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ECN MEMBERSHIP FORM

GENERAL NEWS

ECN Business Meeting
Indianapolis, 12 December 1993

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The business meeting of the 1993 Entomology Collections Network (ECN) was called to order by Chair Michael Schauf at 10:00 a.m.

First order of business was election of two new Steering Committee Members to replace outgoing members Mike Schauf and Steve Ashe. David Wahl (American Entomological Institute, Gainesville) was nominated by John Morse and seconded by John Polhemus. Larry Speers, Agriculture Canada, Ottawa) was nominated by Jim Woolley. Seconded by Steve Ashe, no further nominations were made from the floor.

Steve Ashe moved that the nominations be closed - seconded by Larry Speers, the motion passed. Call for a vote on the nominations was made by the Chair - seconded by Morse, both nominees were approved on voice vote. Wahl and Speers join John Morse and Ron Hellenthal as members of the ECN Steering Committee for 1994.
A resolution supporting the North American Checklist of Insects was read. After discussion, the resolution was slightly amended. A motion was presented by Mike Ivie to accept, seconded by Jim Woolley and passed.

A second resolution on standards for Bar-codes was read. Minor changes were discussed and accepted. A motion to approve the amended version was made by Steve Ashe and seconded by Jim Whitfield. The amended resolution was approved by voice vote.

A letter drafted to Secretary Babbitt supporting the National Biological Survey was read by the Chair. After some discussion, a motion to accept was made by Ron Hellenthal and seconded by Jackie Miller. The motion was passed by voice vote.

The Chair noted that there was sentiment that a membership list be formed as a means of formalizing who and what institutions belonged to ECN. After discussion, a motion was made to send membership applications to all on the mailing list and any other interested individuals or institutions. Mark O'Brien moved to accept, seconded by Larry Speers. The motion was approved on voice vote.

A proposal to form a Public Affairs Committee was made. After some discussion a slate composed of Jackie Miller, Mike Ivie, Scott Miller, Chris Thompson, and Mike Schaff was put forward. Steve Ashe made a motion to nominate those individuals, seconded by Margaret Thayer and approved by voice vote.

Larry Speers asked for suggestions for the program for the 1994 meeting.

Meeting was adjourned at 11:05 a.m.

**Entomology Collections Network Annual Meeting, Dallas 11-13 December 1994**

Hosted by: Dallas Museum of Natural History

Meeting Site: The 1994 Annual Meeting of the Entomology Collections Network will be held Sunday evening, Monday, and Tuesday morning, December 11-13, 1994 at the Dallas Museum of Natural History, Dallas, Texas. This is just prior to the Annual Entomology Society of America meeting in Dallas which begins on Tuesday the 13th at the Loews Anatole, Dallas.

Registration materials and additional information will be mailed in Mid-September. Please pass this notice along to colleagues and other interested parties.

Anyone wishing registration materials who is not currently on our mailing list should contact: Larry Speers, ECN Steering Committee, Centre for Land and Biological Resources Research, Agriculture and Agri-Food Canada, K.W. Neatby Building, C.E.F., Ottawa, Ontario, Canada K1A 0C6. Phone 613-957-4347 Ext. 7319 FAX 613-947-5974; SPEERSL@NCCCOT.AGR.CA.

A block of rooms has been reserved for ECN registrants (Dec. 10-16) at the Marriott Courtyard, 2150 Market Center Boulevard, Dallas, TX, 214-653-1166. This hotel is right across the street from the Loews Anatole (the ESA meeting hotel). Special Group Rates: Single - $59.00 with breakfast; Double - $65.00 with breakfast. Shuttle service between the hotel and the Dallas Museum of Natural History has been arranged. Reservations should be made prior to Nov. 16, 1994, by contacting Gabrielle in the Sales Office and identifying your association with the ECN. After Nov. 16 the block of rooms will be released.

**Tentative Program Outline:**

- Specimen level databases
- Impact on collections of restrictions on naphthalene and PCB
- Networking collections data
- Priorities for Research on Fluid Preservation
- Update on the Lacey Act
- Committee reports
- Business Meeting - Election of Officers

NOTE: See Entomology Collections Network Membership Notice on the last page of this issue of ICN.

**Bar Codes for Specimen Data Management**

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Systematic Entomology is built on massive collections of specimens and associated data. Where other disciplines have collections of a few thousand specimens, entomology collections typically contain millions. These numbers mean greater problems, but are the source of greater promise. Terrestrial arthropods provide more data points as there are more clades, species and individuals with longer histories and broader variation. Terrestrial arthropods are the glue that binds ecosystems together. So, for Society we need to manage the data associated with our entomological specimens efficiently and effectively, so we can benefit from information derived from them (McGinley 1993).

The world is changing, people are more interested in the environment, worried about climate change, loss of biodiversity, and other matters for which much of the scientific data are ultimately derived from museum specimens. Appreciation of this has lead to increased concern about, and unfortunately regulations for, biological specimens. Authorities are now demanding that accession history of a particular specimen be documented to ensure that each and every specimen was legally acquired (Lacey Act). Nations value their biodiversity and are granted legal rights to it by the Convention on Biodiversity. Some are, and more will demand that biodiversity information, if not the specimens from which it was derived, is
repatriated. The impact of these matters will be great on entomology.

All biosystematic information is derived from specimens. Objective, scientific results require that observations can be repeated. So, for biosystematics, there is a need to tie the data derived from a specimen to that particular specimen. Traditionally this has meant that specimens have unique identifying numbers. Unfortunately, due to the high costs and the large number of specimens involved, entomologists have been reluctant to individually number specimens. Today for legalistic reasons alone entomologists must begin doing this. Barcodes while still expensive allow for the identification of individual specimens and greatly reduce the cost of subsequent data handling. Many organizations have now begun bar-coding specimens as they are initially labelled (prospective data capture, see Thompson 1990). However, there remains a large backlog of existing specimens that do not have bar codes or other unique identifiers. So, as these existing specimens are handled in the course of research activities, they should be bar-coded so that the scientific observations can be easily verified (retrospective data capture, Thompson 1990).

The problem of prospective data capture has been solved by one collection (INBio; Janzen 1992). As new material is processed, bar codes are attached as part of the labeling process. The data on locality, time, collectors, etc., are captured when the print order for the labels is generated. Now anyone working with INBio may get these data electronically and need not re-keyboard them. Some of us are working with INBio specimens and get these data on floppies when we borrow the material. However, INBio is on INTERNET and soon one should be able to get the data interactively. The INBio approach is fast becoming the standard. The University of Georgia has adopted it and the Bishop Museum is considering doing so. So this approach is recommended to the Entomological Community. Billions of keystrokes will be saved in the future by doing so now.

Gary Hevel estimates that about 100,000 specimens are labeled each year for the USNM. At this rate, the annual costs for bar code labels would be about $2,000. There are probably 60-100 characters per label. I estimate that I extracted label data from more than 4,000 specimens this past year for my research. Bar coding would have saved me a quarter million or more keystrokes. Multiply that by the number of scientists using USNM material and billions of keystrokes saved over the years is probably a conservative estimate.

The problem of retrospective data capture can be solved by using a similar approach. We (Entomological Collections Network; Thompson 1990) endorsed the view that retrospective data capture should be done as part of the research process. When researchers study previously collected specimens, they capture the specimen label data. Terry Erwin (and a few other scientists) has been doing this for years for his various projects (Erwin 1976). Each specimen that is handled, new or old, gets a unique ADP number that links the specimen to Terry's electronic data record. In the past, scientists linked specimens studied to their work with determination labels. Unfortunately, determination labels did not UNIQUELY identify a specimen with individual observations (these being, for example, a character state noted, measurement, etc.). Combining the Erwin ADP number idea, the traditional determination label and the INBio Bar code approach can generate a solution to the retrospective data capture problem. As the researcher captures specimen label data from old material (that is, material without bar codes), the researcher would affix a standard bar code.

To make this work effective, the community and organizations must set standards and policy. Such standards and policy are outlined below with the resolution passed by ECN. The hardware needed to implement this approach is also briefly described.

Bar Codes for Entomology would consist of an unique ALPHabetic identifier followed by a sequential number. The unique identifier is the key to the organization and/or person that captured the data. Community standards for such organizational identifiers exist and will be followed. USNM, for example, has been accepted as the standard acronym (abbreviation) for National Museum of Natural History. This should be modified as USNM ENT to uniquely identify the entomological collections. The Systematic Entomology Laboratory is uniquely identified as USDA SEL. Terrestrial arthropods are small, so there isn't much "real estate" associated with a specimen to which to attach a bar code. Hence, for Entomology there are two important considerations for Bar Codes: That they be as SMALL as possible and that there be only ONE per specimen. The bar code known as Code 49 fulfills these required.

Organizations will have to accept the responsibility for specimen label databases, seeing that their data standards conform to community standards and that the data are accessible to all qualified users. At the moment, there are various data models and standards for specimen label data. Essentially these are all the same, allowing for storage of the basic data elements ALREADY mandated by our ADP Standard for Systematic Entomology (locality including coordinates, date, collector, and additional data as appropriate; Thompson 1990).

Sources of bar codes and bar code scanning equipment. The smallest bar code in the public domain is Code 49. At the present only one company (INTERMEC) prints these bar codes and provides scanners able to read them. The approximate costs of the initial order of 150,000 labels is about $2,700, with subsequent orders some $500 less. The scanner and associated peripherals to attach it to either a MacIntosh or PC computer runs about $2,200. The scanner is attached between the keyboard and the computer, so it acts merely as an extension of the keyboard. Check your local yellow pages for details on INTERMEC. If you can't find a local sales office or they need further information, then contact William McKenna, 3 Bala Plaza, Suite 117, Bala Cynwyd, PA 19004, (215) 668-2075.

References:


Entomological Collections Network
Bar Code Standard Resolution

Whereas Society is increasingly concerned with biological diversity and the sustainable use thereof;

Whereas Terrestrial arthropods provide the broadest and finest-scale description of the biosphere as they provide more data points as there are more clades, species and individuals with longer histories and broader variation;

Whereas Terrestrial arthropods are the glue that binds ecosystems and therefore, the biosphere, together;

Whereas entomological collections contain the largest and most diverse sample of terrestrial arthropods and associated data;

Whereas entomological collections accept the responsibility to provide Society with the critical information for the understanding and sustainable use of biodiversity that their collections contain;

Whereas scientific information must be verifiable and therefore requires that specimens be uniquely identified;

Therefore the Entomological Collection Network adopts the following standard for the use of Bar Codes for the proper, effective and efficient management of specimens and their associated data.

1) a bar code will be an unique identifier that consists of a string of alphabetic characters that identifies the organization that created the associated data record followed by a sequential number;

2) as bar code labels need to be as small as possible so as not take up too much space and must also encode sufficient data to uniquely identify specimens, code 49 uniform symbology will be used;

3) organizations will maintain computer files of specimen associated data that the bar codes uniquely identify, making the information available to users following the appropriate community standards (such as the ASC Database Policy);

4) organizations and individuals will respect bar code labels by leaving them attached, by not covering them with other labels, and by using existing bar codes, rather than adding new bar codes, so that only ONE bar code is used per specimen and that bar code is always clearly visible; and

5) finally, organizations and individuals will provide the originator (the organization maintaining the computer files of associated data) of bar code with the scientific name and identifier, if so requested.

The above resolution was passed unanimously at the 1993 Annual Meeting of the Entomological Collections Network.

The Information Age and Agricultural Entomology

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[This article was originally published in the Bulletin of Entomological Research 83: 471-474, 1993; because many ICN readers may have missed this contribution it is reproduced here with the permission of the author and Bulletin editor, Annette Walker.]

Prevention and resolution of agricultural entomology problems relies on current and accurate information, part of the overall information on biological diversity. The popular news media provide daily examples of how the information age is rapidly revolutionizing the way information is compiled, managed, and distributed. But what does the information age mean to agricultural entomology? What lies beyond CD-ROM? Within a few years, farmers in many countries will be able to call up a knowledge base on biological diversity, identify their pest organism, and see what is known about it. Using this same system, they could communicate with farmers in other regions who are struggling with the same pest or interact with an international research team working on the problem. How will these farmers progress from having no access to telephones to having access to a biodiversity knowledge base? The technologies to provide these services are rapidly becoming available on a world scale. While these technologies present tremendous opportunities, they also present challenges to the traditional systems of compiling, archiving, and distributing information.

Problems: Some of the major problems preventing local identifications and systematics research in tropical countries include scarcity of correctly identified reference collections; scattered type and voucher specimens and taxonomic literature, not easily accessible because of physical location, lack of indexing, and language; and inadequacy of communication (Hawkinsworth and Ritchie, 1993; Miller, 1994); and, in some countries, a lack of trained personnel.

Solutions: Emerging technology, such as distributed networks, can cut through some of these problems, and empower local users to resolve their own problems, as well as to facilitate training. Distributed networks provide each user with a fully functional system able to work independently and the ability to use data from other members of the network. For example, an end user could be simultaneously connected to specimen data bases at several herbaria. The system can be de-
signed to make the user feel that he/she is only using one data base (e.g., the process of accessing multiple data bases is transparent).

Internet, the concatenation of networks around the world using TCP/IP communications protocols, provides a vehicle for such services (Krol, 1992). Along with mail and file transfer, Internet allows fully interactive communications at great speed and accuracy. Where telecommunications infrastructure is not yet suitable for full Internet, other systems that do not provide interactive access (e.g., store and forward systems) are still useful.

There are over 1,500,000 host computers connected to Internet, serving an estimated 15 million individual users - and doubling annually. By mid 1993, 55 countries had operational full Internet access, and over 120 countries had some form of international network connectivity (e.g., including BITNET, UUCP, and FIDONET).

Many regional grassroots organizations have adopted variations of Internet technology, such as Pegasus in Australia and the Pacific, Alternex in Brazil, Afrinet in Africa.

Networking proponents point out that Internet allows the ultimate in democratization of information because it eliminates many traditional barriers to information access, especially time and distance. Critics worry that lack of technology will widen the gulf between the "haves" and "have nots." Full discussion of this issue is beyond the scope of this paper, but several points are worth addressing:

- Electronic messaging can be less expensive and more convenient than facsimile or telex wherever a computer and telephone lines are available. Improved error checking and correction routines in modern hardware and software are expanding the usability of existing telephone services, as well as reducing the time necessary for transmission. Studies in Latin America and Eastern Europe have shown that e-mail services are at least one and often two orders of magnitude lower in unit cost than fax or telex, at similar levels of service (Ruth and Ronkin, 1992). The expansion of packet-radio systems provides great promise. A complete, solar-powered ground station (including microcomputer) for communicating with a satellite now costs about US $7,000 (Ruth and Ronkin, 1992). This technology is already being used to provide medical communications and information in sub-Saharan Africa.

- Worldwide satellite e-mail is now a focus for the communications and pager industry, so over the next few years the technology will advance rapidly, while the unit cost will continue to fall.

- Providing an Internet link is far cheaper than building a library or a reference collection of insects. In many countries, it is cheaper than erecting a building or paying one salary for a year.

- In most countries, certainly within a few years, the cost of computer technology will not be the limiting factor.

- Emerging technologies in data base management and expert systems, coupled with the power of Internet, have tremendous potential for use in agricultural identification and information services.

Thompson et al. (1993) and others have already promoted biological diversity information bases combining relational data bases, expert systems, and image processing. However, previously, these were "finished" and published on CD-ROM, ending their continued development. I am suggesting an evolving, interactive system that reflects the continuing experience of systematists and users, made available through Internet. The applications that can be supported by a suitable information infrastructure are limited only by imagination and creativity. CD-ROM or electronic file transfer distribution could still be used for those without full Internet access.

To be most robust and useful, the biodiversity knowledge base will require cooperation, collaboration, and shared responsibility among the many constituencies providing and using this information. The quality and utility of a biodiversity information system depends on the taxonomic framework (names, relationships, and associated information) provided by systematic research, but the enterprise will involve a broad spectrum of participants contributing and using data. The latter should also allow systematists to focus on applying their training and resources to providing the systematic framework!

A distributed network approach includes the following features: 1) Reduction in effort -- products created in one place can be used wherever they are needed; 2) Increase in availability -- even an isolated individual in a developing country can connect to Internet (or at least to a network connected to Internet) with minimal delay; 3) Reduction in cost -- less expensive than erecting buildings, and amassing libraries and collections; 4) Increase in accessibility -- allows questions that are not supported by traditional ways of organizing information, encouraging cross-disciplinary inquiry.

Examples: The following applications are prime examples of what can be done with available technology. Library catalog systems provide many examples of distributed networks (e.g., the CARL system in the United States). The SMASH project, centered at the University of California, Berkeley, will link major herbaria in California into a distributed network. Each herbarium will maintain its own data base, but the data bases can be used simultaneously. While many biodiversity data base systems are only in development phases, the Australian Environmental Resources Information Network (ERIN) already includes over one million specimen records (mostly land cover plants), and operates on these data with a sophisticated suite of analysis tools including climatic modeling. Several interactive identification systems (multiple-entry keys) are coming into wide use, and identification packages are already available for grass genera, termites, beetle larvae, and fruit fly adults (Miller, 1994). Based on a general format for recording taxonomic data, these packages also allow generation of natural-language descriptions, keys, diagnostic descriptions, and conversion of the data for use with phylogenetic analysis programs.

Data can be added to the information system in a modular way, as it accumulates from different kinds of projects. Be-
cause most pest species occur regionally, if not more widely, data generated for one place will be likely be of interest elsewhere. For example, most of the major moths of Asia and the Pacific are included in the CABI project Moths of Borneo. If the information in Moths of Borneo were translated into a database, complete with images and interactive keys, it would form the basis for identification of many of the world’s major Lepidoptera pests.

If this data were supplemented with information on pest species from other regions, say Kenya, Costa Rica, and Brazil, it would be an increasingly important world resource.

A core component of this information base will be specimen data from collections in museums and herbaria. These collections have already archived millions of specimens that include a tremendous amount of information on distributions in time and space, as well as natural history (Richardson, 1992). Experience with Australia’s ERIN program has shown that it is far less expensive to extract pre-existing data from museums and herbaria than to recollect it in the field.

Democratization of information: The current trends in information management and distribution are just the beginning of tremendous changes underway. While it will take time for some of these changes to effect developing countries, the impacts are now being felt in many developed countries. Online, electronic publication is emerging as a viable alternative to traditional, ink and paper publication. However, people like books, so some kinds of books will always be produced. But for the very expensive, data-intensive products of biological research, online electronic publication is a very logical and attractive alternative. Online publication allows instant publication, easy updating, inexpensive delivery, and selective but very wide distribution. To “publish” means “to make public.” Compare the impact of a document as a printed book lodged in 300 academic libraries versus being available to 15 million Internet users! While these numbers are impressive, the implications of online publication need to be considered at many levels, including staff promotion and granting schemes that demand traditional publications (Taubes, 1993).

The vast amount of information becoming available at low cost on Internet is also changing the economics and politics of information management. It is no longer viable to hoard information and try to sell it, because most or all of the information is available somewhere else at no charge. In recent years, some institutions have protected their specimen data bases from public access in hope of selling the data. But many are now abandoning this strategy because: (1) It has proven impossible to recover the real cost of creating and maintaining the data base in this way -- you can sell some data, but not enough; (2) Other institutions are committed to making their data available as widely as possible at no cost; and (3) There is great potential for conflict of interest, especially related to government grants and subsidies.

In the United States and Australia especially, tremendous amounts of biological data are already available on Internet (e.g., complete authority files for vascular plants of the New World and Australia via the Biodiversity and Biological Col-
LITERATURE CITED:


COLLECTING NEWS

LACEY ACT 1

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[taken from entomol-1 with permission of author and Peter Kevan, 17 Nov. 1993]

I’ve been on the horn this a.m. with a US Fish & Wildlife Service (USFWS) special agent, regarding the Lacey Act and its amendments and provisions, etc. This was mostly trying to get clear several items that have been on the loose over Entomo-L and noted in various newsletters and some journals, especially with regard to butterflies. I got more information than initially intended, and thought much would be of general interest.

The legal situation is as follows. The congressional Lacey Act is actually a set of amendments, dated from 1981 and subsequent, that modify earlier Acts regulating the movement, importation, and trade in fish and wildlife. The Lacey amendments and more recent legislation have replaced these earlier Acts in order to conform with a number of post-1940’s legislative actions, especially the Endangered Species Act, and its various outgrowths, and international treaty obligations, the latter mostly involving CITES (Convention on the International Trade in Endangered Species).

To quote from the 1981 amendments, "Sec. 3. Prohibited Acts. (a) Offenses other than marking offenses" ... "It is unlawful for any person - (1) to import, export, transport, sell, receive, acquire, or purchase any fish or wildlife or plant taken or possessed in violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law; (2) to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce - (A) any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any State or in violation of any foreign law, or (B) any plant taken, possessed, transported, or sold in violation of any law or regulation of any State; ...".

Under the Lacey Amendments all invertebrates are included under the definition of wildlife.

The crux is that it is simply illegal to collect specimens without the proper permits. Thus, collecting of specimens, including research purposes, is illegal both within the United States and in other countries, if permits are legally required.

The USFWS and border customs inspectors are only concerned with natural history materials that are covered by endangered or threatened species legislation, or may be covered by Appendices I, II, and III of CITES. To be considered covered by the Endangered Species Act, the evaluation of violation of a particular specimen is based on when that specimen was collected. If it was collected prior to the date on which that species was listed (NOT the date of the Endangered Species Act or other legislation!), then the specimen is legal. However, to ease potential future problems, as much documentation as possible should be kept on the date of acquisition and methods of disposition of those specimens.

Inclusion under CITES is not restricted to endangered or threatened species status. Therefore, reference to CITES Appendices I-III must be made in order to avoid violation. Since the U.S. is a signatory to CITES (in spite of the best efforts of recent political administrations!), the USFWS and other government agencies are obligated to enforce collecting permit regulations of other countries as well as those within the U.S. borders.

Without a valid authorization from a legal office of a host country, the collecting of natural history specimens is illegal. Now, I am not personally familiar with details of some recent matters concerning butterflies being imported from Mexico, and the USFWS agent was unable to fill in certain details, but on the surface, it would appear that if in fact the persons affected were returning species to the U.S. that are listed as endangered or threatened or fell within the restrictions of CITES Append. I-III, and they did not have legal permits; well, they
were in clear violation of U.S. law, Mexican law, and international law.

Now, whether this is right or not gets into non-legal matters of personal privilege, and I dare say, matters of self-righteous and arrogant imperialism with regard to what we may or may not want to do in other countries. Mexico is a sovereign country, and we have the legal, moral, and ethical obligations to meet its laws.

In a practical sense, yes, it is next to if not impossible to get legal permits from some countries, such as Mexico. Yes, this is a bureaucratic problem, but it exists! However, even endangered and threatened species can be collected with permits! Even if you can show that your specimens were acquired from another country and do not violate the provisions of the U.S. Endangered Species Act or CITES Append. I-III, the collecting permits from the host country are still mandatory. Only if the host country does not require collecting permits can we legally bring this material into the U.S., even with species not endangered or threatened.

CITES permits are available from the Office of Management Authority in Washington, D.C., and I am awaiting further information on this process. I will forward such information as I acquire it to interested persons.

Of further note is the recognition that within the U.S. borders, the collecting of specimens is tightly controlled. As petty as it may seem, without landowner permission, collecting of specimens on private property can be prosecuted under trespassing laws. Also, the collecting on public lands is not the free and open system, legally speaking, as we all often assume. We are all familiar with the permit requirements for National Parks and Wildlife Refuges, and State Parks. However, even the collecting on specimens on Forest Service and Bureau of Land Management lands is regulated; technically, no collecting without permits.

Now, most of us simply go onto open federal lands without bothering to even contact the local "Ranger Rick," and for the most part this results in no problems. Reality shows that most people don't really care about most invertebrates, and this is true even with local officials. In fact, many of us have had numerous experiences of running into rangers in our forays and having delightful conversations with them, with net and jar in hand. Usually, they are simply curious as to what we're doing and are typically very interested in acquiring any information about organisms on their lands. However, if desired, the local rangers can get nasty, and they have the legal backing to do so. Thus, the best habit to get into, and the sooner the better, is to give the local government offices a call or letter whenever you want to collect, let them know what you're up to, cooperate with them and they will cooperate with you. Even better, if you are working in a particular district, go to the trouble to let the local rangers know that there is something of interest on their lands. Try to get a blanket letter of authorization and to help develop better working relationships between the natural history community and government officials.

Finally, these various laws and permit requirements were largely specifically drafted and implemented to satisfy the demands of us. We are to blame for this mess. Why?, well that's simple. Those of us that felt, as responsible biologists, that certain species should not be allowed to reach premature extinction due to anthropogenic activities demanded and forced the development of endangered species laws, including CITES. To meet the laws within their own borders, as well as international treaties, permits (whether required before the laws or not is presently irrelevant) have become necessary to allow the legal acquisition of specimens. This is the logical and legal product of OUR desire to protect species. It is time to bite the bullet and realize that the world is going and it will continue to get more complicated. In the very near future, many countries (including the U.S.) will develop even more stringent regulations. The Victorian ideal of rampant imperialism is nearly over for us naturalists; we now have legal restrictions on the pursuit of our avocations, and life is not going to get any easier!

Lacey Act 2
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[taken from entomol-w with permission of author and Peter Kevan, 19 Dec. 1993]

Since there has been so much discussion of the Lacey Act, I decided it was time we all met the beast face-to-face. Here are some relevant portions of the Act (the parts in quotes).

The original Lacey Act was, among other things, concerned with the "Importation or shipment of injurious mammals, birds, fish (including mollusks and crustacea), amphibia, and reptiles..." There was a special exclusion for museum specimens, as follows: "Nothing in this subsection shall restrict the importation of dead natural history specimens for museum or for scientific collections..."

The Lacey Act was modified in 1981 to include the following language: "For the purposes of this Act: a) The term "fish or wildlife" means any wild animal, whether alive or dead, including without limitation any wild mammal, bird, reptile, amphibian, fish, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, whether or not bred, hatched, or born in captivity, and includes any part, product, egg, or offspring thereof."

Under the heading "Prohibited acts" were included: "It is unlawful for any person-- (1) to import, export, transport, sell, receive, acquire, or purchase any fish or wildlife or plant taken, possessed, transported, or sold in violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law; (2) to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce-- (A) any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any State or in violation of any foreign law, or (B) any plant taken, possessed, transported, or sold in violation of any law or regulation of any State; (3) within the special maritime and territorial jurisdiction of the United States (as defined in section 7 of title 18, United States
Code—(A) to possess any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any State or in violation of any foreign law or Indian Tribal law, or (B) to possess any plant taken, possessed, transported, or sold in violation of any law or regulation of any State; (4) to attempt to commit any act described in paragraphs (1) through (4).

It should be noted that it is also a violation of the Act to provide, for money, any guiding or outfitting service or hunting or fishing license for the illegal taking, etc., of wildlife.

Lacey Act 3: Entomology and the Lacey Act

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[taken from entomol-1 with permission of author and Peter Kevan, 27 Jan. 1994]

Collecting insects is no longer the benign, enjoyable pastime that most of us discovered in our childhood. We are now faced with ever-increasing quantities of red tape and the necessity for obtaining permits to collect just about anywhere except in our own back yards. The penalties for not wading through the red tape can be draconian.

Most of us were ignorant of these regulations until fairly recently, but ignorance is not a legal defense and thus many collections, both public and private, now find themselves holding specimens the Federal government considers contraband. There is a legal cloud hovering over each and every arthropod collection in the United States that contains specimens collected from outside the country. The specimens involved surely total in the millions. It is a problem of huge proportion, the size of which has not been grasped at all by the U.S. Fish and Wildlife Service (USFWS) officials who have suddenly become diligent in enforcing these laws and regulations.

In a broad sense this situation devolves from concern over endangered species, something all of us support. However, this concern over endangered species has been extended to the regulation of the taking of all wildlife, which in the United States is pretty much defined as anything possessing DNA. There are of course real problems with the U.S. Endangered Species Act (ESA) and the Convention on International Trade of Endangered Species (CITES), especially as insects and other invertebrates are added. But it is the regulations growing out of these documents that are causing the real problems. The Lacey Act Amendments of 1981 make it a crime to import or be in possession of wildlife exported illegally from another country or transported illegally within the United States. To put it in a nutshell, what this means is if you smuggle ivory out of Kenya you are not home free if you get it into the United States. It is still illegal. This is admirable and obviously necessary to stem the tide of poaching of endangered species. But when it is extended to non-endangered insects, the potential problems seem obvious. And there is no provision made for scientific specimens.

There are about 120 countries listed by the USFWS as requiring wildlife collecting and/or export permits. Not all those countries require permits for insects, but some, perhaps many, do. It is the individual’s responsibility to know what is required and to fulfill all of those requirements. (Note that these permits are probably required even for loans of material received for identification or research and which are to be returned.) Here are some points I’ve gathered talking to USFWS officials and other scientists:

—Get everything in writing, even from USFWS officials, since even they often don’t know all the details.

—Start early. Less developed countries usually have slower bureaucracies than do we. This pretty much means the end of "spur of the moment" trips.

—If you can’t get a permit, DON’T GO. Go to countries where permits are available.

—Don’t believe what you are told in that country about permits not being needed unless the information comes from the agency recognized by the USFWS as competent to issue permits. Contact the USFWS or the FSCA for a list of addresses of those agencies.

—When returning to the U.S., be sure to have your paperwork ready, including a Form 317 Declaration for Importation or Exportation of Fish or Wildlife, which is required for ALL wildlife entering or leaving the U.S., even if other permits are not required. Contact the USFWS or FSCA for that form. (By the way, this form is even required for loans between museums.)

—to avoid delays at the airport, you should contact the USFWS ahead of time so an inspector will be available to examine your specimens.

Following the laws should keep you out of trouble on future collecting trips abroad, and there are many countries where permits are obtainable without exorbitant fees or unreasonable delays. But what about specimens collected without permits since the Lacey Act went into effect in 1981? That’s the real sticking point. There has been much discussion among collections officials over this subject, with calls for Congressional action to change the Lacey Act, Presidential action, etc. All of these ideas fly in the face of reality and the reality is that the vast majority of people, including lawmakers, are completely disinterested in the problems of insect collections.

The USFWS offers what it calls a "cleansing" process for collections that, with much trouble, will make illegal specimens into legal specimens. But it extends the process only to public collections. This must be unacceptable to the entomological community, since public collections depend on the support and good will of private collectors. The refusal to extend cleansing to private collections is a policy decision of the USFWS. This, I believe, is the one realistic avenue through which the problem of millions of contraband specimens can be resolved. If the cleansing process is extended to private collec-
tions, the entomological community would have the mechanism to resolve this enormous problem.

I recommend a letter-writing campaign to Secretary of the Interior Bruce Babbitt. Explain the problem, explain the need to remove the legal cloud over ALL U.S. collections, suggest that the solution lies within the USFWS's own policies. Copy the letter to your U.S. Representative or Senator or both. This is important.

Some people have recommended to me a course of non-action: "Let sleeping dogs lie." To mix metaphors (but stay in the same genus), this may keep the wolf from the door but there is no guarantee it will work and it is certainly no solution. A more appropriate quote may come from Benjamin Franklin and has to do with hanging separately versus hanging together.

ADDRESSES: Office of Management Authority, U.S. Fish & Wildlife Service, 4401 North Fairfax Drive, Room 432, Arlington, VA 22203 (phone: 1-800-358-2104); Secretary of the Interior Bruce Babbitt, Department of the Interior, 1800 C St. NW, Washington, D.C. 20240.

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Lacey Act 4: Federal Regulations and Museum Standard Operating Procedures
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[taken from entomol-1 with permission of author and Peter Kevan, 18 Mar. 1994]

In learning about the federal regulations promulgated to enforce the Endangered Species Act, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (aka CITES), and the Lacey Act, I've found that there are a number of areas that require changes in the operating procedures of the insect collection and they may also be relevant for other areas of the Museum. There has been a great hue and cry by curators and systematists around the country about the effects of these laws on legitimate scientific activities. All of these pieces of legislation have sections that indicate that their intent is not to have this result because conservation of populations of endangered organisms relies upon a good basis of scientific knowledge for effective management. Nevertheless, the regulations produced by the US Fish & Wildlife Service do affect us. Some of these rules are merely annoying and there probably is little chance that legislators or executive policymakers would sacrifice their precious time to accommodate us. I have been trying to identify areas that actually do obstruct legitimate science; these are areas in which we have the right to be heard and have the regulations adjusted.

Upon import/export of wildlife or plants, one is required to file a Declaration for Importation or Exportation of Wildlife. 50 CFR Section 14.62(c) seems to provide some relief for us:

Notwithstanding the provisions of Section 14.61, scientific specimens imported for scientific institutions for taxonomic or faunal survey purposes may be described in general terms on the Declaration for Importation or Exportation of Fish or Wildlife (Form 3-177), provided an amended Form 3-177 specifically describing the wildlife imported is submitted to the Service within 180 days after the filing of the general declaration. Extensions of this 180 day period may be granted by the Director.

However, you will note the 180 day filing period. To use the example of one of our colleagues on the Internet, suppose you imported a soil sample containing organisms. There may be something on the order of 200,000 individuals in that single sample. According to the law, you can file a general declaration stating that the identity and quantity of specimens are unknown. But in six months you must file an amended declaration precisely stating the identity (genus & species) and number in the sample. In lieu of that, you must apply for an extension every 180 days until you finally identify every last one of them. This is obviously going to be impossible in a wide variety of situations other than this example.

The Endangered Species Act authorizes the Secretary of the Interior to designate certain ports of entry for import/export of wildlife and plants. These are: Los Angeles, San Francisco, Miami, Honolulu, Chicago, New Orleans, New York, Seattle and Dallas/Fort Worth. For items collected in either the U.S. or Canada there are additional border ports that are acceptable. There are comparable border ports for items of U.S./Mexican origin. This means that it is illegal to import or export specimens by mail. The regulations state (Section 14.11):

"Except as otherwise provided in this part, no person may import or export any wildlife at any place other than a Customs port of entry designated in Section 14.12."

I think that for reasons of ignorance many of us are guilty. And, in fact, it is the policy of the Fish & Wildlife Service to ignore materials sent through the mail. This does not exonerate us. Rather, it is merely a concession to the real world. The law is not enforced because they haven't figured out a way to do it. If you do as one FWS agent seemed to suggest to me, i.e., file a Form 3-177 after mailing a package overseas, you are incriminating yourself. Actually, he only advised me to file the form after receiving a package; presumably I would not be held responsible for the illegal act of another.

We need to inform the powers-that-be of the manner in which these regulations interfere with legitimate scientific work. These powers are those that (a) make the laws, i.e., our congressional representatives; and (b) formulate the regulations to enforce the laws, i.e., the policy-makers in the Department of the Interior. Further, I think we are obligated to suggest alternatives to these regulations as they apply to our activities.

May I offer some suggestions:

--Some things simply don't have scientific names, and they may not acquire them for years. Others may have names available, but they are unrecognizable. Importation/exportation of such specimens should be exempt from the requirement to file

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Form 3-177. Persons qualifying for such an exemption should be members of a recognized academic or scientific organization engaged in legitimate scientific research. Many of our institutions have such a designation for tax purposes.

-Specimens for scientific study by individuals as just described should be exempted from the requirement for importation/exportation through specified Customs ports of entry (i.e., be able to legitimately use the mails).

-I must emphasize that we should not complain to or about the F&WS enforcement agents. In my experience these people are doing their best in an extremely difficult situation. Further, their job is black and white: they are to enforce the laws passed by our legislators as per the policies and regulations promulgated by their superiors. If we get conflicting answers to direct questions from them, its probably because they can cite the laws and regulations to you, but not their internal policies for implementation.

-One further recommendation: these regulations will be open for comments again at some unspecified time in the near future (or perhaps even sooner, depending upon what happens to the Endangered Species Act). We must learn of that comment period and then respond. It turns out that the scientific community voiced absolutely no objections to the prohibition on use of the postal service for sending and receiving specimens. We shouldn’t let another opportunity pass by. We are no longer ignorant.

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Collecting Lepidoptera in Ohio

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[taken from ent-list with permission of author and Mark O’Brien]

The following announcement shows that cool heads working together to solve problems can prevail. Although the negotiations took time, it was worth the effort.

The Ohio Department of Natural Resources (ODNR), Division of Wildlife, in cooperation with The Ohio Lepidopterists, announced a change in the Ohio Wildlife Regulations that will allow Lepidopterists to retain specimens of butterflies and moths that are declared to be endangered in Ohio. The announcement recognizes the close cooperation of the ODNR, Division of Wildlife and The Ohio Lepidopterists in providing the data that contributed to the Division of Wildlife’s understanding that some species are imperiled in Ohio.

The change in the Ohio Wildlife Regulations was made to encourage members of The Ohio Lepidopterists to continue their research in Ohio.

In making the announcement, Richard B. Pierce, Chief of the Division of Wildlife, said "I consider the information provided to the ODNR, Division of Wildlife by The Ohio Lepidopterists, on the status of moth and butterfly populations, to be vital in managing and protecting this important segment of Ohio’s wildlife. It is certainly in the Division’s best interest to facilitate the collection of information by those who are qualified and motivated to do so. A second key factor is ensuring that there is close cooperation in the sharing of data and development of protective strategies.”

Ohio’s Division of Wildlife and The Ohio Lepidopterists society continue to be leaders in recognizing the mutual benefits of working together. It is not easy to chart a course that appears to contradict popular thinking pertinent to protecting endangered species, but the rules of protection, that were not developed with insects in mind, can be recreated to encourage participation by the persons most capable of monitoring populations of butterflies and moths, lepidopterists. Although it is not easy to recast long held ideas, openness to new ideas, while recognizing the sincerely held beliefs of traditional thinking, can lead to a new way of doing things.

The new rules for Ohio took effect on 15 May 1994. The revised language states: "It shall be lawful for any persons to collect and possess the following wild animals for their own personal use. It shall be unlawful to sell, barter, trade, or offer for sale any wild animal, or parts thereof, listed in this paragraph." The paragraph proceeds to list Ohio’s endangered butterflies and moths.

“We’ve made a lot of progress toward conservation of lepidopterans in Ohio,” said Pierce. “There is still a tremendous amount of work still to be done. With our united efforts, I am confident that progress will continue to be made.” The action...
by the Division of Wildlife to modify their regulations are part of the partnership.

The Ohio Lepidopterists society conducted a six year Comprehensive Survey of Moths and Butterflies in Ohio for the ODNR, Division of Wildlife. During the survey, which ran from 1986 through 1992, The Ohio Lepidopterists accumulated nearly 100,000 individual records of butterflies and moths in Ohio. The Ohio Lepidopterists discovered that several species of butterflies and moth were endanger of being extirpated from Ohio due to threats to critical habitats. Two major publications, Butterflies and Skippers of Ohio, and The Owlet Moths of Ohio, also came from the six-year effort. As part of the survey, The Ohio Lepidopterists also own and curate a synoptic collection of Ohio’s butterflies and moths at The Ohio State University Museum of Biological Diversity.

For more information, you may contact: The Ohio Lepidopterists, 1241 Kildale Sq. N., Columbus, Ohio 43229-1306, USA.

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**COLLECTION NEWS**

**The Insect Collection of the Oregon Department of Agriculture**

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**Introduction**

This article is written largely with hope to stimulate greater use of this relatively small regional collection, the symbol for which is listed in Arnett, et al. (1993). The insect and spider collections of the world. Sandhill Crane Press, Gainesville. vi+310 pp.) as ODAC. Many entomologists may not be aware of this collection, let alone its history and scope. Often it has been overlooked by taxonomic and other researchers needing to borrow specimens.

Oregon Department of Agriculture (ODA) Entomologists are Richard L. Westcott, Curator of the Entomology Museum (taxonomy of Coleoptera, Buprestidae); Eric M. Coombs (biological control of weeds); Daniel J. Hiburn (insect survey and detection; butterfly conservation; insects of Bermuda); Alan D. Mudge (insect survey and detection; general Coleoptera); and Gary A. Peters, Biological Technician (insect survey and detection; general Coleoptera).

**History**

The ODAC was started in 1945, resulting from an act of the Oregon Legislature which created an insect survey and detection unit in the Plant Division, ODA. John E. Davis, first entomologist hired for the unit, began the collection which was housed in a 24-drawer cabinet and numerous wooden boxes. It was not until 1954 that another cabinet was purchased; and after 1955 the collection began to grow significantly, largely resulting from the avid collecting and curatorial efforts of Kenneth Goeden, who was hired that year. Others who worked for the department and made collections throughout Oregon include A. B. Black, Vincent Roth, Joseph Capizzi, Harold Foster, Dick Epplle, Robert Stephenson, Jean Fisher, Robert Brown, Eric M. Fisher, Richard L. Penrose and J. M. Mellott, in approximate chronological order. Until 1968 the activities of the entomology personnel were directed almost exclusively towards survey and detection, then a full time taxonomist-curator position was filled by Eric Fisher. Richard L. Westcott assumed this position in 1969. Creating this position enabled the collection to be better maintained, curated and significantly enlarged, at the same time providing much needed support to ever-growing survey, detection and nursery inspection activities. However, after 1980 the position was abolished and taxonomic duties became part time.

Ongoing budgetary constraints—now probably as severe as ever—continue to threaten taxonomic support services, though this certainly is not unique to our institution.

**Scope**

In the ODAC there are approximately 90,000 pinned specimens representing about 5,500 determined species housed in 18 California Academy-type cabinets. The remainder of the collection consists largely of about 1,500 alcohol vials and 3,000 slide mounts. Specimens collected in Oregon represent the vast majority of holdings. There is a small collection of economic species either not known to occur in the U.S. or unrecorded from Oregon. Coleoptera, Diptera and Lepidoptera comprise about 70% of the ODAC. Another 10% consists of Orthoptera, mostly—through the tireless efforts of Ken Goeden—an especially well prepared and comprehensive array of Acrididae. In terms of Oregon species, other families particularly well represented are Asilidae (approximately 80% of the species known to occur), Dolichopodidae, Syrphidae, Tabanidae and Tephritidae—Diptera; Tenthredinidae—Hymenoptera; Noctuidae (approx. 600 spp.) and Geometridae—Lepidoptera; Buprestidae (90%), Carabidae, Cerambycidae, Curculionidae, Elateridae and Scarabaeidae—Coleoptera; Coccinelidae—Homoptera.

Primarily, the collection represents an effort to provide a comprehensive reference to the Oregon insect fauna. However, there is emphasis on distribution and seasonal occurrence of species known or suspected to be of economic importance. Many of the specimens have supporting ecological data.

No attempt is made to maintain a large research collection, in part because such is located 40 miles distant at Oregon State University. In fact, most ODAC surplus is or eventually will be deposited there.

The value of ODAC has been greatly enhanced in recent years with determinations by specialists who have given freely of their time, and for this we thank them. At the same time, we have provided considerable knowledge of Oregon insects for their and others’ use. Much information remains to be gathered and utilized, and expanded use of ODAC is strongly encouraged.

*Entomologist, retired.
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The DEI was founded in 1886 in Berlin as the donation of a hobby coleopterologist, the physician Gustav Kraatz. In the course of time he and his successors collected the old entomological literature as well as many collections and other assets of private entomologists. So we own now nearly the complete entomological literature (as far as it is possible at all), in any case the largest special library in Europa including many rarissima. We get regularly about 800 journals at present. Our collections consist of three million specimens belonging to 275,000 species, among them 25,000 types. This is perhaps infinitely small in comparison to the large national collections of some countries, but our collection is in the best order and very well prepared and easy to work with.

The DEI and Zoologisches Museum Berlin (ZMB) have been coexisting quite independently for more than 100 years. Systematics has been the base of both, but they differ in some other respects. The DEI cared more for applied entomology, bibliography, catalogues and registers and, of course, for local hobby entomologists. The latter provides now a respectable data basis for local faunistics over a centennium, very useful now for regional environmental planning in the Brandenburg region. The ZMB was meanwhile dealing with the fauna of the World. And, not to forget, Willi Hennig wrote his Grundlagen der Phylogenetischen Systematik as a worker of the DEI in the forties and early fifties. In my opinion, these are good traditions, and the presently intended connection with the ZMB should and will consider them. Our personal relationship with colleagues in Berlin is good. There is much more to do in entomology than worker positions are available (we are eight entomologists).

Jäckh Collection of Microlepidoptera

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Following the death of Eberhard Jäckh on August 22, 1993 at the age of 90, the remainder of his extensive collection and library were transferred from the small Bavarian village of Hörnamsdorf to the Smithsonian Institution. The collection was purchased in 1978 with assistance from the United States Department of Agriculture. At that time more than half of the collection was moved to Washington, D.C. Volunteer Mignon Davis, assisted by Jäckh's widow, Ingeborg, and a former colleague of Eberhard, Axel Scholz, recently repinned and packed the remaining 25,909 specimens of Microlepidoptera for shipment to the United States. Begun in 1923, the collection now totals 56,457 Microlepidoptera with nearly 8000 genitalic preparations. Also included are approximately 2000 sheets of leafmines, a well documented library containing extensive reference files, and an illustrated, annotated catalogue of the European Microlepidoptera complete with photographs of adults and genitalic preparations. The collection is especially strong for the middle European fauna with more than 90% of the species represented. Mr. Jäckh also collected extensively in northern Italy, Yugoslavia, as well as the United States, and had exchanged specimens widely with colleagues from other European and middle eastern countries.

The quality standards of the Jäckh Collection are unsurpassed. Mr. Jäckh's meticulous technique of spreading live specimens, anesthetized by ether, produced the finest results possible. All specimens are not only expertly spread but are also fully labelled and identified. The addition of this superb collection has significantly improved the global representation of Lepidoptera in the United States National Museum, where it will provide continual research assistance to generations of workers and students in this field. For further information regarding Eberhard Jäckh and this collection see J. Lep. Soc., 35(2):160, 1981.

Renovation Nearly Completed at the UMMZ

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After over a year of moving, demolition, construction, and renovation work, the Insect Division is almost back to a normal state. The Insect and Herpetology Divisions have undergone the phased renovation since March of 1993, and although there are still some rooms that have to be finished, those renovations are minor in comparison to what we've endured for over 14 months.

Our new alcohol range was completed in January, and we moved in over 70,000 vials and jars into the new space. That room has a nice work area, and a six ft. fume hood for large-volume work.

We moved back into our largest range in early May, and we were able to move all of the insect cases back in within five days. Of course, due to the nature of the move, none of the cases are in their original order, so we'll have to move nearly all of the drawers - luckily all of them are numbered sequentially within each order, so it won't be such a formidable task. The new range has a full-length work area with about six workstations, lots of lighting, and will be an inviting place for us and for visitors to the collection to work.

The old alcohol range has been turned into a pinned range, and will house the Odonata, Neuropteroids, Hemiptera, and minor orders, as well as our Odonata library. That room also features a very nice work space, and I expect that we'll be finished moving into there by the middle of June.

Barry O'Connor, one of our curators, should be moving back into his renovated space by mid-June, and will welcome the move from his cramped quarters in the insect "live room". That room will have some minor renovations that will provide a better work area for graduate students and researchers. Other
rooms will also have minor renovation work, and they ought to be done by July 1.

The National Science Foundation funded our collections enhancement grant, and we'll be putting in new insect cabinets and thousands of new drawers this summer and fall. The University is wiring the entire museum for ethernet, and every one of our ranges and offices will have ethernet connections. The College is providing new computers and networked printers, so we'll be in good shape this fall. A large Novell Netware server will be provided for the museums, but I expect that in the beginning, the Insect Division will be using an AppleShare server until we need to migrate specific services to the Netware server. We are evaluating several database projects, and we hope to have some definite plans in place by the end of the year.

It's been quite a year - and there have been many physical changes in the Insect Division. We are open for business - and we welcome your loan requests, searches, and visits. We have extensive holdings of Coleoptera, Diptera, Odonata (3000+ species), Orthoptera, Acari, and substantial holdings of Hymenoptera, Hemiptera, Neuroptera, Arachnida, and Lepidoptera.

For more information via email: mjobrien@umich.edu; phone: 313-747-2199; fax: 313-763-4080.

Orphaned collections
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For the Resource Sharing Project of the Texas Association of Museums, I am drafting an essay on the problems which cause and which result from orphaned and endangered collections - i.e., those collections which are administratively abandoned as a result of low visibility, shifting priorities, loss of space or staff, or any other related factors.

Comments, suggestions for bibliographic references, and questions are welcome. Anecdotal accounts are not necessary (though always interesting) unless they concern Texas institutions, in which case the committee would like to know more so that they can start thinking of ways to help through resource sharing. No specific instances will be used without the institution's consent. Copies of the final essay will be provided on request.

The TAM Resource Sharing Project is a high-priority commitment by the TAM to provide assistance to museums by pairing museums with needs to museums with available resources to answer those needs. For further information on this, please contact the Texas Association of Museums. Thank you for your assistance.

Effect of Low Temperature on Preservation and Quality of Insect Specimens Stored in Alcohol
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Abstract: Storage of insects in alcohol is discussed with focus on current problems involving members of the order Hymenoptera. Low temperatures in combination with a dark environment have a significant effect on preservation and quality of specimens stored in ethanol or other alcohols over long periods of time. The new simple technology can substantially extend longevity of insects stored in alcohol, buy precious time needed for processing of incoming materials and solve some pressing problems of entomology in the era of biodiversity studies.

Alcohols of various kinds have been the oldest as well as universal media for temporary or permanent storage of insects, other arthropods or biological specimens in general. Some adverse effects of storage in alcohol were soon recognized by early biologists. The interaction of daylight (especially the direct sunlight), room temperature and alcohol has a most detrimental effect on stored insects. The degree of damage varies from group to group but discoloration and maceration eventually affect almost every group. Storage in dark cabinets of alcoholic material was believed to be the ultimate remedy of the above problem. However, in all cases this storage was at room temperature (20-25°C). Currently, this is the standard strategy in most museums and institution with insect collections. The introduction of critical point drier (CPD), chemical drying and freeze drying techniques liberated some groups from deterioration in alcohol; however, many groups are still not processed by these techniques. Finally, all residual as well as bulk material have to be stored in alcohol, with inevitable deterioration.

Our recent observations show that the temperature in storage areas is the determining factor of longevity of specimens preserved in alcohol. Generally, temperatures near or below the freezing point (0°C), in a dark environment, contributed towards the near fresh appearance and conditions of specimens, even after long storage in alcohol. By accident rather than by intention we examined material collected in Malaise traps and stored subsequently in unchanged alcohol for over twenty years in a dark cold room (average temperature 2°C). This material, collected in the summer of 1969, was culled for target groups just months after the field work; second culling of this material was done in 1990 following a sudden reorganization of the cold room. Surprisingly, twenty two years later, no significant changes in overall preservation of the specimens were observed. Even colours most affected by storage in alcohol (e.g., bright whitish markings on some Ichneumonidae) were in fresh condition. By contrast, also in 1990, some parts of the Hymenoptera collection preserved for some twenty years in alcohol in room temperature had to be discarded because of severe deterioration of the specimens.
During the past five years we had additional experience pointing toward beneficial effect of low temperature on Hymenoptera specimens in alcohol. Since then all CNCI Hymenoptera alcholic material is stored in cool conditions. Materials called for subsequent mounting are stored temporarily in a small upright freezer (-20°C); bulk material as well as all residue are stored in a dark cold room (+2°C - +4°C).

The advent of mass collecting techniques and the challenge of biodiversity studies may also benefit from the technique discussed above. Storage of bulk material in low temperatures will buy time without risks of deterioration. This is particularly true for numerous ongoing large-scale biodiversity projects, faunal surveys, monitoring of pests, etc. Cold storage of all these precious materials is a simple as well as safe interim strategy while sorting centres or pools are organized (one hopes) on a better and larger scale. As a final strategy cold storage is currently the best answer for curating of materials that have to stay in alcohol permanently.

It is hoped that this urgent appeal will be understood by both the curators and administrators of entomological collections all over the world. Regrettably, we cannot stop environmental degradation or species extinctions. However, we can now prolong the life of information on nature that is already in our collections.

### USNM Backlog Computerized

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By use of spreadsheets in the Excel-4 for Windows program, an update has been produced of the centralized backlog at the Department of Entomology, Smithsonian Institution. Standard information elements (locality, collector, estimated specimen numbers in lot, storage type) were entered in a spreadsheet for each of the nearly 400 backlog lots. On the same spreadsheet, simple numbering scores were then assigned to, and then tallied for each lot, using the following formula:

<table>
<thead>
<tr>
<th>Assigned points</th>
<th>4</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Region</strong></td>
<td><strong>Neotropical</strong></td>
<td><strong>Other</strong></td>
<td><strong>Nearctic</strong></td>
</tr>
<tr>
<td><strong>Preservation status</strong></td>
<td><strong>Pinned</strong></td>
<td><strong>Dry</strong></td>
<td><strong>Alcoholic</strong></td>
</tr>
<tr>
<td><strong>Collecting method</strong></td>
<td><strong>Malaise trap</strong></td>
<td><strong>Other</strong></td>
<td><strong>Blacklight</strong></td>
</tr>
<tr>
<td><strong>Collector(s)</strong></td>
<td><strong>SI staff</strong></td>
<td><strong>SEL staff</strong></td>
<td><strong>Others</strong></td>
</tr>
<tr>
<td><strong>Duplication</strong></td>
<td><strong>Minor</strong></td>
<td><strong>Short series</strong></td>
<td><strong>Excessive</strong></td>
</tr>
<tr>
<td><strong>Variety</strong></td>
<td><strong>7+ orders</strong></td>
<td><strong>4-6 orders</strong></td>
<td><strong>1-3 orders</strong></td>
</tr>
</tbody>
</table>

Various summaries of all categories can be quickly produced from this effort. The primary reason for doing this is to help in establishing processing priorities.

The six priority fields defined above and all additional data fields in the database are listed below for two actual backlog lots.

<table>
<thead>
<tr>
<th>WHEN, WHO, WHERE</th>
<th>SEQUENCE</th>
<th>E78.62</th>
<th>E85.7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REQUESTER</strong></td>
<td>Flint, O.S.</td>
<td>Grissell, E.E.</td>
<td></td>
</tr>
<tr>
<td><strong>COLLECTOR</strong></td>
<td>Flint, O.S.</td>
<td>Schuaff, M.</td>
<td></td>
</tr>
<tr>
<td><strong>COUNTRY</strong></td>
<td>Chile</td>
<td>Oregon</td>
<td></td>
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<tr>
<td><strong>COLLMETH</strong></td>
<td>?</td>
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<tr>
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<td><strong>NUMSPEC</strong></td>
<td>250</td>
<td>3000</td>
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<td><strong>LABELS</strong></td>
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<td>NO</td>
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<tr>
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<td>ALC</td>
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<table>
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<tr>
<th>CONTENTS (%)</th>
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<tr>
<td><strong>ARAN</strong></td>
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<tr>
<td><strong>OTHERAM</strong></td>
</tr>
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<tr>
<td><strong>HETE</strong></td>
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<td><strong>NEUR</strong></td>
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<tr>
<td><strong>COLE</strong></td>
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<tr>
<td><strong>HYME</strong></td>
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<td><strong>LEPI</strong></td>
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<table>
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<td><strong>REGION</strong></td>
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</tr>
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</tr>
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</tr>
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<tr>
<td><strong>PRIORITY</strong></td>
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<tr>
<td><strong>REMARKS</strong></td>
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</table>

No. 9 - AUGUST 1994
Biological Collections via Gophers

Scott Miller
Bishop Museum, Box 19000-A
Honolulu, Hawaii 96817, USA
scottm@bishop.bishop.hawaii.org


Biological collections databases available on Internet provides unparalleled opportunities to make data from museum collections available (e.g., Miller, 1993, Bull. Ent. Res. 83: 471-474). Gopher servers have become popular interfaces for databases of many kinds. Museum collection data are only beginning to become available. The following list includes those collections databases known to me in May 1994. The list is probably incomplete and will hopefully be out-of-date soon.

All these databases may be reached via the Biodiversity and biological collections gopher at Harvard University, or via other gophers, some of which are listed below (except the U.S. National Fungus collection, available only via telnet). This list includes only databases dealing with specimen data, not those dealing primarily with taxonomic or other data and does not include living collections. Sizes of databases refer to approximate number of records; in some cases a record includes more than one specimen (e.g., a lot). A database is considered complete if it includes all the records available for the category suggested by the title. These databases include over 2 million records already and are growing rapidly.

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>SIZE</th>
<th>COMPLETE</th>
</tr>
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<tbody>
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<td>PLANTS &amp; FUNGI</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>160,000</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Harvard University Herbarium Types</td>
<td>30,000</td>
<td>NO</td>
</tr>
<tr>
<td>Farlow Herbarium Diatom Exsic catae</td>
<td>13,000</td>
<td>NO</td>
</tr>
<tr>
<td>California Academy of Sciences Herbarium Types</td>
<td>9,000</td>
<td>YES</td>
</tr>
<tr>
<td>Smithsonian Plant Types</td>
<td>88,000</td>
<td>YES</td>
</tr>
<tr>
<td>Australian Plant Specimens (ERIN)</td>
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</tr>
<tr>
<td>U.S. National Fungus Collection (USDA)</td>
<td>550,000</td>
<td>NO</td>
</tr>
<tr>
<td>INVERTEBRATES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australian Animal Specimens (ERIN)</td>
<td>50,000</td>
<td>NO</td>
</tr>
<tr>
<td>Boulder County, Colorado Insects</td>
<td>26,000</td>
<td>NO</td>
</tr>
<tr>
<td>California Academy of Sciences Invertebrate Types</td>
<td>4,800</td>
<td>YES</td>
</tr>
<tr>
<td>MCZ Insect Types</td>
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</tr>
<tr>
<td>MCZ Microlepidoptera Types</td>
<td>600</td>
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</tr>
<tr>
<td>MCZ Spider Types</td>
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<tr>
<td>University of California Museum Paleo. Invertebrate Types</td>
<td>11,000</td>
<td>YES</td>
</tr>
<tr>
<td>University of California Museum Paleo. Microfossil Types</td>
<td>?</td>
<td>NO</td>
</tr>
<tr>
<td>VERTEBRATES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cornell University Fish Collection</td>
<td>70,000</td>
<td>?</td>
</tr>
<tr>
<td>MCZ Zoology Fish Types</td>
<td>2,500</td>
<td>NO</td>
</tr>
<tr>
<td>University of Texas Austin Fish</td>
<td>23,000</td>
<td>YES</td>
</tr>
<tr>
<td>University of California Museum Paleo. Vertebrate Types</td>
<td>7,800</td>
<td>YES</td>
</tr>
<tr>
<td>Slater Museum Birds</td>
<td>20,000</td>
<td>YES</td>
</tr>
<tr>
<td>Neotropical Fish Collections (NEODAT Project)</td>
<td>280,000</td>
<td>NO</td>
</tr>
</tbody>
</table>
INSECT COLLECTION NEWS

Gopher Addresses:
Australian Nat. Botanic Garden: osprey.erin.gov.au 70
Biodiversity gopher at Harvard: hub.harvard.edu 70
Bishop Museum: bishop.bishop.hawaii.org 70
California Academy of Sciences: cara.calacademy.org 70
Environmental Resources Info. Network: kaos.erin.gov.au 70
NEODAT Project (Neotropical fish): fowler.acnatsci.org 70
Smithsonian Institution: mmnhgoph.si.edu 70
Univ. Calif. Mus. Paleo.: ucmp1.berkeley.edu 70
Univ. Colorado: gopher.colorado.edu 70
U.S. National Fungus Collection: fungi.ars-grin.gov

Yale Peabody Museum Online
Lawrence F. Gall
Systems Office 2
Peabody Museum, Yale University
New Haven, CT 06511, USA
Phone: (203)-432-989; FAX: (203)-432-9816
Internet: lg@george.peabody.yale.edu

[from Ent-list, 1 July 1994]

The Peabody Museum of Natural History at Yale University is pleased to announce access to its collections data via gopher. You can find us at: gopher.peabody.yale.edu port 70. The initial gopher offering is 255,268 specimens/lots, which translates to a little under a million individual specimens. The museum's approximate holdings and the composition of the gopher are as listed in the table below, which follows ("+" means there are plans to provide material later this summer).

We will be updating the gopher data periodically; the last update times are posted in the "Welcome and Introduction" file on the main menu. Comments about the data (omissions, etc.) are most welcome, and are best aimed via email at the Collections Manager(s) in the respective curatorial discipline(s) of your interest. You can find their addresses in the "Staff Electronic Mail Addresses" file on the main menu. Enjoy!

Ent-List News
Mark O'Brien
Museum of Zoology
University of Michigan
Ann Arbor, MI 48109-1079, USA
mfohrien@umich.edu

What is ent-list? Ent-list is a mailgroup (not a LISTSERV, nor a usenet group) based at the University of Michigan. It started in 1989 as a product of the first ECN meeting, and has steadily grown since then.

Ent-list is a way to "network" people involved in arthropod collections management, systematics, taxonomy, and technologies relating to these topics. It is also a means for ECN members to broadcast announcements and queries. It is not a general entomology forum like entomo-1, nor as general in coverage as museum-1.

Ent-list continues to grow and to fill a useful niche in the Internet world. In late 1992, I moved ent-list over to an X.500 database from the old MTS system. Users won't notice any difference, but it is now easier for me to administer and easier for users to subscribe. If you can access the University of Michigan's X.500 database (via the Internet), you can search for ent-list and subscribe to it yourself.

You can also subscribe by sending me a request and including your name and address. Send your request to: mfohrien@umich.edu. To send a message to the entire mailgroup, send your message to: ent-list@umich.edu. That's pretty simple, and your message will reach at least 170 subscribers within an hour.

I am certain that ent-list will continue to thrive and be more useful as more systematics collections gain Internet access. Please make use of it, and I hope that you will also find it to be a useful service.

<table>
<thead>
<tr>
<th>Curatorial Division</th>
<th>Cataloguing Methodology</th>
<th>Number of Items</th>
<th>Items on Gopher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropology</td>
<td>lot</td>
<td>267,000</td>
<td>+</td>
</tr>
<tr>
<td>Botany/Paleobotany</td>
<td>individual</td>
<td>360,000</td>
<td>16,809</td>
</tr>
<tr>
<td>Entomology</td>
<td>individual/lot</td>
<td>900,000</td>
<td>5,705</td>
</tr>
<tr>
<td>Invertebrate Paleontology</td>
<td>lot</td>
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<td>24,189</td>
</tr>
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<td>Invertebrate Zoology</td>
<td>lot</td>
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<td>8,584</td>
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<tr>
<td>Meteorites</td>
<td>individual/lot</td>
<td>500</td>
<td>+</td>
</tr>
<tr>
<td>Mineralogy</td>
<td>individual</td>
<td>40,000</td>
<td>29,115</td>
</tr>
<tr>
<td>Scientific Instruments</td>
<td>individual</td>
<td>2,000</td>
<td>573</td>
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<tr>
<td>Vertebrate Paleontology</td>
<td>individual</td>
<td>120,000</td>
<td>28,132</td>
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<tr>
<td>VZ - Herpetology</td>
<td>individual</td>
<td>14,400</td>
<td>+</td>
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<tr>
<td>VZ - Ichthyology</td>
<td>individual</td>
<td>9,908</td>
<td>9,908</td>
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<td>VZ - Mammalogy</td>
<td>individual</td>
<td>4,806</td>
<td>4,806</td>
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<tr>
<td>VZ - Ornithology</td>
<td>individual</td>
<td>113,648</td>
<td>113,648</td>
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<tr>
<td>VZ - Osteology</td>
<td>individual</td>
<td>13,799</td>
<td>13,799</td>
</tr>
</tbody>
</table>

No. 9 - AUGUST 1994
Once we get the UMMZ wired for ethernet, there may be some future additions in ent-list services. If you have specific ideas that you'd like to see implemented (Gopher services, etc.), just send me a message and I'll consider it.

Entomo-L News

The entomology INTERNET discussion group, entomo-l, organized by Peter Kevan from the Department of Environmental Biology, University of Guelph, Guelph, Ontario N1G 2W1, Canada, has attracted more than 600 participants. Those interested in participating in the group should write to: LIST-SERV@UOGUELPH and leave the following message: SUBSCRIBE ENTOMO-L <text> (i.e., your real name).

A Butterfly List—*

Hank Brodkin
Marina Del Rey, CA
hankb@kaiwa.com

For those of you interested in butterflies and a related matter - we now have a real list-serv service "LEPS." Leps is a mail list devoted to the insect order Lepidoptera, butterflies and their allies, and is open to the professional and amateur alike for discussion ranging from the scientific to the mundane.

To subscribe send your request to <lissterv@kaiwa.com>. In the body of the message type: ADD <your address> Leps (without the brackets).

To unsubscribe send your request to <lissterv@kaiwa.com>. In the body of the message type: DELETE <your address> Leps (without the brackets).

Submissions to the list should be addressed to: <Leps@kaiwa.com>. We request that the submission includes the name and location of the poster in the body of the message.

All are welcome!

[* My apologies to Hank for the line through the title of this contribution; a code got stuck in somewhere during conversion to Ventura and I can't seem to find it.--RMcG]  

Announcing CITES-L

[from Ent-list, 1 July 1994]

CITES-L is a list for discussion and postings of issues relating to the trade in wildlife and the Convention on International Trade in Wildlife and the Convention on International Trade in Endangered Species (CITES). The list will provide a medium for discussions on wildlife trade and CITES related issues. The World Conservation Monitoring Centre (WCMC), where the list will be maintained, has had over 12 years of experience in dealing with wildlife trade issues and maintains a database of all reported trade in CITES-listed species on behalf of the CITES Secretariat. WCMC has regular contact with the CITES Secretariat in Geneva, which will also be a source of up-to-date information. The 9th Conference of the Parties of CITES will be held in November of this year in Fort Lauderdale, Florida, USA and we hope to post decisions and results of discussions as they take place.

If you are interested in joining the list then please read on for further instructions. Messages sent to CITES-L are distributed automatically and authors are solely responsible for the content of their posts. WCMC and CITES does not verify the accuracy of submitted messages nor endorse whatsoever is expressed. After joining CITES-L, please feel free to introduce yourself and the work/studies you actually are engaged in or general areas of interest.

SUBSCRIBING: Send a one line message to LIST-PROC@WCMC.ORG.UK with the command line (in message body):

SUBSCRIBE CITES-L Your name, e.g. SUBSCRIBE CITES-L Ronald Macdonald

SIGNING OFF: Send a one line message to LIST-PROC@WCMC.ORG.UK with the command line (in message body):

SIGNOFF CITES-L or UNSUBSCRIBE CITES-L

CAUTION: Replying to a message from the list will reply to EVERYONE on the list unless you take precautions to make sure that does not happen.

Thank you for your attention. If you have any questions please direct them to the list manager: Helen Corrigan, Wildlife Trade Monitoring Unit, World Conservation Monitoring Centre, 219 Huntingdon Road, Cambridge CB3 0DL, U.K.
Phone: +44 223 277314; Fax: +44 223 277136; E-mail: helen.corrigan@wcmc.org.uk

Tips for E-mail Beginners

Alan Cady
Department of Zoology
Miami University-Middletown
4200 E University Blvd.
Middletown, Ohio 45042, USA
ACADY@MIAVX3.MIAD.MU.OHIO

Electronic Mail (= E-Mail) is becoming a primary means of communication in science, industry, and business. For those reluctant to enter the world of E-mail, take heart,... most systems are setup to make using E-mail fairly straightforward. The tips here are NOT designed to instruct you on the use of E-Mail; just to acquaint you with finding help and getting started.

Most colleges and universities are connected to BITNET or INTERNET, which are two of many possible ways to access the "Net". Some users have private accounts with commercial network services (e.g. COMPUSERVE, PRODIGY). Any of these interfaces usually allow connection with practically anyone else using the same network services; NetNews, Government accesses, and a myriad of "bulletin boards" (BBSs).

Each user on a service has an "address" which consists of a "nodename" followed by an "address". There is usually an "at" sign (= @) between the nodename and address. Thus, ACADY@MIAVX3 would read "A CADY AT MI Ami"
VaX3. This is the standard syntax for a Bitnet address. Internet addresses are usually longer. For example, the above Bitnet address modified for Internet is ACADY@MLAVX3.MID.MUHO1.EDU. Unfortunately, there is no consistent way to translate addresses from one network to another. This depends on naming conventions adopted by system operators at each local site. However, the final name of an Internet address tends to identify the institution (EDU, GOV, COM, ORG).

The best way to get going with E-mail is to contact your local system operator. Ask if you are connected to any of these major networks. You may have to install a special network circuit board and software into your personal computer. Also ask for explicit instructions on how to access the various networks. Once you get into "MAIL" on your system, the "Help" files there are available to help with specific commands.

Good luck with getting started! Give yourself time to learn how to use the system. Remember how fast and direct E-mail is, and how this tool opens a whole new world. Do not be afraid to ask other "netters" for assistance. Enjoy! :-) (This symbol is a "smiling face"... turn the page 90-degrees clockwise to view it.)

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**EQUIPMENT NEWS**

**Critical Point Dryers**

William H. Rowe, Logistics Manager, LMU
Department of Entomology
NMNH, Smithsonian Institution
Washington, D.C. 20560, USA
muhrow002@svim.si.edu

[An ent-list reader asked for information on CPDs and Bill Rowe provided the following which may be of general interest.]

We have two CPD’s in our department. One is completely automatic (after a certain point in procedure) and one is manual. No one uses the automatic feature because of the purge time guessing game so I do not recommend the extra expenditure unless you will be using the exact same parameters every time and you do not mind the extra CO2 that you will be needlessly using by using longer than necessary purge times.

We use the Tousimis Research Corporation brand, P.O. Box 2189, Rockville, Maryland 20847, 301-881-2450.

Make sure that your model has automatic PRESSURE and TEMPERATURE control, lighted chamber and fine adjustment for the incoming CO2.

One of our units has the two external gas filters as insurance against any bad tank of CO2. The other unit, however, has not experienced any problems from not having the filters as far as we know. Perhaps 10 years is not sufficient time for problems to appear.

We have an extension chamber which allows larger batches but as far as I know, no one has used it.

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We purchased the stainless steel sample holders but again, users have preferred to use the individual polyethylene snap cap holders that we obtain from JBS in Canada.

I will be pleased to learn of experiences with other brands.

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**ANNOUNCEMENTS**

**Mail Service to Cuba**

Jennifer Niese
RARE Center for Tropical Conservation
1616 Walnut Street, Suite 911
Philadelphia, PA 19103
(215) 735-3510

RARE Center for Tropical Conservation, a non-profit conservation organization based in Philadelphia, has recently started a program of scientific information exchange with Cuba. The long-term goal of the program is to develop the Caribbean region’s capacity to conduct biosystematic research and training.

One of the services RARE Center is offering through this program is an express mail service to Cuba, which is designed to reduce the time (often several weeks) it takes for scientific correspondence to reach Cuba. DHL packets are sent regularly from RARE Center’s office in Philadelphia to Havana, Cuba. If you would like to use the service, correspondence should be addressed to Cuban colleagues and mailed in an envelope not exceeding eight ounces to the address listed above.

RARE Center will also receive faxes at (215) 735-3515 and include the hard copy in the DHL packets. Please include a brief note to RARE Center explaining the nature of the correspondence (e.g., scientific paper to be reviewed) so that we can document the service.

Cuban biologists may send letters addressed to US colleagues to:

Orlando Garrido, Scientific Advisor, RARE Center, Museo Nacional de Historia Natural, Capitolio Nacional, Habana, Cuba.

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**ASC and Cuba: A Request for Scientific Literature**

Do you have scientific books or journal series that you no longer use and would like to donate for distribution to Cuba? The Association of Systematics Collections (ASC) is developing a program to exchange systematics and biodiversity information between North American institutions and Cuban institutions. Please contact the ASC office with the titles of books, journals, or reports in systematics/biodiversity (especially related to Caribbean biota) that you are willing to donate, and we will arrange to ship the materials to an appropriate institution in Cuba. For more information and to contribute contact: Elizabeth Hathaway, ASC, 730 11th Street, NW, Second Floor, Washington, D.C. 20001-4521, (202) 347-2850, fax: (202) 347-0072.


A complete revision of the original issued in 1992. Covers Hawaiian insects, mites, spiders and relatives. Lists all valid names, residency status (e.g., endemic, adventive, purposefully introduced), and distribution by island for over 8500 species. The index includes cross references to synonyms and misidentifications.

Available from Bishop Museum Press, Box 19000-A, Honolulu, Hawaii 96817, USA. Price US $25.00 plus $5.00 shipping and handling. Checks, institutional purchase orders, Visa and Mastercard accepted.

Identifying Museum Materials: A Short Course in Collections Management and Conservation

Presented by the San Diego Natural History Museum in conjunction with International Academic Projects, London September 14-17, 1994

This is a four-day, intensive professional course on the practical identification of museum materials, designed for anyone who works with collections of historic, cultural, artistic or scientific objects.

Accurate identification of the materials from which objects are made is vital to decisions in classification, conservation, documentation, exhibition, and storage. The course will focus on identification of a wide range of natural and man-made materials, using visual and physical techniques. Identification of deteriorated and corroded surfaces and the causes of deterioration will also be covered.

Materials to be studied and analyzed in depth include wood, bone, horn, ivory, shell, glass, ceramics, metals, adhesives, plastics, and other materials commonly found in museum objects. Emphasis is placed on techniques that use a minimum of technological or destructive sampling approaches.

Both lecture and laboratory sessions will be offered. Participants are encouraged to bring problematic materials from their own collections or areas for discussion and identification. The course will be taught primarily at the San Diego Natural History Museum in Balboa Park.

Course instructors are Bob Child, BSc, FFLC, FSA, Head of Conservation, National Museum of Wales, and Sally Shelton, MA, Collections Conservation Specialist, San Diego Natural History Museum. Both are visiting lecturers to the International Centre for the Study and Restoration of Cultural Property (Rome), and have taught other IAP courses.

Course fees are $225 for registrations postmarked on or before 1 September, $250 for those marked after. Course fees do not include transportation, lodging, or meal costs.

For further information and registration, please contact Sally Shelton at the following address: San Diego Natural History Museum, P. O. Box 1390, San Diego, CA 92112; phone (619) 232-3821, x226; FAX (619) 232-0248; email: libsdnhm@class.org

Support for this course is provided in part by the Bay Foundation through a grant to International Academic Projects, London.

Pest Infestations
[from Ent-list, 1 July 1994]

I am posting this for Mary-Lou Florian of the Royal British Columbia Museum. She is very interested in information on pest infestations in museums, especially natural history museums, and is compiling this information for analysis. If you have experienced pest infestations in natural history collections in storage, please contact her, providing the species of pest, specimens involved, and a short description of the nature of the infestation.

You may contact Ms. Florian at the Royal British Columbia Museum, 675 Belleville Street, Victoria, British Columbia, V8W 1X4, Canada, FAX 604-385-8263. If you would prefer email, I will forward messages to her that are emailed to me at: pendejo@kubec.ubc.ca.

Thank you for your assistance in this matter - John Simmons, Collections Manager, Museum of Natural History, University of Kansas.

PROCTOS

Lubomir Masner and Jocelyn Denis
Centre for Land and Biological Resources Research
Edifice K. W. Neatby Building
C.E.F., Ottawa, Ontario, CANADA K1A 0C6
Internet: masnerl@uccco2.agr.ca

We are coming to you with good news. With Spring 1994, there is new energy and good intention to rekindle the newsletter PROCTOS. After eleven years of service (1975-1986) PROCTOS slipped into dormancy for seven long years. Perhaps it was the dwindling group of students studying Proctotrupoidae or perhaps just a general fatigue that caused the temporary diaspora. However, during the past several years there has been an encouraging renewal in proctotrupoid studies; several new students emerged and new projects started. It occurred to us that the time is ripe to resurrect the oldest newsletter (est. 1975) on Hymenoptera in order to assist and further invigorate the new process.

Naturally, we need your help, your ideas and suggestions. To subscribe and obtain a PROCTOS questionnaire, contact the Editors at the above address. We are also contacting editors of related Hymenoptera newsletters to spread the word.
Please tell your friends, young students in particular, about this event. Let us make it in 1994!

International Trichoptera Symposium
Ralph W. Holzenthal and Oliver S. Flint, Jr., Co-conveners, cordially invite your participating in the 8th International Symposium on Trichoptera to be held in the "Twin Cities" of Minneapolis and St. Paul and Lake Itasca, Minnesota, from 9-15 July, 1995. An informal opening reception will be held Sunday night, July 9th, on the University of Minnesota campus. Formal paper and poster presentations will begin Monday morning and will continue through Tuesday afternoon, again, on the University campus. On Wednesday morning, July 12th, the symposium will move to Lake Itasca, Minnesota. Paper and poster presentations will resume at Lake Itasca and a day will be reserved entirely for collecting, nature walks, canoeing, and other recreational and social activities. After a final formal paper session and the business meeting, the Symposium will conclude at noon on Saturday, July 15th. Transportation will be provided back to the Twin Cities. An accompanying persons program is also planned as is a post Symposium excursion for a limited number of interested participants.

Accommodations will be available in University dormitories during the Twin Cities portion of the symposium and at Douglas Lodge in Lake Itasca. Total costs for regular participants staying in university housing will be $407 which includes room, meals, transportation, the reception, program and abstract booklets, etc. The cost is slightly lower for accompanying persons. The official language for the Symposium will be English. Subject matter of papers and presentations is wide and will include, among others, morphology, zoogeography, taxonomy and systematics, life history, habitat adaptations, behavior, and applied ecology of Trichoptera. It is anticipated that publication of the proceedings of the Symposium will be by Backbuys Publishers, Leiden, The Netherlands.

For additional information and registration materials, please contact the Co-conveners, Dr. Ralph W. Holzenthal, Department of Entomology, 219 Hodson Hall, 1980 Folwell Ave., University of Minnesota, St. Paul, Minnesota 55108. Phone: 612-624-7728, FAX: 612-625-5299, e-mail (preferred): holze001@maroon.tc.umn.edu. Deadline for registration and abstracts is March 1, 1995.

POSITIONS AVAILABLE

Two Assistant Professor Positions
The Department of Entomology at the University of Georgia invites applications for two tenure-track positions to begin September, 1995.

INSECT SYSTEMATIST - The successful candidate will be expected to sustain a major research program in Arthropod Systematics and Phylogenetics that emphasizes modern ap- proaches and techniques. Teaching responsibilities include graduate-level courses in Insect Taxonomy and Systematics, Insect Morphology, and an additional course in the candidate’s specific area of interest.

INSECT PHYSIOLOGIST - The successful candidate will be expected to develop a strong, creative research program and teach at the undergraduate and graduate levels. Those applying molecular approaches to fundamental entomological questions are especially encouraged to apply.

Applications received by November 1, 1994 are assured of consideration. Applicants should arrange for four letters of reference to be sent to the appropriate committee. Apply by sending a curriculum vitae, list of publications, three selected reprints, brief statements of research and teaching interests, and four letters of reference (solicited by the applicant) to:
Insect Systematics Search Committee, or Insect Physiologist Search Committee, Department of Entomology, University of Georgia, Athens, Georgia 30602-2603. The University of Georgia is, of course, an Equal Opportunity/Affirmative Action Employer.

Jim Howell, Professor, Department of Entomology, Bio. Sci. Bldg., The University of Georgia, Athens, Ga. 30606-2603; internet: cmfpsuns@uga.cc.uga.edu; bitnet: cmfpsuns@uga.bitnet.

Salary: $16,500 and full benefits. Send letter of interest, CV, and two letters of recommendation by June 30, 1994 to:
Dr. Barry M. O'Connor, Insect Division-Museum of Zoology, University of Michigan, Ann Arbor, MI 48109-1079.
Phone: 313-763-4520; fax: 313-763-4080. Internet: userk92r@um.cc.uminich.edu [UM Salary Grade: 11, Job Posting No. A-94-2029-MM].

Also Contact: Ann Arbor Campus Employment Services Office, Room G250 Wolverine Tower, 3003 South State Street, Ann Arbor, MI 48109, (313) 764-6580; 24-hour jobline: 764-7292.

The University of Michigan is an Equal Opportunity/Affirmative Action employer, and complies with all applicable federal and state laws regarding non-discrimination and affirmative action.

Curatorial Assistant - AMNH
The American Museum of Natural History in New York City has a position for a Curatorial Assistant. Responsibilities: Mount, label, sort and identify insects; assist curators with various research; other duties as assigned. Qualifications: Bachelor's degree in a biological science. Experience in scientific collections preferred. Strong general computer experience preferred. Salary: $22,000 per annum. Hours: Monday-Friday, 9-5. This is a one year term position which may be renewed. Contact: Department of Entomology, American Museum of Natural History, Central Park West at 79th St., New York, NY 10024.
Research Assistantship
SDSU Insect Museum, Department of Plant Science
South Dakota State University
Brookings, South Dakota, USA

POSITION: Graduate Research Assistantship in Entomology
LOCATION: Insect Museum, Department of Plant Science, South Dakota State University, Brookings.

GENERAL DESCRIPTION: A nearly half-time (49%) assistantship leading to an M.Sc. in entomology is available at South Dakota State University. Duties will include curatorial needs within the SDSU Insect Museum, fieldwork on the South Dakota Insect Survey, and research on insect or arachnid taxonomy or systematics (subject taxon open for consideration). The student will be expected to work under supervision and independently, and must be capable of active cooperation and interaction with coworkers and members of the public.

QUALIFICATIONS: An earned B.S. or B.A. degree in entomology, biology, or related fields, and effective communication skills. An interest in insect or arachnid taxonomy, ecology and evolution, and biodiversity, is desired. Admission to the SDSU Graduate School.

STIPEND & TUITION FEES: The stipend is expected to be at least $9,200 in the first year. Graduate assistants on contract with the university pay only one-third of the standard resident graduate tuition rate per credit hour.

AVAILABLE: Immediately.

APPLICATION: Applicants should send the following: 1) current resume or curriculum vitae; 2) the names, addresses, and a telephone numbers of 3 references; 3) official transcripts of all post-secondary education; 4) TOEFL and GRE scores; and, 4) a letter of application briefly describing interests and background relating to the position. Additional information will be requested by the Graduate School.

Send materials to: Dr. Paul J. Johnson, SDSU Insect Museum, Box 2207A, South Dakota State University, Brookings, SD 57007, Phone: 605-688-4438, FAX: 605-688-4602, Internet: px53@sdsxms.sdsstate.edu

South Dakota State University is an Affirmative Action/Equal Opportunity Employer (Female/Male) and offers all benefits, services, educational and employment opportunities with regard for age, race, color, religion, sex, disability, national origin, or Vietnam Era veteran status. Women and minorities are encouraged to apply. Proof of eligibility for employment is required by the Immigration Reform and Control Act of 1986.

Rea Postdoctoral Fellowship in Systematic Entomology

Carnegie Museum of Natural History invites applications for the REA POSTDOCTORAL FELLOWSHIP for collection-based research in SYSTEMATIC ENTOMOLOGY, including revisionary studies, phylogenetics, biogeography, comparative biology and morphology. The Rea Fellowship is for one year beginning 1 January 1995 and may be renewed for a second year. Candidates must have a Ph.D. degree on appointment and strong credentials in systematic research. Submit by 15 August 1994: curriculum vitae, three letters of reference, and a letter describing research experience, interests and goals to: Dr. Leonard Krishalka, Assistant Director for Science, Carnegie Museum of Natural History, 4400 Forbes Ave., Pittsburgh, Pa 15213, USA.

Systematic Zoologist - Field Museum

The Field Museum is seeking an outstanding systematic zoologist to fill a career-track appointment in the Department of Zoology at the level of Assistant Curator. Candidates pursuing innovative, specimen-based research in systematic biology will be considered.

Among the areas of interest are the following: (a) molecular systematics, with a focus on integrating population genetics and/or molecular mechanisms with systematics; (b) developmental biology, including the use of tissue culture and histology as a means of addressing developmental and phylogenetic questions; (c) phylogenetic research that investigates questions in population or community ecology; or (d) systematics based on multiple data sets (molecular, morphological, behavioral) or making important contributions in a second field such as conservation, theoretical systematics, or biogeography. The successful candidate will have a Ph.D. and a proven record of scientific achievement. In addition to research, responsibilities include curation of collections and participation in public exhibit and education programs. The potential exists for participation in graduate and undergraduate training at local universities. The Zoology Department is part of the Museum's Center for Evolutionary and Environmental Biology which also includes the Departments of Botany and Geology.

Consideration of applications will begin on September 15, 1994 and will continue until a suitable candidate is found. Please send the following materials: (1) a Curriculum Vitae; (2) a statement of research objectives; (3) names and addresses of 3 people from whom letters of recommendation may be sought; (4) copies of relevant publications to: Search Committee, Department of Zoology, Field Museum, Roosevelt Road at Lakeshore Drive, Chicago, IL 60605-2496. Email inquiries: westmnf@fmnh.org. As an Equal Opportunity/Affirmative Action Institution, we especially encourage applications from women and minorities and we are responsive to dual-career needs.

ICN Communications

Send articles for distribution in ICN to Ron McGinley, Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, USA. I greatly appreciate communications sent via e-mail: mnhen011@slvm.si.edu (these I can easily download).
ENTOMOLOGY COLLECTIONS NETWORK MEMBERSHIP NOTICE

About five years ago a group of members of the entomological collections community formed the Entomology Collections Network to address issues of special importance to managers and curators of entomological collections [see Kim 1989, Formation of Entomology Collections Network, ICN, vol. 2, no.2]. At present, ECN is an entirely informal organization run by a steering committee which is elected each year at the Annual Meeting. In recent months, a majority of those attending the meetings have agreed that in order to more effectively pursue some issues it would be beneficial if ECN had a more formal membership, that is, a list of people who have consented by way of filing a form to be members of the organization. At this time there are still no plans to adopt a formal structure although there is growing feeling that at some point that may be necessary. There are no dues or fees of any kind for membership.

If you would like to be a member of the ECN, we ask that you fill out the accompanying form and return it to the address listed below. If you have colleagues who might be interested in joining the ECN, please feel free to copy this form and distribute it to any interested parties.

Please fill out this form and return it to: Larry Speers, ECN Steering Committee, CLBRR, Agriculture and Agri-Food Canada, K.W. Neatby Bldg, CEF, Ottawa, Ontario, Canada K1A 0C6; SPEERSL@NCCCOT.AGR.CA

Name: __________________________________________________________

Address: _________________________________________________________

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Institution represented: ____________________________________________

Phone no. _________________________________________________________

Fax no. ___________________________________________________________

E-Mail: ___________________________________________________________