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## BOOK REVIEW . . .

**Mammalian Diseases and Arachnids.** William E. Nutting (ed.). CRC Press, Inc., Boca Raton, Florida, USA. 1984. **Volume I, Pathogen Biology and Clinical Management.** 277 pp. \$80.00 US. **Volume II, Medico-Veterinary, and Laboratory and Wildlife Diseases, and Control.** 280 pp. \$83.50 US.

The format of each volume is planned so that each chapter is a self contained unit with a list of references. Arachnid biology, evolution and clinical management of disease caused by the arthropods is presented in Volume I. In Volume II, diseases transmitted and/or caused by arachnids are discussed under the headings of global distribution, specific practitioner concerns with an endemic organism account which summarizes practical problems of diagnosis, control and treatment. Chapter 1 and the appendices (1 to 4) are repeated in each volume so each tome may be used as an independent working unit. The illustrations, for the most part, are excellent.

Chapter 8 in Volume II, "Diseases of Wildlife," deals more extensively with mites than

with ticks, spiders, or scorpions. The mite discussion is primarily limited to the Nearctic Region. Certain diseases, such as tularemia, and numerous references in European (Russian) literature are omitted. In one chapter, no one could adequately discuss wildlife diseases associated with arachnids.

This two volume work is intended to "stimulate curiosity and produce enthusiasm for research" in the problems posed by arachnid-caused or transmitted diseases of man and other mammals. Pragmatically, it is an ambitious attempt at retrieval of pertinent information for the various subjects discussed. In this last mentioned regard, it has been successful. Overall, it is a worthy reference for physicians and public workers; that is, perhaps, its strongest contribution. It is not viewed as a major contribution in wildlife diseases, nor was that probably the original intent.

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## BOOK REVIEW . . .

**Handbook of Diseases of Saskatchewan Wildlife.** Gary A. Wobeser. Saskatchewan Parks and Renewable Resources, 3211 Albert Street, Regina, Saskatchewan S4S 5W6, Canada. 1985. vii + 65 pp. \$10 Canadian.

This publication is aimed at hunters and naturalists, as well as biologists and wildlife technicians in Saskatchewan, who may encounter abnormalities in tissue, or sick or dead wildlife. Its objective is to explain the cause and significance of diseases or conspicuous lesions, and the significance of some parasites. Despite the narrow geographic scope, and the unsophisticated technical background of the intended audience, this publication would be a useful first reference for wildlife biologists, veterinarians, laboratory diagnosticians and students of wildlife disease throughout northern North America. Anecdotal and observational information is presented that is not readily available elsewhere. It joins similar publications describing wildlife diseases in Ontario, Colorado, Alaska and Wyoming, and is among the best of this genre.

Presented in a small (15 × 23 cm) staple-bound format readily carried in the field, this booklet is written in simple language, and the text is supplemented by a Glossary of Technical Terms. Fifteen conditions affecting birds, and over 40 affecting mammals, are considered in the 50 pages of text, under the etiologic groupings of Bacterial, Viral, Fungal, Parasitic, Toxic and Non-infectious Diseases. Each condition is considered succinctly under the headings: Cause; Species Affected; Occurrence in Saskatchewan; Ecology; Clinical Disease; Pathology; Specimens for Diagnosis; and Significance. There is a clear Table of Contents, but no index. The text is illustrated by 60 color figures, and is supplemented by a section on Specimen Collection and Handling and a brief Bibliography. There is an Appendix consisting of four tables listing conditions encountered in hunter-killed

game; zoonoses; diseases of the skin or external surface; and causes of abnormal behavior in wild mammals. While not all conditions described in detail are listed in relevant tables, these do provide a useful point of entry to the text, provided the reader consults the Table of Contents. A section addressing the issue of rehabilitation of injured birds is included.

The conditions selected for discussion are appropriate, and the content of each section is clearly written, generally in sufficient detail to permit understanding, while avoiding irrelevant facts. Significant errors of omission are not evident, spelling mistakes are rare and the information presented is, with only arguable exceptions, accurate. The author seems to have relied upon authorities with which some would quibble when describing the host ranges of some cestodes. Reference to yersiniosis as a zoonosis might have been tempered by an observation that wildlife have not (at least to this reviewer's knowledge) been implicated directly as a source of human infection in North America. Giardiasis, which is not referred to in this booklet, may be much more significant in this context. The illustrations all complement the text, and their quality is good, though some might benefit from the use of arrows to guide the lay reader to the lesion. Diagrams might have helped clarify the life-cycles of some parasites.

The author is to be commended for making his extensive knowledge and experience so clearly available to his "public." I am sure that they, in turn, will reward him with further opportunities to gather more "bits and pieces" to contribute to our understanding of wildlife diseases, in Saskatchewan, and more generally.

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## BOOK REVIEW . . .

**Omsk Hemorrhagic Fever: Ecology of the Agent and Epizootiology.** N. N. Kharitonova and Yu. A. Leonov; M. P. Chumakov, editor-in-chief. Published for the National Library of Medicine by the Amerind Publishing Co., Pvt. Ltd., New Delhi, India. 1985. 230 pp. Available from National Technical Information Services, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia, USA, at a cost of \$22.95 US to purchasers in the United States and Canada and \$45.90 US for others. Also available in Russian from Science (Nauka) Publishers, Siberian Department, Novosibirsk, USSR. 222 pp.

This book results from an attempt by the authors and the editor-in-chief to pull together existing knowledge of the virus ecology and epizootiology of the fascinating disease known as Omsk hemorrhagic fever (OHF). The monograph does not include detailed information regarding virus characterization, antigenic relationships of OHF virus and other viruses, laboratory diagnosis, epidemiology, clinical aspects, or pathology in humans infected with the virus. M. P. Chumakov and others apparently are preparing another monograph to cover these aspects of OHF and the virus that causes this disease.

There is no question that scientific investigators in the Soviet Union have studied OHF intensively since the disease was first reported in 1941. It surely must have been a difficult time in which to investigate any disease or to maintain any semblance of normalcy, scientific or otherwise, and their scientists are to be commended for their devotion to the task and for their heroic efforts under the worst of circumstances. To reiterate accomplishments is not to make for fascinating reading and, to the credit of the authors and editor, this has not been done. The book contains many and extensive discourses on the characteristics of disease foci (natural conditions, species composition, distribution of vertebrates, and ecological associations within the disease foci), epizootological conditions of the water basins where the disease is found (including descriptions of epizootics in populations of the muskrat, *Ondatra zibethica*, natural infections in other animals, and antibody responses in infected animals), some biological characteristics of the virus, susceptibility of native animals to OHF virus, importance of water voles (*Arvicola terrestris*) in the natural cycle of the virus, transmission of the virus, speculations on the origin of the disease, the

present state of affairs, prospects for disease prevention, and a supplement recommending measures to be taken by sanitarians, epidemiologists, and wildlife biologists as well as licensed commercial hunters and, realistically, poachers (who are also susceptible to the virus).

This book has not been translated into the most readable of forms. Whereas it is quite clear that the translator had a Herculean task, the translation is not always clear and the wording oftentimes is awkward. Perhaps some expressions simply do not translate well, but the frequent use of words and phrases such as biocenosis (the interrelationship among organisms inhabiting a specific geographic area and the relationships of those organisms to that environment), Oblast (a regional subdivision of any republic of the Soviet Union), microslopes, stenotopic, sore line, and others, made me go to the dictionary more often than I would have liked. Perhaps this is good. But given that the book seems to me to be poorly organized, even organized backwards, it was disruptive. As is customary with Soviet publications, the reproductive quality of the photographs is exceedingly poor, making them essentially useless; however, I am told that these photographs were not much better in the original copy. The authors call the muskrat the "introducer" of the disease and state that OHF has the shortest history of all "natural-focal" diseases of western Siberia; I assume they mean the shortest recognized history. Later in the book they suggest that the water vole is probably the natural reservoir of OHF virus, but that the disease was first recognized in humans and muskrats after the introduction of the latter from North America into western Siberia for commercial purposes. Because it contains so much information and has so many shortcomings, it is relatively easy to find fault with details of this monograph. The book is out-dated insofar as taxonomy of the virus is concerned (the book was originally published in the Russian language in 1978), many statements of so-called fact are vague, the translation is somewhat flawed ("... isolated a virus pathogenic for mice from sick persons ..."), some statements are fuzzy ("... absence of contagion ...") and, OHF in muskrat hunters' families probably are associated with "contact infections with infected muskrats"), and so on. Nevertheless, if this review only nit-picked it would miss the point.

The bottom line is that this book is a fantastic compendium of the work of more than four decades by Soviet scientists. The authors have

attempted to examine every possible aspect of this disease. Some studies led up blind alleys, but these workers have shown that OHF virus, recognized as basically a tick-borne virus, can be, perhaps under certain circumstances, transmitted from the enzootic host, the water vole, to the epizootic host, the muskrat, as a water-borne infection. One trusts these workers have not ignored the obvious and that appropriate epidemiologic data will be forthcoming in a subsequent volume. If so, here may be a true revolution in the understanding of the ecology of what we call arthropod-borne virus diseases. This is so astounding a piece of information that we must re-examine all other arthropod-borne virus infections in terms of alternative routes of transmission and the role of viral and vertebrate ecology in the perpetuation of viral zoonoses must now be re-evaluated and re-emphasized. Finding that a virus is arthropod-borne and assuming therefore that sexual, aerosol, and other modes of transmission either do not exist or only are accessory, must now be considered superficial and simplistic. The Soviet workers appear to have shown what all ecologists have known,

but which many infectious disease specialists have chosen to selectively ignore; that to study a disease we must study all aspects of the disease: agent, affected host, reservoir host, temperature, humidity, trees, bushes, frogs, fish, birds, population dynamics, chronicity of infection, and so on, until we have in hand complete data, so that we may prepare mathematical and computer models (which the Soviets have not done). As far as wildlife biologists and disease ecologists are concerned, this book should be required reading. After all, these Soviet workers have shown us the way toward job security for unborn generations of ecologists and have opened the door to true understanding of a single disease. As they polish up the details of this one, it is now incumbent upon the rest of us, world-wide, to begin similarly exquisite studies of the other hundreds of infectious diseases.

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## BOOK REVIEW . . .

**Diseases of Marine Animals, Volume II. Introduction, Bivalvia to Scaphopoda.** G. Lauckner and O. Kinne (eds.). Biologische Anstalt Helgoland, Notkestr. 31, D-2000 Hamburg 52, West Germany. 1983. pp. 467-1038. DM 75.

Reviewing this book was like renewing acquaintances with many old friends. The literature-cited sections contain virtually all of the major and most of the minor publications on marine bivalve pathology and parasitology that have appeared within the last 150 years. The author has done a remarkably fine job collecting and reviewing these papers to present the detailed information found in this book. I believe this is the most complete list of references on the subject ever assembled in one place, and it alone makes the purchase of the book worthwhile for the serious student of marine bivalve diseases.

Since I am most familiar with disease studies on bivalve mollusks, my discussion is confined to this area although I assume that Dr. Lauckner has presented as complete a review of the other taxa as well.

The section that covers infectious parasitic disease provides a very nice in-depth introduction to all of the major maladies that have beset oysters and other bivalves since the mass mortalities of the flat oyster that Orton described in the 1920's. This section is generally well done with descriptions and illustrations of the parasites and epizootic impacts on populations. The discussion on pathology is sketchy regarding many of the responses, especially defense mechanisms that have provided experimental insights into host-parasite relationships and clinical disease manifestations. A discussion of general pathologic relationships in a comparative sense including immunological responses or lack thereof would have been warranted.

The problem with terminology continues to plague invertebrate pathologists. However, solutions must involve etymology, and evolutionary concepts as they relate to the comparative cellular anatomy and function of mollusks. Inappropriate usages such as "Leydig cell" should be suppressed. "Leydig cell" was first used as the name for an interstitial endocrine cell of the mammalian testis, and this usage takes

priority over its employment as a name for molluscan vesicular connective tissue. Leydig, in 1857, initially called this molluscan tissue "Bindegewebe" (connective tissue) and Blundstone (1885) referred to these cells as "vesicular cells of the connective tissue" which was continued by Galtsoff in his book on the anatomy of the oyster in 1964. The first usage of "Leydig cell" in the molluscan context is obscure, but it was used commonly in the earlier molluscan pathology literature.

There are some misquotes and omissions. For example, the discovery of acid-fastness of *Haplosporidium nelsoni* spores which was reported in two of the cited papers was credited to a paper published 10 years later.

The author's lack of acquaintance with the field of comparative oncology created problems with his assessment of the pertinent literature and the terminology used in this most difficult area of research.

The term "neoplasia" is not easily defined theoretically even in vertebrate systems because of the lack of knowledge concerning molecular etiologic mechanisms. We can describe the cytologic appearance, clinical behavior and sometimes the etiologic agents of neoplasia, but we do not know how these agents function molecularly to cause the effects that characterize this disease complex.

In studying comparative neoplasia, one must take into account the special histologic, physiologic, and pathologic features that characterize mollusks. Let us use as an example, "metastasis" (occurrence of satellite lesions remote from the site of origin). In the vertebrates, this phenomenon is dependent upon the presence of solid tissues, an invasive proliferative malignant cell population, and a closed circulatory system. The spread of a primary lesion to remote sites occurs by transfer of cells through the blood or lymphatic vessels. The bivalve mollusk has a semi-closed circulatory system composed of a heart, arteries, veins, but most importantly, the

capillary system is replaced by many open sinuses in the vesicular connective tissue. This type of system favors diffuse invasion by anaplastic cells once the basal lamina of epithelia or vessel walls is breached. This mechanism of malignant-cell dispersal is similar to metastasis and results in the same overwhelming invasion of all tissues. Although it is not metastasis as defined in vertebrates, it is the result of the same cytologic phenomenon that causes dissemination in this group.

The author was perhaps misled by the inappropriate references to "hematopoietic neoplasms" of clams, oysters, and mussels that unfortunately occur in many of the papers listed in the bibliography. The neoplasms in Chesapeake Bay *Macoma balthica* were not called hematopoietic in origin. Instead, Christensen (1974) stated that the lesion was of probable epithelial origin in the gill and Farley (1976) demonstrated by electron microscopy that this disease was an anaplastic carcinoma that originated by transformation of gill epithelial cells which had the cytologic characteristics of neoplastic cells but could be identified as epithelial by the presence of tight junctions and microvilli. The author has presented the controversial opinion of Mackin and Schlick (1976) that molluscan neoplastic cells were actually parasites, without reference to the evidence presented in many of the cited papers that clearly shows the cells in question to be molluscan in origin.

Despite its shortcomings, my overall impression of this volume is still very good, and I would highly recommend it as a basic reference, as a text for individual serious students, and for use in teaching courses on diseases of marine bivalve mollusks.

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