

Dr. Grace Thomas of the University of Georgia was honored for over 30 years of outstanding teaching by ASB at its 35th Annual Meeting at Savannah. The Meritorious Teaching Award is supported by Scientific Products Company.

Dr. Thomas received her BS degree from Bloomsburg State College in 1942 and then served as a high school science teacher from 1942 to 1946. After taking the MEd degree from Pennsylvania State University in 1947, she remained at that institution and served as an instructor at the Hazleton Center until 1950. She received the AM and Ph.D. degrees in 1951 and 1955 at the University of Michigan where she then served for a year as a postdoctoral instructor. For the next year, she held a U.S. Public Health Fellowship, and then in 1957 joined the faculty of the Zoology Department where she presently serves as Associate Professor.

Dr. Thomas has kept active her research interests in invertebrate zoology, particularly the general biology and life histories of Mollusks. That her courses in invertebrate zoology have especially received much praise indicates her skill in the use of research to amplify teaching.

The nomination of Dr. Thomas for the award was introduced by a sizable number of her colleagues and was followed by numerous supporting letters from former undergraduate and graduate students and advisees. Her merits as an excellent teacher were clearly developed in the comments of her students and positively documented by teacher evaluation summaries from her institution. A few excerpts from these letters summarize her outstanding contribution to quality teaching.

"Although she assumes a disproportionate burden of

teaching and advisory responsibilities, her diligence and effective teaching have provided primary and renewed inspiration for many students like myself to continue for an advanced degree in biology. She teaches invertebrate zoology and makes what I consider a potentially boring subject a very exciting one. It is her great enthusiasm for her subject, the personal interest that she takes in her students, and her extra effort in course preparation that make her an exceptional teacher."

"An outstanding feature of her teaching is her aim to know each student personally. This provides the opportunity for the exchange of ideas which I have only rarely found in my career as a student. She conveys a desire to learn and a fascination for her subject, which very few teachers can do. In this most important respect, she is the best teacher I have ever had."

"I feel that during my long and trying career as a student, no one helped shape my ability to study and retain what I learned than did she. She had a way of making me feel relaxed and important, while getting twice the work I was willing to expend for the other professors."

The final excerpt not only offers a beautiful tribute but also describes the model we all certainly would emulate.

"Being an excellent teacher, in the fullest sense of the word, is more than presenting an excellent lecture each day, and more than just being available to students. It is showing through one's life and activities a sincere interest in the subject. This creates an environment in which inspirations are born and nurtured. It is this extra measure she brings to her excellent teaching which makes her, indeed, a great teacher."

Books and Periodicals

Biota of Freshwater Ecosystems: A Review

Lost in the literature languish a myriad data, misleading or merely useless, about organisms which were identified wrongly and without reference to published taxonomic concepts that could be re-evaluated in later years. The need for useful ecological information coupled with accurate species determinations has never

been greater than in the present era of environmental crisis, and the taxonomist's role as lexicographer to the ecologist's language has never been more important. However, with the exception of certain studies in Parrish (1968), there have been no eclectic reviews of many portions of the North American fresh-water fauna since the familiar presentations of Pennak (1953) and Edmondson (1959).

Fortunately, this problem is rectified in large measure

by the *Biota of Freshwater Ecosystems Identification Manuals*, recently produced for the United States Environmental Protection Agency by the Oceanography and Limnology Program of the Smithsonian Institution. These good works have been available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402. Sadly, several manuals became out of print almost immediately — which, of course, is an encouraging reflection upon their quality. It is to be hoped that those exhausted can soon be reissued. However, reissue is highly unlikely unless there is a conspicuous demand. Since no additional manuals are intended beyond the eleven reviewed below, a similar demand is required if the series is to be continued at all and extended to the scope that is needed by the aquatic biologists of this country.

Most of the manuals share a common format. An introductory section is followed by notes on collection, preservation, storage, and identification of specimens. There is a list of species, with notes on ranges and other characteristics. The bulk of each manual is devoted to one or more keys, which pursue identifications to specific rank. The keys are adequately to excellently illustrated. Finally, there are a glossary and an index.

So ambitious a project could hardly be flawless. Mechanical errors occur, and species are occasionally omitted. Some groups are not actually keyed to species level, simply because the prerequisite research has not been done. It would be callous and unwitting to depreciate the manuals for their weaknesses; on the contrary, shortcomings should be interpreted as the price of timeliness and as a stimulus to further, rapid research.

Manual No. 1 — Roman Kenk, 1972, "*Freshwater Planarians (Turbellaria) of North America*," Pp. 1-81, Stock No. 5501-0365, \$2.50.

This manual is typical of its author's painstaking scholarship. The entirety of the Nearctic Planariidae is considered, including certain taxa deemed unrecognizable. A clear and well illustrated key is supplemented by detailed and additionally illustrated discussions of the morphology and natural history of all accepted species. Specific determination of planarians depends upon histological sections of genitalia, but the key commences with several "artificial" couplets based on characters that are readily observed in living or properly preserved material; thus can the underzealous investigator make a start toward identifications.

Manual No. 2 — Roger F. Cressey, 1972, "*The Genus Argulus (Crustacea: Branchiura) of the United States*," Pp. 1-14, Stock No. 5501-0366, \$2.50.

Twenty-three species of *Argulus* — that is, the entire branchiuran fauna of the United States — are recognized. Useful notes on host affinities are included. Labeled figures of taxonomically important morphological fea-

tures are used as a superior alternative to a glossary. Like the first, this manual is valuable for its scope, thoroughness, and clarity.

Manual No. 3 — J. B. Burch, 1972, "*Freshwater Sphaeriacean Clams (Mollusca: Pelecypoda) of North America*," Pp. 1-31, Stock No. 5501-0367, \$2.50.

This work is essentially an annotated and illustrated version of the key that Burch prepared for Herrington's (1962) monograph on Nearctic Sphaeriidae. While the monograph provides the greater amount of biological information, the manual has several advantages: the genera *Eupera* and *Corbicula* are included, there are some post-1962 taxonomic adjustments, the illustrations are more plentiful and useful, and the key is more clearly expressed. Together the two works provide the student a thorough and reliable grasp of North American Sphaeriacea.

Manual No. 4 — Nancy Foster, 1972, "*Freshwater Polychaetes (Annelida) of North America*," Pp. 1-15, Stock No. 5501-0368, \$2.50.

Eight species of polychaete worms, representing three families, are considered. The manual is strengthened by inclusion of euryhaline species, which are a group that troubles the freshwater biologist because he will not find it well represented in earlier works. Moreover, some obligately fresh-water species are included in addition to the relatively familiar *Manayunkia* (consistently misspelled) *speciosa* Leidy. The key couplets offer mutually exclusive choices unencumbered by equivocal expressions, such as "usually" and "larger".

Manual No. 5 — John R. Holsinger, 1972, "*The Freshwater Amphipod Crustaceans (Gammaridae) of North America*," Pp. 1-89, Stock No. 5501-0369, \$2.75.

All but two species of strictly fresh-water North American amphipods are in the Gammaridae. In reviewing 81 valid gammarid species, representing eight genera, the author has almost blanketed the fauna of this continent — with the exception, as he points out, of more than 100 species that have been detected, but are as yet undescribed. Under the circumstances, the manual cannot be expected to permit identification of all specimens, and the author wisely "solicits comments and criticisms . . . on the utility of these keys." For example, I have tested the *Gammarus* key on several Atlantic drainage populations which proved to be close to Holsinger's concept of the familiar *G. fasciatus* Say, but closer still to *G. pecos* Cole and Bousfield, which is known only from Texas! Given the unsettled state of amphipod taxonomy, as well as the great ecological importance of these organisms, this is a very important work.

Manual No. 6 — J. B. Burch, 1972, "*Aquatic Dryopoid Beetles of the United States*," Pp. 1-31, Stock No. 5501-0368, \$2.50.

This manual provides the key to the "true aquatic beetles", the truly aquatic Polyphaga: Dryopoidea. One may consider any non-swimming aquatic beetle in the United States to be a species of aquatic beetle, and notes are provided on natural history, pollution biology and their use as indicator organisms.

Manual No. 7 — J. B. Burch, 1972, "*Freshwater Isopods (Amphipoda) of North America*," Pp. 1-45, Stock No. 5501-0369, \$2.75.

As provisionally interpreted, the key to the Nearctic freshwater isopods includes the genus *Lirceus*. Species concepts are so confused that a key based on Williams' earlier key to the Atlantic drainage population of *Asellus* is provided. The key to the Atlantic drainage population is keyed out to *A. communis*. The manual is illustrated key most works. It will prove extremely useful to freshwater biologists in other parts of the world.

Manual No. 8 — D. Sawyer, 1972, "*Freshwater Leeches (Hirudinoidea) of North America*," Pp. 1-31, Stock No. 5501-0370, \$2.50.

The appearance of this manual is a welcome sight. Sawyer's (1972) similar work is a must for the biologist interested in the Nearctic leeches. For the sake of conservation that Sawyer's more conservative key is a must. The material that I have collected is a welcome addition to the drawbacks of the one key. The strengths of the other, and the fresh-water leech fauna is a welcome sight at last.

Manual No. 9 — Horace W. Sawyer, 1972, "*Crayfishes (Astacidae) of North America*," Pp. 1-173, Stock No. 5501-0371, \$3.25.

This paper represents a revision of the author's (1959, 1962) recent taxonomic innovation. The manual offers clear expressive identification of crayfishes.

for its scope.

1972, "Freshwater Pelecypoda," Stock No. 5501.

and illustrated for Herrington's Irididae. While the amount of biological advantages: the included, there are the illustrations the key is more works provide the North American

, 1972, "Freshwater North America," \$2.50.

representing three al is strengthened which are a group because he will works. Moreover, are included in *Manayunkia* (con- The key couplets numbered by equi- and "larger".

Holsinger, 1972, *Stomatopoda* (Gam- Pp. 1-89, Stock

fresh-water North Ammaridae. In re- representing eight keted the fauna of as he points out, been detected, but circumstances, the identification of all "solicits comments of these keys." For *Arus* key on several proved to be close ar *G. fasciatus* Say, Bousfield, which is ne unsettled state of the great ecological is a very important

"Aquatic Dryopoda of the United States," Pp. 1-82, Stock No. 5501-0370, \$2.50.

This manual provides thorough coverage of the "riffle beetles", the truly aquatic members of the Coleoptera: Polyphaga: Dryopoidea. "For practical purposes, one may consider any non-swimming aquatic beetle found in the United States to be a dryopoid." There are keys to species of adults and to genera of larvae. Informative notes are provided on natural history, with an emphasis on pollution biology and the value of certain dryopoids as indicator organisms.

Manual No. 7 — W. D. Williams, 1972, "Freshwater Isopods (*Asellidae*) of North America," Pp. 1-45, Stock No. 5501-0390, \$2.50.

As provisionally interpreted in this manual, all Nearctic freshwater isopods are referable to *Asellus* or *Lirceus*. Species concepts in *Lirceus* are considered to be so confused that a key is impractical. However, based on Williams' earlier (1970) work, a key to species of *Asellus* is provided. I have tested it on several Atlantic drainage populations, which unequivocally keyed out to *A. communis* Say. I found this well illustrated key most workable, and I trust that it will prove extremely useful and satisfactory to aquatic biologists in other parts of the country.

Manual No. 8 — Donald J. Klemm, 1972, "Freshwater Leeches (*Annelida: Hirudinea*) of North America," Pp. 1-53, Stock No. 5501-0391, \$2.50.

The appearance of this manual in the same year as Sawyer's (1972) similar work is a blessing to the aquatic biologist interested in the biology and identification of Nearctic leeches. For the most part, I have found that Sawyer's more conservative approach to the recognition of genera and species is more appropriate to material that I have collected and examined. However, the drawbacks of the one paper are countered by the strengths of the other, and knowledge of much of our fresh-water leech fauna is on a sound taxonomic basis at last.

Manual No. 9 — Horton H. Hobbs, Jr., 1972, "Crayfishes (*Astacidae*) of North and Middle America," Pp. 1-173, Stock No. 5501-0399, \$3.25.

This paper represents a major extension in the scope of the author's (1959, 1968) similar efforts. Several recent taxonomic innovations are adopted, and the manual offers clear expression and excellent illustrations. Identification of crayfishes usually depends ultimately

when the... As the author indicates, a key to females is untenable at this time, but a key to Form II males might be just as useful. Perhaps Hobbs' extraordinary command of his field can be turned to these problems in due course.

Manual No. 10 — V. R. Ferris, J. M. Ferris, and J. P. Tjepkema, 1973, "Genera of Freshwater Nematodes (*Nematoda*) of eastern North America," Pp. 1-38.

The bulk of this manual is devoted to an illustrated key for 56 genera of aquatic nematodes in eastern North America. I have not tested the key, but its illustrations and couplet choices seem clear. Since they are among the few macroscopic fresh-water nematodes, the Mermithidae are commonly encountered during aquatic investigations. However, mermithid larval stages are passed as insect parasites, and this group is excluded from the manual, which considers only fully free-living forms. This disappointment is hardly the authors' fault — every work must have its limits — but the need for a manual on the Mermithidae is great. Also, more work on the specific identities of all nematodes is desirable, for, as the authors emphasize, the structure of the nematode community can be used to infer much about environmental disturbances.

Manual No. 11 — J. B. Burch, 1973, "Freshwater Unionacean Clams (*Mollusca: Pelecypoda*) of North America," Pp. 1-176, Stock No. 5501-00588, \$4.10 (domestic postpaid) or \$3.75 (Government Printing Office bookstore).

The number of nominal species of North America fresh-water mussels greatly exceeds the number of biological species. According to Burch's interpretation, the latter total something more than 200. This is far more realistic than the typological fiction that the Nearctic naiad fauna approaches 1,000 species. Nevertheless, 200-odd species are a considerable fauna. Moreover, their taxonomy is far, far from perfect. An annotated key to all species is simply not possible at this time. Burch is to be commended for the scholarship, industry, and courage required to reduce confusion as much as he has. Accordingly, the following comments are intended, certainly not as adverse reflections upon his efforts, but as aids to users of this manual.

Certain taxonomic changes are desirable. *Pleurobema* (*Lexingtonia*) *masoni* (Conrad) is a *Fusconaia* (Fuller, 1971). *Lampsilis jonesi* van der Schalie is a *Pychobranchus* (Fuller and Bereza, 1973). *Villosa ogeecheensis* (Conrad) should be known as *V. delumbis* (Conrad) (Johnson, 1971); *Lampsilis anodontoides* (Lea), as *L.*

teres (Rafinesque) (Johnson, 1972).

Omitted from the manual are a few valid species recently described by Clench and Turner (1956), Athearn (1964), and Fuller (1972). *Villosa "ogeecheensis"*, *Lasmigona holstonia* (Lea), and *Anodonta imbecilis* Say are included in the species keys, but are omitted from the "Species list and ranges" section. In the latter section, too great reliance is sometimes placed upon understandably imperfect statements by earlier authorities: for example, *Fusconaia cor* (Conrad) does not occur in "the Flint River, Georgia" (Clench and Turner, 1956). Also in this section, *Unio radiatus* Conrad is listed (correctly) in *Anodontoidea* and (incorrectly) in *Alasmidonta*.

The key couplets consistently offer clear choices, which often emphasize discriminants that will be of interest to specialists, as well as of value to users of the manual. Of course, anyone without some prior knowledge of the fauna will have difficulty keying out species which have traditionally been classified in wrong genera. The illustrations are of such a quality, however, that accurate identification will often be facilitated merely by looking at the pictures; the drawings are excellent and usually of typical specimens. One exception is Figure 28f, which is an atypical representation of the marsupium characteristic of the "tribe" Lampsilinae: Heterogenae (the reader might refer to Ortmann, 1912, for other renderings).

Research is ever neither perfect nor complete, and certain kinds of errors are the price of timeliness. The sponsors and authors of these manuals are to be thanked and congratulated. If American biologists wish to have this series continued and expanded, they will have to make their wishes known. — SAMUEL L. H. FULLER, *Limnology Department, The Academy of Natural Sciences, Philadelphia*.

References Cited

- ATHEARN, H. D. 1964. Three new unionids from Alabama and Florida and a note on *Lampsilis jonesi*. — *Nautilus*, 77: 134-139.
- CLENCH, W. J., AND R. D. TURNER. 1956. Freshwater mollusks of Alabama, Georgia, and Florida from the Escambia to the Suwanee River. — *Bulletin of the Florida State Museum, Biological Sciences*, 1: 97-239.
- EDMONDSON, W. T., Editor. 1959. *Freshwater biology*. — John Wiley and Sons, New York. Pp. 1-1248.
- FULLER, S. L. H. 1971. A brief field guide to the fresh-water mussels (Mollusca: Bivalvia: Unionacea) of the Savannah River system. — *ASB Bulletin*, 18: 137-146.
- . 1972. *Elliptio marsupiobesa*, a new freshwater mussel (Mollusca: Bivalvia: Unionidae) from the Cape Fear River, North Carolina. — *Proceedings of the Academy of Natural Sciences of Philadelphia*, 124: 1-10.
- FULLER, S. L. H., AND D. J. BEREZA. 1973. Recent additions to the naiad fauna of the eastern Gulf drainage (Bivalvia: Unionida: Unionidae). — *ASB Bulletin*, 20: 53-54.
- HERRINGTON, H. B. 1962. A revision of the Sphaeriidae of North America (Mollusca: Pelecypoda). — *Miscellaneous Publications of the Museum of Zoology, University of Michigan*, No. 118: 1-74.
- HOBBS, H. H., JR. 1959. Malacostraca [in part]. In: Edmondson (1959), Pp. 869-901.
- . 1968. Crustacea: Malacostraca. In: Parrish (1968), Pp. K1-K36.
- JOHNSON, R. I. 1970. The systematics and zoogeography of the Unionidae (Mollusca: Bivalvia) of the southern Atlantic slope region. — *Bulletin of the Museum of Comparative Zoology*, 140: 263-450.
- . 1972. The Unionidae (Mollusca: Bivalvia) of peninsular Florida. — *Bulletin of the Florida State Museum, Biological Sciences*, 16: 181-249.
- ORTMANN, A. E. 1912. Notes upon the families and genera of the najades. — *Annals of the Carnegie Museum*, 8: 222-365.
- PARRISH, F. K., Editor. 1968. *Keys to water quality indicative organisms (southeastern United States)*. — Federal Water Pollution Control Administration, Washington, D. C. 192 pp.
- PENNAK, R. W. 1953. *Freshwater invertebrates of the United States*. — Ronald Press, New York. Pp. 1-769.
- SAWYER, R. T. 1972. North American freshwater leeches, exclusive of the Piscicolidae, with a key to all species. — *Illinois Biological Monographs*, No. 46: 1-154.

REGIO

Regional associations of instances, may not be mere organizations. However, they the larger organizations a the value of the national merit developed on the r panded to the national le

There are too many c national societies to be regional concerns. A r vides a natural forum fo ecological problems, and and support for ecologic grams. These regional nature, encourage the exp fauna of a specific regio able for the organization a region. Such concerns species and habitats may development of a conse state representatives is c of Southeastern Biologis concern for specific ecol

Regional meetings may tunity to consider edu developments which have Committee on Undergra Biological Sciences (CU Biological Education (O now sponsored by the A.I.B.S. A regional ass unit, easily identifiable, A.I.B.S. and perhaps imp grams. Such an associat follow-up to the CUEBS

With a regional assoc of various national organ place to meet and enjoy biologists, thereby increa the regional meeting and t

¹ Biology Department, Georgia — President A.S.B.
² Department of Zoology, University, Raleigh, North C 1971-72.