

## BOOK REVIEWS

AMERICAN SPIDERS, 2nd ed., by Willis J. Gertsch. 288 pp. Van Nostrand Reinhold, \$24.95.

A classic in arachnology has appeared revised in a 2nd edition. *American Spiders*, first published in 1949, has been out of print for some time and now after 30 years its author, Willis Gertsch, the foremost specialist on American spiders, has brought it up to date.

The most noticeable changes are the different illustrations: 32 color plates and 32 plates of black-and-white photos. But if the text is compared one finds changes throughout. Not only has nomenclature been changed and brought up to date, but new information is presented. Where there is controversy, Gertsch most often takes the middle ground.

The extremely well-written text contains a general introduction to spiders, chapters on the place of spiders in nature, the life of the spider, silk-spinning and handwork, courtship and mating, the economic and medical importance of the North American spider fauna, and the evolution of spiders, sections on such spider groups as mygalomorph spiders, cribellate spiders, aerial web spinners, and hunting spiders, and finally a glossary, short bibliography, and index.

The text is the same length as in the previous edition, made possible by slightly smaller type. Here and there one would wish for a slightly more generous discussion on topics of current interest—sense organs, complex behavior, pheromones—on which much has been published recently in other languages. But perhaps these topics are too specialized for a general reader. Once in a while one comes across topics and statements from older literature, e.g., p. 170, “. . . spider covered with oil that prevents sticky lines from adhering to it?” Has this ever been experimentally investigated or is this speculation from the past, repetition of which has made it a certainty?

I assume that a 2nd printing will correct a few plates on their sides and a jumping spider (plate 32c) which is labeled as a giant crab spider.

Unquestionably the revision is a success and has made even more useful a book that is mandatory as an introduction to spiders.

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THE ANALYSIS OF ARCHAEOLOGICAL INSECT ASSEMBLAGES: A NEW APPROACH, by H. K. Kenward. 1978. *The Archeology of York*, vol. 19, Principles and Methods, number 1. Council for British Archaeology, London, 66 pp, 2 plates, £ 4.75.

Some archeologists in the past several years have been scrutinizing closely insect assemblages at ancient sites. From analysis of such assemblages, these archeologists believe, one may “make reconstructions of past events and ecological conditions based on the habitat requirements of the preserved insects.” Moreover, one may hope to get “information about ecological conditions and

human activity in very restricted areas” (both quotations from p. 1 of this fascinating monograph).

One may use insect remains to get 2 kinds of evidence, although Kenward in this paper (which is largely methodological) does not make the distinction. First, the presence of synanthropic insects tells us something about the immediate habitat and habits of the human inhabitants of the site. Second, the presence of nonsynanthropes tells us something about the site itself, as an environment for organisms including but not restricted to man.

It seems to me important to distinguish between these two and, for the purpose of determining “ecological conditions . . . in very restricted areas,” to exclude the domestic insects. In this regard the insects of interest are not those normally associated with man, *nec volens nec nōlens*. Discovery of insects attracted to man and living in the environment created by him, would yield the archeologist little information about the physical properties of the site—drainage, weather, temperature extremes—information the archeologist needs to discuss the use by humans of the site and their interactions with it. The presence of such insects at a site tells one only the already known, that humans lived there.

And as with man's unwelcome guests, so with those he collects for use. A recent issue of *Esakia* (No. 13, Mar., 1979) contains a color photograph of a basket of belostomatids tastefully arranged for sale in a Bangkok market (by the way, each bug costs about 1/14 the price of a bottle of Scotch). The discovery of a similar cache of belostomatids in an archeological site would tell us little about the environmental conditions under which that site was inhabited, whatever such a discovery might tell us about the peoples' use of insects.

The insects studied for the determination of environments must not be man's willing/unwilling, witting/unwitting semi-domesticates, but insects truly at the site regardless of man's use of it, and therefore true witnesses to the sort of place man chose to inhabit. Luckily, man seems not to have changed significantly for eons, and it can reasonably be assumed the insects he lived with once, he lives with now—and can identify and exclude as true witnesses.

Synanthropic insects provide other sorts of information, although the sites Kenward mentions seem to have contained very few such insects. One site was clearly identified, however, as a grain-storage crib by the abundance of granary beetles, as well as by the presence of several seeds of weeds commonly found in fields of grain.

Kenward lists several problems with the analysis of insect assemblages. These problems derive from both the disciplines of which archeo-entomology is a combination.

The archeological problems are the usual ones of dating and stratigraphy: how old is the deposit; and do the insect remains belong in the stratum where they are found, or have they moved or been moved into it? The problem is exacerbated by the fact the artifacts one worries about were themselves alive; potsherds do not themselves burrow from one layer to another, or move from one midden to another.

The biological problems are perhaps more serious, and Kenward's monograph attempts to help solve them.

The chief one is really a complex of problems stemming from our lack of knowledge of the biology and dispersal abilities of most insects. To analyze a "death assemblage" usefully one must know the ecological needs of the insects in it and their ability to move from one place to another. An assemblage of insects known to range widely and to live in many different habitats, tells one far less about a site than an assemblage of insects of limited dispersal ability and a narrow ecological niche.

Fortunately, the insects found in archeological sites are the same species as one finds today. Presumably their ecological requirements and biologies have not substantially changed, and can be extrapolated to the past. Unfortunately, however, we do not know very much about the individual biologies of most insects, and such extrapolation becomes either highly speculative or very general. For example, Kenward notes that the ground beetle, *Trechus quadristriatus* (Schrank), is found often in archeological deposits. Yet the modern literature places it variously in sandy, or damp, or dry, habitats, and Kenward himself has collected it in all of these and more.

One must also recognize that the abundance of habitats changes with habits of man. *Aglenus brunneus* (Gyll.) is common in deposits but is now rare, probably because it prefers rotting organic matter, the amount of which man's increasing tidiness has diminished.

Archeo-entomologists must rely on the work of insect biologists, of which I fear there are far too few.

To this complex of problems I might add several others. Certainly identification must be one. Kenward does not mention this problem, perhaps because most of this work is done in England, whose beetle fauna is reasonably well known. Indeed, Kenward restricts his account to England, and almost restricts it to the Coleoptera. (For a more general description of the use of insects to reconstruct ancient ecological conditions, I refer the reader to Kenward's 1976 paper, whose title I have just paraphrased [Ecol. Entomol. 1:7-17], and the references therein.) Yet in other countries, and with other insects, the problem of identification must become serious.

Another problem, perhaps an unimportant one, lies in the reliance upon beetles only. Beetles preserve better than other insects, and perhaps others do not preserve at all. But might such exclusive reliance bias the conclusions drawn? I do not know, but the problem should be considered.

This monograph is one in a series on Principles and Methods, and Kenward devotes most of it to ways of presenting and analyzing data that might minimize, if they cannot solve, the problems caused by our ignorance of the insects' biologies. He recommends various ways of listing the data, including numbers and percentages per standard sample size of material, and the distinction between "outdoor" and "indoor" species (a distinction very roughly equivalent to that I mentioned above between synanthropic and non-synanthropic insects, but a distinction not used as I suggested it might be). Methods of analysis include rank-order curves; and he argues convincingly that the steeper the curve—i.e., the lower the no. species/no. individuals ratio—the higher the likelihood that the assemblage is man-associated and not natural. The methods include also indices of diversity, and the recognition of what he calls "superabundants," which are insects found in high frequency; such insects "give a strong indication that those insects were breeding in, or at least very close to, the deposit as it accumulated" (p.16).

Unfortunately, tests of these methods are largely empirical, because of the newness of archeo-entomology as a discipline and because our ignorance of insect biology denies us an absolute measure of what insects were autochthonous to a site and what insects were not. Very few studies have been made of comparable modern sites (modern well sediments, roof-top accumulations, rain-gutter assemblages, etc.), although Kenward has made some and is making more. But as he notes, even comparisons of modern with ancient assemblages cannot guarantee the validity and accuracy of interpretations of the latter.

One is left with one's best judgement, against which one tests the results of the various methods of analysis. Kenward implies in his accounts of the methods this standard of "best judgement" with such phrases as "the validity of this process is strongly supported by practical results" (p.15), "a crude measure but one which in practice proves to be useful" (p.16), and "the species present in assemblages support the inferences drawn from their diversity" (p.23, italics mine).

And so archeo-entomology so far plays only a corroborative part in archeology. Kenward gives accounts of 6 samples from 4 different sites. He analyzes them with the methods he has described and concludes in each case either that no definite interpretation can be made or that his results corroborate those gained from more conventional archeological studies.

Yet the fact that archeo-entomology alone cannot yield definitive results, does not minimize the potential value of the science. For all archeological conclusions derive from analyses of many types of evidence; archeological conclusions are themselves the results of diverse studies. Evidence from pottery alone, or structures, or human remains, or insects is not enough to make clear statements about ancient times and places. Archeo-entomology may well become (although I think it is not yet) a useful part of archeological analysis. Surely we may learn from these outside observers of man's activities.

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BALTIC AMBER—A PALAEOBIOLOGICAL STUDY, by Sven Gisle Larsson. *Entomonograph*, vol. 1, 192 pp., 62 text-figures, 12 monochrome plates. Scandinavian Science Press Ltd, Klampenborg, Denmark, 1978. Price: US \$ 19.70 (subscription price: US \$ 15.75).

Scandinavian Science Press Ltd presents a new series entitled *Entomonograph*, which is intended as a vehicle for the publication of entomological papers which, because of their size, are difficult to place in any of the current periodicals. If the proposed titles materialize, this should become a series of considerable interest. Baltic amber, the subject of volume 1, will undoubtedly attract the attention of a wide scientific public.

A comprehensive review of the Baltic amber fauna was long overdue, and Larsson's attempt to summarize our current knowledge of the subject is generally to be welcomed. Although the predominance of insects in Baltic amber makes the book essentially an entomological work, other zoological and some botanical material is also included.