A Natural Panorama

The Natural History of the USSR. ALGIRDAS KNYSTAUTAS. McGraw-Hill, New York, 1987. 224 pp., illus. $29.95.

The Natural History of the USSR is an introduction to the biota and natural landscape of the Soviet Union, the first book of its kind published in English. The author, Algirdas Knystautas, is a naturalist and photographer who resides in Lithuania. He studied biology at Vilnius University and earned a doctorate in wildlife studies from Moscow State University. His two previous books focused primarily on birds of the Soviet Union.

The largest country in the world in area, the Soviet Union covers 170 degrees of longitude from Latvia to the Bering Strait and 54 degrees of latitude from Turkmenistan to the Arctic Ocean—an area of nearly 22 million square kilometers. Elevations range from about 25 meters below sea level at the Caspian Sea to just under 7500 meters above sea level at Mount Communism in the Pamirs of Tadzhikistan. Contained within these geographic limits is an unsurpassed spectrum of natural habitats. The book illustrates the geographic and biologic diversity of this region in a balanced presentation of color photographs and text.

The book consists largely of narratives about plant and animal life organized by major habitat and area, such as Arctic tundra, Baltic wetlands and mixed forest, East European plains, Crimean-Caucasus mountains, Central Asian mountains and steppes, Siberia, Amur-Sakhalin taiga, Pacific coast, and the deserts of Kazakhstan and Turkmenistan, among others. The landscapes and many plant and animal species are illustrated by numerous color photographs of exceptionally high quality by the author and others. Some rare and endangered plant and animal species are illustrated, a few of which have not been previously photographed. Birds, small mammals, and flowering plants are especially well represented. The mammal, bird, and reptile species typical of the major natural habitats and regions are listed by both Latin and common names in checklists appended to the text. An excellent index helps readers find their way with unfamiliar geographic names.

The book also discusses Soviet efforts to protect native habitats and wildlife. Natural reserves were first formally established in the U.S.S.R. about 65 years ago by V. I. Lenin, following a conservation tradition begun in the 17th century. General locations of the reserves, where many of the published photographs were taken, are shown on sketch maps, which enhance the value of the text.

The U.S.S.R. supports international conservation programs such as the International Union for the Conservation of Nature (IUCN) and the World Wildlife Fund. The Soviet government has published a "Red Data Book" on endangered animals and plants of the U.S.S.R. which includes those listed by the IUCN Red Data Book plus additions of their own.

The book is nontechnical (except for the inclusion of Latin species names) and may be enjoyed by all juvenile and adult readers who are interested in the natural sciences or conservation. All readers who appreciate the natural beauty of the earth's geographic and biotic diversity will gain many hours of enjoyment from this book and achieve a perspective on the U.S.S.R. that is otherwise not readily obtainable.

MICHAEL E. TAYLOR
Paleontology and Stratigraphy Branch, U.S. Geological Survey, Denver, CO 80225

From Molecule to Brain

Molecular Neurobiology in Neurology and Psychiatry. ERIC R. KANDEL, Ed. Raven, New York, 1987. xxii, 199 pp., illus. $54. Association for Research in Nervous and Mental Disease Research Publications, vol. 65.

Approaches to understanding the function of the nervous system are severely limited by its inherent complexity. Neurons in the human brain are estimated to number between 10^{10} and 10^{12}, and each one may have over 1000 synapses with other cells across which signals are relayed. Important current initiatives in neurobiology using cellular biology, molecular biology, and protein chemistry have begun to define some of the constituents important for neuronal function. This reductionist approach to defining the brain has been encouraged by the recognition that component molecules of nerve cells, particularly those that subserve membrane excitability and cell-to-cell communication, are highly conserved in evolutionary development. Recent reports have described the molecular structure of the sodium channel and subtypes of the calcium and potassium channels and of several receptors, including the nicotinic and muscarinic acetylcholine receptors, the β- and α_2-adrenergic receptors, the serotoninergic and substance K (tachykinin) receptors, and the glycine and γ-aminobutyric acid receptors. Hence, it has become particularly profitable to define these molecular components en route to formulating a general doctrine of brain function.

Eric Kandel has been a leading proponent of the reductionist approach, which is based upon the proposition that how the brain works, even in its accomplishment of complex functions like memory and learning, can only be understood by the definition of microcellular molecular events. The book under review focuses on research developments that illustrate this viewpoint. The findings it reports point to areas in clinical neurology and psychiatry where such information is already applicable.

The volume, which contains 14 essays by leaders in neuroscience, provides a fascinating insight into the rapidly moving discipline of molecular neurobiology. The book is divided into three sections: the first describes new insights into the ion channels of nerve cells, the second the regulation of transmitter release, and the third the development and aging of the nervous system. These divisions are somewhat arbitrary, since the individual chapters cover a more diverse range of topics than the titles imply. An attempt is made to link basic neurobiologic discoveries with clinical disorders. A summary of current views on the molecular neurobiology of myelinated nerve fibers is followed by an incisive description of the "positive" sensory phenomena common in clinical neurology. Next come a review of the structure of the nicotinic acetylcholine receptor and a discussion of myasthenia gravis. There are excellent review chapters on ion channels, exocytotic transmitter release, axonal transport, current concepts of short- and long-term memory, development of synapse formation, and cell adhesion molecules. Applications to clinical problems are illustrated by chapters on Huntington's disease, Alzheimer's disease, and the Lesch-Nyhan syndrome.

However, it is the chapter by Kandel and his associates that best explicates the underlying thesis of the book. Both short- and long-term learning and memory can be dissected at a molecular level in simple species. Studies in *Aplysia* point to a cascade of intracellular events triggered by serotonin-receptor activation. These biochemical events have been beautifully categorized and temporally sequenced. The hypothesis formulated for understanding long-term memory suggests a necessity for gene induction and new protein synthesis. The delineation of these steps, which will include identification of transacting-gene regulatory factors and, completing the circle, definition of those molecules involved in memory endowment, will be exciting advances indeed.

This book is timely, easy to read, and informative. Although selective in terms of material presented, it gives a good sense of the pathways of current discovery in molec-