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Program and Abstracts

for the

8th Annual Meeting

of the

Society for the Preservation

of

Natural History Collections

8-13 June 1993

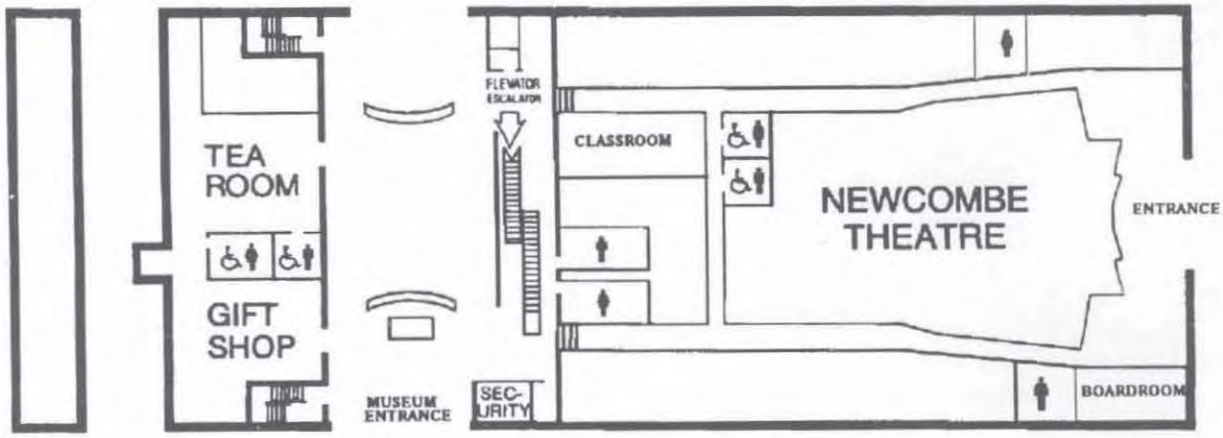
Victoria '93

Royal British Columbia Museum

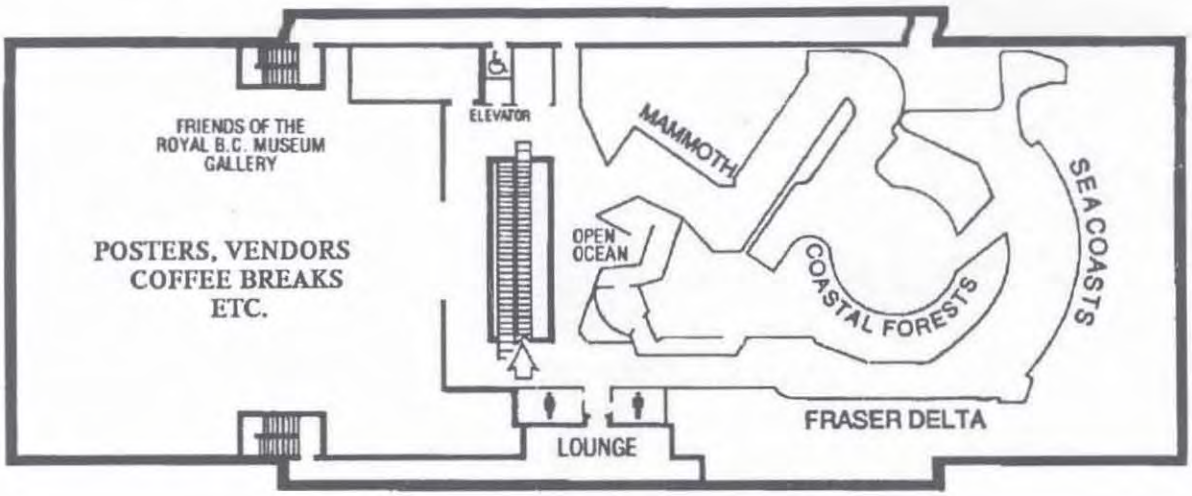
In co-operation with
the Cultural Resource Management Program
University of Victoria

Museum Floor Plan

First Floor



Second Floor



Society for the Preservation of Natural History Collections

Program and Abstracts

8th Annual Meeting
8 - 13 June 1993

Royal British Columbia Museum
Victoria, British Columbia, Canada

in co-operation with
The Cultural Resources Management Program
University of Victoria

NO SMOKING POLICY
By government regulation
smoking is not permitted in the Exhibit and Fannin buildings.

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PROGRAM SCHEDULE

Tuesday, 8 June	8:30 AM - 9:30 PM	Registration (RBCM Boardroom)
	8:30 AM - 4:30 PM	Poster set-up
	8:30 AM - 12:00 PM	1/2 day trips
	9:00 AM - 11:30 AM	Committee Meetings
	1:00 PM - 4:30 PM	1/2 day trips
	1:00 PM - 6:00 PM	Council Meeting
	7:00 PM - 9:30 PM	Icebreaker (Museum Lobby/Exhibits)
Wednesday, 9 June	8:00 AM - 4:30 PM	Registration (RBCM Boardroom)
	8:30 AM	Opening Remarks (Newcombe)
	8:45 AM	Welcome: RBCM Executive Director, Bill Barkley
	9:00 AM	Keynote Speaker: Dr Geoff Scudder, University of British Columbia
	10:20 AM - 12:00 PM	Papers (Newcombe)
	1:00 PM - 3:00 PM	Papers (Newcombe)
	3:00 PM	Group Photograph
	3:30 PM	Annual General Meeting (Newcombe)
	5:00 PM	First Nations Salmon Barbecue
	7:00 PM - 10:00 PM	RBCM Collections "Open House"
Thursday, 10 June	8:30 AM	Opening Remarks (Newcombe)
	8:40 AM - 12:20 PM	Papers (Concurrent Sessions)
	1:30 PM	Group Discussions
	3:30 PM - 5:00 PM	Refreshment Break and Poster Session
	6:30 PM	Cash Bar (Harbour Towers Hotel)
	7:30 PM	Annual Banquet and Dance (Harbour Towers Hotel)
Friday, 11 June	8:30 AM - 10:30 AM	Discipline Topics
	11:00 AM - 12:30 PM	Reports from Topics (Newcombe)
	1:00 PM - 4:30 PM	1/2 day trips
	1:30 PM - 5:00 PM	Computer Workshop and Demonstrations (Newcombe)
	1:30 PM - 5:00 PM	Business Meeting of Council
Saturday, 12 June	9:00 AM - 12:00 PM	Workshop - Archival Concerns of Natural History Museums (Newcombe)
	1:30 PM - 5:00 PM	Workshop - Continued from AM
Sunday, 13 June	8:30 AM - 12:00 PM	1/2 day trips

PROGRAM

Wednesday, 9 June 1993, Newcombe Theatre Session

10:20 *Flooding of the Texas Cooperative Wildlife Collection: Events and Materials Threatened* by R. Kathryn Vaughan and George D. Baumgardner, Department of Wildlife & Fisheries Sciences, Texas A&M University.

10:40 *Flooding of the Texas Cooperative Wildlife Collection: Cleanup and Restoration* by George D. Baumgardner and R. Kathryn Vaughan, Department of Wildlife & Fisheries Sciences, Texas A&M University.

11:00 *Studies of Dried Tissues Subjected to Flood Conditions and Corrective Measures* by Stephen L. Williams, Natural Science Research Laboratory, Museum of Texas Tech. University.

11:20 *Salvage of Water-Damaged Tanned Skins* by Catherine Hawks, Woodbridge, Virginia.

11:40 *Disasters, Disaster Response Plans and the Future of the Texas Cooperative Wildlife Collection* by Sally Y. Shelton, Natural History Conservation Laboratory, Texas Memorial Museum, University of Texas at Austin.

1:00 *Biological Collections: Their Use in Education in the U.K.* by Jane Pickering, University Museum, Oxford.

1:20 *CITES and Natural History Museums: Opportunity and Challenges* by Darlene McCuaig Balkwill, Collections Division, Canadian Museum of Nature.

1:40 *Mineral and Fossil Collections: Versatile Resources for the Whole Museum* by Jean F. DeMouthe and Joe Nagel, Dept of Invertebrate Zoology & Geology, California Academy of Sciences, and M.Y. Williams, Museum of Geological Sciences, University of British Columbia.

2:00 *Updating a Code of Ethics: The Long and Winding Road* by Jane K. Hutchins, Tideview Conservation, Sooke, B.C., and Debbie Hess Norris, Art Conservation, University of Delaware.

2:20 *"Plastination" — a Preservation Method: Its Applications and Uses in the Computer Age* by D. Magliano, Department of Veterinary Medicine, University of California, Davis (UCD), R. Cole, Department of Wildlife and Fisheries, UCD, and E.A. MacKinnon and G.W. Lyons, Department of Anatomy and Cell Biology, Queen's University.

Thursday, 10 June 1993: Newcombe Theatre Session

8:40 *Ionising Radiation in Museums: Causes and Effects* by R.E. Child, Head of Conservation, National Museum of Wales.

9:00 *Ionising Radiation Associated with the Mineral Collection of the National Museum of Wales* by M. Lambert, Department of Geology, National Museum of Wales.

9:20 *Bringing Order to Geological Collections* by Jean F. DeMouthe, Department of Invertebrate Zoology & Geology, California Academy of Sciences.

9:40 *A Radical Solution to Limited Time and Limited Space: A Case Study of a Mineral Collection* by Joe Nagel, M.Y. Williams Geological Museum, University of British Columbia.

10:20 *Three Generations of Compact Storage* by Paul F. Beelitz, Department of Anthropology, American Museum of Natural History.

10:40 *Transport and Curation of Large Volumes of High Density Storage Media Holdings* by Iris A. Hardy, Atlantic Geoscience Centre, Geological Survey of Canada.

11:00 *Salt Crystallization and Hydration: How Important in Natural History Collections?* by Alice M. Blount, The Newark Museum.

11:20 *A Deacidification Pilot Program for Library and Archival Materials Using Diethyl Zinc Processing* by Jean B. Cargill, Botany Libraries, Harvard University Herbaria.

11:40 *Blaschka Glass Models of Zoological Invertebrates: A Problem of Conservation* by R.E. Child, National Museum of Wales.

Thursday, 10 June 1993: Classroom Session

8:40 *Electronic Data Issues: Copyright Versus Citation* by Susan M. Woodward, Department of Mammalogy, Royal Ontario Museum.

9:00 *"Bug Proofing" Dioramas: An Integrated Pest Management Approach* by Carolyn Leckie, Denver Museum of Natural History.

9:20 *Pest Control: Pest Management Policies and Procedures: A Comparison* by Jessie Meltzer, Museum Support Center, Smithsonian Institution.

9:40 *Conservation: Condition Survey of Herbaria and Non-Herbaria Specimens in the National Museum of Wales Botanical Storerooms* by Victoria J. Purewal, Department of Botany, National Museum of Wales.

10:20 *Assessment of a Fluid Preserved Collection* by John E. Simmons and Robert Waller, Museum of Natural History, University of Kansas and Canadian Museum of Nature.

10:40 *Assessment Procedures for a Collection of Fluid-Preserved Invertebrates* by Paisley S. Cato, Virginia Museum of Natural History (VMNH), R. Robert Waller, Canadian Museum of Nature, Courtney R. Carter, VMNH, and Richard L. Hoffman, VMNH.

11:00 *A Method for Reducing Ethanol Evaporation in Wet Collections* by Michele Steigerwald and Sylvie Laframboise, Ichthyology Collection, Canadian Museum of Nature.

11:20 *pH Measurements in Ethanol-Water Solutions* by Robert Waller, Collections Division, Canadian Museum of Nature (CMN), Robert Stairs, Department of Chemistry, Trent University, and Barbara Njie, CMN.

11:40 *Wet Preservation: The Forgotten Striated Muscle and Body Fluid* by Mary-Lou Florian, Conservation Scientist Emeritus, Royal British Columbia Museum.

12:00 *Insect Specimen Rehydration with Hot Ethanol, and Dehydration Through Freeze-Drying* by Crispin S. Guppy, Biological Collections Section, Royal British Columbia Museum.

Thursday, 10 June 1993: Poster Sessions, Friends of the RBCM Gallery

3:30 - 5:00

The Effect of Propylene Glycol on the Ethanol Concentrations Determined By Density Measurement by Nancy Boase and Robert Waller, Collections Division, Canadian Museum of Nature.

Four Curatorial Lessons by Julia Golden, Department of Geology, University of Iowa.

A Conceptual Information Model for Biological Collections by Suzanne B. McLaren, Section of Mammals, Edward O'Neil Research Center, Carnegie Museum of Natural History.

Preparation of Exxon Valdez *Avian Casualties* by Darby A. Morrell, National Fish and Wildlife Forensics Laboratory, Morphology Section, Bird Unit, Ashland, Oregon.

A User-Friendly Computer Database for Museum Mineral Collections by C. Nuñez, W. B. Laffer II and I. Casanova, Department of Geology, Field Museum of Natural History.

Biological Collections: Wet Collections Organization by Kelly A. Sendall, Biological Collections Section, Royal British Columbia Museum.

Freezing Versus Chemical Fumigation As Methods Of Insect Pest Control In Herbaria: A Response To Egenberg And Moe by Charles L. Messenger and Margaret R. Bolick, University of Nebraska State Museum.

Friday, 11 June 1993: Computer Workshop: Newcombe Theatre

1:30 - 5:00

1: *The Canadian Society of Zoologists Collections Database* by M.N. Arai, Department of Biological Sciences, University of Calgary, S.M. Bradley, Canadian Heritage Information Network, Communications Canada, and D.R. Laubitz, Canadian Museum of Nature.

2: *Information Needs and Uses of Natural Sciences Collections in Quebec* by Louise LePage, Canadian Heritage Information Network Fellowship Program, Ottawa.

3: *Introduction of the Internet into Museum Practice* by Paula Sumpter, Milwaukee Public Museum, Inc.

ABSTRACTS

(IN ORDER OF PRESENTATION)

Wednesday, 9 June 1993 (a.m.) — Newcombe Theatre

Flooding of the Texas Cooperative Wildlife Collection: Events and Materials Threatened.

R. KathrynVaughan and **George D. Baumgardner**
Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX, 77843 USA

Early on the morning of 30 October 1992 a water main on the Texas A&M University campus burst and caused the Texas Cooperative Wildlife Collection to be flooded to a depth of 1.1 meters in silt-laden water. Approximately one-fifth of the fish, amphibian, and reptile collection (most of which was stored in containers of alcohol) was submerged. A small proportion of the glass jars floated off their shelves and a few were breached by water. Many of the larger containers floated or fell over; some of these containers lost their fluid and contents. Ninety-six museum cases containing dry-preserved birds and mammals and the larger tanned pelts were completely inundated. Nearly one-third of the frozen tissue collection was partially thawed. One computer hard disk and nearly all of the paper cards used to store catalog data were submerged. Approximately half of the field notes and catalogs got wet. The natural history library was not inundated but was exposed to high humidity. Over half of the contents of this collection were threatened by this disaster.

Flooding of the Texas Cooperative Wildlife Collection: Cleanup and Restoration.

George D. Baumgardner
and
R. Kathryn Vaughan
Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843 USA

The flooding of the Texas Cooperative Wildlife Collection necessitated examination of the majority of its contents for damage. Containers and lids for fluid-preserved specimens were replaced as necessary. When appropriate, the fluid on alcohol-preserved specimens was replaced with fresh 70% ethanol. There appears to have been little long-term damage inflicted to the fluid-preserved specimens. Rust spots on the cases for dry-preserved skins are being sanded and painted and door gaskets on these cases are being replaced as necessary. Skeletons and tanned pelts that got wet were air dried. Dry-preserved skins (excluding pelts) were frozen on-site to halt degradation and subsequently freeze-dried to remove water. The skins of birds and mammals were probably the most severely affected portion of the collection. At present these specimens appear to be in fairly good shape; however, they are likely to be more fragile and there is the possibility of their accelerated degradation. All of the frozen tissue collection was transferred to a new ultra-cold freezer. The catalog data stored on the computer hard drive that was submerged were retrieved. Catalog cards and field notes that got wet were saved via freeze-drying. The high humidity warped paper covers on some of the books in the natural history library but otherwise caused little damage. Initial cleanup and restoration procedures are complete but additional tasks, such as repair of cases, re-sorting of specimens, and removal of silt, will continue for some time. Preservation status of all specimens will be monitored for longterm effects.

Studies of Dried Tissues Subjected to Flood Conditions and Corrective Measures

Stephen L Williams
Natural Science Research Laboratory, Museum of Texas Tech. University, Box 43191, Lubbock, TX, 79409-3191 USA

The 1992 flood of the vertebrate research collections at Texas A & M University resulted in several actions being taken to reduce the loss of specimens. Ideally, these actions reflect decision-making processes based on the collective assimilated knowledge of the individuals involved. However, in actual practice it is soon realized how little is really known about the ramifications of emergency situations and corrective measures concerning natural history materials. Furthermore, until such an emergency does occur, it is difficult to fully appreciate the true nature of problems encountered.

As part of the salvage operation, some parts of the collection were dried under ambient conditions; other parts were subjected to freeze-drying procedures. After the emergency, independent testing was conducted on bone and skin tissues. These material were soaked in water, frozen, and subjected to a vacuum to remove the water. Although the results of these tests can be useful for future decision-making in similar emergencies, it also might be used for decisions involving long-term preservation of the material salvaged.

Salvage of Water-Damaged Tanned Skins

Catherine Hawks
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Woodbridge, VA
22192-2025 USA

In October, 1992, portions of the mammal, bird, ichthyology and herpetology collections of the Department of Wildlife and Fisheries Sciences of Texas A & M University were submerged in warm water for several hours as the result of a break in a hot water main. Among the specimens were tanned or semi-tanned Recent mammal skins that were partially or completely saturated by the flood waters. After the skins were removed from the flood site, salvage efforts involved both triage and treatment. Priority was given to the skins that were least damaged in order to insure that these would sustain no further harm. The treatments included air drying, mechanical manipulation, and some solvent drying procedures.

As might be expected, skins that had been tanned with chromium salts survived without noticeable shrinkage. These were air dried and removed to a secure location. "Semi-tanned" or tawed skins that had been partially or briefly submerged were mechanically manipulated to reduce hardening during air drying. Experiments with solvent drying were moderately successful for skins from which tanning salts had partly been removed by immersion in water, but the skins had not undergone severe maceration. Ethanol/water solutions were more successful than acetone/water solutions for this purpose. A few skins had become gelatinous from prolonged exposure to warm water and disintegrated either before or during the drying process.

Disasters, Disaster Response Plans and the Future of the Texas Cooperative Wildlife Collection

Sally Y. Shelton
Natural History Conservation Laboratory, Texas Memorial Museum, University of Texas at Austin, 2400 Trinity, Austin, TX, 78705 USA

In October 1992, flooding caused extensive damage to the Texas Cooperative Wildlife Collection, a major regional resource in vertebrate studies housed at Texas A&M University. After the immediate response and rescue operation, TCWC collections professionals began examining the causes and effects of the disaster and investigating the development of a disaster response plan. The aims of this plan include the reduction of risk from preventable problems and the best response to those problems which cannot be prevented.

Suggestions for an effective approach to disaster planning which have emerged from the TCWC situation include good documentation of the condition and arrangement of the collection prior to problems, particularly visual documentation; written procedures for immediate, short-term, and long-term disaster responses; lists of community, regional, and national resource personnel to be called in as needed and appropriate; procedures for documenting the extent of and response to damages; and recommended emergency training for collections workers.

Wednesday, 9 June 1993 (p.m.) — Newcombe Theatre

Biological Collections: Their Use in Education in the U.K.

Jane Pickering
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Parks Road, Oxford,
OX1 3PW. UK

If biological collections are to survive and grow it is essential to increase public interest in them. Most people are unaware of the fundamental importance of collections in the study of the world's biodiversity. However it is possible to remedy this since biological collections have a huge educational potential both for formal and informal learning. Specimen-based education can promote ideas of conservation and environmental science and complements education in these issues using other media.

The advent of a new statutory National Curriculum in the U.K, which details exactly what schools must teach, opens new opportunities for natural history museums. Museums provide an exciting environment for the exploratory learning envisioned for science education. There is also great scope for increasing use of collections by other community groups in life-long learning. One difficulty in the U.K. is that the majority of staff charged with increasing accessibility to collections are not scientists. It is vital that biology curators work with education staff if collections are to be used fully.

CITES and Natural History Museums: Opportunity and Challenges

Darlene McCuaig Balkwill

Collections Division,
Canadian Museum of
Nature, P.O. Box 3443,
Station D, Ottawa,
K1P 6P4 Canada

CITES material seized by Customs and Excise is held in bond by the Canadian Wildlife Service for a period of three years, then is made available to scientific institutions for research and display purposes. The material comes in a wide variety of forms and conditions, and presents both an opportunity and a challenge. Such specimens are of value because of their rarity, their use as educational and exhibit material, as voucher specimens, and as a reservoir for genetic material. Occasionally large numbers of one species are seized, providing an unparalleled opportunity to study variation within a species. The challenge is presented by the problems associated with curation of such specimens: lack of data; use of newspaper, straw, wood shavings or sawdust for stuffing; distortion; paint or shellac applied to specimens; brittleness due to lack of tanning; identification problems for some of the material; and storage requirements including lots of space and cabinets for mounts, while for other specimens special environmental controls and extra security are necessary.

In these times of financial difficulties, natural history museums must therefore ask some very serious questions before accessioning CITES material: How much can we afford to keep? How much can we afford not to keep? How much is enough? The worth of the specimens must be evaluated in terms of the scientific research, education and exhibit functions of the museum and the mandate to preserve specimens in trust for research and posterity.

Mineral and Fossil Collections: Versatile Resources for the Whole Museum

Jean F. Demouthe
Dept. of Invertebrate Zoology & Geology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118 USA

and

Joe Nagel
M.Y. Williams Museum of Geological Sciences, University of British Columbia, 6339 Stores Road, Vancouver, B.C., V6T 2B4 Canada

Mineral and fossil collections have been traditionally used in the same ways that most natural history collections are used: for teaching, research and display. Geologic collections, however, can fill some non-traditional roles for which other types of natural history collections are unsuited. Geodes, gemstones and dinosaurs! Geologic collections often contain some of the most attractive and valuable items in a museum's collection. These specimens can be used to interest donors in natural history collections, and as education exhibits during social functions.

Geologic specimens can often be added to temporary exhibits that come to a museum. By incorporating a museum's "home" collections in traveling exhibits, it allows for the inclusion of specimens seldom seen and for the expansion of the educational impact of the display.

Educationally, geologic specimens can be used in exhibits and educational programs where touchable specimens are desirable. Many abstract scientific subjects can be more easily conveyed to students and the general public through the use of concrete examples. Because of their visual interest and durability, some geologic specimens can be used to give students and the public hands-on experiences.

Staff work in the identification & conservation of local specimens, exposures or localities can also reflect positively upon the related collections. Large, active amateur mineral-collector groups exist in most communities, which can provide opportunities for community contact and outreach, using the geologic collections as an area of common interest. Minerals, fossils and/or gemstones can be lent to non-science institutions (public or private) to add dimensions to something they are planning in another field (history, art, etc.).

A collection is not being misused or prostituted if it is being utilized responsibly in other areas of a museum's work, such as public relations, development and education. These non-traditional uses can increase the visibility and be used to demonstrate the flexibility and usefulness of a collection to an administration.

Updating a Code of Ethics: The Long and Winding Road

Jane K. Hutchins
Tideview Conservation,
6555 Tideview Road RR1,
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and

Debbie Hess Norris
Art Conservation,
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Newark, DE 19716 USA

Is a code of ethics for practitioners or those affected by our work? Does it establish minimum standards or the ideals toward which we strive? Should we enforce its tenets?

Recognizing the omissions and ambiguities in its 1979 Code of Ethics and Standards of Practice, the American Institute for Conservation (AIC) has undertaken its review. The process included a careful analysis of the existing Code and those from other professional organizations, and discussion among the members. In articulating its guiding principles the AIC membership has reflected on the scope of its activities, its responsibilities to its colleagues, and the purpose of preservation. In reiterating the primary goals of the conservation profession—the preservation of cultural property for posterity—the AIC has defined cultural property to be material that has inherent importance that may be artistic, historic, natural, religious, scientific, or social. How do we ensure that we always collaborate with colleagues with relevant knowledge? Should conservators be responsible for preventive conservation? Such questions are asked throughout our museums, and we hope that a discussion of our exploration of ethical principles will help SPNCH members as they try to safeguard cultural property.

"Plastination" A Preservation Method: Its Applications and Uses in the Computer Age

D. Magliano
Department of Veterinary Medicine, University of California Davis, Davis, CA 95616 USA

R. Cole
Department of Wildlife and Fisheries, University of California Davis, Davis, CA 95616 USA

E.A. Mackinnon and **G.W. Lyons,**
Department of Anatomy and Cell Biology, Queen's University, Kingston, Ontario, K7L 3N6 Canada

In light of changing curriculae and the difficulties involved in procuring specimens for dissections and teaching in both human and veterinary anatomy, it has become increasingly important to develop new and innovative methods of presentation. With this idea in mind, the School of Veterinary Medicine at U.C. Davis and the School of Medicine at Queen's have combined a new method of preservation, using S-10 plastinated specimens, with interactive-computer programs to create a highly sophisticated approach to the teaching of Anatomy.

At U.C. Davis "user friendly" programs have been developed on the MacIntosh II Si, with the aid of a slide scanner and Adobe Photoshop software and adapted to the Mac Supercard program, which allows graphics to be scripted so that students can interact with the programs. These programs have combined text, photography and plastinated specimens to create a method of teaching which has become highly acceptable to both student and instructor.

The Department of Anatomy at Queen's University is now creating similar programs for teaching modules in their newly structured curriculum. Using the Amiga and the Video Toaster for video image digitization, a program has been developed that combines gross and microscopic anatomy images with text in an interactive format. Image manipulation is carried out using AD PRO and Imagemaster, text is written using standard word processing packages, and program assembly is carried out using AmigaVision or Presentation Master.

Although the methods outlined above are being specifically applied to the teaching of anatomy, the technology is versatile. Complex or simple programs can be created and adapted to other fields of natural history.

Thursday, 10 June 1993 (a.m.) — Newcombe Theatre

Ionising Radiation in Museums: Causes and Effects

R.E Child
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National Museum of Wales,
Cardiff CF1 3NP,
Wales, UK

In many countries, museum collections are not covered by ionising radiation legislation owing to the low perceived hazard they present. However, it is likely that present exposure levels will be reduced drastically in the light of recent information on the effects of long-term low level ionisation radiation on the human body. A consequence of this is that many collections will exceed the new levels, and strict control measures will have to be introduced.

The first paper is an explanation of ionising radiation that may be encountered in museums, its causes, properties and effects on biological systems. It stresses the need for accurate information from monitoring systems to provide effective control. Information on exposure levels, hazards to personnel and basic precautionary measures are given.

Ionising Radiation Associated with the Mineral Collection of the National Museum of Wales

M. Lambert
Department of Geology,
National Museum of Wales,
Cardiff CF1 3NP,
Wales, UK

Measurements of radiation and radon gas levels in the Mineral Store at the National Museum of Wales indicated that the amounts were sufficiently high for the U.K., 1985 Ionising Radiation Regulations to apply.

Radiation surveys of the Mineral Collection of the National Museum of Wales were carried out for both direct gamma radiation levels and for radon contamination. The quantitative results of these surveys are presented. The survey methods adopted and the equipment employed are described briefly. The measures taken to minimise radiation exposure to research and curatorial staff using the mineral collection are reported.

Bringing Order to Geological Collections

Jean F. Demouthe
Department of Invertebrate Zoology & Geology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118 USA

Geological collections are some of the most diverse held by any natural history institution. They can include fossils, rocks, minerals, and gemstones, and are often the repository for "miscellaneous" items that do not fit into any other collection category.

The most important concept in organizing any collection is that the system devised should be as simple as possible, it should be manageable by the staff available, and it should serve the purposes for which the collection is intended. It does no good to have such a complex organization system that it will never be completed and in which it is difficult to locate specimens and information. Keep everything simple.

In organizing geological collections, one must first take into account how the specimens are used. If a paleontology collection is used largely for stratigraphic and structural geology work, then it would make sense for it to be arranged in order of geologic age and locality. If the same collection were to be used principally for systematic work on certain species, then it might be best to organize it phylogenically or to isolate certain elements or groups from it.

Mineral collections can be organized in a number of ways. Collections to be used for teaching are often organized alphabetically by species, so that students need not know alot about a mineral in order to find it. Research collections are most often arranged by chemical composition, with the simplest (native elements) first, becoming progressively more complicated, and ending with the most complex silicates.

Mineralogy and petrographic collections may also be arranged by locality. This should only be done, however, if the primary use of those specimens will be according to where they came from.

The use of "specialty" collections or segments of a collection should be avoided or kept to an absolute minimum. It is much more difficult to organize and maintain a number of small collections than it is to keep track of one well-organized large collection. A simple computer program or even a cross-referencing card file system can be used to show the location and nature of any special collection elements within the larger whole.

A Radical Solution to Limited Time and Limited Space: A Case Study of a Mineral Collection

Joe Nagel
Director/Curator.
M.Y. Williams Geological Museum, 6339 Stores Road, Vancouver, B.C.
V6T 1Z4 Canada

Staff time and storage space are both important arbiters of how well a museum is able to achieve its mandate to collect, research, preserve and exhibit. Effeciently using staff time and storage space during an era when they are diminishing presents a particular challenge for which modern information technology offers some practical options. This case study presents one such application, which has considerably reduced the amount of time and space required for a collection of 10,000 mineral specimens, while at the same time greatly increasing their accessibility and utility.

Modern information systems, especially those developed over the past several years for microcomputers, have a number of strengths. They can handle textual, numerical and visual data efficiently and quickly. In addition, the operating platforms are easy enough to use so that most curators can include such knowledge in their normal repertoire of skills. The fact that collection information can be easily and casually manipulated allows the physical arrangement of the collection to be optimized in a way which would have once been entirely impractical. The resultant efficiencies with respect to storage space, staff management time and collection security may far outweigh any potential disadvantages, especially for small and medium-sized collections and institutions.

Three Generations of Compact Storage

Paul F. Beelitz
Dept of Anthropology, American Museum of Natural History, 79th Street and Central Park West, New York, NY 10024-5192 USA

Storage technology is constantly evolving, such that a new installation is better than the last, but not as good as the next.

In 1986, the American Museum's Department of Anthropology had its first compact storage system fabricated and installed by Drummex Inc. The system, which occupies 10,000 square feet, contains the African, Siberian, Eskimo, and Northwest Coast ethnology collections. In general, the system's performance has been excellent, but the all-important gasketing and locking systems are unsatisfactory.

In 1991, a 5,000 square foot system for the remainder of the North American Indian ethnology collection was installed by Montel Inc. on the floor below. The gasketing works perfectly and the locking system is satisfactory, though it could be improved.

In 1993-1994, a third generation of compact storage will be installed for the Asian ethnology collection. It will incorporate the best aspects of the previous generations, and a few new ones.

Transport and Curation of Large Volumes of High Density Storage Media Holdings

Iris A. Hardy
Atlantic Geoscience Centre, Geological Survey of Canada, P.O. Box 1006, Dartmouth, N.S. B2Y 4A2 Canada

An extensive digital geophysical magnetic tape database worth in excess of some $100 million was donated to the Geological Survey of Canada (GSC) by Husky Oil and Petro-Canada in late 1992. This collection consisting of more than 60,000 1/2 inch 9 track field and stacked (processed) multichannel seismic tapes represents a unique set of frontier geophysical data from the Arctic Island Channels and Ocean, Baffin Bay, Beaufort Sea, Grand Banks, Great Lakes, Gulf of St. Lawrence, Hudson Bay, Labrador Shelf, Northwest Territories, Scotian Shelf as well as the Yukon. Some 10000 line kilometers of seismic data were transported more than 2400 kilometers by road from Calgary, Alberta to Dartmouth, Nova Scotia. Factors maintaining the integrity of this transported data, while guaranteeing its curation to the legislative requirements of the Canada Oil and Gas Drilling regulations (1988) by the GSC will be presented.

Salt Crystallization and Hydration: How Important in Natural History Collections?

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Moisture and salts are the most damaging factors in stone decay and have consequently been studied by those concerned with preservation of monuments and buildings. The presence of salts in Natural History materials likewise causes decomposition of specimens. Salts are more common than generally realized and can have been present in the original material or have formed within the museum. Most notable cases of formation of salt within the museum are the iron and aluminum sulfates on pyrite and marcasite specimens in mineralogy and paleontology collections. Copper sulfates may also form on copper bearing sulfide specimens. Gypsum crystallization causes decomposition of fossils such as clam shells. The gypsum has formed by reaction of pyrite and moisture with calcium carbonate of the shells. This calcium sulfate probably formed, or at least continued to form, after the specimens entered the collection. Halite, sodium chloride, occurs on specimens of modern marine organisms and was derived from their original habitat. The absorption of moisture from the air by the halite may cause serious decomposition of these materials.

Hydration and dehydration of salts on museum specimens is observed to take place with humidity changes. These changes, however, appear to be very sluggish, and in studies of building stones it has been found that hydration reactions are relatively unimportant in decomposition unless they occur rapidly and frequently. In natural history collections crystallization and hydration are probably less important in the decay process than absorption of moisture due to the hygroscopic nature of the salts and the resulting chemical reactions.

A Deacidification Pilot Program for Library and Archival Materials Using Diethyl Zinc Processing

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The Botany Libraries at Harvard University are the libraries developed by Asa Gray (1810-1888) and his successors to support herbarium research and other botanical studies. The library collections, which total a quarter of a million volumes, are rich in the late nineteenth and twentieth century papers that turn brittle with age. In an effort to preserve these documents in their original formats, the Botany Libraries together with nine collections at Harvard embarked on a pilot project employing a deacidification method based on diethyl zinc (DEZ).

The DEZ process was selected after review of existing mass deacidification technologies, and two Harvard Chemists determined it effective in treating papers throughout, not just the surfaces. During the first year of the deacidification program 3700 books and 4688 maps were processed.

Blaschka Glass Models of Zoological Invertebrates: A Problem of Conservation

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In the late 19th century the German firm of Blaschka produced exquisite models of soft-bodied marine invertebrates, and later plant models that were sold to museums worldwide.

Although the Blashka's were essentially glass workers, the models are complex composites of glass, paper, wire, painting mediums etc, and as such, present unique conservation problems. Some investigative work has been carried out on glass analysis by Harvard Center for Conservation and Technical Studies.

The National Museum of Wales has a collection of 144 numbered Blaschka models in various states of preservation. A programme of scientific investigation has been initiated to determine the materials of construction, the degradative pathways and the repair materials. Based on this investigation this paper will produce a protocol for the conservation of those items and guidelines for their future storage.

Thursday, 10 June 1993 (a.m.) — Classroom

Electronic Data Issues: Copyright Versus Citation

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How many field guides, checklists, talks, exhibitions, et cetera have you seen where there are images of or data from museum specimens without credits? Academic publications traditionally cite the specimens used in each study.

With the advent of automated museum data, a new level of research and informed management of natural resources is possible. Derived or compound databases are likely here to stay and can be useful tools. One-time-use limitations stated in agreements concerning use of museum data may impede the evolution of these tools. If museums are not going to manage these derived databases, more reasonable expectations of the "middle men" and their consumers need to be defined.

Suppose a museum collection is analogous to a library and the specimens and associated data are analogous to books. Books can be borrowed by users for an certain length of time; after this period the data must be renewed. Any products of museum data should contain citation of the source and the year the data were obtained from the source. It might also be useful for museums to develop a standard index of data reliability to be stated in citations.

Is copyright the most pressing issue facing electronic data today? If all of the products from borrowed material and data were properly cited in the past the true value of museum collections to society might not currently be in question. Requesting proper citation outside of the academic community might remedy many of todays problems associated with museum electronic data.

"Bug Proofing" Dioramas: An Integrated Pest Management Approach

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DMNH's 89 dioramas are the backbone of its permanent exhibits. An insect monitoring program, implemented in 1992, and based on sticky traps revealed significant amounts of dermestid activity despite almost no visible damage to the specimens. The elevated activity was indirectly attributed to the previous years record numbers of Miller moths. These moths are specific to Colorado. Dead moths, which accumulated "behind the scenes" and were not cleaned up provided food for dermestids.

The museum has embarked upon an extensive integrated pest management plan. The immediate infestations were arrested with the use of an insecticide. Evaluation of the dioramas (inside, underneath and behind) revealed many routes for insects to access the dioramas. Additionally, dusty, cluttered areas acted as reservoirs of infestation.

Cleaning infested areas, cluttered with more than 20 years of accumulated non-collection materials, required extensive administrative support, time and money to discard or rehouse materials. Routine monitoring and annual cleaning of these areas has been implemented and is critical in revealing additional pest problems.

Twenty high priority dioramas were "bug-proofed" to reduce access to insects. Holes and gaps in the diorama shells were sealed. Door latches, gaskets and dust vents were improved. Floors were sealed with white paint, making dirt accumulation visible. Twenty more dioramas will be "bug-proofed" in 1993.

A positive air pressure system, to reduce dust accumulation in dioramas and therefore discourage dermestids, is being planned for dioramas under renovation.

Pest Control: Pest Management Policies and Procedures: A Comparison

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The trend of most museums today is to start up an Integrated Pest Management (IPM) program. Most of the standard chemicals that have been used for pest control in the past are no longer allowed for use in Museums. Many are rethinking the use of chemicals as the first line of control and are going to more labor intensive methods such as cleaning and exclusion that can be less harmful to both collections and people.

Last August, I sent out a call for policies and procedures in various news letters and computer usergroups. I received 40 responses. These included official policies, museum wide and departmental procedures. I also called and spoke with many other museum personnel. I found very few have their policies or procedures in writing. Those that have policies or procedures in use have several key points in common.

Conservation: Condition Survey of Herbaria and Non-Herbaria Specimens in the National Museum of Wales Botanical Storerooms

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A condition survey of collections is an invaluable method for familiarising the conservator with a collection and initiating any urgent conservation work on susceptible material. Furthermore, it acts as a starting point for prioritising conservation work based on curatorial criteria.

Not all valuable material is incorporated into a collection immediately because there is not always the opportunity or the manpower to remove a backlog of specimens in a required time. Specimens such as these are stored for convenience.

The Department of Botany reserve collections consist of non-herbaria and herbaria specimens, including wax models, prints, drawings, botanical specimens and wood sections. It was necessary to determine whether the storage areas were suitable for such dissimilar collections, and to determine if any categories of materials were preferentially degrading. The survey also assesses the environmental factors which affect a potential storage area, thus indicating where possible problems may arise.

This presentation will show how the condition survey was conducted and what parameters were chosen to highlight problem areas within a collection and what influence, if any, the storage location has on the housed material.

Assessment of a Fluid Preserved Collection

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and

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A collection of approximately 209,000 specimens of reptiles and amphibians was surveyed to assess preservation quality. Specimens were preserved in either 70% ethyl alcohol or 10% buffered formalin. A sample of 62 jars of specimens in ethyl alcohol and 58 jars of specimens in formalin were randomly selected. A total of 101 parameters were considered (sample identification, 4; location, 4; container, 9; fluid, 44; labels, 19; and specimens, 21). Internal container labels and specimen tags were generally found to be in good condition. The preserving fluid was evaluated for pH, hardness, titratable acidity to two endpoints, ORP, conductivity, concentration of preservative, color, turbidity, and precipitates. The quality of specimen preservation was evaluated for consistency of preservation, condition of tissue, loss of color and patterns, other physical changes, and general quality of preservation.

Assessment Procedures for a Collection of Fluid-Preserved Invertebrates

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Funding awarded by the Institute of Museum Services supported a project at the Virginia Museum of Natural History to improve the storage environment for a collection of fluid-preserved invertebrates through two basic processes: (1) an assessment of a subsample of the collection to characterize the quality of the preservative and the state of preservation of the specimens, and (2) a systematic pass through the entire collection to replace old lids, inadequate jars, and adjust preservation concentration. Recommendations developed by the SPNHC-CC Assessment Subcommittee for methods of assessing the condition of a fluid-preserved collection were analyzed and modified for use with this collection. Corrections to the process and documentation form included textual revisions to clarify intent; organizational changes to facilitate the flow of the process both procedurally and conceptually, and; additions and deletions of parameters as the result of a previous project at the University of Kansas, and as the result of taxonomic uniqueness. Project components for the subsample assessment now include several phases: planning and preparation; intensive workshop for training and standardization of techniques; pilot test and procedural refinement; data collection; and data analysis. A complementary process was developed for the systematic pass through the collection to record fluid densities.

A Method for Reducing Ethanol Evaporation in Wet Collections

Michele Steigerwald and **Sylvie Laframboise**

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Evaporation of preservative-fluids such as ethanol-water and isopropanol-water solutions is a major concern for wet collections. It leads to both a decrease in alcohol concentration and eventually to specimen desiccation. Small jars of less than 1 litre capacity have shown greater evaporation over the years. Research in ways to minimize evaporation had to be initiated since small jars account for about 40% of the Ichthyology Collection at the Canadian Museum of Nature.

Five different tapes were tested for their sealing properties at the jar-lid junction of 375 ml jars. Teflon tape was applied in 3 different ways to seal the thread and mouth of jars. Adhesive tapes such as metal foil, polyethylene-rubber, polyethylene-acrylic and polypropylene-acrylic tapes were used to seal the outside of the jar-lid junction. Evaporation was assessed by calculating the weight reduction of jars initially containing 10 ml of 70% v/v ethanol in water solution. Regression graphs showing weight loss over time and histograms showing rate of loss/g/day were used to compare the different test groups. Results indicate that evaporation is significantly reduced with the application of polyethylene/acrylic-adhesive tape over the jar-lid junction. The acrylic adhesive was tested for stability against ethanol solutions at two different temperatures.

pH Measurements in Ethanol-Water Solutions

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Reliable and repeatable pH measurements are more difficult to obtain in ethanol-water solutions than they are in simple aqueous solutions. There are several reasons for this. Certain of the problems can be overcome by using the correct type of electrode. Even when reliable and repeatable pH measurements can be made, the interpretation of the meaning of the measurement is neither easy nor straight forward. Addition of ethanol to a solution while maintaining a fixed composition of ph-controlling compounds causes the pH to change significantly. The extent of this change depends on the particular ph-controlling compounds present. For some ph-controlling compounds the change in pH is nearly linear with changes in volume percent ethanol, while for others, the change in distinctly nonlinear. The consequence of this is that pH measurements taken from solutions having differing ethanol concentration cannot be compared without first articulating the chemical phenomenon the pH data is intended to relate to.

Wet Preservation: The Forgotten Striated Muscle and Body Fluid.

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The major protein component of fish and reptile specimens in wet collections is striated muscle. Striated muscle consists of muscles, bundles of fibres and individual fibres surrounded by collagenous connective tissue. The muscles maintain their gross morphology due to the collagen thus the sensitivity of the collagen to colloidal changes should be carefully considered when using preparation fluids.

The function of the striated muscle is contraction and relaxation which occurs in vivo as well as in vitro under specific conditions. The post mortem crosslinking between the actin and myosin which occur preventing extensibility of striated muscle causing rigor mortis can be controlled.

Some other physiological changes that occur after death which are importance in reference to preservation methods are: changes in the body fluid such as the pH decrease due to the increase in lactic acid levels because of lack of aerobic respiration; and the change in membrane permeability resulting in loss of body fluid. These can be controlled by post mortem and preparation methods.

Today there is confusion over the use of alkaline neutralizers or buffers and the use of fresh or salt water for initial fixation. Rarely is an isotonic solution, ionically similar to the body fluids, considered.

Careful examination of the death and preparation process is needed because much of the data from the specimen is related to weight and measurements which are altered by post mortem changes and preparation methods.

Insect Specimen Rehydration with Hot Ethanol and Dehydration Through Freeze-Drying

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Insect specimens may be preserved and stored either dry or in alcohol, depending on the life-stage and the taxonomic group. Specimens which are collected into fluid (glycol, water, or alcohol) in the field frequently need to be removed from the fluid and dried for examination and permanent storage. Critical point drying and chemical dehydration are the accepted methods of removal from fluid, but both methods are complex and the former is costly while the latter necessitates the use of a fume hood. Freeze-drying is an alternative which produces high quality specimens rapidly and at low cost. Freeze-drying fluid collected specimens produces large numbers of high quality specimens at low cost and with little effort.

Specimens may instead need rehydration after inappropriate dehydration. Frequently dehydrated specimens are simply discarded as having been destroyed. The most widespread method of rehydration is by soaking a specimen in a trisodium phosphate (TSP) solution, which is slow and unreliable. Rehydration using hot 70% ethyl alcohol is faster and more reliable, while eliminating a chemical which has unknown effects on the long-term preservation of the specimens.

Poster Sessions, Friends of the RBCM Gallery

The Effect of Propylene Glycol on the Ethanol Concentrations Determined by Density Measurement

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The effect of propylene glycol on the densities of ethanol-water-propylene glycol solutions has been determined. From this data, and from tables of density of ethanol-water solutions, the effect of propylene glycol on indicated ethanol concentrations, obtained through measurements of density, was determined. For most purposes this effect is thought to be small enough to be neglected in all but the most exacting work.

Preparation of Exxon Valdez *Avian Casualties*

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The National Fish and Wildlife Forensics Laboratory provides law enforcement with court-defensible species identification of parts, products and whole animals submitted as evidence. Acquisition, preparation and storage of specimens is required for this mission and casualties from the Exxon Valdez oil spill were considered a potential source for species not yet represented in our collection.

Of 50 birds received, only three were discarded as unusable because of the time interval between death and collection. Heavily oiled birds were successfully prepared utilizing only slight modification of established procedures. Birds that died during cleaning at rehabilitation facilities in Alaska were prepared as skins with little or no washing. Monitoring of the prepared specimens continues and no residual oil has been detected after 23 months.

Oil spills will continue to occur and specimen acquisition is of importance to all museums. This poster presents the preparation techniques used in our Bird Unit, and highlights those extra steps necessary for preparation of oil spill casualties.

Four Curatorial Lessons

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Free-range Dermestids. The vertebrate paleontologist keeps a "bug drawer" in a bank of oak cabinets in the vertebrate paleontology classroom. The dermestids clean skeletons in the drawer but are also free to invade the entire room so that they continue to clean the skeletons housed in the comparative osteology collection. Obviously this method can not be used in a museum where other biological collections would be threatened.

Nutritious Packing Pellets. Now biodegradable foam packing pellets, composed of 95% cornstarch and 5% water-soluble organic polymer, are an attractive food source. Roaches prefer dry pellets to those that have been misted. If biodegradable pellets are saved for reuse, they must be kept in sealed containers.

Fractured Conodonts. Lacquered wells in cardboard microscope slides can crack with age. Specimens on slides, of German origin, were broken within 15 years because the (nitrocellulose-based ?) lacquer deteriorated. Before damage occurs, specimens should be removed with acetone and remounted on different slides with gum tragacanth.

Taxonomic Cleansing. The world's largest Paleozoic snail was originally collected because it was huge. For 35 years, it had gone unnoticed in the collection. Since the collection contains relatively few fossil gastropods, a faculty member suggested that it be given to an institution with a more comprehensive gastropod collection. Number alone is an insufficient reason for deaccessioning a specimen. If this specimen is disposed of, the character of the University's collection will be diminished. The history of the collection is inseparable from its collectors, field parties, and unique specimens. This specimen attests to the collecting acumen and foresight of a former faculty member and major force in preserving this collection.

A Conceptual Information Model for Biological Collections

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In August 1992, the Association of Systematics Collections Committee on Computerization and Networking met for seven days at Cornell University. The focus of that workshop was to initiate the process of developing data standards for biological collection information. Although such efforts have been undertaken within a number of disciplines, no such work has focused on interdisciplinary standards. It was agreed that for a cross-disciplinary effort to be successful, a high-level description of biological collections would be required. As a result, workshop participants produced a draft conceptual information model for biological collections. The model describes the high-level entities (logical and physical objects) that comprise the domain of the biological collection and should be able to accommodate an insect collection as satisfactorily as a mammal collection, a botanical collection, or a paleontological collection. As such, this model provides an opportunity for diverse disciplines to discuss their common activities in a mutually comprehensible frame of reference. The current draft of the model is being circulated to scientific societies for comment, although it is recognized as incomplete at this time. This poster presents a schematic diagram of the model as well as general information on the methodology of information modeling. It is hoped that the poster will facilitate an understanding of this concept that cannot be visualized easily through the other methods by which this project is being publicized and circulated.

A User-Friendly Computer Database for Museum Mineral Collections

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and
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We have designed a relational computer database for the Mineralogy collection of the Field Museum, that facilitates data entry and inventory control, expedites collection management procedures, allows optimization of specimen storage and makes stored information readily accessible to researchers. The main indexing of the database follows the Dana's numerical classification system. A record in the main mineral sample file includes fields containing the Field Museum catalog number, the Dana number, physical and chemical descriptions, and accession information. This file is indexed by the Dana and catalog numbers. The files that relate to the main one contain storage location, loan information, bibliography index (main publications on the respective mineral species and/or unique specimens), and a picture archive (specimen photographs). The storage information of a given mineral sample may be distributed over possibly several records, as we shall distinguish specimens in storage, on exhibit, or on loan. Also, there may be several storage locations for differently sized specimens of a mineral sample. The relationship here is one sample to many storage records. This procedure greatly optimizes adequate storage of large mineral collections, where the size or special care requirements of some specimens may call for particular storage conditions. The program is "user friendly", and enables not only access to graphic (photographic) information from any on-site Macintosh™ computer terminal, but also permits easy conversion to IBM™ compatible format and on-line transfer of information. In contrast with more sophisticated (and generally much more expensive) mainframe or workstation-based collection databases, this innovative system is a time and cost effective manner of performing collection management tasks within today's restrictions in budgets and personnel. It will also enable us to keep track of specimen records and data transfer and facilitate the speedy and complete preparation and documentation of specimens. All transactions involving the collection will be computerized for quick generation of specific reports.

Biological Collections: Wet Collections Organization

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A major consideration of any museum's biological reference collection is how to organize the specimens. If an efficient method is employed the possibility of specimens being misplaced is of course significantly reduced. Recently at the Royal British Columbia Museum, an opportunity was met to upgrade the collection storage standards. While the actual order of placing specimens in the collection remained unchanged, a system to further protect the collection itself, and a way of segregating species or groups was adopted. The new system reduces the possibility of breakage due to vibration from an earthquake by using adjustable plastic dividers in standardized plastic tubs. Protection while transporting groups of specimens in the collection area is increased by using the tubs to contain jars of specimens. If breakage does occur then the specimens are retained with their associated fluid preservative in a plastic tub. Plastic dividers arranged inside the tubs provide a means of separating taxa for ease of locating specimens in the collection.

This presentation will illustrate the method used at the RBCM to organize and increase protection to the invertebrate, ichthyology and herpetology wet collections.

Freezing Versus Chemical Fumigation As Methods Of Insect Pest Control In Herbaria: A Response To Egenberg And Moe

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In 1991, Egenberg and Moe (Taxon 40: 601-604) reported damage to plant specimens that were attached to mounting paper by gluing when freezing was used as the method of insect pest control. In a test of their results, mounted leaves of *Quercus* and *Abutilon* were subjected to 21 24-hour freeze-thaw cycles. In contrast to their findings, the leaves were not damaged by this treatment. Their further recommendation that cyanide be used for insect control must be considered with full recognition of the health hazards this chemical presents.

Computer Workshop — Newcombe Theatre

The Canadian Society of Zoologists Collections Database

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The Canadian Society of Zoologists ad hoc Collections Advisory Committee was set up to locate and survey zoological collections in Canada, and to consider ways to preserve them for posterity. A questionnaire was developed and circulated in both English and French. Information from more than 150 collections belonging to museums, government agencies, universities, and private collectors, has been entered into the Canadian Heritage Information Network computer.

The database provides names, addresses, telephone numbers, contacts, details on the collections, accessibility to researchers, current research topics, eventual fate of the collections, and type of collections welcomed by the owner for deposit. It is now available on line through the PARIS system, or on diskette.

The CSZ has now established a permanent Committee to provide advice and help to those wishing to dispose of collections; and the Committee has established a permanent address through which the Society can be contacted when small collections become endangered.

Information Needs and Uses of Natural Sciences Collections in Quebec

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In Quebec, individuals, disciplinary groups, universities, governmental and non-governmental agencies, zoos, botanical gardens, and some museums, share the business of collecting, preserving and studying natural heritage. It is expected that these collecting agencies will use the affordable and powerful information technologies to manage the information regarding their collections. An example is the Societe des musees quebecois (SMQ) computer network of Quebec museums, the Reseau Info-Muse, that will enable museums to share collections information. The computerization of the bird collection of the Musee du Seminaire de Sberbrooke is one of the present network pilot projects.

In order to understand the actual situation, a qualitative study of the Information Uses and Needs of Natural Sciences Collections in Quebec has been done, supported by a Documentation Research Fellowship grant of the Canadian Heritage Information Network (CHIN). The results indicate that many computerized collections information systems are presently in use in Quebec for collection inventories collection management, information sharing and educational purposes. Analysis of the data gathered through interviews, questions and readings, served as a basis to the development of an empirically grounded theorical information framework for Natural Sciences Collections in Quebec.

Introduction of the Internet into Museum Practice

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In April of 1992, the Milwaukee Public Museum Inc. was awarded a grant from the National Science Foundation in the amount of $25,000 for the purpose of establishing an Internet link between the museum and the University of Wisconsin, Milwaukee. This link will provide MPM with the ability to share automated collections data with other institutions and researchers around the world.

The installation of the ethernet LAN microwave link was completed in September of 1992. Staff made immediate use of the link not for data transfer, but instead began communicating with colleagues via electronic mail. As staff moved upward through the learning curve they began subscribing to news groups and listservers, employed hytelnet in exhibit research and used the link to transfer document and mail files. Though staff have now reached the point where they are ready to begin electronic transfer of collections data, there has been a realization that MPM has many issues to consider before routine data sharing can begin. Issues concerning disclaimers, the possibility of "dirty data", the possibility of instituting access charges, decisions as to which data fields will not be shared must be discussed prior to collections data transfer. The staff and administration have recently begun to set policy on these and related issues.

Participant Unable to Present

Collection Management in Law Enforcement Laboratory

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Established in 1989, the National Fish and Wildlife Forensics Laboratory is the only laboratory in the world devoted to assisting state, national and international law enforcement agencies in the prosecution of violators of all laws protecting wildlife.

The Laboratory is partitioned into six sections: Administration, Evidence and Property, Criminalistics, Technical Support, Serology and Morphology. The Morphology Section is charged with providing court-defensible species identification of wildlife parts, products and whole animals. Identification of evidence is made by scientists using comparison methods with reference materials. Reference materials include the Morphology Reference Library and the Morphology Standards Collection.

The Standards Collection contains birds, mammals and reptiles and consists of study skins, skeletal elements, hair, and feathers. Preparation of specimens for Morphology also provides tissue for the Serology Section and various organs for the Criminalistics Section.

Although the focus of the Morphology collection does differ from that of other collections, management and maintenance procedures are similar. This presentation focuses on our collection and collection management procedures, summarizes preparation techniques designed to facilitate our comparisons, and addresses our acquisition needs.

Not Scheduled at Time of Publication

Experimental Studies on the Chemical Stability of Proteins

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From a chemical perspective, protein stability depends on the interaction of water, pH, heat, oxygen and the matrix in which the protein exists. Even small amounts of water may lead to hydrolysis at selected peptide bonds, especially those involving aspartic acid (catalyzed by acids or bases). This is followed by reactions such as amino acid racemization, and in degraded proteins, by reactions such as the decarboxylation of glutamic acid. The effect of heat on proteins is, for the most part, to increase the rates of these reactions. The relationship between temperature and the rate of the reaction is expressed by the Arrhenius equation. This is demonstrated by simulation experiments in which non-peptide bound amino acids appear in a solution of collagen held at various temperatures and times. The effect of pH is illustrated by comparing the rates of release, and the destruction of individual amino acids under acid and base catalyzed hydrolysis. Heating collagen in the presence and absence of oxygen and water illustrates the varying stability of amino acids to oxidation, and the interaction of oxygen and water with collagen stability. Finally, the long-term stability of proteins in a carbonate and a phosphate matrix is illustrated by heating experiments which compare the rate of decomposition in shell and bone with collagen alone. These reactions are important to the stability of many kinds of museum specimens.

Sponsors And Commercial Participants

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Child, Robert E.	Paper	Thu. 8:40 (N)	19
Child, Robert E.	Paper	Thu. 11:40 (N)	24
Cole, R.	Paper	Wed. 2:20	18
DeMouthe, Jean F.	Paper	Wed. 1:40	16
DeMouthe, Jean F.	Paper	Thu. 9:20 (N)	20
Florian, Mary-Lou E.	Paper	Thu. 11:40 (C)	32
Golden, Julia	Poster	Thu. 3:30	35
Guppy, Crispin S.	Paper	Thu. 12:00 (C)	33
Hardy, Iris A.	Paper	Thu. 10:40 (N)	22
Hare, P. Edgar	Paper	—	42
Hawks, Catherine	Paper	Wed. 11:20	12
Hoffman, Richard L.	Paper	Thu. 10:40 (C)	29
Hutchins, Jane K.	Paper	Wed. 2:00	17
Laffer II, W.B.	Poster	Thu. 3:30	37
Laframboise, Sylvie	Paper	Thu. 11:00 (C)	30
Lambert, M.	Paper	Thu. 9:00 (N)	19
Laubitz, D.R.	Paper	Fri. 1:30	39
Leckie, Carolyn	Paper	Thu. 9:00 (C)	26

N = Newcombe Theatre; C = Classroom.

All posters are presented in the Friends Gallery.

Name	Presentation	Day Time (Place*)	Page
LePage, Louise	Paper	Fri. 1:30	40
Lyons, G.W.	Paper	Wed. 2:20	18
MacKinnon, E.A.	Paper	Wed. 2:20	18
Magliano, D.	Paper	Wed. 2:20	18
McLaren, Suzanne B.	Poster	Thu. 3:30	36
Meltzer, Jessie	Paper	Thu. 9:20 (C)	27
Messenger, Charles L.	Poster	Thu. 3:30	38
Morrell, Darby A.	Paper	—	42
Morrell, Darby A.	Poster	Thu. 3:30	34
Nagel, Joe	Paper	Wed. 1:40	16
Nagel, Joe	Paper	Thu. 9:40 (N)	21
Njie, Barbara	Paper	Thu. 11:20 (C)	31
Norris, Debbie Hess	Paper	Wed. 2:00	17
Nuñez, C.	Poster	Thu. 3:30	37
Pickering, Jane	Paper	Wed. 1:00	14
Purewal, Victoria J.	Paper	Thu. 9:40 (C)	27
Sendall, Kelly A.	Poster	Thu. 3:30	38
Shelton, Sally Y.	Paper	Wed. 11:40	13
Simmons, John E.	Paper	Thu. 10:20 (C)	28
Stairs, Robert	Paper	Thu. 11:20 (C)	31
Steigerwald, Michele	Paper	Thu. 11:00 (C)	30
Sumpter, Paula M.	Paper	Fri. 1:30	41
Vaughan, R. Kathryn	Paper	Wed. 10:20	9
Vaughan, R. Kathryn	Paper	Wed. 10:40	10
Von Endt, David W.	Paper	—	42
Waller, Robert	Paper	Thu. 10:20 (C)	28
Waller, Robert	Paper	Thu. 10:40 (C)	29
Waller, Robert	Paper	Thu. 11:20 (C)	31
Waller, Robert	Poster	Thu. 3:30	34
Williams, Stephen L.	Paper	Wed. 11:00	11
Woodward, Susan M.	Paper	Thu. 8:40 (C)	25

N = Newcombe Theatre; C = Classroom.

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