student?
- does the educational activity have the preponderant support of the professional teaching community?
- Are the methods formulated and conducted within professional standards?

A recent survey (Dunsmoor, *Kansas Biology Teacher* 1991) estimated 97% of Kansas biology teachers use dissection in the classroom. Surveys of NSTA members and Ohio teachers found somewhat lower percentages but nevertheless preponderant support. But what about "professional standards"?

The National Association of Biology Teachers (NABT) and the National Science Teachers Association (NSTA) are generally considered the two major organizations to establish standards in this area. While there is hope that the NSTA standards on animal use in the classroom will align more closely with the perspectives of the scientific community, the NABT policy is clearly pro-"opt out" and pro-alternatives, and leaves the teacher who selects exercises involving dissection or making insect collections, etc., with no support.

NABT Monograph No. IV titled "The Responsible Use of Animals in Biology Classrooms Including Alternatives to Dissection" (1990) compiled from contributions from many pro-animal rights authors, includes guidelines on both dissection and use of live animals. Although it states that dissection "...has a long and well established place in the teaching of life sciences," it recommends that teachers consider alternatives instead. NABT guidelines on animal use state: "The lab activity should not cause the loss of an animal's life. Bacteria, fungi, protozoans and invertebrates should be used in activities that may require use of harmful substances or loss of an organism's life." This and many other statements in Monograph IV cause a reader to question the science input in the development of the NABT guidelines. Contributers to NABT Monograph IV include: Neal Bernard of the Physicians Committee for Responsible Medicine (the PCRM was by unanimous vote of the A.M.A. censured for "...inappropriate and unethical tactics it uses to manipulate public opinion," *Chronicle of Higher Education*, Nov. 21, 1990), three members of the National Association for Humane and Environmental Education, and members from the Animal Welfare Institute and H.S.U.S. PETA apparently likes the guidelines; a brochure distributed to one state chapter in support of PETA admonishes teachers: "Please switch to one of the teaching ideas recommended by the National Biology Teachers Association." The Kansas affiliate (KABT) has unanimously rejected the NABT Guidelines and associated documents and called for their immediate rescission.

On the other hand, the NSTA guidelines on animal use are currently being drafted. While final wording has not yet been approved, a working draft has been approved in principle and the final wording should be approved this summer. In contrast to the NABT policy, the current NSTA draft is relatively free from animal rights terminology. In addition, a statement was accepted in the current draft stating that collecting of insects, etc., is valid science classwork and a central part of biology, and that collections at schools and natural history museums provide valuable research and educational resources. Of course, these provisions are still subject to revision or deletion in upcoming NSTA committee and Board deliberations. There is an overall theme that a science teacher is the professional decision-maker; nevertheless the current draft still retains an "opt-out" statement to the contrary, but only for classroom dissection. If this is left in the final version, we may still see animal rights advocates use this fragment as a "teaching standard" that leverages for state opt-out laws.

One article by a teacher supporting the NABT Guidelines reveals the belief that organismic biology is mined-out or out-of-date. That teacher writes: "Little research is being done at the traditional organismic level...biology lessons are now focused on what is new and important in the field rather than memorizing the parts of a preserved specimen..." (*AWI Quarterly*, Spring 1990).

I have surveyed the biology teacher curriculum in Kansas and Indiana colleges and found a majority of biology teachers have not been required to take human anatomy and physiology for many years. In addition, while most universities and colleges still require a zoology/botany/organismic biology course(s), some no longer have a bonfire zoologist or botanist teaching in the undergraduate curriculum. Thus, many younger biology teachers have not conducted dissections or collected any organisms; they certainly are less likely to recognize the value of such activities if they have never done them. After several decades of many U.S. universities failing to replace organismic biologists, the readiness with which some current teachers abandon reality-based labwork is but one of the ways this sin is coming home to roost.

### Book Review


Nearly three and one-half years after the symposium at which this collection of papers was given, and some four years after the data were organized by the impressive gathering of tropical biologists, the reader may now wander through the anecdotal and species lists, the data and graphic explanations, the few maps and long bibliographies. One may ponder the many words and thoughts, one-legged hypotheses, just-so stories, and didactic reviews of general biology and finish by being puzzled by the utter lack of attention to 98% of the biodiversity in these four wonderful tropical forests.

What happened to the arthropods?

Insects and their relatives are mentioned on only 6 or 7 pages of this impressively large book of tropical science and lore, and in these cases only as fodder for birds, frogs, or small mammals. This is unfortunate since significant knowledge about the insect faunas of the Manaus, B.C.I., and La Selva areas were within reach for the symposium and could have been pulled together to contribute to the book. One month after the 1986 symposium at Ohio State University, major studies of arthropods began within 21 km of Cocha Cashu in the Manu Reserved Zone, and by 1989, well before publicication of this book, findings could have been added to bring balance to the other three localities in some comparative sense, which was the underlying theme the symposium organizer and participants hoped to achieve. The lack of inclusion of insects and their allies is lamentable and places the book in a class with others of its genre: incomplete.

Regardless, the contents of the book are deserving of critical review as they stand. The authors tie together many loose ends in terms of data many of us have heard only while bumping along mountain roads in a dilapidated bus or during brief encounters at some conference mixer; this book has been needed for a long time. Its fundamental problem is that its old fashioned descriptive ecology and biogeography format is without mention of the underlying animal and plant phylogenies on which the many comparative statements should be based. Its fundamental strength is that it is packed.

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with descriptive natural history, rather than ecology per se.

The Preface states the purpose of the book, conceived of by its editor, A. H. Gent-
try, in a 'mental note' in 1982, was to make a "broad comparison of similari-
dities between Amazonian and Central American forests." Further, it was hoped that by "emphasizing the distinctiveness of each of these tropical forests, this book will perhaps document the urgent need not only for additional sites of in-depth ecological study but also for more geographically and taxonomically comprehensive inventories to select appropriate sites for study and conservation." Has the purpose been achieved? Has a feeling of an urgent need to preserve these forests, as hoped for throughout when one finishes the final page? If so, is there a way to demonstrate that feeling outside our small club of intrepid tropical explorers to the likes of Petropere and the amazonian and Central American cattle ranchers or the close-packed people of the cholera-ridden barrios of Iquitos and the favelas of Manaus?

The first section of the book, a collection of four papers which describe the two Amazonian and two Central American sites upon which the book is based, is led off in a mitrencherous fashion by David Clark's excellent description of La Selva Biological Station. The reader will learn not only about the physical setting of the lab, but also history of the site, available habitats, water sheds, background studies such as forest dynamics and nutrient flow, proximity to Braulio Carrillo National Park which is itself a researcher's paradise, and even the political realities of working in a tropical nation. Of course, Clark uses his pages to 'sell' La Selva; who can blame him, it is a great place and not only by his account. Leigh and Wright, in the second chapter and with a more stallonesque beginning spend a mere paragraph on the history and physical setting in which a researcher might find her or himself and get directly to their own scientific interests of forest rhythms. This chapter is misplaced. Terborgh's chapter on Cocha Cashu in Manu National Park returns somewhat, if briefly (4 of 9 pages), to a site description format, but like the preceding one soon departs to favorite research (plant resources and animal populations). Lovejoy and Bierregaard, in their chapter on the Minimum Critical Size project (now called the Biological Dynamics of Fragmented Forest Project) return to a real site description and give the information a reader might expect in this section. Unfortunately, it is very brief (8 pages). One redeeming factor is that the authors at least recognize insects (page 66).

In general, the book fails to provide a balanced introduction to the sites, even though it does provide interesting reading. Thus the foundation for the desired compa-

reparative format for the four sites gets off to a shaky start. The failure is not because there is not sufficient data, the failure is that most biologists are so specialized that they cannot see the forest for the trees and are unable to write such chapters.

Part II, Floristics, by Hammel, Foster and Hubbell, Foster, France, and a summary comparison by Gentry certainly combines the thoughts of some of the very best system-
tatically-oriented tropical forest botanists. Their collective observations and critique of diverse sampling methods are critical to progress in floristic studies. What is lacking is an appropriate comparison of the pattern of evolutionary process in the tropical forest. Unfortunately, the subsequent chapters show this to be the case. Not one of the authors even suggests that a study of relationships and lineage evolution is missing from the analysis. It is well to collect data, but it is necessary to view those data in an evolutionary perspective if valid comparisons are to be made and local florases to be understood.

Part III, Birds, by Blake, Stiles, and A.

Loiselle, Karr, Robinson and Terborgh, Bierregaard, and a summary comparison by Karr, Robinson, Blake, and Bierregaard falls short of its target. Chapter 14, the summary of information, concludes with the statement "Although much has been learned about Neotropical birds in the past decade, our knowledge remains rudimentary." After reading the chapters, one must certainly agree with this. Further, one must also conclude that traditional ornithological methods to data accumulation used here leaves much to be desired. The mist net method to determine abundance (and di-

versity) was critiqued by Remsen and Parker (1985) and this must be held in mind when reading the findings in this book. From an entomological perspective, mist-netting, as in butterfly-catching, measures merely the habitats of the species, and for birds, perhaps their degree of memory as to where the nets are located. To determine species richness at a site, and to compare it with that of another site, one must use comparable elements. Highly motile species, such as birds and butterflies, could be accurately inventoryed at a site, but only through their connection to that site, such as nesting sites and larval host plants, not air space. Without such data, the hypotheses derived from ob-
servations cannot be readily tested, but merely run through different statistical pro-
cedures, all of which would have little mean-
ing in the real world since the data was inappropriate. The section concludes with a list of species found in the combined study areas, each species classified in terms of habitat, mass (grams), guilds, and site. The list suffers from a tradition in vertebrate research in terms of habitat and guild classification, for example, in the use of the category "upland forest." In the area of Cocha Cashu, there are at least 8 distinct types of non-flooded forests (Chapter 17 on mam-
mals, "high ground" forest is used); in the study area north of Manaus, the term is meaningless since there is no "lowland" forest (the area is all terra firme or white sand forest and "terra firme" is also a collective term for forest types under one name); LaSelva's "Primary Forest" (page 14) ranges from 300 to 3000 meters elevation containing numerous types; and even at BCI and Pipeline Road there are distinct forest types. Although many birds may 'see' the environ-
ment in a coarse-grained way, perhaps not all do. Regardless, unless comparable units are used, the discussion has no basis, and the resultant comparisons of the four forests are of little value.

Part VI, Mammals, by Wilson, Glanz, Janson and Emmons, Malcolm, and Eisenberg begins with a complete and anno-
tated inventory of La Selva mammals, in-
cluding bats, where Wilson and his associ-
ates have done extensive work. The Chap-

ter not only covers La Selva, but summa-
rizes Costa Rica and much of Central America. It is clear that the mammalogists know for the most part where their subjects are (with the general exception of 'rats' and bats). The subsequent chapters show this bias, in that they mostly ignore the inven-
tory and comparisons of species counts and move into comparisons of mammal habits and densities at the sites. Further, bats are not included in the discussions of faunas at Manaus or Cocha Cashu because little work had been done to date. But what happened to the data for bats from BCI where studies have been nearly continuous since the early 1970's? Mammals are a very small portion of standing biodiversity. Their ranges and densities have been greatly changed by hu-

mans. Inventories are easily made. The contributing authors were wise to use their space in this volume in comparing things other than species lists, however a complete list of the combined sites, as in the bird and herps summary chapters, would have been better included than excluded even without the bats.

Part V, Reptiles and Amphibians, by Guyer, Rand and Myers, Rodriguez and Cadle, Zimmerman and Rodrigues, and Duellman, is perhaps the most internally consistent section of the book. Although some of the biogeographic treatment is old fashioned observational, non-testable, sce-

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Part VI, Forest Dynamics, by D. Lieberman et al, Hubbell and Foster, Gentry and Terborgh, Rankin-De Merona et al, and Harthorn should have been Chapter II as it sets the context in which the animals and individual plants live. To understand the animal and plant diversity, one must have a solid overview of the forest dynamics and this set of chapters is an excellent start. From an entomological point of view, the types of forests used traditionally in such studies are too ‘course-grained’ to be of specific value, but they do provide a starting point.

The book is a must for all tropical biologists, not only to have the extensive data at hand, but to understand the shortcomings of our studies in the 1970’s and 1980’s. The 1990’s will need more attention to forest classifications and dynamics and more inventories of arthropods. Bats, ‘rats,’ epi­phytes, lianas, and the herbaceous layer also will all need more inventory attention. Those bent on descriptive natural history (usually called ecology in this book) will need to understand the phylogenetic relationships of their organisms. Four Neotropical Rainforests certainly starts us on the right road to comparative tropical biodiversity, but we are not yet to the first milepost. On the other hand, the book does not meet its goal of demonstrating an urgent need to preserve more forests. Perhaps it does provide some basic information for clever politically-oriented conservationists to use in this battle. But quite frankly, I found nothing that I could use to get Petroperu and Texas Crude Exploration to cancel their oil­licences.

 Reviewed by Terry L. Erwin, Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560.

Integrated Pest Management: Research Issues and Applications of IPM
August 5-30, 1991

University Extension, in collaboration with University of California, Davis faculty and other IPM experts, will offer a four­week course focusing on current research and applications of Integrated Pest Management. The objective is to provide an interactive course that will enhance theoretical and practical skills necessary for conducting applied research in Integrated Pest Management.

The course is intended for individuals who are currently conducting, or will be involved in conducting IPM research. The course is organized around lectures, discussions, and field trips. Stress will be on the analysis of pest problems and the design of research and extension programs to solve them.

Registration fee: $1900, payable in U.S. dollars only. Room and board at UC Davis: $980 payable in full with registration fee. Field trip room and board for 5 days and 4 nights: estimate $60 per night. Meals: $25-30 per day.

For more information contact: Alice Warrick, Course Coordinator, International Training and Education Center, University Extension, Univ. of California, Davis, Davis, CA 95616.

Literature cited
Erwin, T. L. (in press). A Natural History of the Carabid Beetles at the BIOLAT Biological Station, Rio Manu, Pakitza, Peru. Rev. per. Ent.


NewsNotes
San Diego Natural History Museum

Because of financial difficulties, the San Diego Natural History Museum found it necessary early this year to lay off several members of its curatorial staff. Included among these was Amadeo Rea, Curator of Birds and Mammals. Phillip Unitt remained as Collection Manager in that department to maintain the collection and process loan and other requests. The Museum has embarked on a fund raising drive specifically for support of the science departments and library and hopes to reinstate its staff quickly. The museum’s search for a new Director is in its final stages. A large number of letters of support for the scientific mission of the museum as well as a large number of monetary donations, has played a significant role in what is hoped is a reversal of the down-turn. Additional supporting letters and donations (which may be earmarked for specific departments or for the overall support of science) would be appreciated.

San Diego Natural History Museum, P.O. Box 1390, San Diego, CA 92112

Danum Valley Field Centre, Northern Borneo

The Danum Valley Field Centre, located on the Segama River 85km West of Lahad Datu, provides facilities for research and education in one of Sabah’s last strongholds of undisturbed lowland rainforest, the 438 sq. km Danum Valley Conservation Area. A long term research program was initiated in 1984 as a collaborative venture between Yayasan Sabah (Sabah Foundation), Sabah Forest Department, Universiti Kebangsaan Malaysia Sabah, and the Royal Society (London). The major aims of the program are to: 1) gain scientific understanding of the ecological processes and evolutionary mechanisms that maintain tropical rainforest; 2) provide training opportunities for Sabahans; and 3) assess the impact of logging and provide information that may contribute to improved forest management. For further information, contact: Dr. Clive Marsh, Senior Conservation Officer, Yayasan Sabah, P.O. Box 11623, Likas Bey 88817, Kota Kinabalu, Sabah, Malaysia; FAX (088) 422410.