Entomological Collection Management - Are We Really Managing?

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Collection management is one of those phrases we all know and generally support, but are we really effectively managing our large insect collections? It is my contention that instead of collection managment, we tend to practice a system of "*ad hoc* management", that is, dealing with problems as they become apparent and seem important at the time. Modern managment practices involve 1) clarification of organizational mission, 2) general data gathering and problem identification, 3) establishment of priorities, 4) solution development and implementation, and 5) problem monitoring, with all of the above based most productively on mutual trust and effective communication between involved individuals and organizations. I find all of these important managment elements generally lacking in the entomological museum community.

A fundamental exercise for any organization is to define its "business". In many organizations this business is often documented in a mission statement, something that often seems pointless and even dangerous to natural history museum curators. However, as D. Griffin, Director of the Australian Museum, emphasizes, museums and other non-profit organizations are nevertheless organizations and must function accordingly if they are to realize their full potential for success [D.J.G. Griffin, Managing in the Museum Organization, I. Leadership and communication. The International Journal of Museum Management and Curatorship (1987) 6:387-398]. Too often, entomological collections seem to be run like stamp collections with the primary goal apparently being that of obtaining more bugs to build a larger bug collection, irrespective of research utility. This reality or even this perception by higher administration and funding agencies has potentially deleterious consequences for the entomological museum community at large. No one museum can or should attempt to excel in all taxa and geographic areas. This is as true for the larger collections at the British Museum, Canadian National, Paris Museum and Smithsonian Institution as it is for smaller university or private collections. Priorities need to be established and communicated. Curators must clearly articulate why and how collections should grow, and always do so in the context of collections and research resources. This should be presented in a written statement of mission and goals.

General data gathering and problem identification in large insect collections can be difficult. What are collection problems? How can we even talk about these problems once they are identified? Is it possible to describe the "health" of a collection, and if so, formulate a system that also suggests solutions? In 1985, the Smithsonian's Entomology Collections Committee addressed these issues and slowly developed what is now becoming known as the Smithsonian Collections Standards and Profiling System. This is nothing more than a numerical coding system that identifies the curation status of the basic storage units commonly used in insect collections, i.e., insect drawers, alcohol racks, slide boxes, etc. The following curation standards are those of common concern for most museum collections, from insects and plants to Indian artifacts.

Level 1. Conservation Problem. A storage unit having any potential conservation problem is recorded as a level 1 problem. These are "red flags" to the curator in charge, identifying a collection unit in need of immediate attention. The problem could be one of physical curation, i.e., evidence of museum pests, rusting pins, crystallizing slide media, evaporating alcohol levels, etc., or one of potential information loss, i.e. fading labels, or unlabeled specimens sorted in the general collection, associated only with lost collecting data. Unprepared material in bulk storage is not considered in this coding system at the Smithsonian; such material is considered part of our backlog and not a part of the general standing collection.

Level 2. Unidentified Material, Unsorted and Effectively Inaccessible to Research Community. Material sorted to only major (usually suprageneric) groups which are not readily available to either in-house research or for loans or visiting scientists.

Level 3. Unidentified Material, Sorted and Effectively Accessible to Research Community. Material sorted to "loanable units" (usually genera; family in small groups), sufficiently refined to be optimally accessible to research specialist for study. The taxonomic category reached will obviously vary among different taxa - Protura sorted to Protura will be fully accessible to the proturan research community (any special cases should be noted on the inventory data sheets).

Level 4. Material Identified to the Species Level, Not Incorporated into General Collection. Valuable material that has been studied by specialists and identified but not yet put away - effectively inaccessible.

Level 5. Inadequately Curated Material, Not Meeting Departmental Standards. Material all identified and integrated. However, these collection units are substandard in terms of physical curation, i.e., specimens need to be transferred from hard bottom to soft bottom foam trays, species names checked, header tray labels prepared and applied, etc.

Level 6. Physical Curation Complete, Meeting Departmental Standards. Material all identified and properly integrated - housed in soft bottom foam trays; unit tray header labels an drawer labels completed; geographical codes added; proper spacing left for additional identified material.

Level 7. Physical Curation Complete, Species Level Inventory Complete. Collection units properly curated with associated captured listing of species representation including approximate or exact number of specimens recorded, geographic area of representation (Nearctic, Neotropical, etc.), misc. remarks, etc.

Level 8. Physical Curation Complete, Individual Specimen Label Data Captured. For large insect collections, practical only for primary types, voucher material, and research collections of staff or collaborating scientists.

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Level 9. Physical Curation complete, Specimen Label Data Captured, Research Data Captured. Specimen measurements, graphic images, etc. associated with specimen database.

This numerical sequence does not represent a direct linear sequence of collection quality. Based on this system, a dynamic and high quality collection should have a bimodal profile with peaks at level 3 (specimens accessible) and level 6 or beyond, with a healthy representation of incoming unsorted material level 2 and recently identified material level 4.

At the Smithsonian Institution, Entomology collection information is recorded on standardized data sheets, with one form for each insect case (or other storage units) representing the matrix of insect drawer by curation level. These data are summarized and entered into a dBase-III system that is linked to an Apple Macintosh Hypercard program for graphic output. With this system collections can be "profiled" at the ordinal level, family level or any other useful categories. Problems can be clearly defined and collection improvement documented. Common questions are: 1) isn't it prohibitively time-consuming to collect the initial data, and 2) isn't it too much trouble to continually update the database? The answer to both questions is definitely "yes" if they not carefully considered. The efficient method of gathering data, especially for large collections, is to organize groups of people, make sure all are clear on what the standards are, and then simply "blitz" the problem. In August 1988, the Smithsonian Hymenoptera collection of 5,152 drawers was reviewed by 10 hymenopterists and associated personnel in approximately three hours. Updates are performed only upon completion of significant curatorial projects.

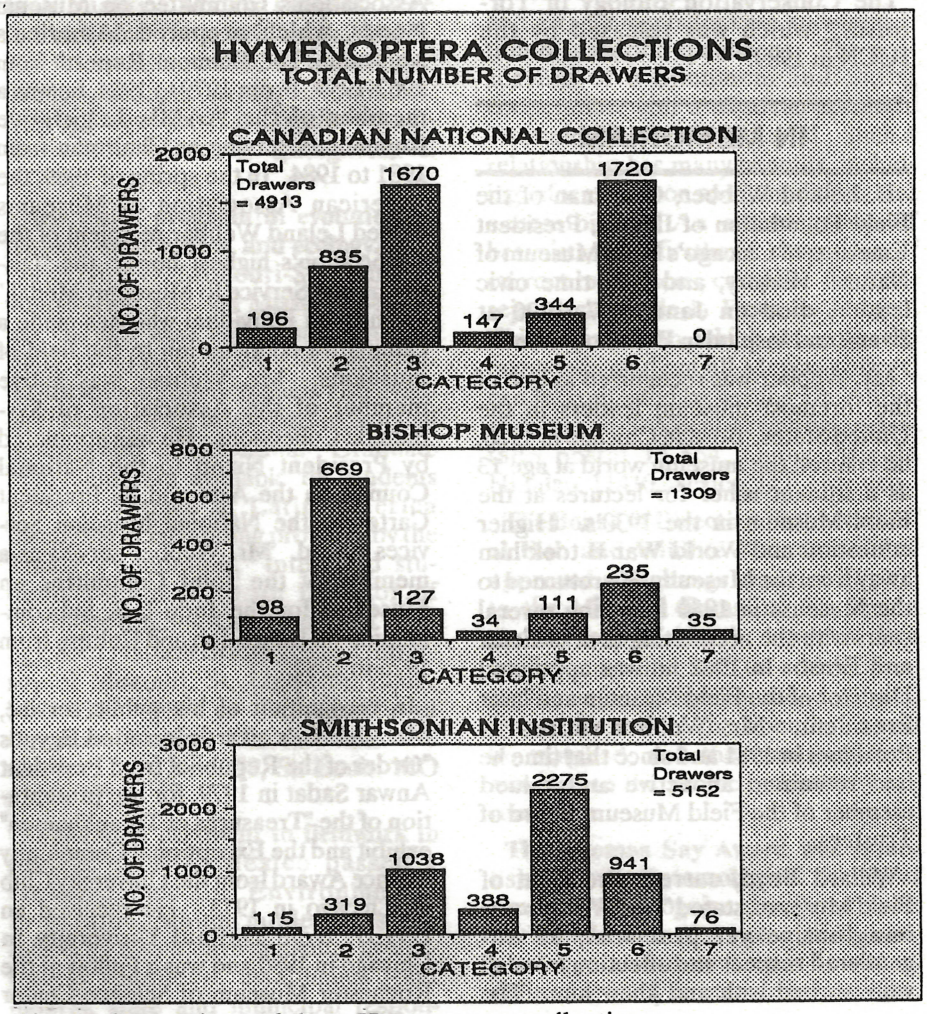

Fig. 1. Comparison of three Hymenoptera collections

The gathered data allows one to assess the status of collections both internally and relative to other similar collections in the community. For example, the need for visiting specialists is clearly supported in the Bishop Musuem profile of Hymenoptera collections where there are 669 drawers of valuable material and no staff hymenopterist. A graph of this situation (Figure 1) was used by Scott Miller to obtain funds from Director Donald Duckworth that allowed the instructors of the 1988 Parasitic Hymenoptera Workshop held in Hawaii to stay on and help sort this material.

While the system described herein is a potential tool for internal management and decison making, it can be equally valuable in convincing administrators and funding agencies that we know what our collection problems are and how they potentially relate to research priorities including such issues as "biodiversity". My goal is to help establish a collection vocabulary that promotes clarity in collection management. The issues of conservation, accessibility, physical curation and information management are common to us all in the museum environment.

Systematics Bibliography Available

Systematics: Relevance, Resources, Services, and Management: A Bibliography. Lloyd Knutson and William L. Murphy. 1988. 56 pp. of references plus introduction. $9.50 including postage and handling.

This book includes references on descriptive taxonomy, theoretical systematics, analytical and synthetic studies, and non-morphological biosystematics. It emphasizes but is not limited to collections-based research. It provides references that document the relevance of systematics and the importance of supporting systematics collections. This book is important to those who must justify their programs to administrators and policy makers. Order from: ASC, 730 11th St., NW, 2nd Floor, Washington, DC 20001 (202) 347-2850.

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National Institutes for the Environment Proposed

An *ad hoc* committee of ecologists and systematists has been formed to work for the creation of a National Institute(s) for the Environment. The Institutes would do for environmental science what NIH does for the medical sciences. The effort comes at a time when legislation to elevate the Environmental Protection Agency to a Department with Cabinet status is moving rapidly through Congress. Although the NIE proposal was conceived separately from the EPA bill, both call for a center for environmental statistics and both would require a review of federal research efforts in environmental biology.

Institutes created under the NIE would include an Institute for Biotic Resources that would support inventory of biodiversity and research in taxonomy, systematics, biogeography, ethnobiology, natural products, *ex situ* conservation of plants and animals, and conservation of germplasm. Elaine Hoagland of ASC has written the draft of an executive needs statement in support of this institute that is a part of a larger document forwarded to the House Science Committee and Senate committee staffers.

There are some dangers in this approach. First, it must not jeopardize existing environmental research programs in other federal agencies and at NSF. Second, the *ad hoc* committee encourages extramural support of science rather than in-house research by national laboratories, and does not want the NIE idea simply incorporated into an EPA that has little experience funding peer-reviewed extramural projects. If the EPA is to become a Department of the Environment and is to take responsibility for applied biological research in ecology and systematics, there is much growth and re-direction of thinking re-

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Biodiversity Initiatives Abound in Washington

Focus on the Biological Diversity Crisis continues in 1990 in Washington, DC. Although some scientists have been afraid that "biodiversity" was just a catch-phrase, interest in the loss of natural resources and in the degradation of the environment continue among policy-makers and the press. According to one science policy expert, "the systematics community has its act together, as witness the incorporation of biological diversity into the daily thinking of [policy planners]." Release of a major report on research needs in biological diversity by the National Science Board of the National Science Foundation in 1990 solidified the importance of biological diversity as a key field in science.

Addressing the Shortage of Systematists

The issue of training systematists and placing them in jobs is reviewed in the National Science Board's report, as well as ASC's 1989 report on Systematics Resources for the 1990's and our 1989 survey on educational programs in systematics. The reports lament the declining number of professional systematists employed by universities in the United States in view of the increasing need for experts on biodiversity. In 1989, ASC was contacted by reporters from several national journals and by the Science Supplement of the New York Times for information on the shortage of systematists to study the earth's biota. This interest demonstrates the public concern and support for systematics.

ASC will sponsor a workshop on "Training and Job Placement of Systematists" at the 1990 International Congress of Systematics and Evolutionary Biology at the University of Maryland on the morning of July 3, 1990. The workshop will provide reports on systematics as a career in Brazil, Peru, Pakistan, Mexico, Western Europe, the USSR, England, Canada, and the United States. Fulbright and other exchange programs will be discussed. Potential support from foundations and conservation groups for joint international training programs and infrastructure development in systematics will be explored, along with the potential for convincing national governments to support taxonomic/systematic research positions.

Results of the workshop will be used by the "Gift to the Future" project sponsored by the World Resources Institute, IUCN, the United Nations Environment Programme, and others. The project aims at "developing a worldwide strategy of action to save, study, and sustainably use the world's biological diversity."

One idea for increasing positions in taxonomy and systematics in the United States has come from the Public Affairs Committee of the American Society of Zoologists (ASZ). Carl Gans, vertebrate morphologist from the University of Michigan, initiated the effort to interest legislators in a program that would fund 100 faculty positions in systematics of poorly-known and understudied taxonomic groups, particularly invertebrates and nonvascular plants. After circulating several versions of his proposal, Carl hosted a meeting at the ASZ on December 30, 1989 in Boston. Forty persons attended the meeting, and a drafting committee was chosen based on responses to the circulated drafts and interest expressed at the meeting.

The sense of the ASZ Committee meeting was to present a proposal for federally-endowed faculty positions in systematics that would include responsibilities for systematics research, training of students, and service to the community. Institutions would choose whether they intend to co-sponsor one

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