms of the metal or mineral groups, such as iron and bauxite, base metals, gold, ultrabasic minerals, tin, carbon fuel, water, and soils. A very interesting section entitled "History and Development of Mining" clarifies the complex interrelationships of many of the African mining companies listed in appendix II; the author then describes the distribution and production of resources by regions—northern, northeastern, west, middle, and southern Africa, including "The Islands and the Sea"—and by countries within regions. The value and production of the economic materials of each country and their relationship to the totals for Africa and the world are reviewed in relationship to the existing mining companies, and notations are given on known occurrences that, in the future, may be important because of improved transportation or other economic factors. One of the unusual aspects of this compilation is that, in addition to minerals and fossil fuels, it treats both ground and surface water, with emphasis on their use for power.

Part 2, a discussion of the economic geology of the individual deposits, is arranged under the same genetic group headings used in part 1—that is, iron and bauxite, gold, and so forth. These genetic types are considered in relation to the author's "Mineralogenic Provinces"—High Africa, East Africa, the Atlantic Rim, Nigeria, the Guinean Shield, the Mauritanian Arch, the Atlas, the Sahara, and the Red Sea. The orogenic-metallogenic belts within these provinces have been delimited, on the basis of age, into seven cycles, dated as 3400 to 3000, 2800 to 2400, 2300 to 1900, 1050 to 850, 650 to 450, 400 to 200, and 150 to 0 million years. The most intense mineralization in these belts was at about 2100 million years, the next most intense at about 650 million years. Oil and coal deposits formed most abundantly at about 200 million years.

The author has a wealth of data at his disposal, and as a compilation this book has an unusually wide coverage. References to the source data in part 1, and more references in part 2, would enhance the usefulness of the book to serious students who will be interested in detailed information on specific areas.

Although all compilations must be abstracts of existing data, in this case the condensation of material in many places has been carried to the point where the data are almost useless. Perhaps this is partly because the author's native language is not English, but appropriate editing could have corrected much of it. I noted numerous typographical errors. All in all, it is difficult to read this book and to understand the author's original intent. Nevertheless, as a reference source the book will fulfill a very useful purpose in that it will acquaint interested persons with the tremendous known and potential natural resources of Africa.

LINCOLN R. PAGE
U.S. Geological Survey,
Boston, Massachusetts

Insect Physiology

A feature of the 12th International Congress of Entomology, held in London in July 1964, was a symposium on the physiology of insect central nervous systems. This meeting marked the recognition of the insect nervous system as an important object of study in its own right, with the aid of the wide variety of research tools currently available. It also served to show that many fundamental problems of integrative physiology in nervous systems might be intensively studied with advantage in relatively simply organized insect ganglia. The speakers have elaborated on their contributions, which have been collected together in a handsome volume—**The Physiology of the Insect Central Nervous System** (Academic Press, New York, 1965. 287 pp., $10), edited by J. E. Treherne and J. W. L. Beament.

The 15 articles that make up this book range in scope from broad reviews—for example, T. Narahashi's review of the physiology of insect axons—to research data not published elsewhere (G. A. Horridge, J. H. Scholes, S. Shaw, and J. Tunstall and G. Hoyle). Excellent articles on the chemical environment (J. E. Treherne and J. H. Ray) precede a survey of the ultrastructure of synapses by D. S. Smith. Microelectrode and pharmacological studies on transmission are contributed by J. Boistel, J. J. Callec, J. Bernard, and Y. Gahery. There is a thoughtful general article on neuronal pathways by the versatile G. M. Hughes and specialized accounts of locomotion in a cater-