THE INSECTS AND ARACHNIDS OF CANADA PART 2, THE BARK BEETLES OF CANADA AND ALASKA, COLEOPTERA: SCOLYTIDAE, by Donald E. Bright, Jr. 1976. Canada Department of Agriculture, Ottawa, Ontario, Canada. 241 pages. $8.40.

This book essentially updates J. M. Swaine's classic reference "Canadian Bark Beetles" published in 1918. Forty-five genera and 214 species are included in this book whereas Swaine's publication has 52 genera and 127 species. The first eight pages include the introduction, describes the general biology of bark beetles, discusses galleries and distribution of the group, and defines morphological terms. The main section of the book covers 200 pages of keys to genera and species of all scolytid known or suspected to occur in Canada and Alaska. A brief discussion for each species—generally less than one page—provides a taxonomic diagnosis and describes hosts, distribution, and biology. Ninety-five maps show distributions and the brief biology includes selected references for additional information. One hundred seventy-two scanning electron micrographs illustrate the important features in the keys. The last section is a brief summary of host records, a glossary, and 109 references.

The aim of this volume, according to Bright, "is to assist students, amateurs, technicians, entomologists, and practicing foresters in identifying . . . Scolytidae, to briefly review the known biological information and to indicate where more detailed information can be found." He has accomplished these objectives fairly substantially and effectively by the keys and illustrations, by the discussion of each species, and by inclusion of important references.

The numerous, excellent illustrations—particularly those obtained by the scanning electron microscope—along with the revised keys are the book's strongest points; these provide a needed tool for students and professional workers. The book can be recommended on the basis of these qualities alone. However, scolytid keys at best are difficult, and I suspect the amateur will have some difficulty in using them. The excellence of the illustrations, including the micrographs, is somewhat marred by the lack of references to size. The size of each species is included in the text, but size references are lacking for parts of beetles and for other illustrations.

The discussion of each species does a reasonable job in updating the information accrued since Swaine's work, but there are weaknesses in this section. For a number of the better known species this section is much shorter and sketchier than in Swaine's book, and there are misleading statements that may have been caused by the need to compress complex information on insect biology to fit the format of the book. For example, in his section on *Scolytus multistratus,* which is the carrier of the Dutch elm disease pathogen, Bright leaves the impression that the same insect generation infects and infests the same tree, when in fact two different generations are involved. The section on *Dendroctonus brevicomis* erroneously claims that its hosts include "numerous" other species of pine (besides ponderosa pine) in the United States. *D. brevicomis* is found only on ponderosa and Coulter pine. The section on *D. ponderosae* gives the impression that only subnormal trees are attacked. Again this is not entirely true. And there are other statements of this nature which might be questioned.

The references were selected, according to the author, as the most effective entry into the information on a given species. The inclusion or exclusion of references in such a comprehensive work is a difficult decision, and each of us would probably do it differently; space limitations must be considered also. Yet, I do not believe I would have omitted some which were. For instance, it seems almost impossible to write about *Dendroctonus* without referring to Hopkins. There are no references by Miller and Keen for *D. brevicomis* or by Massey and Wygant for *D. rufipennis.* Also, the number of references given is not at all related to the amount of information on a given species. For instance, there may be several references for an obscure species, but only one or two references for a well known and economically important species.

In summary, the strong points are the new and revised taxonomic information, the keys and illustrations: the weak points are the biological information and the references.

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BACULOVIRUSES FOR INSECT PEST CONTROL: SAFETY CONSIDERATIONS, by Max Summers, Engler, Falcon and Vail. Published by American Society for Microbiology, 1913 I St., N.W., Washington, D.C. 20006.

A symposium was organized by the Environmental Protection Agency (EPA) and the United States Department of Agriculture (U.S.D.A.) in Washington, D.C. on nuclear polyhedrosis and granulosis viruses (NPV and GV). Papers on the safety aspects and on the biochemistry of these viruses were delivered. The proceedings of the symposium were published by the American Society for Microbiology.

The book is divided into four parts. Part I deals with the biology and biochemistry of Baculoviruses. Here Dr. Max D. Summers describes some of the properties of granulin and polyhedrin proteins as examined by polyacrylamide gel electrophoresis and brings out the fact that the alkaline protease, which is present in the virus inclusion bodies, cleaves the native granulin at high pH. He moves on to describe some of the biophysical properties of the genomes of baculoviruses. Dr. Keith Harrap's discussion brings out valid points about the inconsistencies of results reported in the literature by different laboratories and sums up by saying that "We know very little about the stability of these viruses. We have no idea how we should handle the liberated viruses so that we can get reproducible results . . . one can get different results depending on how one purifies the virus." These remarks by Dr. Harrap mean that we require a great deal more work on characterizing baculoviruses.

However, one of the most significant advances in insect virology, reported by Dr. W. Fred Hink, was the development of a plaque assay technique. He used an NPV isolated from the alfalfa looper, *Autografa californica.* The cell line, TN-368, was established from the cabbage looper *T. ni.*

Part I also encompasses papers on the specificity of insect viruses *in vivo* and *in vitro* and on the mutation potential of NPVs and GVs. The section on mutation is understandably small since we practically know nothing on the genetics of baculoviruses and we do not have to date suitable genetic markers.

In Dr. Ignoffo's presentation on virus specificity he concludes that there are no demonstrable harmful effects of Heliothis NPV to other than the target pest. His tests included inoculation of the virus by various routes to vertebrates and non-target invertebrates. This view is contrasted by that of Dr. Maramorosch who asked: "Is it proven beyond doubt that the use of specific virus, or any insect NPV or GV is safe?" The answer to such a question lies in the fact that we do need experiments similar to those conducted by Dr. Ignoffo on Heliothis NPV. It is also obvious that "beyond doubt" could be an endless series of self perpetuating experiments and we as scientists must recognize the situation that when we have done