labeling methods, and other techniques that have been used on certain membranes and that probably can be applied to membranes in general. The discussion of specific approaches to plasma membrane fractionation includes erythrocytes, bile fronts, and specialized membrane surfaces such as brush border. Cytoplasmic membranes are considered separately.

Chapter 2 emphasizes methods for separating and identifying membrane proteins on the basis of charge and size. The sodium dodecyl sulfate polyacrylamide gel system is discussed in detail, along with artifacts that may develop. The single most important feature of integral membrane proteins is their insolubility in water. As a result of this feature, the researcher is often, as the authors point out, led to "almost desperate maneuvers and unwitting pitfalls" in purification and identification. A comprehensive volume detailing specific membrane methods would be useful as a laboratory reference manual. It is not premature to be thinking in this way. Such a manual might in fact promote the development of methods for handling membrane proteins that would be as powerful and versatile as ion exchange chromatography was in the purification of water-soluble proteins.

Of the remaining chapters, only those on nuclear magnetic resonance, fluorescent probes, and spin-label probes deal with tactics useful for examining properties of the lipid bilayer and the proteins in it. These are the only spectroscopic techniques that have added unequivocally to our knowledge of lipid-lipid and lipid-protein interactions. Infrared spectroscopy, circular dichroism, and optical rotatory dispersion, the other techniques discussed, have occupied the time and energies of excellent people but have not yet been developed to their capacity for answering questions related to the membrane. The initial excitement engendered by the use of circular dichroism and optical rotatory dispersion, for example, for investigating the conformations of membrane proteins has long since abated. The authors resolutely call for "major developments in optical activity outside the membrane field." Yet the chapters on these less productive techniques have value. The authors present the basic theory underlying them in an understandable way and relate the history of their use in membrane work in several laboratories.

The discussion of spin-label probes is well done. The authors introduce the basic theory once again in a concise fashion, describe selected nitroxide spin labels, evaluate their use in various artificial and naturally occurring membranes, and present examples of conclusions concerning membrane structure reached with their aid.

In the final chapter the authors present their views on membrane architecture, repeating and redefining old terms such as "unit membrane" and including a considerable historical discussion of myelin as the prototype membrane. Brief descriptions, with literature references and diagrammatic representations, of specialized amino acid sequences in integral (or "core") membrane proteins, protein-carbohydrate complexes, and specific protein-lipid interactions in some membranes are the most useful parts of the chapter.

It is disappointing that there is no description of electron microscopic techniques using electron dense markers for visualizing the disposition and asymmetries of specific membrane components (for example, ferritin antibody techniques). The preoccupation of the authors is with structure. How these various techniques have been used or might be used for studying the manner in which specific proteins or protein-lipid complexes function in the cell surface might well be considered as a subject for future volumes in this field.

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Potentially Hazardous Nuclides

Radioecology. V. M. KLECHKOVSKII, G. G. POLIKARPOV, and R. M. ALEKSAKHIN, Eds. Translated from the Russian edition (Moscow, 1971) by N. Kaner and H. Mills. D. Greenberg, Transl. Ed. Halsted (Wiley), New York, and Israel Program for Scientific Translations, Jerusalem, 1973. xii, 372 pp., illus. $35.

Since the Russian text of this book began to be circulated here, individuals have attempted to translate parts of it for their own use. This complete translation should be eagerly received.

The book is a collection of papers organized around four topical themes: radionuclide movement in terrestrial ecosystems, effects of ionizing radiation on terrestrial ecosystems, general radioecological aspects of terrestrial ecosystems, and the radioecology of aquatic ecosystems. One of the highlights is a mapping of the geographic distribution of natural radionuclides in soils. In landscape geochemistry and pedology the Russians clearly establish their credentials. Sophisticated analyses of distribution/diffusion coefficients and thermodynamics of radionuclide-soil bonds take into account the influence of natural complexing agents on environmental mobility. Ecology in the strict sense of the word is dealt with rather superficially. Fallout predominates among the sources of environmental radionuclides discussed. The discussion of radiological hygiene (health physics) emphasizes the critical pathway concept for estimating dose to man, although biogeochemical cycles are recognized as important in chronic, low-level uptake. Principles of radiation genetics and dosimetry and ecological effects are adeptly reviewed, but agricultural systems and alpha and neutron radiations are not discussed. A special chapter on radioecology of landscapes of the far north is a comprehensive case study. In aquatic radioecology the proficiency of Russian researchers is again apparent. The extensive data presented here on the ecology and chemistry of marine and freshwater environments provide excellent background for interpreting food chain transport and bioaccumulation of potentially hazardous radionuclides.

A wealth of technical information is summarized in graphs and tables. Inconsistencies in style and objectives—some papers describe analytical methodology, others attempt conceptual synthesis—do not detract from the value of the book. There is an annoying delay in the assimilation of technical literature, and Western literature citations seem to have been editorially appended to various bibliographies. The book is not definitive, but it will serve as an invaluable summary of and guide to a literature heretofore difficult of access. For companion volumes, readers are referred to G. G. Polikarpov's *Radioecology of Aquatic Organisms* (Reinhold, 1966), and B. N. Annekov, I. K. Dibobes, and R. M. Aleksakhin's *The Radiobiology and Radioecology of Farm Animals* (AEC-tr-7523, National Technical Information Service, 1973).

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