

Review of Textbooks of Invertebrate Zoology¹

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Just when environmental issues are enjoying unprecedented attention from the public, and enrollment in biology courses is taxing the capacity of many biology departments, the number and variety of taxon-oriented courses at colleges and universities are declining. About 1,500 students per year take a course in Invertebrate Zoology in North America, which is far fewer than was the case just a decade or two ago, when Invertebrate Zoology was taught at many more institutions (Fautin, 1998). Two pressures appear to be primarily responsible for these declines: the economics of higher education and competition for students. Efforts by administrators to increase the number of credit hours taught per professor results in abandonment of classes with small enrollments. Invertebrate Zoology courses are commonly—although not invariably—small, and enrollments have diminished further as they compete for students with an increasing variety of courses, particularly in cell and molecular biology. We risk training biologists who know a great deal about certain details of structure and function but little about the context in which those structures and functions occur (e.g., Bloom, 1999). As Hutchinson (1975, p. 516) wrote concerning ecology, "Modern biological education . . . may let us down . . . if it does not insist . . . that [we need] a wide and quite deep understanding of organisms . . . It may be best self-taught, but how often is this difficult process made harder by a misplaced emphasis on a quite specious modernity."

Despite the regrettable diminution in the number of courses, North American teachers of college-level Invertebrate Zoology can choose from among no fewer than seven introductory textbooks (Table 1). They cover the immense diversity of body plans that constitute animal life, from sponges to tunicates. We understand that new editions of some of these books will soon be issued to keep up with the flood of research being published on invertebrate animals. We hope this review will contribute to an appreciation of the vigor of the field, inspiring the creation of new Invertebrate Zoology courses and the resuscitation of others.

Our assessments of these textbooks are summarized in Table 2. We provide some specifics in support of our assessments in the text, but the summary values we assign are integrated impressions, both from re-reading the books in preparing this review and in using the books for reference and in class. For assessment of accuracy, we have attempted to look beyond the inevitable errors that creep into such a mass of material to try to detect patterns. Given the breadth of the sub-

ject matter, in terms of both taxa and phenomena covered, we stand in awe of those who have attempted to cover it in a single volume.

In addition, Tables 3, 4, and 5 contain data on textbook use derived from the poll we did during the summer of 1998 that formed the basis of the report cited above (Fautin, 1998). Members of the Division of Invertebrate Zoology of the Society for Integrative and Comparative Biology were asked whether Invertebrate Zoology per se is taught at their institutions, and, if so, the frequency of the courses, the enrollments, and the textbooks used. From 108 respondents at 98 colleges and universities in North America, we amassed 126 course listings (about 10 of which were duplicate responses for a particular course). Some were special-topics courses, but data from the 81 that qualified as courses in general or advanced Invertebrate Zoology are included in Tables 3-5 of this review. Eight respondents listed 11 additional taxon-specific, field, and advanced courses that do not use any of these seven "standard" textbooks. The field-oriented courses typically rely on field guides and published keys. In other courses the reading includes the primary literature and books such as those by Willmer (1990) and Nielsen (1995), which we do not include because they are mainly accounts of phylogeny and do not provide the breadth desirable in an introductory textbook.

Barnes, Calow, and Olive (abbreviated BC&O in Summary and Tables 2-5)

Of the 17 chapters, six are taxon-centered (comprising Part 2: The Invertebrate Phyla; including sections on Protozoa and Uniramia), two comprise Part 1: Evolutionary Introduction, and nine comprise Part 3: Invertebrate Functional Biology.

Sections in each taxonomic chapter occur in the same sequence, making it easy to find comparable information. The final section of each chapter is a list of references entitled "Further reading." Boxes are used only in the non-taxonomic chapters. Many occupy a page or more because, rather than summarizing information, they elaborate on the text (Box 15.1, for example, which occupies most of two pages, explains and illustrates spiral cleavage).

Drawings are small, and the few photographs are not reproduced well. Some drawings are excessively diagrammatic, and some are not adequately explained. For example, the limbs of the copepod are not correct in Figure 8.42(a), and the geometric relationship among the parts of Figure 3.25 is unclear (scales might help). On the other hand, figures such as 5.16 are ex-

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TABLE 1. *The seven textbooks reviewed.*

Title, author, and publisher	Publication date	Edition	Pages	Page size (cm)	List price
<i>The Invertebrates: A New Synthesis</i> R. S. K. Barnes, P. Calow, and P. J. W. Olive Blackwell Scientific Publications, Oxford ISBN 0-632-03125-5 (hardback); 0-632-03127-1 (paperback)	1993	2	488	21 × 27.5	\$44.95
<i>Invertebrates</i> Richard C. Brusca and Gary J. Brusca Sinauer Associates, Inc., Sunderland, Massachusetts ISBN 0-87893-098-1; hardback	1990	1	922	21 × 28	\$63.95
<i>Invertebrates</i> Eugene N. Kozloff Saunders College Publishing, Philadelphia ISBN 0-03-046204-5; hardback	1990	1	866	19.5 × 25	\$89.00
<i>Invertebrate Zoology</i> Paul A. Meglitsch and Frederick R. Schram Oxford University Press, New York and Oxford ISBN 0-19-504900-4; hardback	1991	3	623	17.5 × 26	\$57.00
<i>Living Invertebrates</i> Vicki Pearse, John Pearse, Mildred Buchsbaum, and Ralph Buchsbaum Blackwell Scientific Publications, Palo Alto ISBN 0-86542-312-1; hardback	1987	1	848	18 × 25.5	\$54.95
<i>Biology of the Invertebrates</i> Jan Pechenik William C. Brown Publishers, Dubuque, Iowa ISBN 0-697-13712-0; paperback	1996	3	554	21 × 27	\$71.05 (cloth)
<i>Invertebrate Zoology</i> E. E. Ruppert and R. D. Barnes Saunders College Publishing, Fort Worth ISBN 0-03-026668-8; hardback	1994	6	1,102	20 × 25.5	\$93.50

TABLE 2. *Summary assessment of textbooks.**

Book	Number chapters	Format			Illustrations		Writing		
		Appeal	Special features (boxes, questions, etc.)	Integration	Clarity	Accuracy	Accuracy		
							Factual	Typographic	
BC&O	17	1	2	3	2	2	1	3	3
B&B	24	3	2	3	2	3	3	2	2
Kozloff	26	3	2	1	3	3	3	3	3
M&S	38	2	1	2	3	3	2	3	3
PPB&B	31	3	2	2	3	3	3	3	3
Pechenik	25	3	3	1	2	1	3	1	3
R&B	20	3	2	2	2	2	2	2	3

* Values are relative to one another, with 3 best and 1 worst. The category "Appeal" under "Format" conveys our judgment of attractiveness of layout and ease of finding particular information; "Integration" refers to the degree to which themes weave through the book to relate taxa or phenomena to one another. The categories "Accuracy" of "Illustrations" and "Factual" (Accuracy) of "Writing" contain information about both the degree to which the information presented is error-free and its level of detail.

TABLE 3. *Course duration versus textbook used.*

Course duration	R&B	Pechenik	B&B	PPB&B	BC&O	Kozloff	None	Total
1 year	1	1	2					4
2 quarters		1				1		2
1½ semesters	1							1
1 semester	23	19	8	6	3	1	1	61
1 quarter	1	2	2	2				7
½ semester					1			1
Summer	4		1					5
Total courses	30	23	13	8	4	2	1	81

emplary and show the beautiful diversity of forms within the group. Small drawings and a dearth of photographs contribute to making this volume not very attractive.

The writing can be convoluted. A particularly good (7bad) example is the following sentence from page 283: "As will be seen from Fig. 11.7 this has a relatively low P_{50} ($\approx 5-7$ mmHg) but it will also be noted that it has a hyperbolic not a sigmoid dissociation curve—and compared with a sigmoid curve of similar P_{50} , this would become less saturated at higher P_{O_2} —or to put it another way, the pigment with a sigmoid curve becomes fully saturated at lower P_{O_2} than one with a hyperbolic curve with equivalent P_{50} " (Whew!)

There is a moderately useful eight-page glossary at the back. However, the words included in the glossary are not set off in the text (*e.g.*, by bold face or italics), so there is no way of knowing which words in the text are included in the glossary except by consulting it. Reciprocally, the glossary contains no indication of where a word occurs in the text.

We deem this book appropriate for seniors and graduate students, in a course lasting a semester or more. This assessment accords well with usage (Tables 3, 4).

Barnes, Calow, and Olive is not widely used by respondents to our poll, but users appear to be loyal (Table 5): in recent years, only one user has switched from it. The second edition was out of print two years ago, but we are assured by the publisher that it has been reprinted and is currently available.

Barnes, Calow, and Olive is singular among the seven textbooks in two regards. Being British, it has a perspective and a vocabulary different from the others. Such differences can be confusing to beginning stu-

dents who may be overwhelmed with new material; they are likely to find in this book even less that is familiar than in the other books. However, these differences also represent a strength in terms of presenting fresh perspectives. More importantly, this book provides superior integration. Its comparative approach is to deal with the taxa summarily in the first half of the book, devoting the remainder to comparing functional attributes of all relevant taxa.

Brusca and Brusca (abbreviated B&B in Summary and Tables 2-5)

Of the 24 chapters, 19 are taxon-centered (including one on Protozoa, one covering "The insects and myriapods," and one entitled, "Three enigmatic groups and a review of arthropod phylogeny"). The others include an introduction, one chapter on morphology, and three centered on phylogeny.

Chapters are laid out well. Each begins with classification (which contains diagnostic features and examples of members of each component taxon), and proceeds from general to specific characteristics of morphology and physiology. The text ends with a section on phylogeny, and several pages of "Selected References" typically conclude a chapter. Boxes are used sparingly but nicely summarize the important characteristics of taxa.

Drawings have been faithfully redrawn from original sources. Their lines are appropriately thin and distinct, but many of them contain unnecessary stippling. Their style may detract from the book, depending on

TABLE 4. *Student level versus textbook used.**

Student level	R&B	Pechenik	B&B	PPB&B	BC&O	Kozloff	None	Total
1-2	3	2	0	3	0	0	0	8
2	1	3	0	0	0	0	1	5
2-3	2	0	0	0	0	0	0	2
1-4	0	1	0	0	0	0	0	1
2-4	4	2	1	0	0	0	0	7
3-4	9	12	8	1	3	0	0	33
Up/grad	10	3	4	4	1	2	0	24
Grad	1	0	0	0	0	0	0	1
Total	30	23	13	8	4	2	1	81

* In the column labeled "Student level," numerals refer to undergraduate years (*e.g.*, 4 = senior), up = upper division undergraduate (3 and 4), and grad = graduate student (post-graduate, in British parlance).

TABLE 5. *Current and previous textbook use.**

	R&B	Pechenik	B&B	PPB&B	BC&O	Kozloff	M&S	None	Total
R&B	21	4	3					1	29
Pechenik	3	8							11
B&B		½	10						10½
PPB&B	1	1½		5					7½
BC&O		1			4				5
Kozloff						2			2
M&S				1					1
New	3								3
?	2	8		2					12
Total courses	30	23	13	8	4	2	0	1	81

* Columns list current use; rows list previous use. Thus, B&B is used in 13 courses; in 10 of these courses B&B was used previously, and in three of them R&B was used previously.

one's taste. Some photographs lack contrast, and it is difficult to determine the subject or details of others, perhaps owing to the off-white, matte paper.

The writing style is conversational in tone and therefore easy to read.

The index is designed to be used as a glossary. Bold-face page numbers refer to the text page(s) on which that word appears in bold face and is defined. Some words appear in bold face on more than one page: for example, "radula" is defined thrice, once early in the section on general life styles and twice in the chapter on molluscs. Page numbers italicized in the index refer to figures.

Integration is primarily phylogenetic. The only discussion of functional morphology is in Chapter 3, before the taxa are known to the reader, so the discussion is necessarily cursory.

Typographical errors are fewer in later printings of this book than in the earlier ones.

We deem this book appropriate for seniors and graduate students, preferably in a year-long course. This assessment accords well with usage (Tables 3, 4): two of the four Invertebrate Zoology courses of a year's duration use Brusca and Brusca.

Two organizing principles distinguish Brusca and Brusca. One that is unique to this textbook is the *bauplan*, an effective device in helping students to understand and organize the mass of unfamiliar material that is Invertebrate Zoology. Second, it shares with Meglitsch and Schram an explicit phylogenetic approach. Cladograms are provided in some of the taxon-centered chapters. A summary cladogram "of the major animal phyla" in the final chapter omits what may be the largest phylum of organisms—nematodes. Another concern is the representativeness of the cladograms—the one for cnidarians is not the most widely accepted one for the group, as is claimed.

Kozloff

Of the 26 chapters, 24 are taxon-centered (including chapters on Protozoa and Uniramia). The others are entitled Generalities (first) and Invertebrate Phylogeny (last).

Sections are clearly set off from one another, with parallel heading styles used effectively. Each chapter begins with a classification and ends with an excellent summary consisting of numbered statements. References are listed within a chapter, at the end of a section (such as the discussion of a class in a chapter covering a phylum, or the discussion of a phylum in a chapter covering several phyla). There are no boxes in the text, but the inside front cover contains a very useful table summarizing characteristics of the larger phyla, and classical diagrams of cleavage, gastrulation, embryogenesis, and open vs. closed circulatory systems are on the inside back cover.

Very good line drawings illustrate both morphology and function of structures. Although most are from the literature, many are redrawn, and some are original. Drawings are nicely mixed with well-reproduced black-and-white photographs, many of which are published for the first time. Eight pages of clear, attractive, and instructive color photographs are inserted about two-thirds of the way through the book.

The text is interesting to read: it does not just list structures but nicely interweaves morphology with details of function and adaptation.

"Important words" are in bold face at first mention; some of these are included in the eight-page glossary.

Little integration is attempted concerning relationships among the invertebrate groups or similarity of features across taxa beyond what is discussed for each taxon. Some largely outdated ideas about pattern formation and related aspects of evolution are reviewed at the end of the book, and a few pages of the first chapter are devoted to body plans, etc.

We deem this book appropriate for upper division undergraduates and graduate students, in a course lasting a semester. This assessment is supported by usage (Tables 3, 4). Both users of Kozloff who responded to our poll have used it for some years (Table 5); they praised the book, especially because of the positive response of their students to it.

For the attributes and books we consider, Kozloff shares with Pearse, Pearse, Buchsbaum, and Buchsbaum the greatest number of "3" ratings (Table 2). Its primary short-coming lies in integration; it is especially weak in its coverage of contemporary systematic

thought. It achieves the difficult balance of accuracy in content and attractiveness in format.

Meglitsch and Schram (abbreviated M&S in Summary and Tables 2-5)

Of the 38 chapters, 35 are taxon-centered (including chapters on Protozoa and Uniramia). The others are "Introduction" (first), "Classification" (second), and "Phylogeny" (last).

Each taxon-centered chapter begins with a paragraph or two providing some history of the group and/or distinctive attributes. The definition, in italics, is followed by sections on morphology, biology, and taxonomy, which are subdivided as appropriate to the taxon. These units are nicely and consistently set off from one another. Fossils, phylogeny, and evolution are then dealt with in one or more sections. Each chapter ends with a brief list of selected readings, which is preceded by a taxonomic summary that seems redundant with the extensive taxonomic section.

Most of the writing is a series of short, declarative statements, which can become tedious but is understandable.

The lay-out is attractive, if a bit cramped and monotonous, with only line drawings as illustrations. These clear drawings are done in a variety of styles. Some are original, but most are redrawn.

There is no glossary. Rather, bold-face page numbers in the index refer to the page on which a term is defined or to pages on which related terms occur. There are, for example, many bold-face references to blood vessels, which lead to definitions of terms such as "dorsal vessel." The text references render the terms in bold face, making them easy to find.

Integration is primarily phylogenetic. Two summary cladograms are presented, and the differences between them are analyzed, conveying to students the important message that all issues have not been settled.

Meglitsch and Schram is not currently used by any respondents to our poll, although it was recently used in one course (Table 5). It is, in our opinion, an appropriate textbook for use by seniors and graduate students, in a course lasting at least a semester.

Meglitsch and Schram shares with Brusca and Brusca an explicit phylogenetic approach. Discussion of phylogeny extends to the fossil record to a greater extent than in any of the other textbooks reviewed. It is also divided into the greatest number of chapters, which has the effect of sorting its rather encyclopedic coverage (presumably owing to its descent from one of the early, classical textbooks in the field) into cohesive units digestible by students.

Pearse, Pearse, Buchsbaum, and Buchsbaum (abbreviated PPB&B in Summary and Tables 2-5)

Of 31 chapters, 28 are taxon-centered (there are two each for Cnidaria, flatworms, molluscs, annelids, and arthropods, and separate chapters for protozoans and insects). The others are an introduction ("Seeking Per-

spective"), and two terminal chapters ("Animal Relationships" and "Colors of Invertebrates").

Each taxon-based chapter first deals with general forms, then with diversity of the group being discussed. Chapters for larger taxa end with an extensive classificatory summary. All references (constituting a modest list) are at the end of the book. Visually identifiable summaries, except for the taxonomic hierarchy, are lacking. The marginalia, set in smaller type, make for interesting reading and contribute to the information-richness of this book. They include topics such as the identity of the Biblical "fiery serpents" (p. 269) and an octopus drawn on a Cretan vase that illustrates invertebrates as decorations (p. 375). Use of nearly the entire page area for information, either in text or as extensive figure legends, additional notes, etc., might be considered cramped by some.

The distinctive, clear, original drawings are commonly diagrammatic but retain accuracy of detail. Any distortions are noted in the figure legends, e.g., the pores of the clam gill (p. 353) are enlarged to show their position. Also original, and especially appealing, are the photographs, many of which show some of the rarest, or hardest to find, organisms. Black-and-white photographs are in the body of the book; the 36-page inset of color photographs grouped by color provides for interesting integration, primarily on morphology and physiology.

Good use of variable sentence structure makes the writing interesting. The authors, perhaps in recognition of the rarity of a classical education in today's students, eschew some Latin plurals. Thus the use of "antennas" instead of "antennae" in the section on lobsters, and "zooxanthellas" rather than "zooxanthellae" on that concerning corals, but "flagella," "septata," and "bacteria" are also used.

There is no glossary. Bold-face words in the text are used in two ways. Some technical terms are bolded at first mention; some are defined explicitly and some only by implication. Other words are bolded as an organizational device, to call attention to the subject of a paragraph or section (such as "circulatory system").

We deem this book appropriate for undergraduate students, in a course lasting a semester, an assessment generally supported by usage (Tables 3, 4).

Pearse, Pearse, Buchsbaum, and Buchsbaum is the most distinctive of the seven books reviewed in terms of illustrations and physical layout. The deceptively simple writing and illustration styles convey a wealth of information.

Pechenik

Of 25 chapters, 21 are taxon-centered (including one on protozoans). The others are "Environmental Considerations" and "Invertebrate Classification" at the beginning, one on the hydrostatic skeleton (Chapter 9), and a final overview on reproduction and development.

Each chapter begins with a section on general characteristics, which may contain those of several classes or orders. It includes a box providing etymology and pronunciation of the group name. Following are dis-

discussion of the major taxa, and a section entitled "Other Features," which provides details of reproduction, digestion, etc. The "Taxonomic Summary" box lists the major component taxa. Identical information, and much more, is provided in "Taxonomic Detail," the penultimate section of a chapter that contains some interesting biological or geographical information, and briefly inventories features distinguishing the taxa. The final section of each chapter is a short list of general references. Immediately following the text, the section "Topics for Further Discussion and Investigations" poses questions such as "How do flatworm parasites evade the host immune system?" and provides several up-to-date references on the subject. The final question is amusing—that for platyhelminths is, "What does a trematode cercaria have in common with a long-staying house guest?" Each chapter contains at least one Research Focus box summarizing a paper from the primary literature.

The black-and-white photographs are clear. The heavy lines of many drawings might have more appropriately been made lighter—for example, to convey the delicacy of membranous structures. The blue shading is as often distracting as it is enlightening. Accuracy is sacrificed in some of the drawings. For example, on page 388, all thoracic legs of a crayfish are shown as chelate and the scheme of arteries exiting the heart is incorrect. Line drawings of representatives of 19 phyla grace the inside front and back covers.

The text is generally easy to read. Sentences vary in structure and style. But overgeneralizations (*e.g.*, "Hydroids are generally medusoid as adults" [p. 90]), misstatements (*e.g.*, "Ctenophores have left no fossil record" [p. 114]), and oversimplifications (*e.g.*, the explanation of the hydrostatic skeleton, which includes only information on antagonism of longitudinal and circular muscles [pp. 160–161]) are common. Sentences such as "The approximately 900 species [of Nemertea] are distributed among two classes" leave something to be desired grammatically.

Few words that appear in bold face in the text are included in the four-page glossary, but most are defined in the text, at least implicitly. Illustrations are indicated in the index by bold-face type.

General principles and phylogenetic relationships are briefly discussed in the second chapter, before the taxa are known to the reader.

We deem this book appropriate for undergraduate students, in a course lasting a semester; Pechenik is widely used in courses for lower division students (Table 4).

Increased use (Table 5) probably reflects the student-friendly format of Pechenik. This seems to have been achieved, at least in part, at the expense of rigor. References are the most current, perhaps owing to the frequency of new editions—the fourth will be available for use in fall 1999. Research Focus boxes expose students to scholarship and convey the important message that Invertebrate Zoology is dynamic. Instructors concerned that beginning students may interpret a box less as an example of how research is done than as something of special importance can use it as a spring-board to discussion of additional journal articles.

Ruppert and Barnes (abbreviated R&B in Summary and Tables 2–5)

Of 20 chapters, 18 are taxon-centered (including separate ones on Protozoa and insects). The others are "Introduction" and "Patterns of Invertebrate Evolution."

Each taxonomic chapter begins with a section entitled "Principles and Emerging Patterns" that offers good integration regarding function. Hydrostatic skeletons are explained in the nemertean chapter, and eyes, symbionts, spermatophores, and larvae are discussed in the chapter on molluscs; the Gulfweed community is the subject of the chapter on lophophorates, although most colonial members of that community are hydroids. A taxonomic chapter ends with a summary consisting of numbered statements, followed by an informative systematic resumé, and finally an extensive list of references, subdivided by subject and taxon. Section headings and figure labels are clear.

This volume is a mix of the old and the new, with some illustrations unchanged from the first edition of "Barnes." The unevenness of the illustrations detracts from cohesiveness of the book: the newer drawings are much better than some of the old, drawing styles are mixed, and the black-and-white photographs are of variable quality and clarity. Some of the captions are unclear (and we could find none for the figures on the inside covers): that of Figure 14-14 is "A shrimp trawler pulling an otter trawl," but there are two otter trawls and only one boat; and the identification of Figure 14-68, labeled *Diastylis*, is impossible to determine, given inaccuracies in the drawing. On the other hand, most of the drawings, whether new or old, are taken from the primary literature and so are as accurate as the literature will allow.

The writing is generally clear, concise, and uninteresting. The almost staccato style of some sections has provoked groans from students through the many years of this book's use. A good example is the text on sea anemone septa on page 138. A few tautologies exist, such as on page 519: "A tube-dwelling habit has evolved in many families of tubicolous polychaetes." There are some misconceptions in the crustacean chapter, at least. For example, the section on larval development mixes stage names, and the criteria for determining the stage of a larva are confused. On page 689, the impression is created that a larva is no longer naupliar when it has appendages posterior to the carapace, but the defining criterion has to do whether the larva has segments added posterior to the head. Some of the newer text contributed by Ruppert is a joy to read, such as the section on bilateral symmetry and movement on pages 175–179. The chapter on phylogeny is, however, rather superficial and offers only a glimpse into the world of modern techniques and arguments.

The extensive glossary is 16 pages long. Words rendered in bold face in the text seem to be their first mention. Some are found in the glossary, but some are not. Many are defined in the text, some only implicitly.

We deem this book appropriate for undergraduate and graduate students, in a course lasting at least a semester. Ruppert and Barnes appears to be maintaining its user base (Table 5), and has the virtue of being

familiar to many of us whose first exposure to invertebrates was through "Barnes."

SUMMARY

All seven textbooks provide students with a good exposure to Invertebrate Zoology. None is fatally flawed. Therefore, how is one to choose among them? It is difficult—both of us have frequently switched from one to another of these books.

A major consideration is the organizational approach of a course. Phylogeny is the traditional manner of organizing comparative information concerning invertebrates. B&B and M&S excel in this regard, with the latter providing more information on fossils and more alternative interpretations of the data. Reproduction and development are the integrative themes used by Pechenik. Comparative morphology and physiology are emphasized by PPB&B. BC&O stress comparisons, especially in physiology, reproduction, and development.

Students whose careers are likely to involve Invertebrate Zoology will benefit by learning the sorts of details included in BC&O, B&B, Kozloff, M&S, and R&B. They are also likely to benefit by having a textbook they can retain to consult in the future. In this regard, the multiple editions of BC&O, M&S, and R&B presumably have purged them of the sorts of errors in detail and typography that are occasionally evident in B&B, for example.

Duration of the class and level of students are important considerations. The books of fewer than 600 pages (BC&O, M&S, and Pechenik) may be suitable for a one-term course or one with few prerequisites. On the other hand, advanced students with a good grasp of basic biology should not be intimidated by the prospect of covering more than 800 pages (B&B, Kozloff, PPB&B, and R&B).

We hope our assessments in Table 2 can also provide guidance. To create spread in our evaluations, we use relative scores. Thus we give a "3" to the book(s) we considered best in a category (on an absolute scale, such a book might not attain excellence) and a "1" to the book(s) we considered worst (which, on an absolute scale, might be quite good).

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