

## THE OBJECTIVES OF A MUSEUM ENTOMOLOGY DEPARTMENT

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My subject is "The Objectives of a Museum Entomology Department." A few qualifications are necessary at the outset. I speak of a *museum* department, and of an *entomology* department. Some statements may have broader implications, and if they do, so be it. But some may have narrower meanings, and I may not always repeat the qualifying expressions. Remember that my basic subject concerns a *museum entomology* department, and particularly the Department of Entomology at Bishop Museum. For historical, geographical or other reasons, some remarks will obviously not apply elsewhere. I should also state that the views expressed here are personal and not official. I am always amused at seeing such a disclaimer on descriptions of new species, or similar innocuous material. However, since I am here discussing administrative and policy matters, a disclaimer of official views is appropriate. Some may consider that it is retrogression for a taxonomist to discuss administration; but for one who has spoken most often on the subject of zoological nomenclature, even the subject of administration is a welcome change for the better!

One final warning: Although I am officed at a great museum, I am employed by the Department of Agriculture. Since I am not, technically, a museum worker, I can of course speak with authority and freedom on the subject of museums. This accords with George Bernard Shaw's famous dictum: "He who can, does; he who cannot, criticizes."

At the risk of sounding facetious, I will say that the first and most immediate objective of the Department should be to decide upon its objectives. It should decide where it wants to go and what it wants to achieve. Flexibility is fine, but one should not confuse drift with flexibility. In particular will the Department need to consider objectives in the light of funds and personnel, both number and kind. A long-range program should be worked out as soon as possible, with priorities established, and with a projected series of sequential steps that might be effectuated from time to time, as money or personnel or both become available.

I suggest that a committee on long-range policy be established at once, and charged with working out such objectives and general plan, and that the "thinking job" be actively pursued in the weeks immediately ahead. It is all too easy to become so occupied with and so overwhelmed by the daily chores of curating, identifying, supervising, etc., that one lacks the time for reflection and imaginative consideration of broad aspects and long-range possibilities and objectives.

What should and what can this Department achieve and represent to the United States, to the Pacific region, to the world? Answers to these questions will do much to determine future activities, expeditions, exchanges, direction of growth of the collection, personnel, etc. Above all, you must soon decide, on the basis of projected availability of funds and staff, whether you wish to aim at being all things to a few, or a few things well to all, or all things to all people.

Now let me explore a few areas of possible objectives, in the hope that some helpful

and suggestive ideas may result. I shall group my remarks under the major categories of Collection, Library, Publication, and Staff, with emphasis on the first.

#### THE COLLECTION

I believe firmly that the primary responsibility of any museum is to *preserve*. I recognize that some modern versions make it an educational institution, a physiological laboratory, a rainy day nursery school, a midtown snack bar, or other things. These are not necessarily evil; some are more or less inevitable; any may be included among the objectives of a museum, or of some departments of a museum. But if a museum is only those other things, it is no longer a real museum. I reiterate my basic thesis that the primary responsibility is to preserve: To accumulate, maintain, and conserve a documented record of something, if I may broaden the term "document" to include any kind of material evidence, including specimens.

This responsibility will involve far more, in the long run, than sending out more expeditions to collect more material to publish more papers to require more journals. Faunal surveys, as well as floral, of course, are indeed necessary in the beginning, as is much alpha taxonomy. These may long be a necessary part of the program, in a region where there are still many unexplored or poorly known areas. They can also be continued as adjuncts to studies of the faunal elements themselves, after the general composition of the fauna has been established reasonably well.

I suggest consideration of a regular program of field stations, each to last for 6 months, a year or 2 years, with supervised nationals as assistants. The program should include the rearing of insects, study of host plants, parasites, ecology, life history, immature stages, and any other subject that can be developed. Brief collecting trips—hit-and-run entomology—are too short for this kind of work, in general. The field of immature stages is, I strongly suspect, one of the big gaps in the knowledge of Pacific insects, and one of the big lacunae in this collection, as in most collections for that matter. Remember that the four major orders, Coleoptera, Lepidoptera, Hymenoptera, and Diptera, which together comprise 84 percent of the world's insect fauna, have complete metamorphosis. This means that there are egg (usually), larval, and pupal forms to be associated and described, and more than one instar of larvae when you get down to details. At the minimum, then, there are probably three times as many forms as adults still unrecognized and uncollected, after publication has been completed on the "Insects of Micronesia," and perhaps even after complete publication of the better known "Insects of Hawaii."

I believe that such a study program should be started early. It can make additions to the known fauna incidental to its study activities. It can provide for exploration of little-known niches, and can be continually alert for the rare species that turn up only at infrequent intervals even in well explored regions.

It is easy—and there is perhaps a tendency for this in the far-flung Pacific region—to keep traveling to the far off places, to collect more and more from farther and farther away, when the near at hand has not been thoroughly investigated. The Bishop Museum has carried out over a long period some admirable and useful and energetically executed programs in Guam, the Marquesas, Micronesia, New Guinea, the Antarctic Islands, and others. Yet here at home in Hawaii, the native fauna was fast being exterminated and re-

placed. Untouched reserves of endemism have already gone beyond recall or record. Elmo Hardy's studies of *Drosophila* and Dolichopodidae, with hundreds of undescribed species, show that the Museum's own backyard was still a fertile field for exploration, at the same time that expeditions were being sent to distant regions. Do not neglect Hawaii. It too is a part of the Pacific story, and not merely America's peephole to the South Pacific.

Material already collected must be worked up and woven into the fabric of organized knowledge, in order that proper planning can be done on where best to seek future collections. Granting agencies have a responsibility here. It is or has been easier to get money to go out and collect more material, than to work up collections already in existence. The U. S. National Museum still has bottles of unworked material from the Philippines from the cruise of the "Albatross" in 1907-10, and too many similar examples could be cited.

I shall not dwell on the details of the collection itself. There will be many problems of normal housekeeping of a museum, and some will be linked to the long-range objectives of the Department. Certainly the maintenance of the collection and its increase in value as a working tool and a reference work both for ordinary identification work and for broad systematic studies are important considerations. Perhaps in that distant future super-jet age—far distant, we hope—when the Pacific Islands have become bedroom suburbs for Honolulu, Tokyo, Hong Kong, and Australia, we shall appreciate a museum of the antiquities of the 20th Century!

Mention of identification work brings to mind the proposition of developing here an identification center for the Pacific region. The advantages and disadvantages should be very carefully weighed before such a project is attempted. Beware all ye who enter here! If you do not do it well, it is better not attempted at all. If you do it well, be prepared to be swamped, on the principle of the better mousetrap. Develop a good identification service, and the postman will beat a path to your door. I assure you that I can speak with authority on the subject of being swamped!

The amount of work is not necessarily a deciding reason against such a development. An identification service may be a necessity, a duty, an obligation to fellow scientists, especially to those to whom you are indebted for help and for material. But do not attempt such a service unless you are fully prepared to maintain a staff adequate to give prompt and authoritative identifications in only a *part* of their time. Beware that the work load does not grow and crowd out other legitimate activities which are also proper objectives. An identification service can become a tiger whose tail cannot easily be released.

The direction of growth of the collection will be determined in large part by the nature of the objectives. Naturally, this collection will be expected to cover the Pacific region. Are your taxonomists to work also on a broader basis? If so, your collection needs will be broader. It is too grandiose, however, to hope for—or to handle—good series of all the species of the world. Perhaps it is even a bit too much to hope for adequate coverage of the Pacific region and its perimeter, but this must surely be an objective for this collection. Beyond that, aiming at a collection of type-species of genera would be reasonable, and would be important. Material for a publication that does require broader knowledge can of course be borrowed or exchanged. A specialist can also be sent to another museum that has a large collection of the group in question. Broadly based studies need not necessarily mean mounting expeditions to other regions, yet in fact some may be desirable or

even necessary. It may be far more productive of good material in adequate series to go to selected areas oneself than to laboriously work out exchanges for a small amount of old and sometimes decrepit specimens. A few well-aimed expeditions, coupled with museum visits and consultations with specialists, could be most fruitful. Purchase of collections can also be useful, when the material is authentic and is authoritatively determined.

On the loan of types, I favor a liberal policy. Naturally, one must exercise reasonable precautions, such as registry of packages, one or few types at a time, and only to responsible institutions and individuals, in countries where climate and political conditions are favorable. I envision a time when type collections will also be moved around to where they are more accessible to specialists. North American types would be far more useful in North American institutions, for example, because almost all taxonomic work on the Nearctic fauna is done by North Americans. Not all problems are so simple, of course. One might argue that the types of early expeditions to Hawaii should be moved here, but sometimes the specialist on your orders or families is far from Honolulu. For such situations, a liberal loan policy will do much.

#### THE LIBRARY

Next to the collection in importance is the library. I would not have a library—as such! Let me explain.

The world of tomorrow, as it is now developing, threatens to become a vast expanse of supermarkets, cemeteries, and libraries. (Museums are included under cemeteries!) You have heard of the publication explosion, or the information explosion, which will be further aggravated by the population explosion. Libraries cannot expand fast enough to keep up. Adequate coverage is a serious problem. Problems of indexing and abstracting, of storage and retrieval, are subjects of widespread concern and frequent conference. Where are we heading?

We cannot disregard or throw away the accumulated knowledge of the past, the written records of man's experiences and observations. There is a duty to preserve literature as well as to preserve specimens. Old reports, as well as old collections, may be our only record of what used to be. We cannot, as I see it, dispense with collections, but we may be able to dispense with conventional libraries as we know them today. I will go further. I would recommend giving serious thought at an early date to devising ways of doing without one, before the investment becomes so heavy that vested interest and the inertia of accumulated mass outweigh other considerations in any planning for the future. It seems to me most important that the Bishop Museum and this Department, situated as they are far from old library centers and faced with the increasing difficulty of obtaining old literature, should consider ways of developing their information center in a form that they can utilize most efficiently and make available readily and cheaply to others in the Pacific region.

It is also most important that the literature be as close as possible to the working specialist. Work proceeds most efficiently if the specialist never has to go to the library! With present conventional methods of publication, this means that he must have in his office or laboratory the relevant books, plus reprints (or photostats) of those articles that were scattered in journals. In this way, one can avoid the time loss from internal commutation, a point referred to by Dr Smith in the opening discussion of this program. But

this book-and-reprint system still occupies a great deal of space, repeated over and over again in many offices and departments and institutions.

I would dream of the time when any library could have the entire world's literature in its field on microcards in a few card file drawers; when any taxonomist might have, in a few card files on a corner of his desk, all the literature in his field, with a handy desk-size reader, and with attachments that would permit him to scan pages rapidly, to shift easily from page to page or line to line, and perhaps to juxtapose plates from two different papers for direct comparison. Think of the saving in library space, of journal subscriptions, of inter-library loans, of reprint files, and the mailing of reprints. Developments are coming fast in this field.

The magazine "Time" recently carried an article on data handling, describing an exhibit at the New York World's Fair. The entire Bible, both Old and New Testaments, in all 1,240 pages and 750,000 words, was reproduced on a 2-inch square sheet of plastic. One million pages can be placed on a stack of 3×5 cards about 4 inches high. All the books in the mammoth Library of Congress could be reproduced in that way and packed into 6 ordinary filing cabinets. These are modern miracles of miniaturization.

Key-sort cards, one taxon per card, were recently published as a pilot project by W. L. Brown, Jr., of Cornell University. These approach the problem in a different way, emphasizing ease of filing and organizing information. The approach is by conventional printing, but it would avoid journals filled with a hash of miscellaneous articles.

It is not easy to decide what is best to do, to adopt. But in this fast-moving age of electronics, computers, lasers, and communications satellites, conventional libraries impress one as being of cracker-barrel vintage by comparison. A really serious problem also for a museum department is that what it buys this morning may be obsolescent this afternoon and obsolete by tomorrow, figuratively speaking. An industry can retool every year, and the cost is absorbed (shall we say!) by the consumer. Museums have no such out. Many of us know full well from our experience with antique microscopes that capital investments live on and on in active use in the world's museums.

No matter how difficult the choice, however, something must be done about libraries, lest they push us into the street. We must have the recorded information, but do we need it in the traditional form? Even though the method we adopt may be superseded by still more improved methods, I believe that we must soon adopt some better method of storage and retrieval than the old-fashioned type of library. Some progressive step is badly needed. We cannot continue to stand still, while the morass of publication becomes ever deeper around us. Let the Department be alert and receptive to the latest developments, and do the best it can at planning for the future.

#### PUBLICATION

Discussion of libraries, data handling, etc., naturally leads to the subject of publication by the Museum and the Department.

In a period of transition, perhaps one can only continue as he has until the road ahead becomes clearer. This is especially true if one's present publication program is satisfactory. But in the long run, should "Pacific Insects," for example, disappear in favor of species-by-species publication in the style of Brown's cards? Or should it continue, but only

contain brief notices of new taxa—the diagnoses—with details reserved for cards, available to those interested? Should we reverse our field in publication, and publish abstracts first, in present conventional journals, and then file the complete papers, to be sent on microcard on order? Among other advantages, we could file complete drawings and photographs (including color slides), which is more than one can usually afford to publish.

I have no immediate answers, but by all means let us be flexible and alert, especially in mind. The modern world is no place for people with set ideas. No doubt present conventional publication methods will continue to be desirable for reference works, such as catalogs, gazetteers, check lists, dictionaries, and perhaps monographs and keys. But scattered species descriptions, redescription, new names, new synonymies, and similar material may better be handled in other ways. Again, modern developments are changing the face of things rapidly. Publication format can and in many cases will be linked with developments in storage and retrieval.

#### THE STAFF

Staff is always important, and in a smaller staff, the choice of individual staff members is of greatest importance. They should be chosen with the objectives clearly in mind, and chosen with appropriate interests and talents, or adaptability that gives promise. A small staff can ill afford to take a chance on the untested, or to be stuck with misfits.

It is vital that the small staff be congenial, and yet be competent and creative. It does sometimes appear that the most is accomplished by the aggressive, the uncongenial, the sandpaper-tempered. Most of the great museums and universities have in the past had their share of abrasive characters. Some have had first-class ones, and some only second-class. Some have even had to make do with cheap imitations! I would not necessarily hold such a personality against a demonstrably creative individual, but the whole situation must be evaluated. Remember that accomplishment by such individuals is sometimes achieved at the cost of a negative effect on colleagues and outside contacts that in the long run may react against a department and outweigh the positive gain from the strong individualist. However, a strong member can be a stimulant, a challenge, a driving force; or he can be a wedge of discord and disunity and disruption. Much depends, in many an organization, on the leader and his personality and his administrative and supervisory policies and practices.

I would recommend a regular program of visiting staff members (specialists), with perhaps one position reserved for rotation by 3- to 6-month periods, or even a year or two, to develop neglected or poorly covered orders or families, to place the collection in order, and to collect by specialized methods.

One decision that should be made early is the proportion of specialists and supporting staff, *i. e.*, artists, preparators, catalogers, etc. I plead for consideration of an adequate supporting staff. It is inefficient—worse, it is a ghastly waste—to hire admirals, but give them no one to row the boats. I have done a lot of my own boat rowing in my time, and it has not left me with any feelings of satisfaction or accomplishment. It is idle to say: Refuse to do it. If one does not do some, one is soon swamped: Reprints unfiled, species uncataloged, new species unmounted, material unlabeled, identified material undistributed. One must thrash about occasionally just to keep afloat. Furnish enough sup-

porting positions, and make them worthwhile—positions to which the workers can give skilled service and loyalty, for compensation appropriate to the tasks.

In the immediate future, it may well be that the Department's objectives, like politics, will be an art of the possible. Regardless of limitations or difficulties, now is the time, with the opening of this splendid new research building, to dream dreams, and to plan plans, and to determine objectives!

**Gressitt:** Thank you Mr Sabrosky. I think these have been very stimulating words. Have you some comment, Dr Quate?

**Quate:** I think Mr Sabrosky has touched on a good number of problems that many of us here have thought about. I would like to ask Mr Sabrosky's further comment about the matter of insect identification, since he has been associated with this. The question is, as we are building up these large collections for the Pacific area, working in countries that have no, or very few, entomological services, are we becoming obligated to render identification of insect material? Is it something we can pass off, or are we becoming obligated? As this becomes a financial matter, has there been any thought among systematists of your acquaintance of having a service fee for identifications?

**Sabrosky:** My organization is tax supported and must furnish identifications. Bishop Museum is in a quite different position. You have the opportunity to decide whether you are going to be a research organization and improve systematics irrespective of any obligation to a research man. However, the obligation may be great, and the problem might become endless. You may be forced into it to some extent. Fees are a possibility. It is done in Washington for soil testing, etc. Some museums charge pest control operators for identification.

**Gressitt:** Actually we have solicited suggestions from Dr Sabrosky from time to time and some of this present valuable advice we have used in the past, as well as some from others like Dr Usinger. We have a field station in New Guinea and have developed a concentrated program there over the last eight years. As to collection of immature stages, we have been encouraging our field participants to do this and to get host-documented (host animal or host plant) material both of adults and immatures. The next step of further associating and getting complete life histories or stages of these in the field will require much ecological work in the future. We have made some starts, and have plans for the future.

Our next speaker is Robert Traub, retired Army Colonel and now Research Professor of Entomology at the University of Maryland School of Medicine. We are particularly grateful to Dr Traub because he is stopping here today on his way to Pakistan where he is carrying on an extensive field program connected with scrub typhus and related research. Dr D. Elmo Hardy of the University of Hawaii will act as discussant. Dr Traub.