sonable phenotype to be studied in searching for genetic influence? The facets of intelligent human behavior extend considerably beyond what is measured in IQ tests, however important the predominantly verbal abilities measured by many IQ tests may be. Some test specialists, such as Guilford, have defined well over 200 separate, albeit correlated, factors making up intelligence. Would it not be appropriate to treat many of these abilities separately? As for the social and political implications of this controversy, it would be a better strategy to focus on the efficacy of alternative environmental treatments in effecting changes in measured intellectual abilities. As the data stand, had the author been equally zealous in evaluating the null hypothesis that such treatments make no difference he would have been hard pressed to fail to reject it.

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The Fate of Toxic Chemicals

Environmental Dynamics of Pesticides. Proceedings of a symposium, Los Angeles, April 1974. RIZWANUL HAQUE and V. H. FREED, Eds. Plenum, New York, 1975. viii, 388 pp., illus. $29.50. Environmental Science Research, vol. 6.

This group of papers is an admirable attempt to draw into perspective recent advances in relating the chemical and physical properties of pesticides to their movement and persistence within the numerous compartments within the environment. While the contributors consistently express the belief that useful predictive tools can be based upon chemical and physical data obtained from laboratory studies, it is apparent that the development of such tools lies in the future. For those who maintain that only field studies provide a sound basis for assessment of the environmental risks associated with the use of pesticides, this group of reviews should be required reading.

Perhaps the major weakness of several of the articles stems from the tendency of their authors simply to review the correlations reported in the literature. Often the reviews do not set forth the known or theoretical limits of these correlations. For instance, the use of the *n*-octanol–water partition coefficient of a pesticide as an indicator of its tendency to preferentially accumulate in living organisms breaks down theoretically where stereoisomers of a pesticide are metabolized or excreted at different rates. A critical account of the degradative pathways operative specifically within aquatic ecosystems would have been a valuable addition to the book.

Overall, the book is a valuable reference not only for scientists interested in pesticides but also for those studying the environmental dynamics of organic chemicals in general.

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Organelles

The Mitochondria of Microorganisms. DAVID LLOYD. Academic Press, New York, 1975. xii, 554 pp., illus. $36.

Because of their peculiar morphological features, cytochrome content, and pathways of electron transport, the mitochondria of simple eukaryotic cells were for some time looked upon as anomalies and considered quite apart from the mainstream of research in bioenergetics. However, owing in part to the increased concern since the early 1960's with the molecular and genetic aspects of organelle biogenesis, the mitochondria of microorganisms have become of more general interest, even a fashionable subject of investigation. In fact, it has been possible to conveniently study many aspects of the organization, assembly, and continuity of mitochondria, such as the rules governing mitochondrial inheritance, only in simple eukaryotes.

In this volume, Lloyd has attempted to provide a comprehensive and critical review of the isolation, properties, and biogenesis of mitochondria in a wide variety of microorganisms, and for the most part he has succeeded admirably. His approach is thorough. For example, his treatment of cell breakage and mitochondrial isolation procedures for different organisms, each of which presents its own unique problems, is summarized in a comprehensive, well-referenced table. Such compilations are found throughout the book and enhance its utility by making specific methodologies, compositional analyses, and other such information readily accessible.

Lloyd presents the material in two main sections. The first deals with the isolation, purification, and properties of mitochondria from a variety of microorganisms. A smooth transition into the second major topic, the biochemistry, molecular biology, and genetics of mitochondrial biogenesis, is accomplished by a revealing section on the manifold effects of environmental factors on mitochondrial structure and function. One of the advantages of studying mitochondria in microorganisms is the relative ease with which dramatic phenotypic changes in mitochondria can be elicited by controlled environmental pertubations, and Lloyd emphasizes the potential wealth of information that can be obtained from such studies.

The topic of mitochondrial biogenesis is developed from a roughly historical point of view; that is, the treatment begins with the discovery of mitochondrial DNA and the integration of the rudiments of mitochondrial molecular biology with the phenomenon of cytoplasmic or extrachromosomal inheritance. Much of this information can be found in recent reviews, but Lloyd again shows his penchant for organization by providing extensive, well-referenced tabulations. These include extensive listings of chromosomal and extrachromosomal mutations affecting mitochondrial function, particularly in yeast.

Those entering the field should find of considerable value the attention given to major unsolved problems, particularly with regard to biogenesis. Although by design the book is restricted to the mitochondria of microorganisms, Lloyd has not hesitated to make use of pertinent information obtained in work on higher eukaryotic cells.

Lloyd concludes the volume with a brief but provocative discussion of the evolution of mitochondria. Although some may consider this topic, for the time being at least, to be peripheral, the chapter will appeal to aficionados of molecular evolution.

In sum, the book is a comprehensive and readable reference work that ties together major concepts of the functional organization and assembly of mitochondria in a diversity of organisms. My most serious objection is to the absence of an author index.

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Catalytic Processes

Homogeneous Catalysis by Metal Complexes. M. M. TAQUI KHAN and ARTHUR E. MARTELL. Academic Press, New York, 1974. Vol. 1, Activation of Small Inorganic Molecules. xiv, 422 pp., illus. $42. Vol. 2, Activation of Alkenes and Alkynes. xii, 196 pp., illus. $23.

Compounds of the transition metals form complexes with a variety of types of small molecules: molecular hydrogen, dinitrogen, dioxygen, carbon monoxide, nitric oxide, olefins, acetylene derivatives,

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