

and others. The reactivity of these coordinated molecules forms the basis for homogeneous catalytic processes now widely used in chemical synthesis and for others yet to be exploited, both in this area and in fossil fuel processing, gaseous pollutant control, and energy production. The subject is both important and very broad.

These two volumes survey the basic reactions of small molecules coordinated to transition metal ions. They provide a balanced, qualitative introduction to the most important reactions encountered in representative reaction systems. Discussion of the theoretical and physical chemical basis of homogeneous transition metal catalysis is held to a minimum; the emphasis is on descriptions of reaction products, possible structures for intermediates, and hypothesized reaction mechanisms. The coverage of these volumes is so broad that no single topic is explored in sufficient detail to be useful to specialists. Further, research in transition metal catalysis is very active, and discussions of many topics are either out of date or incomplete. Volume 1 includes occasional literature citations to 1972, but most are to the 1960's; very little of the extensive and important research by Russian scientists is included; current views of the details of mechanisms of certain important reactions—oxidative additions of alkyl halides to transition metals, homogeneous hydrogenation, oxidations of coordinated ligands by metal-dioxygen complexes—differ in important respects from those that were current when the books were assembled. This shallow coverage limits the value of these volumes for workers actively engaged in research on transition metal catalysis, but permits a breadth that should be useful to those requiring a general introduction to the principles of catalysis by transition metals.

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Arctic Environment

The Coast and Shelf of the Beaufort Sea. Proceedings of a symposium, San Francisco, Jan. 1974. JOHN C. REED, JOHN E. SATER, and WADE W. GUNN, Eds. Arctic Institute of North America, Arlington, Va., 1974. 750 pp., illus. Paper, \$25.

To the anguish and despair of many environmentalists, petroleum development is coming to the Arctic. Not only will the Alaska pipeline have a marked influence upon the terrestrial environment of northern Alaska and Canada, its construction

will assure increased offshore exploration and development. This "side effect," in fact, may have a far greater impact upon the North than construction and maintenance of the pipeline itself.

The extent of the impact, however, can only be predicted by knowing the present environmental conditions on both the shore and the continental shelf. What are the patterns of ice development and flow? To what depth does permafrost extend into nearshore and shelf sediments, and how might this affect the stability of man-made structures? To what extent could ice scour affect bottom-mounted fixtures (such as pipelines) on the shelf? Where will the pollutants (which there surely will be) move, and how will they affect the biosphere? In order to provide answers to these and other questions, the Arctic Institute of North America convened a symposium dealing with the Beaufort Sea, its coast and continental shelf. The results of the meeting are presented in this volume.

Perhaps the most significant and common theme in the volume (at least to a low-latitude scientist) is the extent to which nearly all terrestrial and oceanographic processes ultimately relate to the excessively long winter and the resulting predominance of ice cover. Spring is very short, and thus most of the river flow and sediment influx occurs during a remarkably short period (several weeks). The dominance of ice cover also controls circulation patterns, in that wind-driven circulation is limited to the ice-free areas. Similarly, ice can affect depositional and erosional processes, both on the shore and on the shelf. Although ice does not necessarily restrict biologic productivity (ice algae contribute a significant portion of the particulates produced within the system), recycling of organic matter can lead to severe depletion of oxygen from ice-covered waters.

Unfortunately, the adverse climate also has restricted the number of observations and measurements documenting the environmental regime. This volume, therefore, is particularly useful in presenting a reasonably complete compilation of available data concerning the Beaufort Sea. In fact, the book is characterized by the diversity of topics, which range from winds to polar bears. The papers fall into groups according to four general subjects: water circulation; ice morphology and flow; sedimentation; and chemistry, productivity, and animal communities. Each group is punctuated by valuable discussions and exchanges among the participants. Not only does this help clarify some points, it also points out subjects requiring further research.

As in any symposium, there is a curious

mixture of new and recycled data. Happily, the former dominate. Papers that were of particular interest to this reviewer (who has a bent toward geology) include those by Reimnitz and Barnes (sea ice as a geologic agent), by Lewellen and by Judge (offshore permafrost), and by Walker (flow characteristics of the Colville River). In spite of its breadth, the book does not cover all topics. Conspicuously lacking are details of topography, the shallow structure of the shelf, and (particularly) the biosphere (for example, plankton). Still, the book is far more comprehensive in scope and detail than another recent book on a similar subject, *Marine Geology and Oceanography of the Arctic Seas* (Y. Herman, Ed., Springer-Verlag, 1974).

Despite the rather stiff price, this volume has great scientific and practical value. One would hope that the planners, entrepreneurs, and politicians who are so eager for expansion in the Arctic will read and appreciate it. Economic development in the North is possible, but in order for it to have minimum ecological impact, a critical awareness of the uniqueness of this fragile and poorly understood environment will be required.

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Algae

Fossil and Living Dinoflagellates. W. A. S. Sarjeant. Academic Press, New York, 1974. viii, 182 pp., illus. \$13.

First observed by Ehrenberg 135 years ago in transparent flakes of flint from the Upper Cretaceous of Silesia, fossil dinoflagellates have been under fairly continuous and intensive study by paleontologists in the last 20 years. In the current geological search for petroleum, these minute (mostly 60 to 120 micrometers) fossils are playing a significant role as guides to the geologic age and depositional environment of marine sedimentary formations of the Mesozoic and Cenozoic. On the biological scene, the study of fossil dinoflagellates has thrown new light on, and raised new questions about, the structure and living processes of modern dinoflagellates. This little book, readable and informative, brings many aspects of these organisms into focus.

Sarjeant, who has made major contributions to the study of fossil dinoflagellates, writes in a clear and comfortable style. He provides the paleontological reader with a compact source of biological information (48 pages) incorporating many facts not