with good wine and served in a good restaurant, for one person can cost $25.00 (and up!), the issues of the "Flies of the Nearctic Region" are not unreasonably priced. Furthermore, their value is likely to increase with the passage of time. Certainly, dipterists must have the series, and entomological bibliophiles who wish to own fine publications will want it, too. For the rest of us, it might be a toss-up between buying various issues or investing in some other worldly pleasure. However, this series is worth having, and publisher, editor, and authors of the first parts are to be congratulated for their efforts.

G. E. Ball

HOWDEN, H. F. and O. P. YOUNG. 1981. Panamanian Scarabaeinae: Taxonomy, distribution and habits (Coleoptera, Scarabaeidae). Contributions of the American Entomological Institute, 18 (1): 204 pp., 216 figures. (Separates available from the senior author, for $15.00, U.S.).

According to the authors, this publication is a "review" rather than a "revision", for the taxa are described in terms of Panamanian material, only, and types of previously described species were not studied in detail. The stated justification for publication at this time is to provide a volume that will serve a need for identification of dung beetles by ecologists, ethologists, and economic entomologists who are or who might become interested in way of life of these animals. Scarabaeine adults exhibit complex behavior patterns in relation to use of dung, and are therefore of interest to many biologists. The unstated justification for this publication is the senior author's intense interest in and enthusiasm for the heavily armored, bumbling, horned monsters with disgusting alimentary habits, that are included in the Scarabaeinae.

In the taxonomic part of the paper, 22 genera and their 113 species are keyed, diagnosed, compared and described. Illustrations are included toward the end of the publication. Most are SEM photographs. They are adequate rather than elegant.

This paper contains a useful gazetteer providing for each locality mentioned in the text latitude and longitude, elevation (in meters), and relation to nearest major feature, so that a particular place can be located by those who have at their disposal only rather general maps of the area.

Figure 1 is an outline map of the Republic of Panamá, with provinces labelled and their boundaries indicated. Fig. 260 is a map showing elevations and Fig. 261 illustrates distribuion of forest types of life zones in Panamá. Thus, geographical aspects of this study are very well portrayed.

In a few pages, the authors provide insights about behavior patterns of some species and draw attention to aspects of behavior that require further investigation. These notes summarize the wealth of information that the authors were able to gather in two man years of collecting and observing in Panamá. This field work has enlarged and enriched their knowledge of tropical scarabaeines, and has given them insight that is denied to systematists who confine their activities to study of preserved specimens housed in museum drawers.

Distribution patterns of the scarabaeine fauna of Panamá are considered against a background of topographical and geological changes during Tertiary time. The species are

arranged in two major zoogeographic groups: endemics (in Panamá, or in Panamá and Costa Rica); and species that are more wide-ranging. In turn, species in the latter group are arranged in three subgroups: widespread (in other parts of Central America, Panamá, and South America); those in Panamá and South America, only; and those in Panamá and Central America, only. This last group, plus the Panamanian endemics, comprise the endemic Central American fauna, which represents 52 per cent of the total. The authors correlate this high rate of endemism in Central America with isolation, by seaways, of Central America from South America, during much of the Tertiary period. They infer that, during the time of isolation, differentiation took place. Further, they propose that species occurring now in both Central and South America attained the present ranges when the seaways were closed as a result of orogenies in Central America, leading to development of emergent land, and a terrestrial connection of the two areas. This proposed sequence of events accounts nicely for the observed patterns, and correlates well with inferences of various other recent authors, who have studied distribution patterns of other taxa in Middle America.

A more detailed examination of the data shows that average body size is smaller for members of Panamanian endemic species than it is for members of the wide-ranging groups. From this, Howden and Young infer that smaller size may be correlated with flight behavior as it relates to foraging, which in turn may relate to dispersal. Thus, the smaller species may be inherently less vagile than are the larger ones. Hence, they have remained in their areas of origin, that is, the areas that were above sea level during Tertiary times.

This is a reasonable explanation, but I wonder if more might be involved than dispersal ability. The small endemics might represent older, less progressive stocks, and might have remained in their areas of origin because they have been unable to compete successfully with later-evolving, more progressive stocks comprised of species whose adults attain large size. To test this hypothesis, a phylogenetic analysis of the scarabaeine fauna of Middle America is required, and this the authors have not undertaken– nor do they recommend such an analysis. In my view, this is an unfortunate oversight, for the missing system of hypotheses limits markedly ability to interpret the zoogeographic data.

In spite of this one omission, the publication overall is fine, and contains information of value to a wider range of biologists than those who wish to identify their Panamanian scarabaeines. It should be on the shelves of coleopterists in particular, systematic entomologists in general, ethologists, and biogeographers.

G.E. Ball

Reigert, P.W. 1980. From arsenic to DDT: A history of entomology in western Canada. xii + 357 pp. University of Toronto Press. Price:$30.00. ISBN 0-8020-5499-4.

Perhaps more than any other group of scientists, entomologists revel in writing histories of themselves and their science. Although some of these (e.g. Mallis, "American Entomologists"; Weiss, "The Pioneer Century of American Entomology") briefly mention Canadian entomology, Riegert's book represents the first attempt to collect the history of entomology in any part of Canada in one place. The book is organized into four parts encompassing 20