ICN REGIONAL CO-EDITORS
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Insect Collection News (ICN) is an informal newsletter for individuals associated with entomology collections around the world (Trevor Crosby, please note that New Zealand has been added to the masthead - thanks). It hopefully supplements the communications of more general interest distributed by the Association of Systematic Collections Newsletter. ICN started as a handout for a talk presented at the last International Congress of Entomology, Vancouver, July 1988. I am delighted to announce that while retaining its informality, ICN is becoming a bit more structured internationally. Laurence Mound, Keeper of Entomology, Natural History Museum, London, has agreed to cooperate as an ICN regional co-editor for the United Kingdom; Ebbe Nielsen, Section Head for Taxonomy and General Biology, Division of Entomology, CSIRO, will do the same for Australasia. Their important role is to support local regional communication and help coordinate and funnel information on to ICN for general distribution. But, who else? Potential regional co-editors please identify yourselves ... Help!

DEVELOPMENTS IN LONDON
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Much has been written, spoken and even shouted about what is going on in my Department. This short article is an attempt to shed a little light onto some of our problems, posed by the numbers of living insect species, the 25 million sorted specimens in our collections on 6000 sq.m. of a six-floored building, and the diversity of needs for systematic work.

Let me start with the political arena in which this institution must survive. We have always been funded by the British taxpayer. Any politician responsible for the Treasury must have two basic questions. First, what is the appropriate level of expenditure from the public purse on taxonomic entomology for any country (should it be related, for example, to the specific needs of that country)? Second, should Britain's financial support of taxonomy be substantially greater than that of other countries, and if so for what reasons; or should it be much less because our knowledge of British insects is so good? Taxonomists do not like such questions; we know how important our work is. But the questions have to be argued over, not with "ignorant politicians," but with other scientists who are equally convinced of the importance of elemental particles, astrophysics or biotechnology. We have just been given the finest collection of moths ever developed in Japan. Am I right in being delighted that this will become an ideal focus for future collaborative work with Japanese entomologists to our mutual benefit?

Or is the Japanese taxpayer right in not paying for a suitable institute in that country to house this collection, investing instead in better microchips and motorcycles? In this connection, "right" is not a fundamental; it is a matter for public discussion and the creation of public opinion, and taxonomists must accept the hard work that this involves.

Within our own institute the questions do not get any easier. Having secured a slice of the available financial cake, what should be our priorities for taxonomic work in entomology? Priorities have to be worked out across a two-dimensional matrix. First, what groups of insects should we concentrate on; we cannot deal with them all, but should each member of staff work on a separate group or are research teams on particular groups more effective, leaving more groups untouched? Secondly, what level of work is appropriate, from DNA research on species complexes, through revisionary taxonomy and phylogenetics to comprehensive books at graduate level or enthusiastic introductions for children? We have to bear in mind that we are not doing taxonomy for other taxonomists or for ourselves, we are employed to contribute to the public understanding of science. We cannot do it all, and so priorities are essential. Priorities are a function of current knowledge, expertise, equipment, funding, external demand and feasibility - and they change with time. (Personnel management, as I pointed out to Dan Janzen over breakfast at the Vancouver Congress, is a form of applied ecology very similar to conservation management.) An alternative strategy, still advocated in some Museums such as Paris, is to divide the cake equally and leave each specialist alone for 30 years to become an au-
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authority and produce anything that seems appropriate. Certainly creative work needs freedom and a measure of security; but the security of tenure in government service accompanied by traditional academic freedom is contrary to those market forces which determine the rest of human society. This takes us full circle back to the political arena of how answerable public servants should be to their paymasters, the public.

These questions are particularly important given our system of employment at the Natural History Museum which does not distinguish between technician and research worker. We are not permitted to advertise for a scientist with a Ph.D.; the highest qualification at which we can advertise is “four years postgraduate experience.” All staff, insect pinners to director, are on the same set of salary scales (as in the U.S. government service), but we have never had a fixed number of staff at any level, and so everyone always expects promotion. Many of our well-known entomologists are non-graduates who would be graded as technicians in other organisations; we pay them according to. This viewpoint is related to the vast size and richness of our collections and the number of scientific visitors; a good specialist may spend 30% of each year looking after visitors and substantially more attending to loans. To give such research specialists more time we have created a curatorial programme involving 28 staff led by Dr. Mike Fitton. This team will be responsible for looking at the totality of problems in our collections and determining priorities; should 10,000 longhorn beetles damaged by verdigris be looked after before 100,000 rough-sorted butterflies? They will also deal with loans and the thousands of public enquiries we have each year.

Our research work will be focused, not just on enriching our collections but on the end-users of systems, whether these are economic entomologists, evolutionists, ecologists, or young children. To this end our research is now organised, not by insect groups, but by potential users and collaborators. There is a medical and veterinary insect group (part of the Museum’s Human Health Research Programme). This is led by Dr. Tony Shelley, whose many years of Neotropical experience as a blackfly specialist is supported by three other research workers and three support staff. This group is also largely responsible for a biochemistry laboratory using DNA methods to recognise sibling species. The group studying insects and their hosts (part of the Museum’s Living Resources Programme) is led by David Hollis, our psyllid specialist, and includes four research workers on parasitic wasps, aphids, mites and moths together with three support staff. This group maintains our long standing interest in agricultural insects and biological control. The Biodiversity Programme under Dr. Nigel Stork is more extensive, with six research workers and five support staff; this reflects our success in attracting new collaborative research funding, particularly for work on tropical forests. Finally, the Environmental Quality Programme, led by coleopterist Peter Hammond, has only three staff, with
a remit to attract contract funds for taxonomic work in this particular area of conservation biology. These Research Programmes extend through all five of the Museum’s departments, so that botanists and entomologists are encouraged to look for scientific areas of mutual interest thus promoting interdepartmental collaboration and stimulation.

This idea of organizing a taxonomic research institute along lines which do not reflect the taxonomy of the insects studied has horrified many people. But the idea came not from “management,” but from my younger taxonomists who felt the need to interact with biologists in other disciplines. They asked why is taxonomy so often thought to be unimportant by other biologists? Could it be because taxonomists do not interact readily with nontaxonomists, and so often insist that to rise to their full potential they must be left alone, unhurried for their allotted term?

We are not ecologists, geneticists or comparative anatomists. But as taxonomists we contribute to these and many other biological disciplines. As taxonomists we stake our reputations; but selling the value of our systematic viewpoint requires that we are involved in the research projects and teaching of other biologists. This approach is reflected in my own recent appointment as an Honorary Professor in the School of Pure and Applied Biology at the University of Cardiff, the first time in our 100 years that any British University has sought collaboration with this Museum at such a level.

Yes, we have severe financial constraints, such that our salary bill absorbs 98% of our government funds. In order to invest in better computers, microscopes and laboratories we must limit this bill by reducing to 64 staff. In order to expand our research programmes we must seek jointly funded collaborative projects. In order to cover the costs of our public enquiry system we must charge appropriate customers such as lawyers and commercial firms. But we remain in business as one of the most diverse museums that exists. Above all, we remain alive, with the ability to develop in new directions. Before criticizing yet again, why not visit and find out?

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The cost of airfare is significantly less if you stay over a Saturday, so the added expense of arriving on Friday and attending this important preconference meeting should be minimal. We currently are working out details and will be sending these to you within the next several weeks.

MEETINGS

IMPORTANT MEETING OF ENTOMOLOGICAL SYSTEMATISTS!!!!
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A two-day session will be held Friday evening November 30 and Saturday December 1 to implement and develop plans discussed last year at the Entomological Society of America (ESA) Conference in San Antonio and the Entomological Collections Network (ECN) workshop at Pennsylvania State University. The session will be convened at Louisiana State University near New Orleans preceding the ESA National Conference. Emphasis will be placed on two issues: 1) Data standards for systematic entomology; 2) Cooperation as a vehicle for progress in systematic entomology in the 1990s.

The tentative schedule is: Friday evening, a reception and dinner; Saturday morning, session I on “National Agendas,” with James S. Ashe, Douglass R. Miller and Scott E. Miller, Lead; afternoon, session II on “Database Management in Entomological Collections,” with Gerald R. Noonan, F.C. Thompson and Ronald A. Hellenthal, Lead; concluding with an ECN Business Meeting and election of new steering committee. Dr. Joan B. Chapin of LSU will serve as the local arrangements person, and K.C. Kim is responsible for general coordination.

ASSOCIATION OF SYSTEMATICS COLLECTIONS
1991 Annual Meeting
K. Elaine Hoagland, ASC

The Association of Systematics Collections will hold its 1991 Annual Meeting at Texas A&M University, College Station, Texas on May 16-18, 1991. The meeting will feature a workshop on “Biodiversity and Collections.” Speakers from the U.S., Canada, and several Latin American countries will discuss the role of collections in biodiversity studies, international collaboration in biodiversity studies and collection development, and the status and needs of collections in developing countries. There will also be a workshop on Collections Policy issues. Participants are welcome. For further information, contact ASC at 730 11th St NW, Second Floor, Washington, D.C. 20001; (202) 347-2850.

Bishop Museum and the University of Hawaii announce
COLEOPTERA LARVAE WORKSHOP
June 2-8, 1991
University of Hawaii, Honolulu, Hawaii

With over 350,000 described species, the beetles (Coleoptera) represent the most diverse group of animals known. Likewise, a wide diversity of life history strategies are displayed, among which the variety of
feeding specializations of larvae are notable. Numerous species of beetle larvae consume living and dead plant material as well as stored grain and fiber products. Others are extremely important as natural enemies since they feed upon other insects.

As with most insects, present taxonomic research has been based largely upon adults. However, as many of us know, it is critical to acquire an understanding of the larval stages as well. Through "hands-on" study of preserved larvae, demonstrated collecting methods in the field, lecture overviews of basic anatomy and life history strategies, and introducing students to Volume 2 of Immature Insects (including the extensive section on beetle larvae), we intend to greatly widen the participants' understanding and knowledge of Coleoptera larvae.

Instructors for this week-long workshop will include Drs. Daniel K. Young (University of Wisconsin), John Lawrence (CSIRO), Alfred F. Newton, Jr. (Field Museum), and G. Allan Samuelson (Bishop Museum). Lecture and laboratory sessions will take place at the University of Hawai'i at Manoa, Honolulu, where low cost dormitory accommodations will also be available. The course fee is expected to be $350, which will include the course text.

For registration forms and information, contact Tina Kuklenki, Department of Entomology, Bishop Museum, P.O. Box 19000-A, Honolulu, Hawaii 96817-0916; FAX (808) 841-8968. The class will be limited to 25, so early reservations are encouraged. Course credit may be available through the University of Hawai'i.

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GENERAL CONTRIBUTIONS

STANDARD FIELDS & TERMS FOR DATABASES ABOUT INSECTS

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Entomologists increasingly use computerized data bases to handle the large amounts of information available about insects. However, each entomologist seems to have a unique set of fields and terms, making easy data exchange impossible.

Earlier this year I began a project with the aim of obtaining a consensus about fields and terms for data about insects. The project began with 5 initial premises: (1) entomologists should be able to easily exchange data amongst themselves; (2) entomologists should be able to exchange data with workers in other disciplines (for example, with botanists for studies of insect and plant coevolution); (3) data bases should be relational; (4) programs for handling data should be constructed to integrate collection management functions (e.g., in part, tracking loans, inventorying taxa in collections) with files containing research data; and (5) to start the process of devising standard fields and terms we need to begin examining drafts containing such items.

The first premise requires that entomologists agree on standard fields and terms for their data. The second premise mandates that entomologists interact with workers in other disciplines to determine what fields and terms should be identical among different disciplines. The premise that data bases should be relational is based on the expectation that entomologists will wish to be able to easily search related data bases for desired information. An example of the power of a relational data base is that an entomologist could with a single query search a collection file for information about how many members of a species are in the collection and also search a related file (containing ecological data) for information about the habitats in which he had collected specimens. The fourth premise recognizes that collection management relates to research. The fifth premise simply states that to make progress, someone must propose a set of fields and terms and ask for feedback.

I decided that a good starting point would be to propose a set of fields and terms for data about where and when insects were collected and about their ecology. The final agreed on set of fields and terms would in turn influence the design of fields and terms for data bases constructed to manage collections.

In early June I sent an initial draft of proposed fields and terms for collecting and ecological data to approximately 80 fellow entomologists and to selected workers in other disciplines. The result has been useful feedback and expressions of strong interest. Dr. David Lindberg, Chair of the Association of Systematics Collections' Task Force on Computerization and Networking of Natural History Collections, has asked me to serve on that committee as a representative of systematic entomologists. The committee's task is to establish standards and protocols for databases so that a core set of data fields and other items will emerge between disciplines, thus allowing for the future maximum sharing of data between systematists. Dr. Lindberg is structuring the committee to include representatives from all systematic disciplines (e.g., in part, mammalogy, ornithology, ichthyology, herpetology, botany, cryptograms, paleontology, arachnology, malacology, invertebrate zoology).

I have agreed to serve on the committee and am now asking for your help. Below is a revised set of proposed fields and terms for collecting and ecological data. Please let me know of any problems you note in the fields and terms. The draft is an interim step toward a
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UNIT2  Subdivision within unit 1, such as county for the U.S.
UNIT3  Subdivision within unit 2.
LOCAL  The name of a town, village or other point found on readily available maps is listed first, followed by the number of kilometers from such a point. If distances are measured along roads, give the road numbers. For example, "Phoenix, 12.3 km NW on rte 12."
DAY  Use 1 or 2 numerals as needed. (This field is for specimens collected on a given day. For specimens taken in a trap over a period of time use the fields with the 1 & 2 suffixes below.)
MONTH 1 or 2 numerals for month as needed.
YEAR  Use four numerals so that century is given, for example *1990* rather than 90.
DAY1  For situations where there is a span of time over more than 1 day; use 1 or 2 numerals depending on the first day of the period in question.
MONTH1  1 or 2 numerals to indicate the first month a time period.
YEAR1  4 numerals (so that century is given) to indicate the first year of a time period.
DAY2  1 or 2 numerals to indicate the last day of a time period.
MONTH2  1 or 2 numerals to indicate the last day of a time period.
YEAR2  4 numerals to indicate the last year of a time period.
COLLECTOR  The first or first & second initials of the collectors plus the lastname.

Each initial is followed by a period. Designations such as "Jr." follow the initials. Multiple collector names are separated by a comma & blank space. Example: G. R. Noonan, D. J. Jones, Jr.

LAT  When available, latitude coordinates are entered in a format such as 00 00 N, with first set of digits being degrees & second set being minutes.
LONG  When available, longitude coordinates are entered in format such as 00 00 E, with first set of digits being degrees & second set being minutes.
DECLAT  For decimal latitudes calculated from information in the lat field.
DECLONG  For decimal longitudes calculated from information in the longt field.
START  Record, in military format, time when collecting on a given day starts, for example 0900 for 9 AM & 1300 for 1 PM.
STOP  The time when collecting stops on a given day. The placing of start & stop times into different fields allows one to have a database calculate collecting duration for a given site.
DIEL  The diel period. (DAWN; DAY; DUSK; NIGHT)
ELASPED  Elapsed period during which a trap was in the field, commonly calculated by database from TIME1 & TIME2 fields.
FAUNAL  AFROTROPICAL AUSTRALIAN, NEARCTIC, NEOTROPICAL, OCEANIC, ORIENTAL, PALEARCTIC
ELEV  Elevation is entered in meters.
TEMP  Temperature in C.
MACROHABITAT DESCRIPTORS

BIOTYPE

This field describes the general habitat rather than the particular type of site in which an insect is found. For example, an insect found in a meadow in a region that was otherwise boreal forest would receive an entry of “BOREAL FOREST,” with the term meadow being reserved for the site field described below. Terms for the biotype field are derived from a combination of biogeographical sources:

BOREAL FOREST (Extends in broad band across northern North America, Europe & Asia in areas of subtemperate climate & also extends southward into the temperate latitudes at higher elevations. The canopy is often not dense, & there may be a well developed understory of shrubs, mosses & lichens in the most moist sites. Vegetation is typically dominated by a few species of narrow, needle-leaved evergreen tree conifers such as listed below as additional terms.)

Additional terms include the dominant trees: Douglas fir (Pseudotsuga); fir (Abies); pine (Pinus); spruce (Picea).

DESERT (Rainfall usually less than 25 cm per year.) Plants typically widely spaced, with large bare areas in between. Plants of 3 forms: (1) annuals that avoid drought by growing only when moisture present; (2) succulents, such as cacti, that store water; (3) desert shrubs with numerous branches ramifying from a short basal trunk bearing small, thick leaves that may be shed during prolonged drought.

GLACIAL. (For insects found on or in snow or ice in permanent glaciers or snowfields at high elevations or at polar regions.)

PANTANAL. (Swamp or wet grasslands such as in the Everglades of Florida.)

SCLEROPHYLLOUS WOODLAND (Occur in mild temperate climates where they receive moderate winter precipitation but experience long, usually, dry summers. Dominant plants have sclerophyllous hard, tough, evergreen leaves. The woodlands may be tall communities that receive over 100 cm of annual rainfall, as in the eucalypt woodlands of southwestern Australia. Woodlands that receive less than 60 cm/year of precipitation tend to be shrublands. The shrublands are characteristic of mediterranean-type climates & form dense almost impenetrable masses of vegetation only a few meters high.) Localized terms for shrublands are: CHAPARRAL; PYNOS; MACCHIA; MATTORAL; MAQUIS.

SEMI-EVERGREEN (This biotype is a form of subtropical evergreen forest in which temperate broad-leaved deciduous trees comprise half or more of a forest whose other trees are subtropical evergreens. See description of subtropical evergreen forest.)

SUBTROPICAL EVERGREEN FOREST (Common in subtropical mountains at intermediate elevations & in extensive areas of China & Japan, the southeastern United States & disjunct areas in the Southern Hemisphere. Some forests may receive as much as 150 cm of rainfall/year, evenly distributed. Do not occur where mean annual temperature is much below 13°C. Most dominant species are dicotyledons with entire or with margined, sclerophyllous evergreen leaves such as laurels (Lauraceae), oaks & magnolias. Stratification is usually not present, & understory plants, especially mosses, can be common where fog occurs. Some temperate broad-leaved deciduous trees may occur in the subtropical evergreen forests, with such temperate trees progressively replacing the broad-leaved evergreen trees as climate becomes colder.) The following terms may be added to the subtropical evergreen forest entry: CLOUD FOREST; MONTANE FOREST; OAK; OAK- LAUREL FOREST.

TEMPERATE DECIDUOUS FOREST (Grow throughout temperate latitudes almost wherever there is enough moisture. Typically are dormant during cold winters.)

TElPERATE GRASSLAND (Occurs in all areas with a moderately dry & cold continental climate. Vegetation is confined to a single stratum that varies in height & density depending largely on water availability. Perennial grasses usually predominate, but a large number of other herbaceous plants are sometimes also present. Fires play a major role in preventing the establishment of forests.) Additional terms are related to decreasing amounts of moisture & are: PRAIRIE (veldt of South Africa, puszta of Hungary, pampas of Argentina & Uruguay); SHORT GRASS PLAINS (steppe of Eurasia); DESERT GRASSLAND (adjacent to deserts).

TEMPERATE RAIN FOREST (Found in a few temperate regions where precipitation exceeds 100 cm/year & occurs during at least 10 months/year. The dominant trees are large evergreen conifers. The epiphytes are mostly mosses, lichens, fungi & some ferns.)

THORN FOREST (Low arborescent vegetation types that grow in hot, somewhat dry to semiarid lowlands. Dominant plants are small, spiny or thorny shrubs & trees, including many members of Acacia. Succulents, such as cacti or Euphorbia are often abundant. Most plants lack leaves during the prolonged dry season, but the trees leaf out & a dense herbaceous understory develops during the wet season. Thorn forests are often found on drier sites adjacent to tropical deciduous forests. Usually at least 30 cm of rainfall/year are required to establish a thorn forest, & the region is mostly without rainfall for about 6 months.)

TROPICAL DECIDUOUS FOREST (Occurs chiefly in hot lowlands outside the equatorial zone, where rainfall is more seasonal than in tropical rain forest. Canopies lower & more open than those of tropical rain forest, with more understory vegetation present because more light reaches ground. Many trees & understory plants leafless during the long dry season but may flower then.)

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TROPICAL RAIN FOREST (Chiefly found at low elevations in tropical latitudes of ca. 10 degrees N to 10 degrees S where rainfall is abundant & over 180 cm/year; uniform annual temperatures, without any freezing. Humidity high. Trees evergreen, often with buttressed bases & smooth, straight trunks. With many vines & epiphytes. No or only a few annual plants.)

TROPICAL SAVANNA (Tall grasslands with widely scattered trees or shrubs. Found mostly at low to intermediate elevations where seasonal drought & fire favor grasses & limit tree growth.)

TUNDRA (Low scrubland & mat-like vegetation found at high latitudes & above tree line at high elevations. Characterized by plants adapted to low temperatures & short growing seasons. Precipitation is scanty, & cold temperatures limit the water available for plant growth. Many tundra regions receive less precipitation than some deserts, but evaporation is usually so limited that soils become saturated with water. Subdivisions include:

ALPINE TUNDRA (Found in mountains at high elevations. Vegetation usually low, only a few centimeters or decimeters high & dense & complex. The dominant plants are usually dwarf perennial shrubs, sedges, grasses, mosses & lichens.)

ANTARCTIC TUNDRA (Found at high latitudes in southern part of world. Vegetation of some general appearance as in alpine tundra.)

ARCTIC TUNDRA (Found at high latitudes in northern part of world. Vegetation of same type as in alpine tundra.)

TROPIC ALPINE SCRUBLAND TUNDRA (Found on mountaintops in the equatorial zone mountains of the Andes (paramo), the upper slopes of the highest mountains in east Africa & mountaintops in New Guinea. Vegetation is taller than alpine tundra, with dominant plants being bizarre, erect rosette perennials with thick stems & tussock grasses. This biotype is found below the region of permanent snow & bare rock.)

REGIONAL
This field is for regional zones of interest to a given researcher. For example, some North American researchers use Life Zones as originally proposed by Merriam (1894) & modified by Marr (1967). Life Zones are based on isotherms that seem to coincide with concentrations of plant & animal species & that also form the boundaries of recognizable vegetation formations such as tundra, coniferous forest, etc. The Zones do not consider factors other than temperature, such as aridity & humidity. The Zones are primarily of interest to some workers who collect in the southwestern United States since the zones are well correlated to the altitudinal belts of mountains there. However, the zones do not work in many other areas. Terms are: BOREAL REGION; ARCTIC ZONE; HUDSONIAN ZONE; CANADIAN ZONE, AUSTRAL REGION; TRANSITION ZONE, UPPER AUSTRAL ZONE; LOWER AUSTRAL ZONE, TROPICAL REGION. It would be helpful if researchers could identify other regional zones of interest to them so that terminology can be standardized.

HOLDRIDGE
Holldridge zones are used mainly by tropical biologists but in theory apply worldwide. (LATITUDINAL REGIONS: BOREAL; COOL TEMPERATE; LOW SUBTROPICAL; POLAR; SUBPOLAR; TROPICAL; & WARM TEMPERATE. LATITUDINAL BELTS: ALPINE; NIVAL; LOWER MONTANE; MONTANE; SUBALPINE; SUBTROPICAL. ZONES: DESERT; DESERT BUSH; DRY FOREST; DRY TUNDRA; MOIST FOREST; MOIST TUNDRA; PARAMO; PUNA; MOIST FOREST; RAINFOREST; RAINFOREST [RAINF PARAMO]; RAINFOREST UPLAND; STEPE; THORN WOODLAND; VERY DRY FOREST; WET FOREST; WET TUNDRA.

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COMMUNITY
Used for community names that modify the biotype, regional or Holdridge fields.

SITE
A general description of the type of site in which an insect was found. For example, the site field might contain an entry such as "swamp," while the biotype field would identify whether the swamp was found in a generally forested region, grassland, etc. Entries in the site field may be one or several words, such as "meadow with grass & other herbaceous plants & scattered shrubs." Terms include: AQUATIC (found in water as opposed to found on shore of bodies of water); BEACH (beach alongside salt water; for fresh water use shore); BOG (a floating mat of vegetation & is acidic, formed from shore going out, has a quaking mat before any open water, Ericaceae); BRACKISH MARSH (needs a characterization); CAVE (modifying terms are probably needed); CULTIVATED LAND (for areas with crops growing on them); DISTURBED AREA (modified by humans); FALLOW FIELD (crop growing area with crops not on it when insects collected); FELL (rocky area with sparse or little vegetation); FOREST; GRASSLAND; LAKE (a large body of water whose shores generally have relatively few plants due to the action of waves); FRESH WATER MARSH (characterized mainly by cattails & possibly sedges & other herbaceous plants); MINE; PASTURE (has grazing animals or evidence [dropped plants, droppings] of past presence of such animals; forests if formerly present have been mostly cleared); POND (a small & relatively quiet body of water with shores usually having a moderate to dense cover of plants & not being washed by waves; Modifiers include: TEMPORARY; & VERNAL); POOL (a temporary body of water, smaller than a pond & having only those aquatic animals & plants that can complete their life cycles quickly or can disperse readily to other bodies of water); RIPARIAN (in or alongside stream, creek or other body of run-
ning water); RIVER; SEDGE MEADOW (dominated by sedges that form hummocks); SEEP; SHORE (alongside a body of fresh or brackish water); SHRUB CARR (wetland dominated by shrubs); SPRING; STREAM (the modifier of INTERMITTENT may be used as needed); SWAMP (has trees in the wet areas); TUNDRA; WETLAND (General term for use when not certain if body of water is bog, marsh, etc).

**TOPO**

Descriptions of the topography of the general site such as: FLAT (with angle of approximately 10 degrees or less); MODSLOPE (moderately sloped, with angle of approximately 11 to 30 degrees); STEEPSLOPE (steeply sloped with angle of approximately 30 degrees or greater); FLOODPLAIN; RAVINE (modifiers include: BOTTOM (for insects found in bottom) HEADSECTION for head section of ravine; MIDSECTION for mid section of ravine; MOUTH-SECTION for mouth section of ravine; SIDES for insects found on sides); ROLLING (topography changes notably within site, with mixed flat to steep areas). The direction of slope may be entered as: EAST-FACING; NORTH-FACING; NORTH-EAST-FACING; NORTHWEST-FACING; SOUTH-FACING; SOUTHEAST-FACING; SOUTHWEST-FACING; WEST-FACING.

**HERBCOVER**

Percent (estimated in most instances by simple inspection) cover of ground by herbaceous plants with terms being: COMPLETE (90 to 100% covered); DENSE (50% to 90% covered); MODERATE (approximately 25-50% covered); SPARSE (under 25%).

**LITCOV**

This field describes the cover from leaf litter; terms, modifiers & definitions need to be written.

**WEATHER**

SKY [CLEAR; FOG/HAZE; CLOUD COVER (give %); SUN [BRIGHT; HAZY]; RAIN [LIGHT; MODERATE; HEAVY]; SLEET [LIGHT; MODERATE; HEAVY]; SNOW [LIGHT; MODERATE; HEAVY]; WIND [direction wind is blowing; EASTERLY; NORTHERLY; WESTERLY; SOUTHERLY; VIOLENT].

**INSECT COLLECTION NEWS**

**MICROHABITAT DESCRIPTORS & COLLECTING METHODS**

**For terrestrial insects**

Terrestrial insects are defined as those found on land or alongside bodies of water in places where any film of water over the substrate is too shallow for the insects to swim.

**DISTURBED**

BURNT (burned in past by fires set by humans or caused by nature; may refer to areas that are regularly burnt or those that have been burnt only once in recent years); CLEARED (normal vegetation removed by humans); CULFIELD (cultivated field); DITCH (drainage area dug for keeping fields, roads, or other human modified areas dry; these ditches are usually maintained periodically to ensure proper water drainage); FLATROADSIDE (portion of road or parking bed that has been graded flat & left to pioneer plants); FLOOD; LANDSLIDE; LEAF-PACKS; LOGGED; MOUNDROADSIDE (soil pushed up by graders & left along road or parking lot as mound that is soon covered by pioneer vegetation); PASTURE (made by humans as opposed to a naturally occurring meadow with grazing animals); PLANTS (PIONEER & ANNUAL herbaceous plants & perhaps small shrubs & seedlings, most plants are of species typically found in disturbed areas); PLANTS (PIONEER & PERENNIAL herbaceous plants); CLIMAX (refers to maturing stands of plants in areas that were disturbed long ago & are nearly back to having normal cover of climax plants); TREEFALL (This term describes the creation of a clearing in a forest due to one or more trees falling. The falling trees may or may not drag down surrounding trees; & the sizes of the clearings may thus vary considerably.)

**Plant associations**

This includes fields describing relationships to plants.

**PLANTNAME**

Name of plant or plants; species & family when possible.

**PLANTPART**

This field describes where on a plant an insect was found. Terms & modifiers include: FLOWER; FOLIAGE; FOLIAGE-EPiphyte; FOLIAGE-fern; FOLIAGE-grass; FOLIAGE-herb; FOLIAGE-moss; FOLIAGE-sedge; FOLIAGE-shrub; FOLIAGE-tree; FOLIAGE-vine; FRUIT (ADHERENT; DROPPED; DRY; FERMENTING; RIPE; UNRIPE); FUNGI; ROOT; SEED; TUBER. Modifiers of use for these terms include: ALIVE; AMONG; DEAD; IN; LEAF; ON, PTERIOLE; LEAF AXIL; ROLLED; ROTTEN; STEM; UNDER; UNROLLED; WEBBED TOGETHER BY INSECT; WELL-ROTTED

**SUBSTRATE**

For the terms listed the following modifiers may be used: ALONGSIDE; AMONG; IN; ON; UNDER. Note that terms & modifiers for insects found alongside free water are the same as those for aquatic insects with the addition of the term ALONGSIDE. [For example, an entry might read “on ground alongside rapid stream.”]

**BOULDER** (large rock, possibly requiring implement such as a crowbar to overturn); CLAY (firm, fine-grained earth); COBBLE (fist-sized, mostly rounded stones that can be easily overturned with one hand); GRAVEL (loose mixture of pebbles & rock fragments, coarser than sand, often mixed with clay, etc); HUMUS (brown or black product from partial decay of leaves & other plant matter); LATERITE (red, porous deposit with large amounts of aluminum & ferric hydroxides, formed by decomposition of certain rocks); LEAF MOLD (rich soil consisting largely of decayed leaves); LEAF
LITTER (surface layer in which leaves are partially decomposed); LOAM (rich soil composed of clay, sand & some organic matter); PEAT (spongy like material composed of partially decomposed marsh plants); SAND (loose, small, gritty particles of worn or disintegrated rock or coral); SILT (earthy material composed of very fine particles, as soil or sand suspended in or deposited by water); STONE (rock of relatively small size requiring two hands for overturning); WOOD (tree trunk that has fallen to ground); FUNGUSY [covered with fungus]; ON; IN; IN HEARTWOOD; IN SAPWOOD; PIECE [fragment of wood lying on ground]); UNDER.

MOISTURE

DAMP (soil feels wet when touched but is not saturated with water; DRY (soil is dry to the touch); IMPERFECTLY DRAINED (water from precipitation or from melting snow tends to pool in microhabitat, which might be a depressed area, microhabitat presently lacks free water); INTERMITTENT WATERWAY (presently dry intermittent waterway); MOIST (intermediate between dry & damp, soil has some moisture); SPLASH ZONE (kept moist by spray but without water flowing over it); SATURATED (soil saturated with water, but without free water on it); WELL-DRAINED (water from precipitation or melting snow does not tend to pool); WATER [ALONGSIDE; NEAR; term water used for terrestrial insects near free water but not living in such water].

STRATA

The vertical sequence of layers in which the insect was taken, with terms of: CANOPY (associated with a tree crown in a forest); EPICEAN (found on surface of ground; may or may not be beneath objects such as rocks); ENDODIC (within the ground, found in the soil); HYPOGEAN (underground); SUPRA-EPICEAN (on grass, shrubs, logs & other objects).

DROPPINGS

DUNG (BALL; BUFFALO; BURIED; CATTLE; DEER; DOG; DRY; FRESH [still moist, & not notably decomposed]; GUANO (BATS; BIRDS); HUMAN; IN; ON; ON GROUND; UNDER; as needed names of other animals may be listed).

CARRION

If possible give name of animal. Other terms & modifiers include: IN; ON; UNDER.

NEST

(ANT; BEE; BIRD; MAMMAL; TERMITE; WASP; other animals as needed; when possible, give species, genus, family & order of animal).

OTHER

Miscellaneous field for terms not placed in other terrestrial fields. ALGAE (FILAMENTOUS; FLOCULENT); ANT (CARRIED BY; COLUMN; ESCAPING FROM; FLYING ABOVE; RIDING ANTS; WALKING); FUNGUS GARDEN; LEAF-CUTTING; NEST;); BARK (ALIVE; ON; LOG; SHRUB; SNAG (standing dead tree); TREE; UNDER); HUMAN DEBRIS (for human-produced trash such as pieces of plastic, mattresses, cans, etc.; NATURAL DEBRIS (WOOD, DRIFTWOOD, BARK, etc.); TERMITE (take modifiers from ant term as needed); SPIDER WEB. Modifiers that may apply to all terms include: AMONG; IN; UNDER.

Aquatic insects

(Here defined as those found in water deep enough for animals of their size to swim.)

WATETYPE

The type of the body of water. (LAKE [LITTORAL; PROFUNDAL; note that lake, pond & pool are defined above under site category]; POND (NONVEGETATED; VEGETATED); RIVER OR STREAM; HYPOHEIC; POOL; RIFFLE.

WATPLANT

Vegetation (ALGAE; DECAYING; EMERGENT; FLOATING; MOSSES; SUBMERGED; ROOTS; WOOD).

FLOW

(CASCADE [steep gradient, water flow extremely rapid, all "white water," does not lose contact with substrate]; RAPID [moderately steep, water moves swiftly, mix of "white water" & smooth surface]; RIFFLE; RUN; SLOW [low gradient, slow movement, no "white water"]; STANDING [no gradient, water not moving, typical of ponds & swamps, flooded meadows]; WATERFALL (steep gradient with water losing contact with substrate).

WAVES

(Used mostly for large bodies of water, such as lakes or oceans, where there is movement of water from action of the wind or tide, as contrasted to the current of a stream. We need additional modifying terms to describe speed & height of waves; possible terms & modifiers are LIGHT SURF; MODERATE SURF; HEAVY SURF. Definitions for these terms & modifiers are needed.)

PH

pH of water (may also be used for insects found alongside water).

O2

Dissolved oxygen. Someone please tell me the best way of expressing this.

CO2

Dissolved carbon dioxide. Same request as for oxygen.

HARD

Hardness expressed as parts per million.

WATAPP

Appearance of water (CLEAR & COLORLESS; CLEAR & COLORED; CLOUDY; MUDDY; POLLUTED).

WATEMP1

Temperature of water in C.

TEMPDEEP1

Depth at which temperature of WATEMP1 field measured (in m or cm).

WATEMP2 & WATEMP3 & TEMPDDEEP2 & TEMPDDEEP3

Additional fields for temperatures at various depths.

BOTTOM

(BEDROCK; BOULDERS; STONES; GRAVEL; PEBBLES; SAND; MUD; CLAY; DETRITUS).
The method (other than kap, which has its own field) used to collect the insect. ASPIRATED; BEATING; DVAC; FOGGING; FUNNEL (modifiers include: BERLESE; other words to be furnished by entomologists); HAND (picking up insect with hand); KICKNETTING; LIGHT (BLACKLIGHT; BLACKLIGHT & WHITE; MERCURY VAPOR; TOWN [insects found at town or city lights that may be of various types as regards wave lengths]; WHITE [broad modifier that includes lights such as mercury vapor & lantern]); NET (AERIAL; SWEEPING); RAKING; SIFTING; SOIL WASHING; SPLASHING; SURFER SAMPLING; TREADING.

ASSOCIATIONS
This area needs considerable additional input. It should address needs such as: (1) giving host plant names; (2) providing data so that one can find associated organisms in other collections (such as finding a vertebrate that had been parasitized by an insect); (3) providing data for finding body parts, such as genitalia, that might be stored elsewhere in the insect collection.

SYMBIOSIS
(CELEPTOBIOSIS; DULOSIS; ECTOPARASITISM; ECTOSYMBIONS; ENDOSYMBIONS; INQUILINISM; LESTOBIOSIS; PARABIOSIS; PARASITISM [FACULTATIVE, TEMPORARY WITHIN SPECIES; FACULTATIVE TEMPORARY PARASITISM BETWEEN SPECIES; OBLIGATORY TEMPORARY PARASITISM BETWEEN SPECIES; OBLIGATORY TEMPORARY PARASITISM BETWEEN SPECIES; PHORESY; PLESIOBIOSIS; SYMPLIES; SYNODYKES; TEMPORARY; TROPHIC PARASITISM; XENOBIOSIS.

SOCI
Name of associated animals—needs further thought so that different types of associations can be recorded, with taxonomic names in appropriate fields.

PARANO
Give the parasite & host specimens the same unique number so that they can be properly associated. The format of this unique number will depend on the format selected for the field.

HOST
If known, enter the name of the host.

PREDATOR
Name of insect found feeding on another animal.

PREY
Name of prey.

SOCIAL
Logical field. ANT indicates insect found in a social situation, for example, ants found in a nest.

CASTE
(ADULTOID REPRODUCTIVE; DICHTHADIIFORM ERGATOGYNE; DRONE; ERGATOID REPRODUCTIVE; ERGATOMORPHIC MALE; ERGATOGYNE; LARVA; MALE; NYMPH; NYMPHOID REPRODUCTIVE; PRIMARY REPRODUCTIVE; QUEEN; PSEUDEGATE; REPLACEMENT REPRODUCTIVE; SUPPLEMENTARY REPRODUCTIVE; SOLDIER; WORKER).

NESTLOC
Location of nest, number of cells or chambers, etc.

ASSOCIATED DATA
The fields & terms need more thought.

TAPE
Some sort of entry identifying the tape number on which data or recordings of vocalizations are recorded.

TAPESP
When known, give genus, species (and possibly family, order, etc.) of insects recorded on tape.

PHOTO
Some sort of entry identifying the photos taken here.

PHOTOSP
When known, give genus, species (and possibly family, order, etc.) of insects photographed.

DESCRIPTIVE DATA
One or more memo fields should be used to give any necessary text type data not covered above.

Acknowledgments
I wish to thank the many entomologist who responded with suggestions about the previous version of fields and terms. Both Al Newton and Margaret Thayer were especially helpful and spent long periods of time discussing the previous draft with me.
ENT-LIST UPDATE
Mark O'Brien
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University of Michigan
Ann Arbor, Michigan 48109

After being in operation for nearly one year, ENT-LIST is starting to grow. It is still far from attaining the critical mass needed for being a mainstream communications venue for entomological systematics and collections. However, the user list has grown considerably in the past few months, and I hope that as word spreads, more collections will be connected.

The lack of network access seems to be the main obstacle that I have seen for most potential users. The reasons are varied - from not having terminal access to BITNET or InterNet, or because the computers are simply not there. Other hurdles are lack of resource people to tell users how to gain access to the national networks, decidedly unfriendly user interfaces, and of course, the "it's on a computer and it's too hard to do" syndrome.

ENT-LIST has seen quite a variety of topics appear on the screen such as:

- Developments in laser printer technology for producing alcoholic labels
- Questions on heating and freezing to kill museum pests
- Disposal of libraries and reprints
- Collection data standards
- Databases and collection management
- Specimen requests
- Useful new items for collecting

As user interest grows and the base expands, I am sure that ENT-LIST will be a valuable resource for collections and those individuals working in systematics.

Encourage your department to gain access to BITNET, InterNet, or the gateways that connect you to them. Even if your institution does not have a direct connection to a national network, there may be an educational, governmental, or other research unit nearby that can allow you to tie in on their system. The type of computer used has no bearing on the use of ENT-LIST.

However, the user-friendliness of the communication package used will certainly influence your usage of the system. If you don't like your current package, ask the local computer resource person if there is a better way!

Ultimately, I'd like to see ENT-LIST used by all major collections around the world. It's cheaper than a phone call, faster than a letter, and about as informal as being face-to-face. There's probably no better way for institutions and individuals to cooperate and share the one most important resource we all have - knowledge ...
Any then be

When you address for

ENTL1ST@UB.CC.UMICH.EDU

only to send your mail to:

Send your message to me at

member of the group.

Ftemet

[BITNET access] or

mailname,

vIREN@UFFSC

WI

Joe Smith,

Amer.

MNHEN003@sIVM

Univ. Michigan

Shappirio

Iorge

Rowe

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In each of the last three years

my Department sent out an average of

839 loans and 45,000 specimens.

These went to a total of 432 in-

dividual borrowers, with 95% of

the loans going to 40 different countries

(20% to the USA alone). The mail-

ing costs are now about £8,000

annually, but the salary costs (ex-

cluding overheads) of preparing,

documenting, packing - and later re-

incorporating - all these specimens

are over £50,000 annually. However,

it is not the cost of this ser-

vice to international science I would

draw your readers attention to
today. That is a subject in its own right

we could well explore, with its com-

plex equation “Who benefits/Who pays?”

My immediate problem is simply - how can I get the loans

retumed?

As a Museum worker I am often
told that I have a moral obligation
to make our material accessible and

available for loan. But as soon as

material is loaned it is no longer

“available” to anyone but the bor-

rower. Paradoxically, some borrow-
ers seem to feel that once they have

accumulated material on loan from

various museums then they have the

right to determine “accessibility”

for much of the rest of their own

working life. Sometimes no one else

may study it for years on end.

After an initial period, typically

of one year but much less for type

material, we will often agree to ex-
tend a loan, progressively. However,

we warn borrowers that our Trustees

insist on an absolute limit of ten

years. Can any of your readers sug-
gest what we can do about the self-

ish few who, after this long period,

refuse to reply to any letters of en-
quiry? Sometimes pressure can be

applied through their employers,

but senior university administrators

may not regard a box of dead in-
sects as of much importance; the

borrower has lectures, committees,

etc. which must take precedence.

Extended enquiries, including re-
ports to our Trustees, push up the
costs of the loan system and ex-
cessively annoy those involved at all

levels. Within the U.S. the

Smithsonian can call upon the sup-
port of Federal Marshalls to retrieve

federal property; but that cannot

help other museum curators. Should

we produce a blacklist system be-
tween us? Personally, I doubt that

this would speed recovery. Could na-
tional entomological societies be

persuaded to bring peer-group pres-
sure? That might be more effective;

a blacklist in a Society Bulletin! Or

should I just declare a moratorium

on, say, all Heteroptera loans to

North America, with an ex-
planatory letter to would-be borrow-
ers asking for their help in re-
possessing our property from certain

named workers so that we can make it “available and accessible” once

again (after 16 years!)?

Some readers may be dismayed

that a Museum curator should con-
template any form of punitive ac-
tion against the free exchange of in-
formation. But it is that free

exchange which I seek to protect.

Retaining a loan when clearly asked
to return it, more than once, ensures

the material is not available. Should

we view such misappropriation se-
riously, or simply accept that this

aspect of mini-lich is a disease as old

as taxonomy itself?

ENTOMOLOGICAL LOANS AND
RETENTION POLICIES

David Wahl

American Entomological Institute

3005 SW 56th Ave.

Gainesville, Florida 32608

Specimen retention from loans

is one of the more overlooked as-
psects of entomological collection
management. The curator is torn be-
tween dissipating museum resources

and the need of systematists to re-

...
tains specimens for future research and reference. After some years experience with both collection management and revisionary systematics, I’d like to review some of the problems and offer suggestions for further discussion. The ultimate goal would be to agree on retention policies for loans from entomological collections.

I wish to distinguish at the outset between loans made at the request of a borrower and specimens sent out for examination at the request of the lending institution. Specimen retention in the case of the latter has more the aspect of payment for services rendered and is open to negotiation between the two parties. My concern is specimen retention incurred while borrowing material for revisionary studies.

Discussions with vertebrate and botanical curators indicate that retentions are much more common and generous in entomology than in other areas of systematics. This is probably due to both the larger numbers of invertebrate populations (and ease of collecting), and the greater involvement of amateurs both past and present. It is undeniable that elements of “stamp collecting” motivate some workers. There are, however, compelling reasons for retentions including reference for future identifications, enhancement of outstanding specialty collections, research, and the wider dissemination of authentically determined specimens.

Before proceeding, it is useful to examine the policies of some representative collections. The following are taken either directly from loan forms or stated loan policies, or from personal communications with curators.

American Entomological Institute: Specimens may be kept from loans only under the following circumstances: 1) An exchange in return for the specimens kept is agreed upon; exchanges which increase the taxonomic representation of the collection are welcome. 2) The borrower describes a new species or subspecies: in these cases the borrower may keep the second, fourth, and sixth paratype of each sex (up to 3 male and 3 female paratypes). If an allotype is designated, this counts as the first paratype of that sex (to be returned).

American Museum of Natural History: “... We have no written policy about the retention of specimens loaned from our collections. The spider people as I understand it don’t keep any specimens. Most insect people keep some specimens, but the practice seems to vary from group to group in our institution. I generally tolerate the retention of some material, and am more generous when people give me something in return. I am not particularly tolerant of the enrichment of private collections or the retention of material outside the context of revisionary studies.” (R.T. Schuh, pers. comm. to D. Wahl)

Australian National Insect Collection: Retention of specimens by the borrower is permitted only by arrangement. The following must always be returned: all primary types, allotypes, and uniques, together with at least one specimen of each sex, caste, or major variant for each species represented and one specimen from each locality.

Bishop Museum: 1. Primary types of new species originating from Bishop Museum must be returned to Bishop for deposit; by prior written agreement, a reasonable portion of the type series may be retained by the author and/or distributed to other institutions. 2. All pre-identified specimens sent out on loan must be returned, even if incorrectly identified when borrowed. Special arrangements are sometimes made for gifts or exchanges of such material under certain conditions. 3. Unidentified specimens sent on loan and identified by the specialist may be retained in part, as agreed to in correspondence; where possible major geographical localities, stages, and both sexes should be represented in series of specimens returned. NOTE: “We do not have a formal policy on species retention... our informal one is up to 25-33.3% depending on the group, collection locality, total number of specimens, and other such factors.” (G. Nishido, pers. comm. to D. Wahl)

Biosystematics Research Centre, Agriculture Canada: All types designated from CNC material must be returned. Exchanges and retention of duplicate specimens permitted only by written arrangement.

California Academy of Sciences: 1. Types and all uniques MUST be returned. 2. Exchanges or permanent retention of duplicate specimens is permitted only by written arrangement with the curator.

Cornell University: All primary types and unique specimens must be returned. Duplicates of specimens identified by the borrower (including paratypes) may be retained by prior arrangement with the curator. As a rule, requests for retention of duplicates should be based on 3rd, 5th, 7th, etc. specimens of a series. We encourage exchanges of material which increase the taxonomic representation of our collections. Any question relating to retention should be directed to the curator.

Florida State Collection of Arthropods: We request that the first paratype, other than an allotype, be deposited in the Florida State Collection of Arthropods. In general, we request that the first, third, fifth, seventh, etc., specimen be returned but this should be regarded only as a somewhat flexible, general guideline. Where it is possible for the borrower to retain specimens whose collection data are duplicated on specimens to be returned, this is recommended. The borrower is encouraged to make exchanges which will be mutually beneficial. Please submit a list of all species retained with complete collection data for each specimen, or a group of specimens bearing the same collection data, including collector and host or habitat.

Lund University (Museum of Zoology and Entomology): All borrowed types and all holotypes, allotypes and a majority of paratypes newly described from borrowed material must be returned.
Museum of Comparative Zoology (Harvard): 1) All borrowed types and all holotypes, allotypes, and a majority of paratypes newly designated from MCZ material must be returned promptly via registered mail. 2. Subject to approval by the MCZ curatorial staff, a minority (at most 1/3) of duplicate specimens (from series) identified by the borrower may be retained. We prefer that such retentions be part of an exchange of equal benefit to the MCZ. All unique specimens must be returned.

Naturhistorisches Museum Wien: It is not permitted to keep specimens as an exchange or as an acknowledgement of services rendered, unless a definite arrangement has first been made with the NHMW.

New Zealand Arthropod Collection: Primary types designated from these specimens and unique adult and immature specimens must be returned. Retention of other specimens is permitted only by written agreement with the Curator.

Ohio State University: The first, third, fifth, seventh, ninth, etc., specimens or pairs of all species to be returned. This to include holotype and allotype, both of which we desire designated.

Oregon State University: Retention of duplicate material representing not more than 1/2 of the total loaned is permitted subject to authorization by the Curator. Return of unique specimens, representatives of polymorphic forms, examples from diverse localities, pairs, etc., is expected.

Snow Entomological Museum (Kansas): All primary types and unique specimens must be returned. A reasonable number of duplicates (same sex and data) of specimens identified by the borrower (including paratypes) may be retained by prior arrangement with the Curator. Either all the material should be returned with specimens desired for retention indicated, or a list of such specimens should be sent in advance to the Curator.

Texas A&M University: No real policy on retentions, decisions are up to the individual curator. Robert Wharton allows retention of 1/2 of the paratype series. The holotype may be returned, or its depositary indicated (Texas A&M does not keep holotypes in its collection). For nontype specimens, up to 1/2 may be retained, depending upon the group. (R. Wharton, pers. comm. to D. Wahl)

University of California, Berkeley: 1. Holotypes, allotypes, uniques, and first, third, fifth, etc., specimens or pairs of all species are returned unless otherwise arranged. 2. Data of retained specimens is listed on the duplicate loan copy.

University of Wisconsin: 1. All holotypes and allotypes from material originating from the collection are to be returned. 2. All material from identified collections is to be returned. From unidentified material, second and fourth specimens represented in duplicate may be retained if desired but records of the complete data on the labels should be sent so our records may be kept complete.

Aside from insisting on the return of holotypes, allotypes, and at least some paratypes, there is little institutional conformity on retention policy. Nine collections explicitly state that uniques are to be returned; nine ask that retentions be arranged in advance. Three request that label data of retained specimens be sent back.

Sensible discussion must begin with categorizing the kinds of specimens sent out on loan. I have adopted three categories put forth in a memo of the Collections Committee of the Smithsonian Institution's Department of Entomology. I recognize four categories: 1) Type material, 2) Previously determined specimens, 3) Prepared but undetermined specimens, and 4) Unprepared and undetermined specimens, such as specimens in alcohol or paper envelopes.

All collections agree that types must be returned and the reasons for this are obvious. Previously determined specimens (Category 2) are integral parts of the collection, even if misidentified. They should be returned; any retentions should be on a strict exchange basis, provided that adequate material exists.

Prepared but undetermined specimens (Category 3) can be further divided into: a) paratypes belonging to newly described species, b) specimens belonging to previously described species, c) morphospecies, and d) specimens sorted to genus. Institutional policy toward paratypes varies between 25-50% retention. While in usual cases this might mean that only several are kept, a series of 100 paratypes of the same sex with identical locality data could result in 25-50 being retained. This seems excessive. An upper limit of 6-8 paratypes (based, say on, the 2nd, 4th, and 6th paratype of each sex, and counting an allotype as the first paratype) should satisfy most needs. Retaining larger numbers of paratypes might enable the researcher to distribute them to other collections, but I think this is better done under the auspices of the lending institution. Previously described species might best fall under the same guidelines as well. If such material is later found to represent a new species, the holotype and paratype(s) must be returned to the originating institution.

Retention of morphospecies, that is, specimens sorted to species but not named, is more problematic. They often represent undescribed species that will enhance the lending institution's collection and thus should not be dispersed casually. Morphospecies should be returned in most cases. When a researcher is engaged in revisionary work, or the recipient institution has a specialty collection, small numbers of duplicates with identical label data to the rest of the series could be retained. As in the case of new species erroneously thought to be previously described, holotypes and paratypes must be returned to the originating institution.

It should be understood that specimens in Categories 2 and 3 are to be placed immediately into a col-
collection, or never sold or used for personal gain (such as tax write-offs); much of this material has been collected and prepared at taxpayer’s expense.

Material determined only to genus should not be retained except under compelling circumstances.

Unprepared and undetermined specimens (Category 4) require the borrower to expend much preparation effort. Retention terms should therefore be negotiable between the borrower and the lending institution.

What of the practice of sending back label data for retained specimens? This frankly seems to be a drain on human resources. Potential use of such information is nebulous.

Even with a cap on the total number of retained paratypes and other categories, there still may be times when the lending institution desires to keep specimens that the worker wishes to retain. While it is often stated that “x” number of a series are being retained, unless the number is greater than the usual 1/4-1/2 limit, the lending institution usually acquiesces. One possible solution is to send all loaned specimens back with candidates for retention suitably flagged. The curator can then examine the series and, if acceptable, return the desired specimens.

At this point, some workers might feel discouraged about borrowing material that can’t be kept. We should remind ourselves that the objective of borrowing specimens is obtaining material for research, not building up collections.

Why should curators and systematists be concerned about specimens retained by individuals? First, 95% of all workers are responsible individuals who do not abuse retention policies. Unfortunately, there are those individuals (and all of us know candidates who readily spring to mind) who necessitate regulations. Uniform guidelines will make it that much easier to deal with problem cases. Second, consider the implications of the global bio-

large is not adequately aware of the central and very important role systematics plays in the biological sciences and present global biodiversity crisis” ... “systematics is a dynamic field propelled by new information and techniques, however, we still need to stay in touch with basic taxonomy” ... “systematics is working at working, but needs help and money to back up all the mouthings about biodiversity” ... “phylogenetic philights of phancy [sic] and other new wave systematics should not obscure the need for or erode deeply into time spent on classical taxonomy and associated field endeavors in this day of rapidly disappearing habitats and changing politics” ... “systematists have got to grab themselves by the bootstraps and drag themselves into society.”

While we would have loved to subject these data to detailed analysis, given the sample size, we believe we must merely let the results speak for themselves!

** • © •**

**WHY BOTHER WITH SPECIES RICHNESS ESTIMATES?**

Kevin J. Gaston
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The question of how many insect species there might be has attracted rather little attention from the taxonomic community. Indeed, most taxonomists seem to regard it as at best a trivial, and probably an unanswerable problem. The difficulties within many groups in defining what a species is, and the lack of any common species concept from one group to another appear to provide an almost insurmountable obstacle to any attempted estimates. However, I for one believe that despite these problems, the question of how many species there might be is an important one, and cannot be lightly dismissed. It is as reasonable a line of scientific en-

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**INSECT COLLECTION NEWS**

diversity crisis. Preserved museum specimens will be the only remnant of a depressingly large fraction of the biota. This resource will be used by systematists for hundreds of years. Curators should carefully consider their stewardship of such priceless material and the long-term consequences of relaxed dissemination of specimens.

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**STATUS OF SYSTEMATICS - A SURVEY**

Ron McGinley, F. Christian Thompson
NMNH, Smithsonian Institution
Washington, D.C. 20560

During the 1989 ESA meetings in San Antonio, Chris Thompson distributed a flyer on entomological systematics in the 21st century. It included a brief questionnaire with the following options:

**SURVEY:**
- Systematics is OK and doesn’t need a fix.
- Systematics is OK, but improvements would be great.
- Systematics is in disarray and any help is better than nothing.
- Other:

Only 45 forms were returned but the feedback was nevertheless interesting:

- No response: 10
- Systematics OK: 0
- Systematics OK, but...: 22
- Systematics in disarray: 13

Several people offered the following comments: “systematics is just about down for the count” ... “systematics needs a blood transfusion through a National Biological Survey” ... “systematics is in fairly good shape, theoretically and methodologically, but suffers terribly from a lack of funding because the scientific community at
Adverse from the purely heuristic case for addressing the issue of how many species there might be, there are additional benefits which should not be ignored. First, in order to refine our estimates we require vastly improved data on the numbers and identities of insect species occurring in many regions of the world. Thus, there is an even stronger case for improved funding for alpha-taxonomy, and for the compilation and publication of faunistic catalogues. Second, improved estimates will provide a more satisfactory base line for understanding current rates of species extinction, and may help to emphasize to politicians the enormity of the biodiversity crisis currently facing us.

Whether or not you agree with the arguments I have laid out I would be grateful for any assistance you may be able to give with my own endeavours to explore the question of how many species there are. I have been employed by The Natural History Museum, London, to assess (in collaboration with Prof. Robert M. May, University of Oxford, and colleagues at the Museum) the difficulties and limitations of previous attempts to examine this problem, and to find ways in which these might be improved. As part of this work I am trying to collate estimates of the total numbers of insect species, and the total number of Coleoptera species alone, known or thought to occur in different regions, states, and countries. Such data seems hard to come by, but I suspect that this is because it remains unpublished or unwritten, rather than that people do not have a feel for the numbers of insects occurring in the areas with which they are most familiar. I would therefore greatly appreciate it if you could let me have any figures you may have, or direct me towards any sources of information of which I may be unaware. I would be especially interested in information for individual North American states and provinces, and for European nations, as this would enable me to establish a base line data set for the reasonably well-known temperate regions. Naturally any help received would be appropriately acknowledged.

MEETINGS OF THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE
Jay M. Savage
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What will doubtless be recorded as the most momentous meeting in the history of the International Commission on Zoological Nomenclature (ICZN) took place July 4-5, 1990, at the International Congress of Systematic and Evolutionary Biology, held at the University of Maryland, USA. At these sessions the Commission developed a series of fundamental principles to be adopted for the preparation of the forthcoming 4th edition of the International Code of Zoological Nomenclature that will revolutionize both the theory and practice of zoological nomenclature. Significantly these principles were first enunciated as the result of an all-day session of the Commission held on America’s celebration of the anniversary of the signing of its Declaration of Independence, July 4. Like the statements in that document, these historic changes in the code promise to free systematic biology from the tyranny of the past and provide sound and comprehensive guidance for the future.

Members of the ICZN in attendance at these meetings all contributed to a series exciting and productive exchanges of ideas that led to overwhelming support for the fundamental and revolutionary revisions in the code described below. They included: O. Kranus (FR Germany, President), H.G. Cogger (Australia, Vice-President), W.J. Bock (USA), J.D. Corliss (USA), D. Heppell (UK), P.T. Lehtinen (Finland), A. Minelli (Italy), C. Nielsen (Denmark), W.D.L. Ride (Australia), J.M. Savage (USA), R. Schuster (Australia), and F.C. Thompson (USA). Clearly the Commission undertook the new initiative for code revision in response to the changing needs of the user community and the burgeoning requirements for stable biodiversity data bases. Their goal was to retain the most essential features of previous codes while designing a foundation for the nomenclature of the future.

Underlying all of the Commission actions were three primary principles. First, that as emphasized in the Preamble to the present Code (3rd ed.) the overriding purpose of the Code is "to promote stability and universality." The Commission agreed that this goal is best achieved by adopting procedures that validate names in current use rather than through following strict priority. Second, as succinctly stated by both Linnaeus and Strickland (the promulgator of the first Code of Zoological Nomenclature) that the names given to organisms are simply symbols representing taxa that enhance communication about, and allow development of information bases regarding them. Consequently the Commission decided that matters relating to details of orthography, transliteration, strict adherence to the rules of Latin grammar, determinations of gender and spelling are secondary to establishing and maintaining a unique, distinctive and stable name for each valid taxon. Third, that the provisions of the Code must be simplified and designed to insure easy and automatic application of them by practicing
systematists, with minimum need to petition the Commission for use of its Plenary Powers.

In the following paragraphs I will mention the most important proposals for change adopted during the Commission's deliberations, including a meeting open to all members of the zoological community on July 5. These matters will be presented below in what I perceive to be their order of significance not in the order in which they were considered. It should be noted that the Commission reaffirmed throughout these meetings that the Linnean classification system, its hierarchy of taxa and the binomial system of nomenclature are fundamental and irreducible bulwarks of the Code.

Without question the most significant and revolutionary changes adopted at these meetings were those that will severely constrain the strict application of priority by giving heaviest weight to the criterion of current usage as the determinant for establishing the validity of names. The first and interim step in this process will be the bringing together of materials in Articles 23c, 79 and 80 of the Code making it mandatory that senior synonyms that have not been used in the 50 years prior to the date of publication of their rediscovery are to be rejected and are not to be used to upset a long accepted name. No application to the Commission will be necessary (contrary to the present Code) to maintain current usage. Much more important than this improvement, in what might be called the statute of limitations for the resurrection of old names, are a sequence of decisions that the Commission believes will provide a stable and universal zoological nomenclature for the 21st century. The first of these involves the early establishment by the commission of a List of Available Generic Names in Zoology. The list would be developed substantially from Neave's Nomenclator Zoologicus and the Zoological Record with additions and corrections. At the time of publication (e.g. 1996) the dates in the list (regardless of any subsequent findings) would be the final determinants of priority. In addition and most importantly, only the generic names on this list would be available for use! Any other name, subsequently discovered or not, would not exist for nomenclatural purposes. Obviously new names proposed after 1996 would be available from their date of publication.

A second step in this process will be to ask the appropriate specialist committees (e.g. Nomenclature Committees of the International Congress of various taxonomic groups) to prepare lists of family-group, genus-group and species-group names in current usage. These might be based on up-dated versions of the lists of living mammals and amphibians prepared by the Association for Systematic Collections, for example. After appropriate consideration the Commission would certify such a list as an Official List of Names in Current Use (LNCU). Names not on this list would not be available and would not exist for nomenclatural purposes. Obviously new names proposed for taxa after the publication of the LNCU would become available from their date of publication. This procedure means that for a particular group there will be no necessity to search for any names published prior to the appearance of the LNCU thus completely freeing the systematist from the past. Essentially each LNCU will be a new (although mini-) Systema Naturae and will serve as the new starting point for nomenclature in that particular major group. In poorly known groups it may be sometime before LNCU's will be prepared. For these taxa the revised Article 23c and the List of Available Generic Names in Zoology will provide maximum stability until LNCU's are available.

In another significant area the Commission recognized the inherent incongruity between the absence of knowledge of classical languages by most practicing systematists and the requirements of the Code. It was agreed that scientific names are only symbols for taxa in themselves carrying no special meaning and under the current Code may even be arbitrary combinations of letters. Consequently, while the Commission believes that names for taxa should continue to be based primarily on words of Latin and Greek derivation, the pertinent articles on name formation in the Code will be re-written without reference to the rules of Latin grammar. Specifically a simple and uniform method will be devised for forming family-group names for the future. The accepted spellings of older family-group names will be established by current usage not Latin grammar.

Two other specific issues in the area of grammar were considered. It was agreed that in the case of species-group patronyms that terminate in -ii or -i, either spelling would be admissible regardless of the original spelling (e.g. peteri or peteri; boyill or boyill). Less clearly resolved was the matter of agreement in gender between generic and species-group names based on adjectives. The idea that generic names should be without gender received considerable support, however, there was no agreement on how to establish fixed spellings for the adjective-based species-group names. One alternative might be to make all generic names feminine for purposes of zoological nomenclature. Certainly it would be best if all members of a particular genus had the same adjectival terminations.

The area of what constitutes publication and the criteria of availability were revisited. Clearly with development of new methods of electronic publication and printing unintentional, accidental, personal or even mischievous proposals of new names for taxa are possible. The Commission favored the notion that to be published for purposes of zoological nomenclature a new name must appear in one of a substantial number of approved scientific journals or in books from an extensive list of publishers that were registered with the ICZN. Logistics for such a plan are complex and need further investigation but the aim is to insure publication in the
primary scientific literature as opposed to privately printed and/or unedited sources. In the area of availability it is proposed that in order to be available (after a certain date) a new name must be accompanied by an abstract and/or diagnosis purporting to distinguish it from other similar taxa in a language using Latin letter, preferably "a language of the Code." A language of the Code being any language so designated in the Code. Candidate languages are to be determined at a later date.

The Commission agreed that provisions should be added to the Code so that in cases where a type genus of a family-group name has been misidentified the first available name for the same taxon is to become the type genus and 2) similarly a misidentified type species of a genus-group name should be replaced by the first available name for the same taxon. Another change would require all future species-group descriptions to include a designation of a holotype, syntypes or hapantotype or in certain cases of ephemeral organisms, an illustration that may be composite (some special designation will be required for these). Such types must be deposited in a museum or similar institution. After a stated date no new species-group name would be available if it does not meet these requirements.

Although the Code does not treat names of order-, class- or phyla-groups the Commission is often thought to have authority in this area. There seems to be some advantage to the community if the ICZN could provide a list of such names in current use, with some indication of preference in usage. Consequently the ICZN will undertake the preparation of a list of recommended names in these categories in zoology. Hopefully this will encourage universality of usage of order-, class- and phyla-group names as key words, in titles and in abstracts.

An editorial committee chaired by F. Christian Thompson is in the process of drafting these dramatic changes into definitive form for action at the meeting of the International Union of Biological Sciences at Amsterdam, the Netherlands, in September 1991. It is important that systematists voice their support of these changes, which are based upon the Commission's response to the demands of both taxonomists and other members of the biodiversity community. Your comments may be directed to the Executive-Secretary, International Commission on Zoological Nomenclature, c/o Museum of Natural History, Cromwell Road, London SW 7 5BD, Great Britain. It is vital to the welfare and future of systematic biology that the progressive and exciting innovations in zoological nomenclature developed by the ICZN at Maryland become implemented. Your individual aid, through endorsement of the major principles described above, in bringing this great enterprise to fruition of biologists and biology generally is an essential ingredient in adoption of a Code of Zoological Nomenclature that emphasizes stability based on current usage and is designed for the needs of systematists in the 21st century.

COLLECTIONS

SMITHSONIAN-BISHOP MUSEUM COOPERATION: BOMBYLLIDAE ENHANCEMENT PROGRAM - PART 1
Ron McGinley and Neal Evenhuis
NMNH, Smithsonian Institution and Bernice P. Bishop Museum
P.O. Box 19000-A
Honolulu, Hawaii 96817

Within the entomological community most of us are aware of long-term loans of large collections. The horror stories associated with such transactions are commonplace, e.g., the collection was not adequately protected, was not improved, etc. To the latter points one can ask "What did your Memorandum of Understanding look like?" "What did the lawyers say about the agreement?" the standard response is that "We didn't see the need to be so formal." Unfortunately, such informality opens the door for any number of potential misunderstandings. Furthermore, most long-term loans are relatively static arrangements ... the collection is transferred, maintained separately, used by the researcher, and ultimately returned in a condition similar to that in which it was originally sent. For these reasons, the Department of Entomology (NMNH/SM) has initiated an Offsite Collection Enhancement Program. This involves nothing more than a renewable five-year loan of a large collection (including primary types) which is bound to a detailed Memorandum of Understanding (of mutual benefit) between both parties, and signed off institutionally by Museum Directors and/or University Presidents. These loans will be rare because three variables must be satisfied simultaneously: 1) the loaned material must be clearly beneficial to the research program of the borrower, 2) the loan will clearly improve the maintenance and curation standards of the collection, and 3) the loan must support the interests of the immediate research community. For the near future the NMNH has decided to limit the Enhancement Program to three potential transactions (Bombyllidae, Ticks, see below, and possibly Ichneumonidae, currently under negotiation with the American Entomological Institute) in order to monitor results and hopefully document success. Frank Talbot, NMNH Director, and Donald Duckworth, Bishop Museum Director, have recently come to a formal agreement involving the loan of the NMNH Bombyllidae Collection to the Bishop Museum. Factors supporting the importance, feasibility, and usefulness of the Bombyllidae loan include: 1a) by having the entire
NMNH Bombyliidae collection at his side, the systematic research on these flies by Evenhuis benefits dramatically - the Painter Collection, by itself, represents the best collection of Bombyliidae from Mexico anywhere in the world; 1b) the large representation of accurately identified and type specimens of the NMNH Nearctic Bombyliidae collection will expedite and enhance the ongoing publication of generic revisions of *Flies of the Nearctic Region*, edited by Graham Griffiths (six fascicles have been published so far from 1980-1987); 2) active curation of the family will result in a synoptic collection being returned to the NMNH at periodic intervals plus an assurance that the collection will be upgraded and maintained at optimum collection management levels (i.e., 3 and 6-7; see previous issue of ICN for details on these rankings) throughout the duration of the loan agreement; 3a) Evenhuis is the only active worker on this family in the New World, thus shipping the entire collection to his care does not infringe on local accessibility and, in fact, enhances efficiency of international access; 3b) Evenhuis has agreed to provide identifications upon request through USDA/SEL procedures, which further enhances the international service identification capabilities of that laboratory.

Because of the interest expressed, the entire signed agreement is reproduced below.

**MEMORANDUM OF UNDERSTANDING**

The National Museum of Natural History, Smithsonian Institution ("NMNH"), whose address is Washington, D.C. 20560, and the Bernice P. Bishop Museum ("Bishop Museum" or "BPBM"), whose address is P.O. Box 19000-A, Honolulu, Hawaii 96817-0916, hereby agree to undertake an Offsite Collection Enhancement Program for the NMNH collection of Bombyliidae, in accordance with the following terms and conditions.

1. NMNH will loan to the Bishop Museum all of its specimens of Diptera of the family Bombyliidae (the "Collection") and sufficient drawers, unit trays, and cabinets to accommodate anticipated expansion of the collection after curation for a period of five years, subject to renewal by agreement of the parties. A species inventory of the Collection and a collection profile based on curatorial standards adopted by the NMNH and the Bishop Museum is attached hereto as Appendix A.

2. The Bishop Museum will provide proper care and maintenance of the Collection and associated data, including label data, correspondence, type catalog data, and field research notes throughout the term of this Agreement. It is understood and agreed that the Collection will be curated by Dr. Neal L. Evenhuis, who is currently on the staff of the Bishop Museum Department of Entomology (the "Researcher").

3. The Bishop Museum will provide adequate storage and security for the Collection, which shall be subject to the review and acceptance of the NMNH. The NMNH will make periodic site visits at reasonable intervals to inspect the status of the Collection. Site visits will be scheduled in advance with the Bishop Museum, and the Bishop Museum agrees to make reasonable accommodations to permit a thorough inspection.

4. Upon receipt of the Collection, the Researcher will prepare a condition report, which will be sent to the Chairman of the Department of Entomology at NMNH within thirty days of receipt of the Collection by the Bishop Museum.

5. Within one year of receipt of the Collection by the Bishop Museum, the Researcher will sort, identify, and return to NMNH a synoptic collection of voucher specimens, exclusive of uniques, as represented in the Collection. If ongoing research identifies additional voucher specimens from the Collection, such specimens will be sent to NMNH to augment the initial voucher specimen shipment.

6. It is anticipated that the Researcher will acquire through field research additional Bombyliidae specimens that would appropriately be added to the Collection. Accessions into the Collection shall be subject to the approval of NMNH. The Researcher will make periodic written proposals to NMNH describing specimens recommended for accessioning into the Collection. The Chairman of the Department of Entomology of NMNH will notify the Researcher of the NMNH decision on accession proposals.

7. NMNH will prepare accession papers for specimens approved pursuant to this process. Subsequently accessioned specimens will be recorded and treated as part of the Collection and subject to the terms of this Agreement. Voucher specimens of new accessions shall be sent to NMNH.

8. All loan transactions against the Collection during the term of this Agreement will be processed by the Bishop Museum. Outgoing loans are subject to the approval of the Chairman of the NMNH Department of Entomology, or his designate. The following statement will be printed on invoices for all outgoing loans processed by the Bishop Museum: "These specimens are the property of the National Museum of Natural History (NMNH), Smithsonian Institution. BPBM is acting as agent for NMNH." Copies of all documents concerning loan transactions against the Collection will be submitted to NMNH at the time of the transaction.
9. The Bishop Museum will be responsible for receiving and cancelling outstanding loans made while the Collection was located at the NMNH. NMNH will supply the Bishop Museum with copies of outstanding loan documentation and a draft of an appropriate loan recovery form. The Bishop Museum agrees to use its best efforts to recover overdue outstanding loans, and will notify NMNH promptly of any problems encountered with respect to loans.

10. All requests for identifications of Bombyliidae received by NMNH or the U.S. Department of Agriculture during the term of this Agreement will be referred to the Researcher, who agrees to handle them.

11. The Bishop Museum will give NMNH prompt written notice of any damage or loss to the Collection.

12. The Researcher will provide to the Chairman of the Entomology Departments of NMNH and the Bishop Museum annual reports each January, documenting Collection acquisitions, loans, improvements, and damage or losses. Annual reports will include collection profile updates that incorporate the standards adopted by both Entomology Departments.

13. NMNH will advertise the terms of this Agreement to the entomological community through notices in appropriate publications, such as the Entomological Society of America Newsletter, The Flyer (international newsletter for Diptera research), Insect Collection News (ICN, Newsletter for Entomology Collections), the Association of Systematic Collections Newsletter, and the Fly Times (North American Dipterists Society newsletter).

14. Costs related to the initial shipment of the Collection from NMNH to the Bishop Museum and its return upon termination will be split equitably by NMNH and the Bishop Museum.

15. Either party may terminate this Agreement upon giving thirty days written notice. Unless otherwise instructed by NMNH, the Collection will be returned to NMNH no sooner than one year after the termination of this Agreement.

16. Upon termination, the Collection, and all NMNH storage equipment, will be returned to NMNH. The method of packing and shipping shall be subject to the advance approval of NMNH. A condition report will be prepared prior to packing the Collection and will be provided to NMNH prior to shipment of the Collection.

17. Upon termination, and subject to the approval of NMNH, the Bishop Museum may retain a synoptic collection of specimens from the Collection, exclusive of unique and type specimens.

18. The Bishop Museum will give prompt written notice to NMNH if the Researcher ceases to be an active member of the staff of the Bishop Museum.

19. The terms of this Agreement may not be modified except by written agreement signed by both parties.

ACCEPTED AND AGREED:
For the Bernice P. Bishop Museum

____________________________________ [signed 6 July 1990]
Donald W. Duckworth, Director
For the National Museum of Natural History

____________________________________ [signed 5 July 1990]
Frank H. Talbot, Director

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SMITHSONIAN TICK COLLECTION: OFFSITE COLLECTION ENHANCEMENT PROGRAM - PART 2
Karen Leighty, James Keirans and James Oliver
National Institutes of Health and Department of Biology
Georgia Southern University
Statesboro, Georgia 30460

The world's largest tick collection, representing 90 percent of all known tick species, will be established in a new home at Georgia Southern University. Through a grant awarded by the National Institute of Allergy and Infectious Diseases (NIAID), the collection will come under the purview of Dr. James H. Oliver, Jr., head of the Institute of Arthropodology and Parasitology at the Statesboro, Georgia Southern University. The present curator, NIAID scientist Dr. James E. Keirans, the world's foremost authority on tick classification, will join the Georgia Southern faculty and continue in his role as curator. Dr. Oliver's research facility is already highly regarded for the expertise it offers in tick biology, genetics and Lyme disease. Enhanced by the tick collection, the facility will provide a national center for tick studies.

NIAID's award represents an innovative approach in the use of grant monies. The collection will remain the property of the Smithsonian Institution, but it will be on long-term collection-enhancement loan to the University (terms of the loan are specified in a Memorandum of Understanding signed by Frank Talbot, NMNH Director and Nicholas Henry, GSU President; the MOU is similar to that for the Smithsonian Bombyliidae loan to the Bishop Museum which is reproduced above). NIAID's award will provide for moving, operation costs, and staffing. Georgia Southern, in turn, has made a major personnel commitment-at the end of the five-year grant, it will continue its support of the curatorial staff as researchers in tenured track positions. In addition, the university is providing a two-story building to house the collection and staff.

In announcing the award, NIAID Director Anthony S. Fauci, M.D., said that the move "offers a significant opportunity to advance studies in medical entomology." In Lyme disease, for instance, recognition of the deer tick as the vector of the spiral-shaped bacterium that causes the disease was critical to understanding the recently recognized arthritic ailment. This disease is be-
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Specimens. Each specimen, preserved in alcohol in a glass vial, is documented as to place of origin and, where possible, identity of the animal from which it was taken.

The Georgia Southern facility formally opens in the fall. Over 300 type specimens will be available for study there, in a setting that will include laboratories, a tick library and conference room, preparation rooms, and staff offices. Dr. Oliver refers to the collection as a “national treasure,” and through cooperation between government and academia, this scientific gold mine will be even more responsive to the needs of the research community.

[THE MOVE WAS COMPLETED DURING AUGUST 1990. — RMC, ed.]

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TEXAS A&M UNIVERSITY INSECT COLLECTION: STATUS, CHANGES AND GOALS

Horace R. Burke and James B. Woolley
Department of Entomology
Texas A&M University
College Station, Texas 77843

Growth of the Texas A&M University Insect Collection (TAMU) has accelerated in recent years due to the expansion of the systematics faculty and new staff. We are now beginning the second year of a three-year NSF grant for collection improvement awarded to TAMU. This grant was obtained to assist in the purchase of additional cabinets and drawers for storage of recent acquisitions resulting from extensive collecting in the southwestern United States and Mexico, to mount and label a considerable backlog of specimens, and to bring in specialists on a short-term basis to sort and identify groups in need of considerable work and for which we have no local expertise. These activities will benefit the collection in general but special emphasis is being placed on Coleoptera, Heteroptera, and parasitic Hymenoptera, groups on which we are actively working.

TAMU contains approximately 1,000,000 specimens representing all insect orders, but is particularly strong in holdings of Coleoptera, Hemiptera, Hymenoptera and Cyclorrhaphous Diptera. A substantial portion of this material is from the southwestern United States and Mexico. Since the major growth of the collection has occurred during the past 10-20 years, modern collecting and preparation techniques have resulted in the accumulation of high-quality material. Present biodiversity studies in the Trans-Pecos region of Texas, proposed fieldwork in the Big Thicket and surrounding areas of eastern Texas, and our long-standing interest in Mexican insects assures that the collection will continue to grow at a rapid rate. Nearly 82,000 pinned and labeled specimens were added to the collection during 1989 from all sources, including donations and our own collecting activities. Even with the addition of this substantial amount of material (now processed and ready for study), our backlog of unprocessed specimens has continued to grow. Increased use of mass collecting methods (malaise traps, pan traps, screen-sweep nets) has led to a sizeable accumulation of material in alcohol, currently stored in freezers. Use of these methods has also resulted in addition of much high-quality material in groups outside our own particular areas of interest.

Systematists directly associated with the collection include Horace R. Burke (Curculionidae), Edward G. Riley (Chrysomelidae), Joseph C. Schaffner (Miridae), Robert A. Wharton (Ichneumonidae and Diptera), and James B. Woolley (Chalcidoidea). All are actively involved in building and curating the collection, with Burke being responsible for overall administration and Riley serving as full-time collection manager. We also have an active group of graduate students in systematics. Tami Carlow (Curculionidae), Fuiza Ferrara (Miridae), John Heraty
(Chalcidoidea), Darlene Judd (Nematocera), and Greg Zolnerowich (Chalcidoidea) are all working on projects directly related to systematics and are actively involved in building the collection. Several other students in entomology have projects or interests which relate to systematics to some degree.

The major part of the collection consists of pinned insects stored in the unit tray system using Cornell-type drawers housed in steel (Steel Fixture Mfg. Co.) 48-drawer cabinets. The additional cabinets and drawers made possible through the NSF grant allows us to reorganize several portions of the collection which had become overcrowded by recent addition of considerable material. Most of this reorganization is presently taking place in the Coleoptera, Heteroptera and Hymenoptera. The acalyptrate Diptera and, to a lesser extent, the Lepidoptera are slated to be spread out and reorganized soon. The collection now contains about 3,600 Cornell drawers with more to be added later this year.

In general, we see our role in the systematics resources community as providing a primary repository for material from the southwestern U.S. and Mexico. As part of a land grant university we have an institutional mission to concentrate on the insects of Texas and adjacent regions, and as part of this responsibility, we identify insects for extension personnel, researchers and the general public. Many of our research interests also involve insects from this region, for example, J.C. Schaffner’s long-standing research program on the Miridae of Mexico. Our present collection strength is based mainly on the excellent material accumulated from this region and we intend to continue this emphasis. In addition to the regional emphasis, some of our research programs have an increasing component of international work. One example is the research being conducted by R.A. Wharton on the Tephritidae and their parasites in the old world tropics. Several projects on phylogenetics and higher classification are being pursued on a world-wide basis.

Recent field-work by Wharton (Australia, Malaysia, New Guinea) and fieldwork by others (for example, J. Heraty in Australia, Taiwan and Malaysia and J.B. Woolley in Venezuela) resulted in the addition of much valuable material.

Emphasis is also given to insuring that the material in TAMU is readily available via loan to specialists for revisionary and other systematic studies. The numbers of loans made for such purposes have increased steadily from an average of about 32 annually throughout most of the 1980’s to 54 in 1988 and 81 during 1989. Our holdings of high quality material from areas often not well represented in collections, along with continued specialized collecting activities, should assure that important materials in most major groups will be contained in TAMU. We are anxious to make this material available for systematic studies. Inquires about the availability of material for loan should be made to E.G. Riley or to any of the other systematists listed above.

THE NEW ZEALAND ARTHROPOD COLLECTION/
KO TE AITANGA PEPEKE O AOTEAROA
Trevor K. Crosby, NZAC
Auckland, New Zealand

NZAC is the world’s foremost collection of insects and related terrestrial arthropods from the New Zealand subregion, with a well-curated collection of about 1 million pinned specimens and over 5 million ethanol-preserved specimens. There are about 2,200 primary types. An estimated 20,000 species of terrestrial arthropods occur in New Zealand, of which only about half have yet been validly named; about 90 percent are endemic to New Zealand. In addition to the New Zealand specimens, NZAC has the largest collection of insects from the South Pacific; most of these are held in trust for the Pacific nations.

Most specimens in NZAC have been collected since 1963, the year in which the Systematics Group was established within the Entomology Division, DSIR at Nelson. Earlier specimens were collected by government entomologists of the Department of Agriculture, and systematists of the Cawthron Institute in Nelson. In 1973 the collection was moved to Auckland, along with most of the Entomology Division’s staff. The DSIR Plant Diseases Division’s insect collection at Auckland was merged with the Entomology Division collection, and the collection was given the name of the New Zealand Arthropod Collection. Because of these changes in name, specimens have been referred to in the literature as being housed or deposited at the Cawthron Institute, Nelson, at the Entomology Division, Nelson, at the Entomology Division, Auckland, and at the Plant Diseases Division, Auckland; all these specimens are at NZAC.

In October 1989 the Entomology Division was amalgamated with the Plant Diseases Division to form DSIR Plant Protection. In February 1990 the collection was given a parallel Maori title “Ko te Aitanga Pepeke o Aotearoa;” the “Fauna of New Zealand” publication series is to have the same parallel Maori title.

NZAC is housed at Mt. Albert, Auckland, at the Department of Scientific and Industrial Research (DSIR) Plant Protection station. The staff of the Systematics Group-Entomology look after the collection, provide identification support for the research of DSIR Plant Protection and other divisions, and conduct systematic studies on the fauna.

Personnel

There are 15 permanent staff, of which 3 work half time. Three retired staff members work as Research Associates.
INSECT COLLECTION NEWS

AMERICAN ENTOMOLOGICAL INSTITUTE
David Wahl
American Entomological Institute
3005 SW 56th Avenue
Gainesville, Florida 32608

The American Entomological Institute is a non-profit independent research foundation located in Gainesville, Florida. Its nucleus is a collection of approximately 950,000 Hymenoptera with emphasis on parasitoid taxa. For parasitoid Hymenoptera, the collection is one of the four largest in the world. The geographic representation is worldwide. The Institute’s library is one of the most complete sets of literature for Hymenoptera together in one spot.

The collection has been assembled through the efforts of Henry and Marjorie Townes, starting in 1934. The Townes undertook numerous field trips, both domestic and abroad. Gifts, exchanges, and purchases of specimens were common, as well as subsidized collecting trips. The main focus has been Ichneumonidae. With about 600,000 specimens from all continents, no Ichneumonidae collection is more complete nor as well curated. It is the ultimate reference point for workers studying the systematics of this family. Holdings of Braconidae are significant as well, consisting of about 149,000 specimens. The 1983 gifts of the R.D. Shenefelt braconid collection and library are especially valuable. The remainder of the Institute’s collection consists of 17,000 Symphyta, 89,000 “microhymenoptera” and small apocrita families, and 98,000 Acalypta. The type collection numbers 3200 holotypes.

For some time, the Institute’s goal has been to make a transition from a private research collection to one more generally available. The Institute was awarded a 3-year NSF Collection Improvement Grant in 1988 to help achieve this new status. Among the activities funded by the grant are expansion of collection storage space, specimen processing, transfer of the type collection to a drawer and unit system, and sorting specimens to categories accessible to specialists.

The death of Henry Townes in May 1990 marks the end of an era for the Institute. His vision and unmatched capabilities will be sorely missed. He believed, however, in the viability of the Institute and left a firm foundation for its maintenance and expansion. The Institute’s endowment will enable it to operate indefinitely as an independent organization and center of excellence. The Institute is governed by a board of 11 Directors. Virendra Gupta is President; David Wahl is Curator.

There is perhaps some confusion concerning the Institute’s relationship to other entomological agencies. The Institute is independent but maintains liaisons with other institutions worldwide.

What are the objectives of the Institute? They are: 1) to continue the growth and expansion of the Hymenoptera collection, with priority on Ichneumonoidea, and secondarily on other parasitoids; 2) to encourage and support use of the collection for systematic research; 3) to provide services to the scientific community with loans, accommodation of visitors, information, determinations, etc.

COMPACTORS FOR INHS INSECT COLLECTION

Wallace E. LaBerge and
Kathryn C. McGiffen
Natural Resources Building
607 E. Peabody Drive
Champaign, Illinois 61820

The official insect collection of the state of Illinois is housed at the Natural History Survey. Its 6,000,000 specimens document our knowledge of the insects of the state, including distribution, behavior, life history, and pest status. This collection, the sixth largest in North America, represents more than a century of effort.
by those who seek to understand and appreciate the insect fauna of Illinois.

The need for additional space in which to store this irreplaceable resource became apparent in the late 1960s. A few years later, compactors became available, and Survey scientists sought funds to install such a space-saving system. In 1979, a request was made for Capitol Development Funds. After several years of negotiation, money became available in 1987.

In the interim, the National Science Foundation was approached for funds to support the transfer of specimens to the new storage system and other collection-related needs. This request was approved, and a continuation grant was made for 1989 and 1990.

Construction of the storage system began in December of 1988 and was completed in August of 1989. The compactor consists of seven mobile and two stationary storage units. Two aisles can be opened at desired locations by electronically moving the units. The system holds nearly 8,000 insect drawers and the equivalent of 24 cabinets of specimens stored in alcohol.

Prior to installation, the room that was to house the collection was remodeled. The new facility includes not only the compactor but a visitor's work station, two offices for staff, and a preparation, packing, and storage area. The compactor holds the Survey's entire collection of pinned insects, a third of its specimens stored in alcohol, and enough new drawers to nearly double the capacity for pinned specimens. The new system should provide space for expansion for the next two decades.

INSECT COLLECTION NEWS

VOUCHER COLLECTION OF INSECTS ASSOCIATED WITH WEEDS
Lloyd Knutson, Director
Biological Control of Weeds Laboratory-Europe
American Embassy, Agriculture, APO New York 09794

The USDA-ARS Biological Control of Weeds Laboratory-Europe, situated in Rome since 1959, has recently renovated its important voucher collection of insects associated with weeds. Dr. Enzo Colonelli, Rome, a leading specialist on weevils, and Dr. Andrei Sharkov, parasitic Hymenoptera specialist formerly with the Zoological Institute, Leningrad and now in the U.S., carried out the first major curatorial work on the collection since it was last updated by R.W. Pemberton (see Pemberton, R.W. and E.M. Hoover, 1980. Insects associated with Wild Plants in Europe and Middle East Biological Control of Weeds Surveys, USDA Misc. Publ. 1382). The collection consists primarily of pinned insects in 96 Cornell drawers, and a small alcoholic collection. Most of the material has been identified by the Systematic Entomology Laboratory, Smithsonian personnel and European taxonomists. The collection is especially strong in insects associated with the major weed projects of the Laboratory, especially Carduus, Linaria, Papaver, Convolvulus, Centaurea, and Euphorbia from southern and eastern Europe but includes specimens collected or reared from many other U.S. weeds native to the Mediterranean. Requests for study of specimens should be sent to Lloyd Knutson, Director, Biological Control of Weeds Laboratory-Europe, American Embassy, Agriculture, APO New York 09794.

THE MOSQUITO COLLECTION OF J. PEDRO DURET
Ralph Harbach, Manager,
Walter Reed Biosystematics Unit
MSC, c/o NMNH,
Smithsonian Institution
Washington, D.C. 20560

The mosquito collection of Dr. J. Pedro Duret of Buenos Aires, Argentina is now the property of the Smithsonian Institution. In July, this extensive collection was purchased by the National Museum of Natural History and successfully packed and shipped to Washington, D.C., by E.L. Peyton and Richard C. Willkorn of the Walter Reed Biosystematics Unit, an affiliated/tenant agency associated with the Smithsonian Institution. WRBU has primary responsibility associated with the National Mosquito Collection.

Dr. Duret's collection is an outstanding addition to the National Collection. It includes over 14,000 pinned, fully labelled and identified adult specimens, representing some 545 species, or 60% of the known mosquito fauna of Central and South America. Some 7,800 specimens have associated dissected genitalia and another 900 have associated immature exuviae on microscope slides. The collection also contains 39 holotypes, 5 allotypes, and 134 paratypes of species named by Dr. Duret. The material constitutes the most complete mosquito collection ever assembled for Argentina, and also includes extensive series of specimens from Paraguay and Brazil and many excellent series from several other countries of Middle and South America. The individual specimens were collected, expertly prepared and curated, and authoritatively identified by Dr. Duret while he served as a consultant for the Pan American Health Organization. The labels and collection records associated with the specimens bear invaluable ecological and behavioral data of importance to current and future studies on the mosquito fauna of the Neotropical Region.
INSECT COLLECTION NEWS

OPPORTUNITIES

JOB OPENING: CURATORIAL ASSISTANT, ENTOMOLOGY
Alfred F. Newton, Jr.
Division of Insects
Field Museum of Natural History
Roosevelt Road at Lake Shore Drive
Chicago, Illinois 60605

The Division of Insects, Department of Zoology, Field Museum of Natural History, has an opening for a full-time Curatorial Assistant (MSS-III, salary $15,743-19,854). The position has been funded for four years, is available immediately and will be open until filled.

The assistant will be responsible for curation of the Museum's worldwide collection of the beetle family Staphylinidae, which includes over 400,000 specimens and 20,000 species, with primary types of over 4,000 specimens. Objectives include physically re-organizing the collection, transferring all specimens to foam-lined trays, labeling all trays, and constructing a computerized catalog of all species and apparent type material in the collection. Occasional involvement with other curatorial activities in the Division.

BA/BS required, MS preferred, with one or more years of appropriate museum experience. Some knowledge of insect taxonomy, good manual dexterity, and ability to work independently and accurately required. Computer data entry skills and experience in working with taxonomic literature desired.

Interested candidates should submit resumes and names of three references to: Marilyn Martinson, Personnel, Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago, Illinois 60605. For specific information about duties of the position, contact: Alfred F. Newton, Jr., Assistant Curator and Head, Division of Insects, Tel. (312) 922-9410, ext. 263.

WANTED - STUDENTS DESIRING TO BE SYSTEMATISTS!
F. Christian Thompson
Systematic Entomology Laboratory, ARS/USDA
C/o NMNH, Smithsonian Institution
Washington, D.C. 20560

The Maryland Center for Systematic Entomology (MCSE) will have fellowships and/or assistantships for at least two students starting in the fall of 1991. Especially wanted are students interested in phytophagous insects and co-evolution.

The Maryland Center for Systematic Entomology is a consortium for research and training in the systematics and evolutionary biology of insects and allied groups. Graduate students are enrolled in the Department of Entomology, University of Maryland, College Park, and may also take a USDA or Smithsonian scientist as co-advisor. The research programs of the Center's more than 40 scientists encompass tropical biology, systematic theory, ecology and behavior, developmental and molecular biology, and medical entomology, in addition to the systematics and biogeography of virtually all major groups of terrestrial arthropods. Interaction with other disciplines is fostered by the presence of strong groups in ecology, evolution, molecular biology, and insect biology at the University (including the Center for Agricultural Biotechnology), the Smithsonian Institution, and the Beltsville Agricultural Research Center. Students have access to the National Collections and the superb Smithsonian and National Agricultural libraries. Other major research facilities, including the National Institutes of Health and Walter Reed Army Medical Center, are also nearby. The many research programs of the Smithsonian Institution provide excellent opportunities for fieldwork, especially in the tropics. The Washington metropolitan area offers a wealth of cultural and recreational opportunities, and is within easy reach of both the

SMITHSONIAN COLLECTION IMPROVEMENT FUND GRANT: MUSCIDAE
Wayne Mathis
Department of Entomology
NMNH, Smithsonian Institution
Washington, D.C. 20560

In December of 1989, the NMNH awarded a Collections Improvement Grant to Adrian C. Pont to help identify and curate the mass of level 2 accessions of the family Muscidae (80 drawers; see previous issue of ICN for explanation of curation levels). In February and March of this year Adrian spent 200 working hours during a 3-week period working on this project and succeeded in processing nearly all the Old World material, bringing it to levels 3 and 4. Twenty-one drawers containing over 11,500 specimens were sorted to genus, including identification of over 150 species. In addition, over 2300 non-Muscidae were removed and sorted to family, including nearly 1200 Palearctic Anthomyiidae. All specimens were identified at least to genus, transferred to foam-bottom unit trays, and arranged alphabetically within the holdings of a zoogeographic region for easy incorporation into the main collection. Several primary types were recognized in the material being sorted and in the main collection (these were segregated), and a handwritten list of species in the main collection was prepared. Finally, Adrian and F.R. Magpaya worked on NMNH's holdings of Philippine Muscidae, making considerable progress on a collaborative project. In all, some 13,800 specimens were processed. For more information on the Collection Improvement Fund contact Ron McGinnley, Department of Entomology, NMNH, Smithsonian Institution.

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Chesapeake Bay and the Appalachian mountains.

For further information, including a list of faculty and research programs, please write or phone: Dr. Charles Mitter, Department of Entomology, University of Maryland, College Park, Maryland 20742 (tel. (301) 405-3957).

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Drawn by
George L. Venable
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and a Macintosh II