SPNHC

SOCIETY FOR THE PRESERVATION OF NATURAL HISTORY COLLECTIONS

6th ANNUAL MEETING

6-11 MAY 1991

Programme and abstracts

Canadian
Museum
of Nature

Musée
canadien
de la nature

Society for the Preservation of Natural History Collections

SIXTH ANNUAL MEETING

CANADIAN MUSEUM OF NATURE
OTTAWA, ONTARIO
6-11 MAY 1991

Important Telephone Numbers

Registration Desk	(613) 943-1932
CMN Front Desk	(613) 996-3102
CMN Facsimile	(613) 952-9693
City Bus Information	(613) 741-4390
Emergency (Police, Fire, Medical)	911

Smoking Policy By governmental regulation, smoking is not permitted in museum buildings, the Canadian Conservation Institute, or the Biosystematics Research Centre.

LOCAL COMMITTEE

Local Committee Chairman

Gerald Fitzgerald

Local Committee

Katherine Andrew
Charlie Costain
Stephen Cumbaa
Richard Day
Albert Dugal
Diane Dupuis
Peter Frank
Beverly Gallagher
Carloyn Leckie
Linda Ley
Len Marhue
John Meyer
Judith Price
Michael Shchepanek
Tom Strang
Robert Waller

PROGRAM COMMITTEE

Program Committee Chairman

Robert Waller

Program Committee

Katherine Andrew
Catherine Hawks
Frank Howie
Grant Hughes
Carolyn Leckie
John Simmons
Arnold Suzumoto

ACKNOWLEDGEMENTS

Canadian Museum of Nature

Alan R. Emery, Director

Patrick Colgan, Assistant Director, Collections and Research

Chris Jackson

Harvey Slack

Elizabeth White

Departments of:

Communications and Marketing

Protection Services

Architecture and Planning

Collections and Research

and the volunteers of CMN

Canadian Conservation Institute, Department of Communications

Charles G. Gruchy, Director General

Robert Barclay

Paul Marcon

Stefan Michalski

Carl Schlichting

Jean Tétreault

Biosystematics Research Centre, Agriculture Canada

Canadian Heritage Information Network, Department of Communications

Heritage Services Division, Department of Communications

SPONSORS

Capital Box Ottawa Ltd.

1475 Star Top Road
Ottawa, Ontario
K1B 3W5

D M & M Realty

2378 Holly Lane
Ottawa, Ontario

COMMERCIAL PARTICIPANTS

Carsen Medical and Scientific Co. Ltd.

151 Telson Road
Markham, Ontario
L3R 1E7

Boyd Group of Companies

767 Belfast Road
P.O. Box 9040
Ottawa, Ontario
K1G 3T8

Burrowes Manufacturing Ltd.

347 Sorauren Avenue
Toronto, Ontario
M6R 2G5

Kols Containers Inc.

1408 DeSoto Road
Baltimore, Maryland 21230

Oak Tree Software Specialists

515 East Altamonte Drive
Suite 250-9A
Altamonte Springs, Florida 32701

Twinpak Inc.

7544 Côte de Liesse
Saint-Laurent, Québec
H4T 1E7

University Products Inc.

517 Main Street
P.O. Box 101
Holyoke, Massachusetts 01041-0101

PROGRAM SUMMARY

Sunday, May 5	7:00 pm-9:00 pm:	Early registration at CMN
Monday, May 6	9:00 am-noon:	Meetings of Committees and reports of committees to Council
	1:00 pm-5:00 pm:	Meeting of Council
	8:30 am-5:00 pm:	Registration at CMN
	8:30 am-5:30 pm:	Day trip to Shaw Woodlot
	1:30 pm-4:30 pm:	Workshop: Making Display and Storage Mounts for Natural History Specimens (demonstration session)
	9:00 am-noon:	Tours (detailed on Planning Form)
	1:30 pm-4:30 pm:	Tours (detailed on Planning Form)
	7:00 pm-9:00 pm:	Icebreaker, CMN Salon, hosted by the Director, CMN
Tuesday, May 7	8:30 am-5:00 pm:	Registration at CMN
	9:00 am-1:30 pm:	Poster set-up at CMN
	9:00 am-noon:	Welcoming Presentation, Technical Sessions
	1:30 pm-4:30 pm:	Technical Sessions
	4:30 pm-6:00 pm:	Poster Sessions, Vendor Displays
	5:00 pm-7:00 pm:	Reception hosted by Madrid 1992 Committee
Wednesday, May 8	9:00 am-noon:	Technical Sessions
	1:30 pm-3:30 pm:	General Business Meeting
	9:00 am-4:30 pm:	Poster Sessions, Vendor Displays
	7:00 pm-1:00 am:	Dinner and Dance, CMN Salon
Thursday, May 9	9:00 am-noon:	Technical Sessions
	1:30 pm-5:00 pm:	Workshops (detailed on Planning Form)
	5:00 pm-7:00 pm:	Meeting of Council

Friday, May 10	**8:30 am-noon: Late Registration for CCI Training Workshop at CMN**
	9:00 am-5:00 pm: CCI Training Workshop: Practical Approaches to Preventive Conservation for Natural History Collections - Day 1, CMN Auditorium
	5:00 pm-7:00 pm: Beer & Pretzels, CMN Salon, hosted by CCI
Saturday, May 11	**9:00 am-5:00 pm: CCI Training Workshop - Day 2**

NOTES

PROGRAM

MONDAY, MAY 6

WORKSHOP

1:30 - 4:30 Making Display and Storage Mounts for Natural History Specimens: Demonstration Session

Coordinator: Carl Schlichting

Location: Canadian Conservation Institute

TUESDAY, MAY 7

Session Chair: **Patrick Colgan**, Canadian Museum of Nature, Ottawa, Ontario

9:00 Welcoming address

Dr. Alan Emery, Director, Canadian Museum of Nature, Ottawa, Ontario

9:10 Museum collections: fundamental values and modern problems

Hugh Danks, Biological Survey of Canada, Canadian Museum of Nature, Ottawa, Ontario

9:40 Biodiversity of natural science museum clienteles: The splendid diversity of modern museum functions

Don McAllister, Zoology Division, Canadian Museum of Nature, Ottawa, Ontario

10:00 Break

Session Chair: **Robert Waller**, Canadian Museum of Nature, Ottawa, Ontario

10:30 Museum collecting in remote areas: The first step in specimen conservation

Ronald Cole, Museum of Wildlife & Fisheries Biology, University of California, Davis, California

10:50 Preliminary results of cleaning small vertebrate skeletons using the pancreatic enzyme Trypsin

Charles Ross and David Von Endt, Dept of Vertebrate Zoology, National Museum of Natural History (DVE) and Conservation Analytical Laboratory (CR), Smithsonian Institute, Washington, DC

11:00 Data collection and documentation : How relevant are our data to today's research needs?

Stephen Cumbaa, Paleobiology Section, Canadian Museum of Nature, Ottawa, Ontario

11:20 Falsification of mineral specimen data

George Robinson, Mineral Sciences Section, Canadian Museum of Nature, Ottawa, Ontario

11:35 Curatorial problems affecting natural history collections

Fernando Palacios ~~and José Gutiérrez~~, Museo Nacional de Ciencias Naturales (FP) and Abascal 2, 28006, Madrid, Spain (JG)

11:45 Progress in organizing the International Symposium on the Preservation and Conservation of Natural History Collections

Cesar Romero-Sierra, Department of Anatomy, Queen's University, Kingston, Ontario

12:00 Lunch

Session Chair: **Arnold Suzumoto**, Bernice P. Bishop Museum, Hawaii

1:30 The Canadian Society of Zoologists survey of zoological collections

Diana Laubitz, Zoology Division, Canadian Museum of Nature, Ottawa, Ontario

1:45 Spirit collections: An analysis of the fluids

David Von Endt, Conservation Analytical Laboratory, Smithsonian Institute, Washington, DC

2:05 Defining standard procedures for assessing fluid preserved collections

Robert Waller, Mineral Sciences Section, Canadian Museum of Nature, Ottawa, Ontario

2:25 Fluid preserved specimen condition assessment

John Simmons, Museum of Natural History, University of Kansas, Lawrence, Kansas

2:45 Break

Session Chair: **John Simmons**, Museum of Natural History, University of Kansas, Kansas

3:15 Using PARIS documentation as a research tool in palynology

David Jarzen, Paleobiology Section, Canadian Museum of Nature, Ottawa, Ontario

3:30	Accountability sampling in natural history collections Lee-Ann Hayek and Frederick Collier, Department of Paleobiology, National Museum of Natural History, Washington, DC
3:45	Status of conservation efforts in North American herbaria Ann Pinzl, Nevada State Museum, Capital Complex, Carson City, Nevada
4:00	Results from a survey to profile collection management positions Paisley Cato, Virginia Museum of Natural History, Martinsville, Virginia
4:30 - 6:00	Poster Presentations

WEDNESDAY, MAY 8

Session Chair: **Carolyn Leckie**, Conservation Consultant, Canadian Conservation Institute, Ottawa, Ontario

9:00	A stable, dust and insect-free display case for a mummy Carl Schlichting, Canadian Conservation Institute, Department of Communications, Ottawa, Ontario
9:15	The wilderness lives again: Conservation of an Akeley diorama David Rasch, Conservation/Anthropology, Field Museum, Chicago, Illinois
9:30	Mounting the Qualicum Walrus Gerald Fitzgerald, Paleobiology Division, Canadian Museum of Nature, Ottawa, Ontario
9:50	The potential of Paralene for preserving natural history specimens David Grattan, et al., Canadian Conservation Institute, Department of Communications, Ottawa, Ontario
10:10	Break

Session Chair: **Grant Hughes**, Royal British Columbia Provincial Museum, Victoria, British Columbia

10:45	Invertebrates filter their way into the ROM Sheila Byers, Department of Invertebrate Zoology, Royal Ontario Museum, Toronto, Ontario

11:00	Managing and preserving archival records Kristine Hagland and Alan Bain, Library/Archives, Denver Museum of Natural History, Denver, Colorado (KAH); Smithsonian Institution Archives, Washington, DC (AB)
11.20	A new open faced steel shelving system designed for museums Denis Alsford, Canadian Museum of Civilization (retired), 2938 Richmond Road, Ottawa, Ontario
11:35	Toxic minerals : Identification and care Jean DeMouthe, Department of Invertebrates and Geology, California Academy of Sciences, San Francisco, California
11:55	Lunch
1:30 - 3:30	General Business Meeting

THURSDAY, MAY 9

Session Chair: **Frank Howie**, The Natural History Museum, London, U.K.

9:00	Calclacite efflorescences in geological specimens Caroline Buttler and Jana Horak, Department of Geology, National Museum of Wales, Cardiff, U.K.
9:15	Decomposition of specimens containing pyrite and marcasite in the museum environment Alice Blount, The Newark Museum, PO Box 540, Newark, New Jersey
9:30	Rapid aspartic acid racimization and protein diagenesis in mollusk shells in museum collections David Von Endt and Glenn Goodfriend, Conservation Analytical Laboratory, Smithsonian Institute, Washington, DC (DVE); Department of Environmental Sciences and Energy Research, Weizmann Institute of Science, Rehovot, Israel (GG)
9:50	"Ageless" oxygen absorber: How to create oxygen-free storage conditions simply David Grattan, Canadian Conservation Institute, Department of Communications, Ottawa, Ontario

10:00	**Pollutant monitoring in mineral collections**
	Katherine Andrew, Robert Waller and Jean Tétreault, Mineral Sciences Section, Canadian Museum of Nature, Ottawa, Ontario (KA, RW); Canadian Conservation Institution, Department of Communications, Ottawa, Ontario (JT)
10:15	**Break**

Session Chair: **Katherine Andrew, Canadian Museum of Nature, Ottawa, Ontario**

10:45	Radon and mineral collection storage
	Ellen Faller and Kenneth Price, Peabody Museum, New Haven, Connecticut (EF); Radiation Safety Department, University of Connecticut Health Center, Farmington, Connecticut (KP)
11:00	The move of natural history collections to allow for asbestos removal at the Royal British Columbia Museum
	Grant Hughes, Collections Program, Royal British Columbia Museum, Victoria, British Columbia
11:15	Arsenic in the museum environment
	Jean DeMouthe, Department of Invertebrates and Geology, California Academy of Sciences, San Francisco, California
11:30	How can The Canadian Conservation Institute best serve natural science collections?
	Carolyn Leckie, Conservation Consultant, Canadian Conservation Institute, Department of Communications, Ottawa, Ontario
11:50	The National Institute for Conservation project on the conservation and preservation of natural science collections
	Catherine Hawks, Division of Mammals, National Museum of Natural History, Smithsonian Institution, Washington, DC
12:05	**Lunch**

WORKSHOPS:

1:30 - 4:30	1. Making Display and Storage Mounts for Natural History Specimens: Practical Session
	Coordinator: Carl Schlichting
	Location: Canadian Conservation Institute

2. Computer Workshop:

Coordinator: Peter Frank, Canadian Museum of Nature

Location: Room 2, Canadian Museum of Nature

3. Documentation Policies and Procedures: interdisciplinary discussions on:

Museum Safety Standards, Moderators: Elizabeth Merritt, Cincinnati Museum of Natural Hitory and Jane Deisler-Seno, Corpus Christi Museum

Destructive Sampling, Moderator: Paisley Cato, Virginia Museum of Natural History

Curatorial Procedures, Moderators: Julia Golden, Department of Geology, University of Iowa and John Simmons, Museum of Natural Hsitory, University of Kansas

Location: Salon, Canadian Museum of Nature

NOTES

POSTER PRESENTATIONS

Government of Canada programs for museums

Carrie Brooks-Joiner, Department of Communications, Toronto, Ontario

Mastodon tusk conservation - A simplified and inexpensive method

Robert Grantham and Jeannette Macey, Natural Science Section, Nova Scotia Museum, Halifax, Nova Scotia

Vanishing biogenic sedimentary structures

Iris Hardy, Geological Survey of Canada, Atlantic Geoscience Center, Dartmouth, Nova Scotia

The unitization of paleobiological collections

Derrick Kysar, Department of Museum Studies, The George Washington University, Washington DC

Prioritization of a small but diverse natural history collection

Mary Hennen, The Chicago Academy of Sciences, Chicago, Illinois

The importance of amateur naturalists

Stephen LeMay, PO Box AA 769, Evanston, Illinois

Geoloc: A simple, brief and precise world-wide latitude and longitude-based site-identifier for specimens, catalogs and files

Louis Moyd, Mineral Sciences Section, Canadian Museum of Nature, Ottawa, Ontario

A computer assisted collections move

Donna Naughton and David Campbell, Mammalogy Section, Canadian Museum of Nature, Ottawa, Ontario

Quality of DNA removed from mammalian tissues preserved by different museum procedures

Madison Powell and Steve Williams, Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, Texas

New concepts in the cleaning of osteological material for vertebrate research collections

Steve Williams, Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, Texas

ABSTRACTS

A NEW OPEN FACED STEEL SHELVING SYSTEM DESIGNED FOR MUSEUMS

Denis B. Alsford. 2938 Richmond Road, Ottawa, Ontario K2B 6S5 (ex Canadian Museum of Civilization, retired)

A new shelving system has been designed and is installed at the new Canadian Museum of Civilization. It was found that available shelving systems did not meet the requirements of the collections, or collections management techniques.

The system provides the following: the top surface of the bottom shelf is 6" above floor level; the underside of the bottom shelf has a clear 4" gap; each shelf is adjustable on 1" centres; no tools are required to move a shelf up or down; there are no cross braces between back-to-back rows; unit widths available are 48", 72" and 96", including uprights; shelf widths are 2" narrower; unit depths are available from 12" to 36" in 6" increments; 48" wide shelves are one piece; 72" and 96" width shelves are in 6" depths; drawers are available for 48" wide units in face front depths from 3" to 13"; the system is capable of mezzanining to over 22'-0"; it has a baked enamel finish, with smooth edges and surfaces; it is easy to change, or add on; it is easy to design to accept special fittings, such as rollers for textiles, lightweight shelves, and others.

POLLUTANT MONITORING IN MINERAL COLLECTIONS

Katherine J. Andrew, Robert R. Waller, and Jean Tétreault. Mineral Sciences Section, Canadian Museum of Nature, Ottawa, Ontario K1P 6P4 (KJA, RRW); Canadian Conservation Institute, Department of Communications, Ottawa, Ontario K1A 0C8 (JT)

Pollutants known to occur in mineral collections include hydrogen sulphide, sulphur dioxide, mercury, carboxylic acids and an arsenic containing gas. Damage has been observed from the reaction of pollutants with mineral specimens as well as other inorganic constituents of museum collections.

A monitoring program has been set up in order to establish the levels of pollutants found in three mineral collections, housed in different types of closed cases; those at the Canadian Museum of Nature (all metal), the Geological Survey (wood drawers in metal carcasses) and the Royal Ontario Museum (all wood) will be sampled for a minimum period of three months using a variety of test strips, some of which are specific to individual pollutants and others which are expected to be more general in their response. Test strips being considered include commercial pH and sulphur dioxide test papers, lead acetate and alkali buffered lead acetate paper, palladium chloride treated paper and test coupons of high-purity silver, copper and lead foil, the first four are sensitized for use in air by moistening with a glycerol-water solution. Response of strips in cabinets will be judged by comparison with strips exposed to known concentrations or concentration-time doses of individual pollutants.

Results of this work are expected to provide a basis for future interpretion of results from controlled exposure tests of pollutant sensitive species and to indicate what are probably unwise associations of species in storage or on display.

DECOMPOSITION OF SPECIMENS CONTAINING PYRITE AND MARCASITE IN THE MUSEUM ENVIRONMENT

Alice M. Blount. The Newark Museum, P. O. Box 540, Newark, New Jersey 07101

Efflorescent coatings on a number of pyrite and marcasite samples stored in interior environments were studied, by means of X-ray diffraction and optical methods, through a year to determine the phases present and the changes which result from natural variations in humidity. The following minerals have been observed: LOW HUMIDITY-kornelite, szomolnokite, coquimbite, rhomboclase and MEDIUM TO HIGH HUMIDITY-rozenite, melanterite, roemerite, alunogen.

The reactions that take place with increasing humidity are complex. The simplest are reversible changes of hydration state of crystalline phases (i.e. szomolnokite to rozenite to melanterite; halotrichite to alunogen and ferrous sulfate hydrate). The transformation of szomolnokite to melanterite is very sluggish. The resultant phase is dependent upon the mean-relative humidity for each season (several months), and the samples go through only one cycle per year. Some deliquescent minerals such as rhomboclase and roemerite, on the other hand, absorb moisture to yield viscous colloids. Preliminary evidence suggests that these usually involve minerals containing ferric ($Fe+3$) ions. Colloids tend to "glue" the specimen together until the autumn when humidity suddenly drops due to commencement of interior heating, and the colloidal material dehydrates (shrinks and cracks) and/or recrystallizes. The specimens then crumble apart.

GOVERNMENT OF CANADA PROGRAMS FOR MUSEUMS

Carrie Brooks-Joiner. Ontario Region, Department of Communications, Toronto, Ontario M4T 1M2

Heritage and cultural traditions are fundamental to our society. As custodians of our collective memory, museums perpetuate these traditions. Through its museums policy, the Government of Canada is committed to fostering public awareness, understanding, and enjoyment of Canada's human, natural, artistic, and scientific heritage through the acquisition, preservation, research, presentation and interpretation of collections of that heritage.

The Government of Canada supports Canadian museums in their pursuit of excellence by providing technical and financial services through the Museum Assistance Program, the Movable Cultural Property Program, the Canadian Conservation Institute, and the Canadian Heritage Information Network.

Information on these programs and services are available from the Department of Communications.

CALCLACITE EFFLORESCENCES IN GEOLOGICAL SPECIMENS

Caroline J. Buttler and Jana M. Horak. Department of Geology, National Museum of Wales, Cathays Park, Cardiff, CF1 3NP, Wales, U.K.

Spectacular white fibrous efflorescent growths were discovered on mineral and palaeontological specimens in the National Museum of Wales Collections. The specimens are Permian calcareous mudstones containing Glossopteris from the Trans Antarctic mountains and an anatase, calcite, albite sample from North Wales. XRD, infrared and scanning electron microscope analysis have identified the efflorescence as calclacite [$Ca(CH_3C00)Cl.5H_2O$].

Calclacite has previously been identified in museum collections on specimens stored in wooden, especially oak, cabinets. The NMW specimens are housed in "compacta" storage and efflorescent growths have not been observed on any other specimens. Examination of the history of the anatase specimen indicates that the calclacite growth may be attributed to etching of the specimen with acetic acid prior to museum acquisition, combined with a period of high RH and temperature in the storage units. The calclacite growth on the palaeontological specimens is less explicable. The previous treatment of calclacite efflorescence has been removal with a brush, however this can result in regrowth. Methods of specimen cleaning are being tested and include ultrasonic treatment in I.M.S. and drying over potassium hydroxide pellets. The preliminary results appear encouraging.

INVERTEBRATES FILTER THEIR WAY INTO THE ROM

Sheila C. Byers. Department of Invertebrate Zoology, Royal Ontario Museum, Toronto, Ontario M5S 2C6

The Department of Invertebrate Zoology (non-Insecta) was solidified at the Royal Ontario Museum in 1980. It was an outgrowth of the former Department of Entomology and Invertebrate Zoology. As such, invertebrate collections had accumulated as a matter of course through field work by various departments. Until 1986 major efforts were directed towards cataloguing, primarily, research specimens; however, the remainder of the collections remained in disarray with little or no documentation or accessibility.

A collections management system was established by the Department in 1987 to process, curate and document the invertebrate collection. Phase I encompassed a complete physical reorganization which (1) ordered the collections in a phylogenetic sequence and (2) resulted in approximately 90% of the collections being accessioned. Phase II will computerize all steps of the curation process by means of a minicomputer database with an ultimate linkup with the national database CHIN/PARIS.

RESULTS FROM A SURVEY TO PROFILE COLLECTION MANAGEMENT POSITIONS

Paisley S. Cato, Chair, SPNHC Committee for Evaluating Collection Support Positions. Virginia Museum of Natural History, Martinsville, Virginia 24112

A project was initiated to develop a profile of professionals who directly care for natural science collections as well as a profile of the positions held by these individuals. The primary emphasis was for those positions involving collection management, regardless of the formal institutional title of the position.

Surveys were sent to 130 individuals working with natural history collections in the United States and Canada; 107 responses (82.3%) were received. Responses were analyzed to develop (1) brief descriptions of the institution(s) represented, the collections with which individuals were affiliated, the individual's job, the individual's background and training, and the individual's professional development opportunities; and (2) a more detailed description of the tasks involved with the individual's job.

The majority of respondents (72%) reported that collection manager best described their job function, but only 40% formally held a title of "collection manager". At least 50% of the collection managers reported tasks in the areas of specimen preparation, management of specimens, management of data and records, management of personnel, service, and general collection support and administration. About 1/3 also reported tasks in the areas of research and publications, teaching, and grant-writing.

MUSEUM COLLECTING IN REMOTE AREAS: THE FIRST STEP IN SPECIMEN CONSERVATION

Ronald E. Cole. Museum of Wildlife & Fisheries Biology, University of California, Davis, California 95616

The current trend in natural history specimens seems to be drifting towards the conservation of existing specimens, including quite costly repairs and stabilization procedures. In point of fact, conservation of biological materials begins in the field, within the first moments of specimen collection.

Large scale collecting expeditions, where hundreds or thousands of specimens of several taxonomic classes are obtained by a team of scientists, once a common activity with most major museums, are becoming a rarity. This is a shame, as the complexities of field collecting and specimen conservation, on such a grand scale and in remote areas of the world, are not easily learned from a book. They are best learned through a tutor/pupil relationship. The author, who has been both a pupil and a tutor, considers it important to draw conservators into the problems faced by collectors.

DATA COLLECTION AND DOCUMENTATION: HOW RELEVANT ARE OUR DATA TO TODAY'S RESEARCH NEEDS?

Stephen L. Cumbaa. Canadian Museum of Nature, Ottawa, Ontario K1P 6P4

As natural history museum curators, we pride ourselves on being the keepers of our natural heritage. We speak of our collections and relevant data as being often the only evidence of the biological and geological history of our planet, and therefore critical for all future studies. However, a preliminary survey shows that in many disciplines, our collective laziness and shortsightedness in data collection and recording have rendered many of our collections either useless or at best tangential to even today's needs. This places in question their future value, and therefore their relevance to society.

MUSEUM COLLECTIONS: FUNDAMENTAL VALUES AND MODERN PROBLEMS

H.V. Danks. Biological Survey of Canada (Terrestrial Arthropods), Canadian Museum of Nature, Ottawa, Ontario K1P 6P4

Collections underpin scientific enquiries about the natural world, and education. These fundamental values notwithstanding, resources for collections remain limited despite recent increases in material stemming from biodiversity itself, from the development of mass collecting techniques, and from the need to house endangered collections, voucher specimens, collections preserving genetic diversity, and regional collections. The pressure on resources can best be met by obtaining more resources. Knowing biodiversity (and thus understanding the world we inhabit and living there sensibly) requires the steady accumulation of information supported by collections, which in turn require essential infrastructure resources. The support to other branches of science provided by collections (and by the systematics work they permit) needs to be explained to those who use this support but do not appreciate its true cost. Initial project costs should include the means to identify material and preserve voucher specimens. In addition, existing resources can be used more efficiently by setting priorities to optimize scientific quality and resource use. Increasing operational efficiency (collections management, improved preservation) and division of labour (regional participation, networks and data standards) also conserve resources. Modern problems can be solved by emphasizing the fundamental scientific value of collections in building knowledge for current and future use.

ARSENIC IN THE MUSEUM ENVIRONMENT

Jean F. DeMouthe. Department of Invertebrates and Geology, California Academy of Sciences, San Francisco, California 94118

Arsenic is present in the museum environment as a part of some collections, and in chemicals used for pest control and other purposes. Natural compounds of arsenic are part of most mineral collections. And arsenic trioxide was commonly used to control pests in the preparation and storage of dry zoological specimens.

Inorganic arsenic is a regulated cancer-causing substance and poison. Inorganic arsenic compounds can cause health problems following exposure by inhalation, ingestion, or direct contact with the skin or eyes.

The presence of arsenic can be detected using simple chemical tests, and exposure to airborne arsenic can be monitored. Museum staff should be educated about the hazards of arsenic in the working environment. If procedures are established for the safe handling of arsenic-bearing specimens, the potential health hazard can be greatly reduced.

TOXIC MINERALS: IDENTIFICATION AND CARE

Jean F. DeMouthe. Department of Invertebrates and Geology, California Academy of Sciences, San Francisco, California 94118

There are three basic types of toxic minerals. Radioactive specimens are those that contain significant amounts of U or Th. These are the most hazardous because they are generally poisonous if taken internally, and their dust is harmful if inhaled. The second level of toxicity involves those minerals that are soluble in water or mild acid and contain potentially harmful elements or compounds. These are hazardous if taken internally or absobed through the skin. The third type includes those minerals which can cause health problems if their dust or particles are inhaled.

There are simple and effective methods available for the storage, treatment and exhibit of toxic minerals. Potentially hazardous minerals should be identified and designated as such in the collection. Collection storage should be designed or modified to provide maximum protection for specimens and the staff. Staff members, including both curators and exhibits personnel, should be educated as to the potential hazards and safety procedures.

RADON AND MINERAL COLLECTION STORAGE

Ellen W. Faller, and Kenneth W. Price. Mineralogy Division, Yale Peabody Museum, Connecticut 06511 (EWF); Radiation Safety Department, University of Connecticut Health Center, Farmington, Connecticut 06032

The accumulation of radon daughters in a mineral collection storage area may be a potential health hazard. Because radioactive minerals are naturally occurring substances, there are no federal (US) regulations or guidelines for their collection and storage.

A project was initiated to review the situation as it existed in the Yale storage/office area which resulted in the establishment of tentative guidelines to minimize exposure within our storage area. An informal survey of other museum collections has revealed that each site has a distinct set of storage variables including proximity to people, number of specimens, type of storage case, and HVAC system.

Basic recommendations for storage are that: (1) all radioactive specimens and their storage locations should be obviously labeled as such; (2) specimens should be stored in zipper-lock plastic bags or plastic boxes; (3) no smoking in the storage area; (4) air samples should be taken yearly in areas where specimens are stored. Providing adequate shielding from radiation, maintaining suitable distance from the specimens in storage, and limiting the duration and kind of necessary exposure are most important in assuring a safe environment in a mineral storage area.

MOUNTING THE QUALICUM WALRUS

Gerald R. Fitzgerald. Canadian Museum of Nature, Ottawa, Ontario K1P 6P4

Over the years, a variety of methods have been used to mount fossil skeletons. In an effort to create cleaner, more pleasing mounts preparators moved away from external mounts to more sophisticated internal supporting systems. These techniques are very damaging as bones must be hollowed out or drilled, and are not considered ethical by the conservation community.

Recognizing the value of their specimens and the problems related to exhibiting traditional mounts, many museums resorted to mounting only cast specimens.

The Qualicum walrus skeleton was assembled using external bracket supports, moulded forms and reproduced elements to produce an esthetically pleasing mount that is ethically acceptable. Authenticity is maintained by using as much of the original skeleton as possible.

MASTODON TUSK CONSERVATION - A SIMPLIFIED AND INEXPENSIVE METHOD

Robert G. Grantham, Jeanette F. Macey. Natural History Section, Nova Scotia Museum, Halifax, Nova Scotia B3H 3A6

In October, 1989, a well preserved, nearly complete tusk, presumed to be that of a mastodon, was discovered during overburden removal at Fundy Gypsum's Quarry near Windsor, Nova Scotia. A low cost conservation procedure has been employed by the authors and shows great promise for success.

After collection, the tusk was kept moist and an inexpensive controlled environment chamber was constructed. When the chamber was completed, the tusk, in its own polyethylene wrap, was placed inside. When the relative humidity (RH) was stabilized at the desired level, the tusk was removed from its wrapping, fungal growth was cleaned off, and the tusk was then suspended vertically, point down.

In order to be sure consolidant impregnation would be continuous without "gel-up" blocking the natural porosity of the tusk, the tusk was slowly introduced to the final solution by passing distilled water through it. This was followed by a solution of water and ethyl alcohol in the same proportions as the final solution. This in turn was followed by the final solution (water, alcohol and Rhoplex AC-33).

When the tusk would not permit any more solution to pass through it, it was surface-cleaned, wrapped in pellon (a fine weave material), tightly wrapped in elastic bandages, trussed by stainless steel bands and suspended by a set of rings and wires to a scale which was outside, and above the chamber. Slow lowering of the RH could then take place with no risk to the tusk. Daily monitoring has been crucial.

To date the RH has been lowered from 86.5% to 54.0% and the tusk has lost 929.8 grams of water in 211 days. It is expected to be at the desired RH tolerance in an additional 35 to 40 days. It will then be unwrapped, cleaned, stabilized and placed on display in a controlled environment display case.

AGELESS* OXYGEN ABSORBER: HOW TO CREATE OXYGEN-FREE STORAGE CONDITIONS SIMPLY

David W. Grattan. Canadian Conservation Institute, Department of Communications, Ottawa K1A 0C8

Ageless* oxygen absorber provides conservators with a simple means of creating oxygen-free conditions. To acheive these conditions, Ageless sachets are sealed in plastic bags or other containers and within a matter of hours the oxygen concentration is reduced to below 0.01% by volume. In the sealing process, all operations are carried out in ordinary laboratory conditions. The use of heat-sealable oxygen-barrier film enables the Ageless to maintain oxygen free conditions for periods of several years. Experimental work at CCI has measured oxygen concentrations within sealed bags. Estimates of the longevity of bags have been made based on the oxygen capacity of Ageless sachets and the leak rates of barrier film.

* Ageless is a trade name of Mitsubishi Gas Chemicals.

THE POTENTIAL OF PARALENE FOR PRESERVING NATURAL HISTORY SPECIMENS

David W. Grattan, Malcolm Blitz, R. Barclay, Margaret Morris, Gerald R. Fitzgerald, Robert Walker, Ron Seguin, and Len Marhue. Canadian Conservation Institute, Department of Communications, Ottawa K1A 0C8 (DWG, MB, RB); Centre de conservation du Quebec, Quebec (MM); Canadian Museum of Nature, Ottawa K1P 6P4 (GRF, RW, RS, LM)

The current status of research in Paralene at CCI and elsewhere is reviewed with particular attention to studies on aging. A number of applications are reviewed with special attention being given to fossils and to crustaceans.

The utility of Paralene is highly dependent on the physical state of the substrate and the purpose of the coating, i.e. whether the coating is being applied as a protective barrier, as a consolidant or for strengthening. In addition success depends on the optical properties of surfaces and the sensitivity to moisture loss.

Since Paralene coating is in most instances, an irreversible process ethical constraints limit its use. It is clear that to shun Paralene condems certain very fragile items to certain destruction. But when the issue is less clear, that is when the objects are in a less critical condition, careful thought must be exercised before Paralene is applied. Of fundamental importance in this issue are (1) the control which can be exercised in the application (2) the thinness of coatings which can be applied and (3) the long term stability of Paralene.

MANAGING AND PRESERVING ARCHIVAL RECORDS

Kristine A. Haglund and Alan L. Bain. Library/Archives, Denver Museum of Natural History, Denver, Colorado 80205 (KAH); Smithsonian Institution Archives, Washington, DC 20560 (ALB)

Documentation is critical to natural history collections. Without it specimens are of limited or no value. Although archival records provide information required to fully document collections, they are an often ignored resource.

Information about natural history collections can be found in all types of records. Preservation of those records requires the development of policies and procedures governing their collection and use. In addition, an appropriately trained person must enforce the policies and procedures and manage the records in a professional manner. Retention schedules, arrangement and description, access, conservation, and security all are essential components of an archives program.

Professional organizations can provide help. Funding is often available to assist in establishing archives programs. Training programs are available to non-archivists, and a substantial body of literature is obtainable from several sources.

VANISHING BIOGENIC SEDIMENTARY STRUCTURES

Iris A. Hardy. Geological Survey of Canada, Bedford Institute of Oceanography, Dartmouth, Nova Scotia B2Y 4A2

The study of post-depositional biological effects on sedimentary deposits is known as ichnology, or the study of the aspects of organism - substrate interrelationships (trace fossils).

Trace fossils observed on the CSS Hudson 90023 cruise in the Hudson Strait and Ungava Bay area were of two types: (1) Burrows - structures made in unlithified sediment and (2) biostratification structures or burrow mottling. Both types represent the behaviour of an organism and can, therefore, be utilized as indicators of a particular type of sedimentary environment. As there was no observed displacement by these trace fossils, they were regarded as in situ and may provide paleosalinity and/or ecological information ie. feeding behaviour for marine postglacial sediments cored offshore eastern Canada.

The uniqueness of these fossils, however, can be short-lived without adequate efficient and thorough descriptive measures in place. These trace fossils were found to oxidize and subsequently disappear within 30 minutes of exposure to air during normal core processing.

THE NATIONAL INSTITUTE FOR CONSERVATION PROJECT ON THE CONSERVATION AND PRESERVATION OF NATURAL SCIENCE COLLECTIONS

Catherine Hawks. Division of Mammals, NHB 390, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560

Implementation of a project to survey the conservation needs of natural science collections has long been a goal of the natural science members of NIC. In early February of 1991, NIC submitted a project proposal to the U.S. National Science Foundation (NSF) for part of the costs of such a project. NSF is extremely interested in the proposed project, and there are strong indications that it will be funded. The project is designed to solicit information from some 20 discipline-orientated, scientific interest groups in North America, and to synthesize this information into published reports on the conservation needs of our collected natural science resource. Also part of the project is the development of preventative conservation training at a variety of levels, and the development of proposed curricula for the formal training of geoscience and bioscience conservators. Associated in the project with NIC will be both the Association for Systematics Collections (ASC) and SPNHC. ASC will assist with many information-gathering aspects of the project. SPNHC will be asked to contribute via the expertise of individual members.

ACCOUNTABILITY SAMPLING IN NATURAL HISTORY COLLECTIONS

Lee-Ann C. Hayek and F.J. Collier. Paleobiology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560

Accountability is an inherent part of collections management. Scientific importance, endangered species status, street value and other considerations must be factored into a value statement to be included in constructing a museum's collection policy. No satisfactory statistical technique for cyclical inventory by sampling has been devised until recently. A Smithsonian program is now near completion which derived a unique statistical approach to provide for an extremely tight limit on the number of specimens which could be missing from a collection, based upon a relatively modest sample size. The collections used for developing the trial program consist of 167 inventoried collection units totalling 3,839,579 specimens in single or lot arrangements. With the chosen sample size of 10,000 specimens or lots, this new approach can offer 95% assurance that no more than .0295% of the total number of specimens could be missing. These numbers can be varied for other desired confidence limits or sample sizes. The program is mathematically formulated on the premise that museum collections are distinguished by the very low probability that specimens will be missing.

PRIORITIZATION OF A SMALL BUT DIVERSE NATURAL HISTORY COLLECTION

Mary Hennen. The Chicago Academy of Sciences, Chicago, Illinois 60614

When faced with a small but diverse collection, limited staff and limited funding, prioity must be given in the approach to care and maintenance to best optimize resources available. Goals were chosen in the order of preservation, inventory, usage and expansion.

The Chicago Academy of Sciences is a small natural history museum containing approximately 300,000 specimens from a wide range of fields, including ornithology, oology, mammalogy, herpetology, entomology, botany, paleontology and malacology. In the past eight years, a complete renovation and inventory of the collection has been undertaken. Prior to this time, the collections had not been worked with for over 30 years. With limited staff available, the approach was designed to advance the work in the most efficient manner possible. The collections are presently available for use by researchers and computerization has been completed on four of the collections: ornithology, oology, mammalogy and herpetology.

Priority was given first to modern storage of the most fragile collections susceptible to deterioration. Once properly stored, work can be geared towards computerization and inventorying. As the collections have been little noted in literature one of the main goals is to make the scientific community aware of its use for a resource.

THE MOVE OF NATURAL HISTORY COLLECTIONS TO ALLOW FOR ASBESTOS REMOVAL AT THE ROYAL BRITISH COLUMBIA MUSEUM.

Grant W. Hughes. Collections Program, Royal British Columbia Museum, Victoria, British Columbia V8V 1X4

The Fannin Building of the Royal British Columbia Museum houses millions of biological collections representing seven major disciplines. Each specimen is being packed and moved to a temporary location to allow for asbestos removal from the ceilings, posts and beams in the collection storage space. This paper reviews the steps taken to plan and execute this major project.

We have found that preparing for the move of the collection has resulted in major improvements in the documentation and methods of storage as each specimen was inventoried and safely packed for transport.

Recommendations are: (1) a skeletal computer record for each specimen should be created and edited as collections are moved, and (2) materials used to enable cost effective moving of the collection should be selected based upon their longterm contribution to improving storage of the collection.

USING P.A.R.I.S. DOCUMENTATION AS A RESEARCH TOOL IN PALYNOLOGY

David M. Jarzen. Earth Sciences Division, Paleobiology Section, Canadian Museum of Nature, Ottawa, Ontario K1P 6P4

The Canadian Museum of Nature has catalogued a collection 15,000 slides of extant pollen and spores. This reference collection is invaluable in evaluating comparisons with fossil palynomorphs recovered from rock sediments. However, the collection is only as valuable as are the supporting data accompanying each species, and the availability of those data.

Through cooperation with the Canadian Heritage Information Network, Communications Canada, a data base with supporting entry and retrieval programs was developed to accommodate the specific needs of palynological research. The P.A.R.I.S. program allows specific questions to be answered through a series of simple searches. Research needs for accuracy, cross-referenced fields, and searching for "unknown" pollen forms via a morphological key are all possible through P.A.R.I.S.

The palynology collection is documented with research as the primary use, and as such, provides the scientist with a time-saving tool that guarantees accuracy and completeness.

THE UNITIZATION OF PALEOBIOLOGICAL COLLECTIONS

Derrick A. Kysar. Department of Museum Studies, The George Washington University, Washington, DC 20052

Techniques used to maintain a paleobiological collection vary in response to the unique collecting objectives of each museum. The interrelated problems confronting a curator, however, concerning access, accountability, security, conservation, and space availability remain constant. There is little or marginal value in documenting paleobiological collections and listing them if specimens are not maintained in good order, in storage which alleviates each of these primary curatorial concerns.

The Paleobiology Department of the National Museum of Natural History utilizes a Collection Information File (CIF) to unitize over forty-five million vertebrate, invertebrate, protist, paleobotanical, and sediment sample specimens. The CIF provides a flexible system of organization that satisfies the curatorial, managerial, and research demands placed upon it.

THE CANADIAN SOCIETY OF ZOOLOGISTS SURVEY OF ZOOLOGICAL COLLECTIONS

Diana R. Laubitz. Zoology Division, Canadian Museum of Nature, Ottawa, Ontario K1P 6P4

The Canadian Society of Zoologists established an ad hoc Canadian Zoological Collection Advisory Committee in 1987. The first objective of this committee, under Terms of Reference approved in 1989, is to locate and survey the zoological collections in Canada, particularly those that may be at risk, and consider ways to preserve them for posterity.

The progress of the committee is described. A questionnaire is ready to be circulated in the fall of 1991, by which time we hope to have a fairly complete address list. The results of the questionnaire should be available by May 1992, and eventually will be accessible in part on-line at Canadian Heritage Information Network. Possible future uses for this information are outlined.

HOW CAN THE CANADIAN CONSERVATION INSTITUTE BEST SERVE NATURAL SCIENCE COLLECTIONS?

Carolyn Leckie. Canadian Conservation Institute, Department of Communications, Ottawa, Ontario K1A 0C8

The Canadian Conservation Institute (CCI) was established to promote the proper care and preservation of Canada's cultural heritage. Recently, CCI has realized the need to expand its efforts to include the conservation of natural science collections as part of its regular programmes. During this year the author plans to review the conservation services and funding currently available in Canada, and compare this situation to the emerging natural science conservation movements in the UK and USA. Most importantly, the author will be asking the natural science community how it feels CCI can best help with the preservation of collections. Toward this goal the author will be travelling to a number of museums, as well as actively looking for individuals who are interested in discussing this matter. In order to help familiarize the natural science community with CCI the range of functions offered by the institute will be reviewed. Some of the natural science projects CCI has been involved in will be cited as examples.

THE IMPORTANCE OF AMATEUR NATURALISTS

Stephen LeMay. Authentic Fossils, Evanston, Illinois 60204

In many fields of science, the amateur is an important and dedicated ally of professional scientists. Amateurs spend many hours in their chosen field devoting time and money to museums in addition to donating specimens. Many amateurs have given entire collections of great scientific value.

Many amateurs have great knowledge and understanding of science. One famous amateur, George Langford Sr. finished college and had a degree but, because he had never taken a geology course, he was considered an amateur. Nevertheless, his collections of Mazon Creek flora and fauna are among the best in the world and are prized by several major museums.

Museum and university scientists may be reluctant to take time to cooperate with amateur collectors. This may result in the loss of a collection, which may be sold or given away (or worse, disposed of by heirs), rather than donated to an institution. Specimens loaned by amateurs may not be treated with the same respect as a specimen loaned by another institution. Standards must be set regarding loans from amateurs.

BIODIVERSITY OF NATURAL SCIENCE MUSEUM CLIENTELES: THE SPLENDID DIVERSITY OF MODERN MUSEUM FUNCTIONS

Donald E. McAllister. Zoology Division, Canadian Museum of Nature, Ottawa K1P 6P4

The biological surveys, collections, computer data bases and biosystematic researcher expertise of natural science museums provide unique provincial, national and international knowledge-bases on the planet's biodiversity. The knowledge-bases are unique in that they are documented by voucher specimens; represent long time-frames, wide geographic spans and many species, and in the variety of expert services that are available. Museums fail to communicate about these essential knowledge-based roles and the public continues to view museums largely as buildings with public exhibits. Even individual museum staff members and boards are unaware of the breadth and depth of expert knowledge provided because they see only small portions of the service spectrum.

This paper surveys the museum expert service spectrum to document its diversity and its roles in society. Museums must communicate much more about the important roles they play, if they are to expect, society, funding agencies and governments to provide adequate resources for these functions. Numerous examples of expert service to the private sector, governments, NGOs, the general public and developing countries are provided.

GEOLOC: A SIMPLE, BRIEF AND PRECISE WORLD-WIDE LATITUDE AND LONGITUDE-BASED SITE-IDENTIFIER FOR SPECIMENS, CATALOGS AND FILES

Louis Moyd. Mineral Sciences Section, Canadian Museum of Nature, Ottawa, Ontario K1P 6P4

A GEOLOC 10-character descriptor (e.g.2DXE302207) pinpoints any site to within about 100 meters. Widespread familiarity and use could greatly reduce the confusion caused by inadequate descriptions and multiple or duplicated names for sites, also changes in the names of geographic features and the names and boundaries of political, administrative and cadastral entities.

Parallels and meridians at 24^{0} intervals form primary quadrangles. These are numbered 1 to 4 northward from the equator, 5 to 8 southward, and are lettered A to H westward from Greenwich and S to Z eastward. Parallels and meridians at 1^{0} intervals divide each primary quadrangle into secondary quadrangles. Each is designated by two letters from the A-Z (less I and O) sequence. The first increases in the direction of latitude, the second, longitude. Parallels and meridians at 1/10th-degree intervals form a tertiary grid. GEOLOC's first two characters designate a specific 24^{0} quadrangle, the first four a specific 1^{0} quadrangle. The final six are the actual geographic coordinates, in minutes and tenths, of the tertiary grid-intersection nearest the site (but omitting decimal points and space between coordinates).

A COMPUTER ASSISTED COLLECTION MOVE

Donna A. Naughton and David B. Campbell. Mammalogy Section, Canadian Museum of Nature, Ottawa, Ontario K1P 6P4

The Canadian Museum of Nature has begun a process of rehousing its many scattered collections in a single centralized facility. Relocation of the large mammal skeleton collection was planned and executed with the aid of a computerized data base. Several beneficial spin-offs resulted.

Computerized listings were used to determine the number and nature of specimens to be packed. This information was indispensable during an intensive planning phase and enabled selection of standard sizes and quantities of boxes and packing materials, estimation of time and cost and planning of economical use of storage space.

The move offered us the opportunity to undertake some long-overdue curation. Specimens were individually packed then identified with comprehensive and uniform labels generated by the computer. Since a complete set of labels was generated, the exercise of matching them with specimens served as an inventory of the collection, drew attention to uncatalogued material, helped to reunite dissociated skeletons, and served to check the accuracy of the computerized records. The labeled boxes could then be used for permanent storage.

With the help of a computer we were better prepared, able to maximize the curation efforts and discovered that a move need not always have a negative impact on a collection.

CURATORIAL PROBLEMS AFFECTING NATURAL HISTORY COLLECTIONS

Fernando Palacios and José Gutiérrez. Museo Nacional de Ciencias Naturales (CSIC, FP) and Abascal 2, 28006, Madrid, Spain (JG)

Need of curatorial work is a common and important problem in natural history collections. There are several reasons for this. Some collections do not have curators. In others, the standards and needs of the institutions are forcing curators to excessive specialization, thus reducing the scope of their research and collection responsibilities, and forcing them to assume many administrative duties. Curators are also forced to compete externally for research and preservation funds. Some important natural history institutions do not recognize the need for curators. Others do not recognize curatorial work and responsibility as justification for professional promotion. All of these factors impact natural history collections. In general, there is a loss of interest in collections and consequently a reduction of institutional and scientific support for them. Many collections have a great number of un-curated, misidentified, or mismatched specimens. Most collections need to update identifications and nomenclature. There is little interaction among curators and support staff to make appropriate decisions in collection management. There is no appropriate policy for improving collections, in spite of the Museum's responsibilities and the current needs for scientific research, conservation of nature, and education.

STATUS OF CONSERVATION EFFORTS IN NORTH AMERICAN HERBARIA

Ann Pinzl. Nevada State Museum, Carson City, Nevada 89710

Herbaria, reflecting a range in size and governing authority, were queried about their practices relating to collection conservation and specimen care. An effort was made to determine what changes have occurred since a similar 1978 study by Croat, and what directions are being pursued.

General trends noted were: greater awareness of health hazards of materials (as evidenced for example by decreased use of toluene soluble adhesive [Archer's] to affix specimens), resulting in some uncertainty about replacement materials; decline in fumigant use and greater reliance on freezing for pest control; greater consciousness of conservation matters, with nearly universal interest in "archival" quality products.

Significantly, about half of the respondants indicated a lack of satisfaction with their knowledge of herbarium practices, particularly in regard to conservation matters. Others, while satisfied, thought they could/should learn more.

QUALITY OF DNA REMOVED FROM MAMMALIAN TISSUES PRESERVED BY DIFFERENT MUSEUM PROCEDURES

Madison S. Powell and Stephen L. Williams. Department of Biological Sciences (MSP) and Museum of Texas Tech University (SLW), Texas Tech University, Lubbock, Texas 79409

Techniques used for the long-term preservation of mammalian skins have varied over time and institutional practice. Isolation of DNA from preserved specimens would greatly enhance the value of collections as variations within DNA could then be studied temporally.

Skin from a river otter (Lutra canadensis) was divided into 10 samples which were treated with various preservatives used in the past. Samples of preserved skin were homogenized in the presence of liquid nitrogen. Tissues were extracted using methods to maximize the isolation of DNA. The results of these extractions are significant because they help identify specimens that may or may not be useful for genetic studies. Also the results help determine more suitable methods of preservation for genetic research purposes.

THE WILDERNESS LIVES AGAIN: CONSERVATION OF AN AKELEY DIORAMA

David A. Rasch. Conservation / Anthropology, Field Museum, Chicago, Illinois 60605-2496

Carl Akeley's "Four Seasons" Virginia Deer dioramas contain objects of significant historical importance. The idea of scientifically correct faunal habitats was achieved with these dioramas. The animals and plants were collected in the same location near Iron Mountain, Michigan that Charles Corwin sketched landscapes for the background paintings.

The widely-used techniques for large mammal preparation were developed with these mounts. Akeley's use of hollow manikins made of cloth, papier maché, and wire mesh gave the specimens a lightweight and durable quality that has only recently been surpassed by resin manikins. A patented wax process for botanical accessory fabrication was used by Akeley during the assemblage of these dioramas.

The accidental damage to the "Autumn Group" during exhibit preparation required repair of the mounted stag and many of the vegetational elements. Conservation approved materials that were used include goldbeaters skin, tissue, and polyvinyl acetate and acrylic resins.

FALSIFICATION OF MINERAL SPECIMEN DATA.

George Robinson. Mineral Sciences Section, Canadian Museum of Nature, Ottawa, Ontario K1P 6P4

There exists a very active and commercially profitable trade in mineral specimens throughout the world. The value of any given mineral specimen depends on its quality as an example of a given species from a given locality and, in some cases, on its rarity or value as reference material for research and to the history of science.

Dishonest or uninformed persons may be involved in the trade of mineral specimens, as they may in any human endeavour, and money can be made by misrepresenting the origin and history of a specimen. The consequence of these facts is that specimens exist, both on the market and in museum collections, which are accompanied by falsified data, generated intentionally or through ignorance.

Examples exist of specimens with incorrect species identification, incorrect locality representation and incorrect type status information. It is therefore essential that curators be knowledgable in topographic mineralogy and practise discretion in specimen acquisition, taking all possible precautions to ensure that they do not become party to any activity that will result in or perpetuate falsification of specimen data.

PROGRESS IN ORGANISING THE INTERNATIONAL SYMPOSIUM ON THE PRESERVATION AND CONSERVATION OF NATURAL HISTORY COLLECTIONS.

Cesar Romero-Sierra. Department of Anatomy, Queen's University, Kingston, Ontario K7L 3N6

The Symposium will be hosted in Madrid, by the Museo Nacional de Ciencas Naturales and the Real Jardin Botánico of the Spanish Council for Scientific Research (CSIC) from May 10-15, 1992. The goal of this symposium is to accept the challenges inherent in preserving natural history collections for the next five hundred years and to develop new philosophies and strategies to meet these challenges.

Participants, who represent the forefront of current thinking and practice have been chosen to highlight key topics and to lead interactive sessions. Opportunities for participation are also being provided via poster sessions and working groups. A training course to share the latest developments in preventative conservation and to discuss techniques for mitigating preservation problems, will be offered to participants. Information on collections care resources, including publications, bibliographies and a display of archival quality storage materials will be available at the conference.

PRELIMINARY RESULTS OF CLEANING SMALL VERTEBRATE SKELETONS USING THE PANCREATIC ENZYME TRYPSIN

Charles A. Ross and David W. Von Endt. Department of Vertebrate Zoology, National Museum of Natural History (CAR) and Conservation Analytical Laboratory (DWVE), Smithsonian Institution, Washington, DC 20560

Current techniques for the preparation of skeletons are costly and consume vast technician resources. "Enzymes" have been used in the preparation of skeletons for several decades with sometimes catastrophic results. Typically commercially manufactured detergents containing a wide variety of substances other than enzymes have been used. The use of pure enzymes has not been documented.

We have used Trypsin in cleaning a wide variety of vertebrate skeletons and are conducting experiments on Glossy Swiftlet carcasses to determine optimal conditions for its use. Analysis of trypsin cleaned bones has been conducted to determine the long term effect, if any, this process has on the material.

Preliminary results appear promising.

A STABLE, DUST AND INSECT-FREE DISPLAY CASE FOR A MUMMY

Carl Schlichting. Canadian Conservation Institute, Department of Communications, Ottawa, Ontario K1A 0C8

A recently treated Egyptian mummy required a stable, dust and insect-free display environment. This had to be achieved with minimal maintenance. A method was developed to obtain an effective and inert seal using only glass, plywood, common gasket materials and Marvel Seal.

The temperature and relative humidity fluctuations recorded inside the case prove that a positive seal is in effect. The additional aspects of minimal display volume, and a large surface area of hygroscopic material create a highly stable microclimate.

FLUID PRESERVED SPECIMEN CONDITION ASSESMENT

John E. Simmons. Museum of Natural History, University of Kansas, Lawrence, Kansas 66045-2454

To develop standard procedures for assesing fluid-preserved collections, we have tried to determine evaluations of specimen preservation quality. Workers in fluid-preserved collections have an intuitive feeling for well-preserved specimens, but this is highly variable and subjective. Initially, food technology literature was surveyed for objective, non-invasive methods to evaluate preservation quality, but no useful standards were found. Next, histological definitions for fixation and preservation were examined. Determination of these required invasive tissue sampling. We contemplated building simple devices to measure firmness, flexibility, and color, but variation in morphology, texture, etc., precluded this. We then developed a series of subjective measures (consistency of preservation; firmness; embrittlement; elasticity; flexibility; condition at death; loss of integument; patterns; bleaching; darkening; clearing; contraction; bloating; condition of abdomen or internal organs). Some of these were found to be useful. All were limited by the prior experience of the evaluator.

DEFINING STANDARD PROCEDURES FOR ASSESSING THE CONDITION OF A FLUID-PRESERVED COLLECTION

SPNHC Conservation Committee, Assessment Subcommittee

c/o R.R. Waller, Canadian Museum of Nature, Ottawa, Ontario K1P 6P4

Recommendations for methods of assessing the condition of a fluid-preserved collection are being developed. They will include details on what collection-background information should be recorded, how to choose sample specimens that will be representative of the collection, what specimen information should be recorded, standard descriptors for containers and their contents, standard descriptors for specimen condition, methods for characterization of the preservative fluid including its identification, concentration, pH, concentration of impurities and specimen extractives and so on. It is anticipated that this will save time and improve quality in surveys of individual collections and will eventually result in a large body of internally consistent data drawn from many collections. This body of data could then be used for analyses of differences between collections and consequently between collection management procedures and for analyses of changes in preservation quality over time.

SPIRIT COLLECTIONS: AN ANALYSIS OF THE FLUIDS

David W. Von Endt. Conservation Analytical Laboratory, Smithsonian Institution, Washington, DC 20560

For hundreds of years animal specimens have been stored in different fluids in order to preserve them for later study. This paper reports the analysis of organic materials leached from these specimens into the storage medium.

The samples consisted of fluids taken from Abbott collection mammal type specimens, and from fish, bird, insect and mollusk collections. These were analysed for amino acid content, lipids and other compounds using amino acid analysis, gas chromatography and GC/MS. A variety of lipids and constituent fatty acids were found. The usual C12, C14, C16 and C18 fatty acids were present, as well as a number of chain length C20, C22 and C24 acids. Further, the palmitic to stearic acid ratios were high (like those of plants) rather than the low ratios normally associated with animal fat. Amino acid profiles indicated that peptides and amino acids also were being leached into the storage fluids. These profiles indicate general protein loss, and have some structural protein characteristics such as a higher than expected glycine (in the 30% range) and alanine content.

The results from these analyses when compared with each other across taxa, have implications for specimen storage requirements. These results form the baseline data for the study to proceed to an analysis of the specimens themselves.

RAPID ASPARTIC ACID RACEMIZATION AND PROTEIN DIAGENESIS IN MOLLUSK SHELLS IN MUSEUM COLLECTIONS

David W. Von Endt and Glenn A. Goodfriend. Conservation Analytical Laboratory, Smithsonian Institution, Washington DC 20560 (DWVE); Department of Environmental Sciences and Energy Research, Weizmann Institute of Science, Rehovot 76100, Israel (GAG)

Hydrolysis of proteins at peptide bonds involving the amino acid asparagine (Asn) occurs very rapidly and is considered to be a major cause of deterioration of long-lived proteins in living tissues. This hydrolysis is accompanied by racemization. Recent studies have shown that "aspartic acid" (Asp) racemization (actually the sum of Asp + Asn is measured in conventional analytical procedures) occurs very rapidly in mollusk shells. For example, land snail shells collected in the Negev Desert show an initial "Asp" racemization rate of 1% in ca. 25 years. Preliminary data from museum specimens indicate that similar or even faster rates of racemization occur in this material.

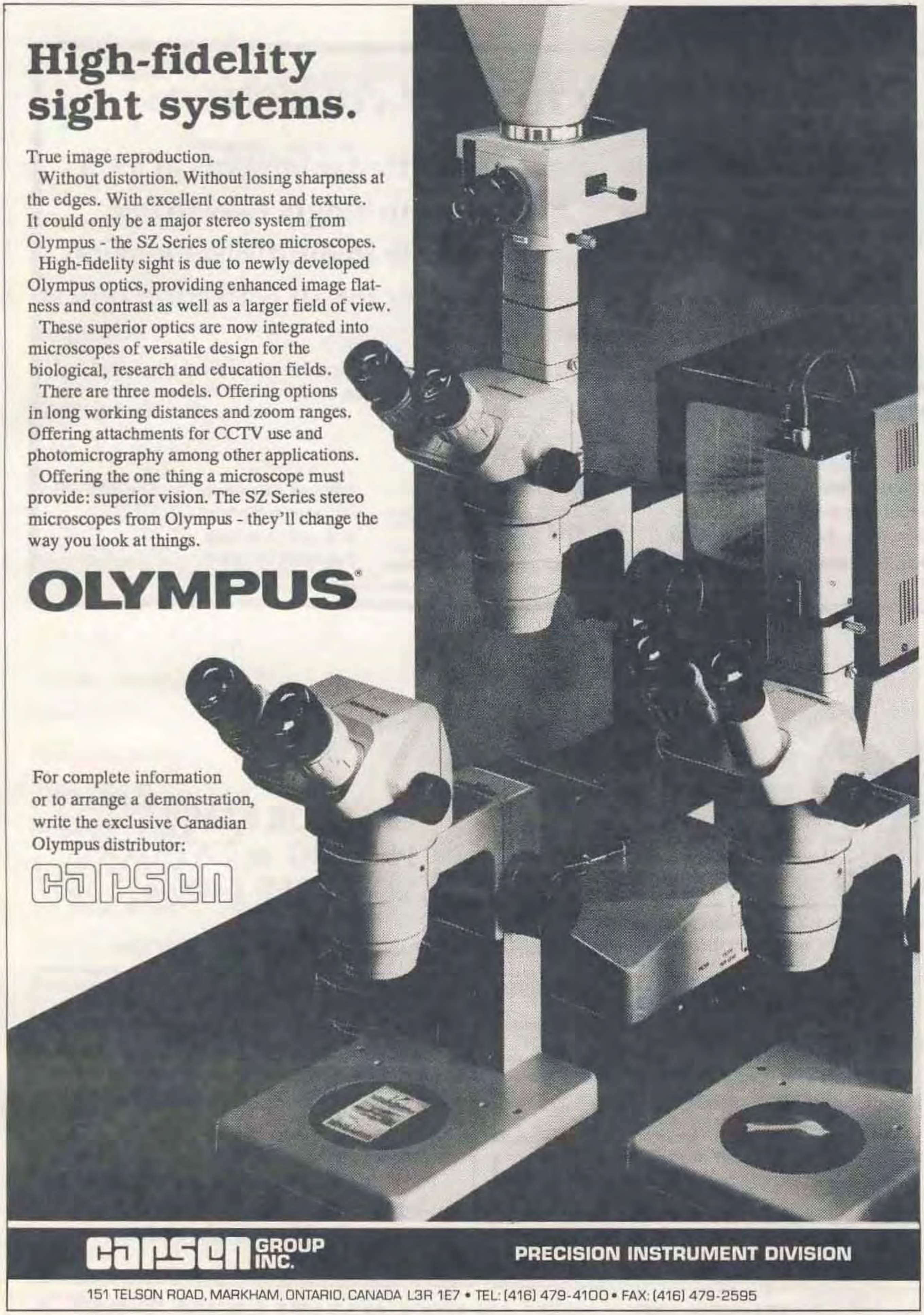
These results have implications for dating of museum specimens, the study of short-term changes in species ranges, provenance of specimens, and monitoring the state of preservation of museum material.

NEW CONCEPTS IN THE CLEANING OF OSTEOLOGICAL MATERIAL FOR VERTEBRATE RESEARCH COLLECTIONS

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

Previous studies have demonstrated that some treatments of osteological material, particularly those using aqueous solutions or fumigants, contribute to specimen deterioration. It is also possible that these treatments may compromise specimen integrity for future research, such as genetic and biochemical analyses. Investigations were conducted on treatments that could promote specimen research potential, as well as specimen stability for long-term preservation. Information is presented on that part of the project associated with small specimens that would fit into glass vials.

The procedures developed relied heavily on the management of a dermestid colony to produce completely cleaned skeletal material. Following the removal of non-osseous tissues, the remaining dermestids and debris were removed by a vacuum process using an aspirator hooked to a forced-air supply. To ensure against the survival of insects that may remain inside specimens, the skeletal material was stored in closed vials for at least one month. Results show the effectiveness of this quarantine procedure.


High-fidelity sight systems.
True image reproduction.
Without distortion. Without losing sharpness at the edges. With excellent contrast and texture. It could only be a major stereo system from Olympus - the SZ Series of stereo microscopes.
High-fidelity sight is due to newly developed Olympus optics, providing enhanced image flatness and contrast as well as a larger field of view.
These superior optics are now integrated into microscopes of versatile design for the biological, research and education fields.
There are three models. Offering options in long working distances and zoom ranges. Offering attachments for CCTV use and photomicrography among other applications.
Offering the one thing a microscope must provide: superior vision. The SZ Series stereo microscopes from Olympus - they'll change the way you look at things.
OLYMPUS
For complete information or to arrange a demonstration, write the exclusive Canadian Olympus distributor:
carsen
carsen GROUP INC.
PRECISION INSTRUMENT DIVISION
151 TELSON ROAD, MARKHAM, ONTARIO, CANADA L3R 1E7 • TEL: (416) 479-4100 • FAX: (416) 479-2595

INDEX OF AUTHORS