



Association of  
Systematics Collections



SPNHC

Society for the  
Preservation of  
Natural History  
Collections

# PROGRAM AND ABSTRACTS

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## JOINT MEETING

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11-15 May, 1994

Hosted by



Missouri  
Botanical  
Garden

St. Louis, Missouri USA

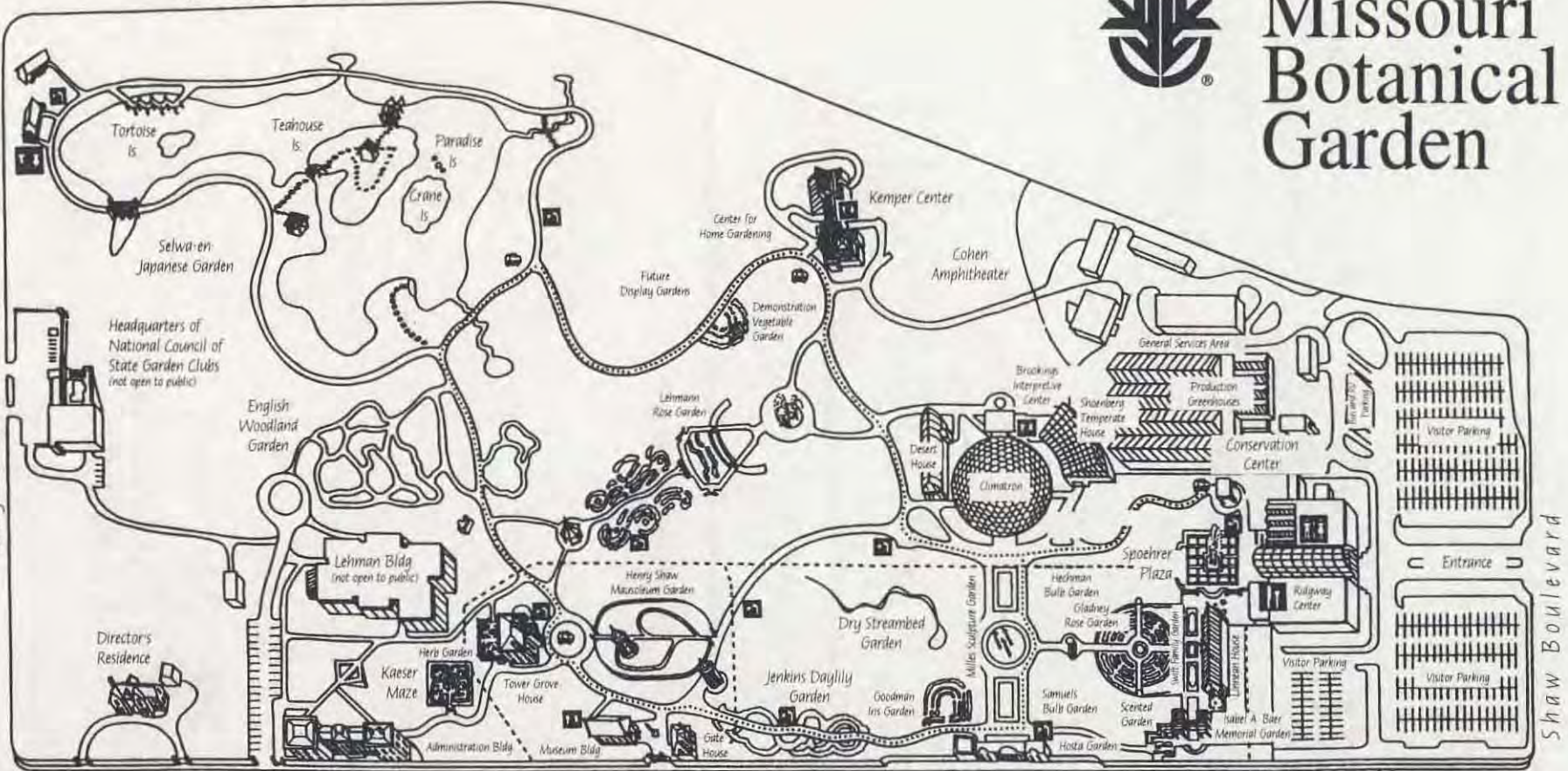


Alfred Avenue



# Missouri Botanical Garden

Magnolia Avenue



Shaw Boulevard

Cleveland Gate

Spink Pavilion

Tower Grove Avenue

- ◆ Registration
- ◆ Slide Preview
- ◆ SPNHC Council & Committee Meetings
- ◆ ASC Board Meeting
- ◆ ASC Business Meeting
- ◆ SPNHC Annual General Meeting
- ◆ SPNHC Resources Display

- Grigg Lobby, Ridgway Center*
- Garden Room, Ridgway Center*
- Spink Pavilion*
- Conservation Center Conference Room*
- Shoenberg Auditorium, Ridgway Center*
- Shoenberg Auditorium, Ridgway Center*
- Beaumont Room, Ridgway Center*

- ◆ Poster Displays
- ◆ Vendor Displays
- ◆ Reserved Box Lunches
- ◆ ASC/SPNHC Joint Sessions
- ◆ SPNHC Technical Program
- ◆ Risk Assessment Workshop
- ◆ Garden Reception
- ◆ Banquet

- Beaumont Room, Ridgway Center*
- Missouri and Botanical Rooms, Ridgway Center*
- Spink Pavilion*
- Shoenberg Auditorium, Ridgway Center*
- Shoenberg Auditorium, Ridgway Center*
- Kemper Center*
- Spoehrer Plaza*
- Monsanto Hall, Ridgway Center*

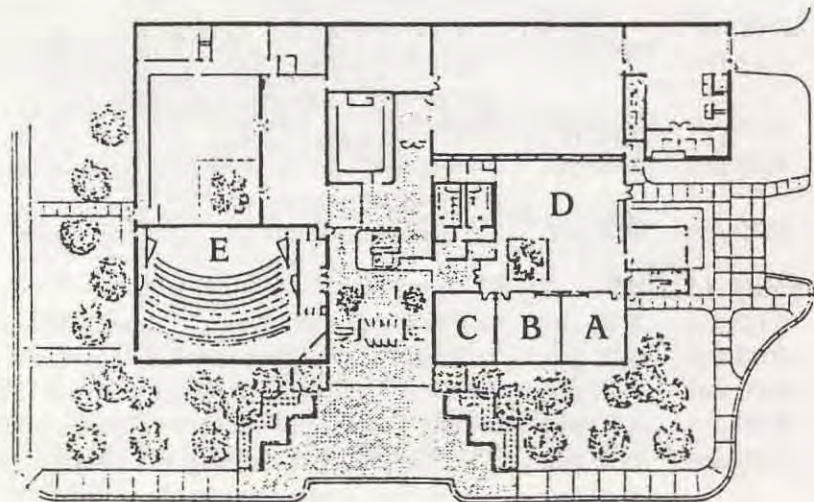


## COURTESY BUS SCHEDULE

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<b>Wednesday, 11 May</b>	Afternoon	1:00 - 6:00 pm	Continuous shuttle between hotels and Garden
	Reception	6:00 - 8:00 pm	Shuttle between Garden and hotels
<b>Thursday, 12 May</b>	Morning	7:00 - 8:30 am	From hotels to Garden
	Afternoon	4:00 - 6:30 pm	Return to and from hotels and Garden
	Evening	9:00 pm	Two buses from Garden to hotels
<b>Friday, 13 May</b>	Morning	7:00 - 8:30 am	From hotels to Garden
	Afternoon	5:00 - 8:00 pm	From Garden to hotels
<b>Saturday, 14 May</b>	Morning	7:30 - 9:00 am	From hotels to Garden
	Afternoon	5:00 - 6:00 pm	From Garden to hotels
<b>Sunday, 15 May</b>	Morning	7:30 - 9:00 am	From hotels to Garden
	Afternoon	2:30 - 4:30 pm	From Garden to hotels

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- A Missouri Room
  - B Botanical Room
  - C Garden Room
  - D Beaumont Room
  - E Shoenberg Auditorium



**RIDGWAY CENTER**



# PROGRAM SCHEDULE

## GENERAL

### *Wednesday 11 May*

8:00 am - 3:00 pm	ASC Board Meeting (Conference Room, Conservation Center)
8:00 am - 12:00 pm	SPNHC Committee Meetings (Spink Pavilion)
8:30 am - 4:30 pm	Poster Display set-up (Beaumont Room, Ridgway Center)
8:30 am - 4:30 pm	Vendor Display set-up (Missouri and Botanical Rooms, Ridgway Center)
9:00 am - 3:00 pm	Tours of Missouri Botanical Garden and Herbarium
11:30 am - 1:30 pm	Lunch (reserved box lunches in Spink Pavilion)
1:00 pm - 6:00 pm	Registration (Grigg Lobby, Ridgway Center)
1:00 pm - 3:00 pm	SPNHC Council Meeting (Spink Pavilion)
3:30 pm - 5:30 pm	ASC Business Meeting (Shoenberg Auditorium, Ridgway Center)
6:00 pm - 8:00 pm	Missouri Botanical Garden Reception (Spoehrer Plaza)

### *Thursday 12 May*

8:00 am - 8:30 am	Coffee (Beaumont Room, Ridgway Center)
8:00 am - 5:00 pm	Registration (Grigg Lobby, Ridgway Center)
8:00 am - 6:00 pm	SPNHC Resources and Poster Displays (Beaumont Room, Ridgway Center)
8:00 am - 6:00 pm	Vendor Displays (Missouri and Botanical Rooms, Ridgway Center)
<b>8:30 am - 5:00 pm</b>	<b>ASC/SPNHC Workshop on Collections Care Initiatives</b> (Shoenberg Auditorium, Ridgway Center)
8:30 am - 9:10 am	Welcome and Opening Remarks. Peter Raven (Shoenberg Auditorium, Ridgway Center)
9:10 am - 10:40 am	Panel Presentations on Collections Care Initiatives (Shoenberg Auditorium, Ridgway Center)
10:40 am - 11:00 am	Coffee (Beaumont Room, Ridgway Center)
11:00 am - 11:50 am	Discussion on Collections Care Initiatives, and Logistics for Breakout Sessions (Shoenberg Auditorium, Ridgway Center)
11:50 am - 1:15 pm	Lunch (reserved box lunches in Spink Pavilion)
1:15 pm - 3:30 pm	Collections Care Initiatives Breakout Sessions (Shoenberg Auditorium, Ridgway Center)
3:30 pm - 4:00 pm	Coffee (Beaumont Room, Ridgway Center)
4:00 pm - 5:00 pm	Plenary Session on Strategies to Implement Programs in Collections Care (Shoenberg Auditorium, Ridgway Center)
6:30 pm - 9:00 pm	Banquet (Monsanto Hall, Ridgway Center)

### *Friday 13 May*

8:00 am - 8:30 am	Coffee (Beaumont Room, Ridgway Center)
8:00 am - 5:00 pm	Registration (Grigg Lobby, Ridgway Center)
8:00 am - 6:00 pm	SPNHC Resources and Poster Displays (Beaumont Room, Ridgway Center)
8:00 am - 6:00 pm	Vendor Displays (Missouri and Botanical Rooms, Ridgway Center)
<b>8:30 am - 4:30 pm</b>	<b>ASC/SPNHC Workshop on Institutional Planning and Policies</b> (Shoenberg Auditorium, Ridgway Center)
8:30 am - 9:30 am	ASC Reports on Institutional Planning and Policies (Shoenberg Auditorium, Ridgway Center)
9:30 am - 10:30 am	Panel and Open Discussions on Draft Reports (Shoenberg Auditorium, Ridgway Center)
10:30 am - 11:00 am	Coffee (Beaumont Room, Ridgway Center)



**Friday 13 May cont'd**

11:00 am - 11:45 am	Discussion and Logistics for Breakout Sessions on Institutional Planning and Policies (Shoenberg Auditorium, Ridgway Center)
11:45 am - 1:15 pm	Lunch (reserved box lunches in Spink Pavilion)
1:15 pm - 03:00 pm	Breakout Sessions on Institutional Planning and Policies (Shoenberg Auditorium, Ridgway Center)
3:00 pm - 3:30 pm	Coffee (Beaumont Room, Ridgway Center)
3:30 pm - 4:30 pm	Plenary Session on Institutional Planning and Policies (Shoenberg Auditorium, Ridgway Center)
4:30 pm - 6:00 pm	SPNHC Annual General Meeting (Shoenberg Auditorium, Ridgway Center)
6:00 pm - 7:30 pm	Risk Assessment Workshop Reception (Spink Pavilion, open to all meeting participants)

**Saturday 14 May**

8:30 am - 6:00 pm	SPNHC Resources and Poster Displays (Beaumont Room, Ridgway Center)
8:30 am - 6:00 pm	Vendor Displays (Missouri and Botanical Rooms, Ridgway Center)
10:00 am - 12:00 pm	Disciplinary Specialty Groups (Spink Pavilion)
<b>9:00 am - 5:00 pm</b>	<b>SPNHC Risk Assessment Workshop (Kemper Center)</b>
8:30 am - 9:00 am	Coffee for Workshop participants (Kemper Center)
9:00 am - 10:15 am	SPNHC Risk Assessment Workshop
10:15 am - 10:45 am	Coffee for Workshop participants (Kemper Center)
10:45 am - 12:10 pm	SPNHC Risk Assessment Workshop, continued
12:10 pm - 1:30 pm	Lunch (reserved box lunches in Spink Pavilion)
1:30 pm - 3:00 pm	SPNHC Risk Assessment Workshop, continued (Kemper Center)
3:00 pm - 3:30 pm	Coffee for Workshop participants (Kemper Center)
3:30 pm - 5:00 pm	SPNHC Risk Assessment Workshop, continued

**Sunday 15 May**

8:30 am - 9:00 am	Coffee (Beaumont Room, Ridgway Center)
8:30 am - 1:15 pm	SPNHC Resources and Poster Displays (Beaumont Room, Ridgway Center)
8:30 am - 1:15 pm	Vendor Displays (Missouri and Botanical Rooms, Ridgway Center)
<b>9:00 am - 2:45 pm</b>	<b>SPNHC Technical Presentations and Poster Sessions</b> (Shoenberg Auditorium, Ridgway Center)
9:00 am - 9:05 am	Introductions and announcements, SPNHC Technical Program (Shoenberg Auditorium, Ridgway Center)
9:05 am - 9:45 am	Special Presentation Stephen Busack, National Fish and Wildlife Forensic Laboratory
9:45 am - 10:15 am	Technical Papers
10:15 am - 10:45 am	Coffee and Poster Session (Beaumont Room, Ridgway Center)
10:45 am - 11:30 am	Technical papers
11:30 am - 12:45 pm	Lunch (reserved box lunches in Spink Pavilion)
11:30 am - 12:45 pm	Final SPNHC Council Meeting (Spink Pavilion)
12:45 pm - 1:15 pm	Final Poster Session (Beaumont Room, Ridgway Center)
1:15 pm - 2:45 pm	Technical Papers (Shoenberg Auditorium, Ridgway Center)
2:45 pm	Meeting adjourns



# PROGRAM SCHEDULE

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## DAILY SCHEDULE

**WEDNESDAY, 11 MAY 1994**

***ASC/SPNHC Board, Council and Committee Meetings;  
Tours***

### ***Locations***

ASC Board:	Conference Room, Conservation Center
SPNHC Committees and Council:	Spink Pavilion
Poster Display set-up:	Beaumont Room, Ridgway Center
Vendor Display set-up:	Missouri and Botanical Rooms, Ridgway Center
Reserved Box Lunches:	Spink Pavilion
Registration:	Grigg Lobby, Ridgway Center
ASC Business Meeting:	Shoenberg Auditorium, Ridgway Center
Garden Reception:	Spoehrer Plaza

### ***Schedule***

8:00 am - 3:00 pm	ASC Board Meeting
8:00 am - 12:00 pm	SPNHC Committee Meetings
8:30 am - 4:30 pm	Poster and vendor display set-up
9:00 am - 3:00 pm	Tours of Missouri Botanical Garden and Herbarium
11:30 am - 1:30 pm	Lunch
1:00 pm - 6:00 pm	Registration
1:00 pm - 3:00 pm	SPNHC Council Meeting
3:30 pm - 5:30 pm	ASC Business Meeting: Status of National Biological Survey; ASC-DOI Memorandum of Understanding; Systematic Agenda 2000; Caribbean Collections, Michael Smith, Center for Marine Conservation (all joint meeting participants welcome to attend)
6:00 pm - 8:00 pm	Missouri Botanical Garden Reception

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**THURSDAY, 12 May 1994**

***ASC/SPNHC Workshop on Collections Care,  
Ridgway Center***

### ***Locations***

Registration:	Grigg Lobby, Ridgway Center
Workshop:	Shoenberg Auditorium, Ridgway Center
Slide Preview:	Garden Room, Ridgway Center
Coffee/Posters/Resources Display:	Beaumont Room, Ridgway Center
Vendor Displays:	Missouri and Botanical Rooms, Ridgway Center
Reserved Box Lunches:	Spink Pavilion
Banquet:	Monsanto Hall, Ridgway Center

### ***Schedule***

8:00 am - 8:30 am	Coffee
8:30 am - 5:00 pm	ASC/SPNHC Workshop on Collections Care Initiatives
8:30 am - 9:10 am	<i>Welcome and Opening Remarks</i> Peter Raven, Director, Missouri Botanical Garden
9:10 am - 10:40 am	Panel Presentations on Collections Care Initiatives
9:10 am - 9:15 am	<i>Introduction</i> K. Elaine Hoagland, Association of Systematics Collections



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9:15 am - 9:35 am	<i>National Institute for Conservation Project</i> Hugh H. Genoways, University of Nebraska State Museum
9:35 am - 9:45 am	<i>World Council on Collections Resources</i> Carolyn Rose, Smithsonian Institution
9:45 am - 10:00 am	<i>American Institute for Conservation</i> Carolyn Rose, Smithsonian Institution
10:00 am - 10:15 am	<i>Canadian Conservation Institute</i> Charles Gruchy, Canadian Conservation Institute
10:15 am - 10:40 am	<i>National Science Foundation Research Collections in Systematics and Ecology Program</i> James Estes, Long-Term Projects in Environmental Biology, National Science Foundation
10:40 am - 11:00 am	Coffee
11:00 am - 11:30 am	<i>Discussion</i>
11:30 am - 11:50 am	<i>Introduction and Logistics for Breakout Sessions on Collections Care Initiatives</i> K. Elaine Hoagland, Associations of Systematics Collections
11:50 am - 1:15 pm	Lunch
1:15 pm - 3:30 pm	Breakout Sessions <ol style="list-style-type: none"> <li><i>Education and Training</i> Group Leaders: Hugh H. Genoways, University of Nebraska State Museum; Christopher Collins, University of Cambridge</li> <li><i>Research on Collections Care</i> Group Leaders: George Davis, The Academy of Natural Sciences of Philadelphia; Robert Waller, Canadian Museum of Nature</li> <li><i>Technology Transfer</i> Group Leader: Jacqueline Zak, Getty Conservation Institute (invited)</li> <li><i>Educating the Public</i> Group Leaders: Susan Woodward, Royal Ontario Museum; Douglas Arnold, Missouri Botanical Garden</li> <li><i>Strategies and Alliances to Develop Resources</i> Group Leaders: Lawrence Reger, National Institute for Conservation; W. Donald Duckworth, Bishop Museum</li> </ol>
3:30 pm - 4:00 pm	Coffee Group Leaders assemble and prepare reports
4:00 pm - 5:00 pm	Plenary Session: Strategies to Implement Collections Care Programs Moderator: Hugh H. Genoways, University of Nebraska State Museum
6:30 pm - 9:00 pm	Banquet

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**FRIDAY, 13 May 1992*****ASC/SPNHC Workshop on Institutional Planning and Policies, Ridgway Center******Locations***

Registration:	Grigg Lobby, Ridgway Center
Workshop:	Shoenberg Auditorium, Ridgway Center
Slide Preview:	Garden Room, Ridgway Center
Coffee/Posters/Resources Display:	Beaumont Room, Ridgway Center
Vendor Displays:	Missouri and Botanical Rooms, Ridgway Center
Reserved Box Lunches:	Spink Pavilion
SPNHC Annual General Meeting:	Shoenberg Auditorium, Ridgway Center
Risk Assessment Workshop	
Reception:	Spink Pavilion (open to all meeting participants)



**Friday 13 May cont'd**

8:00 am - 8:30 am	Coffee
8:30 am - 4:30 pm	ASC/SPNHC Workshop on Institutional Collections Planning and Policies
8:30 am - 9:30 am	ASC Reports on Institutional Planning and Policies
8:30 am - 8:45 am	<i>Mission Statements</i> Betsy Bennet, North Carolina State Museum
8:45 am - 9:00 am	<i>Long-Range Planning</i> Louis Levine, New York State Museum
9:00 am - 9:15 am	<i>Collections Policies</i> Paisley Cato, Virginia Museum of Natural History
9:00 am - 9:30 am	<i>Data Policies</i> James King, The Carnegie Museum of Natural History
9:30 am - 10:30 am	<i>Panel Discussion Followed by Open Discussion of Draft Documents</i> Panelists: Paisley Cato, Virginia Museum of Natural History; F.G. Hochberg, Santa Barbara Museum of Natural History; Lynn Kimsey, University of California, Davis; Jere Lipps, University of California, Berkeley
10:30 am - 11:00 am	Coffee
11:00 am - 11:35 am	<i>Discussion, continued</i>
11:35 am - 11:45 am	<i>Introduction and Logistics for Breakout Sessions on Institutional Planning and Policies</i> K. Elaine Hoagland, Association of Systematics Collections
11:45 am - 1:15 pm	Lunch
1:15 pm - 3:00 pm	Breakout Sessions <ol style="list-style-type: none"> <li>1. <i>Setting Collections Priorities (Accession, Care, Use)</i> Group Leaders: Gerald Fitzgerald, Canadian Museum of Nature; John Simmons, Museum of Natural History, University of Kansas</li> <li>2. <i>Information Management Priorities/Policies and Coordination Within and Between Institutions</i> Group Leaders: Nancy Morin, Missouri Botanical Garden; Suzanne B. McLaren, The Carnegie Museum of Natural History</li> <li>3. <i>Repatriation and Other Legal Issues</i> Group Leaders: Kris Haglund, Denver Museum of Natural History; Joalyn Archambault, Smithsonian Institution (invited)</li> <li>4. <i>Health and Safety</i> Group Leaders: Kathryn Makos, Smithsonian Institution; F.G. Hochberg, Santa Barbara Museum of Natural History</li> <li>5. <i>Destructive Sampling and Deaccessions</i> Group Leaders: Paisley Cato, Virginia Museum of Natural History; W. Donald Duckworth, Bishop Museum</li> </ol>
3:00 pm - 3:30 pm	Coffee Group Leaders assemble and prepare reports
3:30 pm - 4:30 pm	Plenary Session on Institutional Planning and Policies Moderator: Philip S. Humphrey, Museum of Natural History, University of Kansas
4:30 pm - 6:00 pm	SPNHC Annual General Meeting
6:00 pm - 7:30 pm	Risk Assessment Workshop Reception (open to all meeting participants, cash bar)



**SATURDAY, 14 May 1992****SPNHC Risk Assessment Workshop,  
"Don't Worry, Be Ready," Kemper Center;  
Disciplinary Specialty Groups, Spink Pavilion****Locations:**

Workshop and Coffee:	Kemper Center
Disciplinary Specialty Groups (special interest discussion groups for those not attending Risk Assessment Workshop):	Spink Pavilion, 10:00 am - 12:00 noon
Posters/Resources Display:	Beaumont Room, Ridgway Center
Vendor Displays:	Missouri and Botanical Rooms, Ridgway Center
Reserved Box Lunches:	Spink Pavilion

**Schedule**

8:30 am - 5:00 pm	SPNHC Risk Assessment Workshop
8:30 am - 9:00 am	Coffee
9:00 am - 9:30 am	<i>Introduction and Outline</i>
	Instructors: Robert R. Waller, Chief of Collections, Canadian Museum of Nature; Sylvie Marcil, Conservator, Canadian Museum of Nature
9:30 am - 10:15 am	<i>Framework: Agents of Deterioration</i>
	Brainstorming sessions in small groups
10:15 am - 10:45 am	Coffee
10:45 am - 11:10 am	<i>Framework: Agents of Deterioration, continued</i>
	Synthesis of brainstorming sessions
11:10 am - 12:10 pm	<i>Recognizing Three Types of Risk</i>
12:10 pm - 1:30 pm	Lunch
1:30 pm - 3:00 pm	<i>Estimating Magnitude of Risk:</i>
	$Risk = probability \times severity \times value (PE*FS*LV)$
3:00 pm - 3:30 pm	Coffee
3:30 pm - 4:45 pm	<i>Risk Profiles for Collections and Risk Mitigation Strategies and Priorities</i>
4:45 pm - 5:00 pm	<i>Summary and Discussion</i>

**SUNDAY, 15 May 1994****Society for the Preservation of Natural History  
Collections Technical Presentations and Posters,  
Ridgway Center****Locations**

Oral Presentations:	Shoenberg Auditorium, Ridgway Center
Slide Preview:	Garden Room, Ridgway Center
Posters/Coffee:	Beaumont Room, Ridgway Center
Reserved Box Lunches:	Spink Pavilion
Final SPNHC Council Meeting:	Spink Pavilion

**Schedule**

8:30 am - 9:00 am	Coffee
9:00 am - 9:05 am	<i>Introductions and announcements</i>
	David Von Endt
9:05 am - 9:45 am	<i>The National Fish and Wildlife Forensic Laboratory: A Multi-disciplinary Facility Designed to Support the Wildlife Law Enforcement Effort</i>
	Stephen D. Busack



**Sunday 15 May cont'd**

- 9:45 am - 10:00 am *Conservation of Subfossil Vertebrate Material in situ and Beyond, Mezhirich Dwelling #4, Ukraine*  
Julianne Snider
- 10:00 am - 10:15 am *Conservation of a Paleobotany Collection - A "Case" Study*  
Charles Messenger
- 10:15 am - 10:45 am Coffee and Poster Session (with presenters)
- 10:45 am - 11:00 am *What Does It Mean When the Pink Strip Turns Green?*  
*A Comparison Study of the Efficacy and Accuracy of Test Strips*  
Sally Y. Shelton
- 11:00 am - 11:15 am *Considerations When Rearranging and Updating a Mid- to Large-Size Herbarium*  
Deborah Q. Lewis
- 11:15 am - 11:30 am *Practical Considerations in the Design and Development of Museum Storage Trays for Three-Dimensional Objects*  
Virginia M. Deucher
- 11:30 am - 12:45 pm Lunch  
Final SPNHC Council Meeting
- 12:45 pm - 1:15 pm Final Poster Session (with presenters)
- 1:15 pm - 1:30 pm *Comparison of Two Computer Conversion Methods for Hard Copy Records*  
Elaine R. Hughes
- 1:30 pm - 1:45 pm *Documenting the Collections Care of Invertebrates*  
Sheila C. Byers
- 1:45 pm - 2:00 pm *A Program to Locate "Lost" Paleontological Collections*  
Donald G. Mikulic and Joanne Kluessendorf
- 2:00 pm - 2:15 pm *An Instructional Design Model for the Use of University Research Collections in Undergraduate Education*  
Llyn Sharp
- 2:15 pm - 2:30 pm *Dealing with Photographic Collections: Gifts, Valuations, Losses*  
Deborah Metsger
- 2:30 pm - 2:45 pm *Appraisers and the Collections*  
John A. Woods
- 2:45 pm Meeting adjourns



# ABSTRACTS

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## POSTER SESSION

### ***A Risk Assessment for a Vascular Plant Collection***

Albert Dugal  
Robert Waller  
Canadian Museum of Nature  
Box 3443, Station "D"  
Ottawa, Ontario  
Canada K1P 6P4

Most curators and collection managers are familiar with the most obvious threats to their collections. In recent years, with the increasing awareness of problems in natural history collections, there has been some progress in implementing beneficial changes. However, in order to properly protect and argue effectively for increased funding for collections, museums must be aware of the relative magnitudes of all risks to these invaluable resources. This paper provides the results of an attempt to do this for the vascular plant collection at the Canadian Museum of Nature.

Twenty three possible risks to the collection were identified. The magnitudes of these risks were assessed by estimating the probability of a catastrophic event occurring, or the extent to which a gradual process occurs, and combining that with estimates of the fraction of the collection susceptible to the risk and the anticipated loss in value for the specimens subjected to the risk.

Estimates for these factors ranked the following risks as most significant: fire, physical forces, criminal behaviour, and incorrect temperature. Certain of the factors employed in calculations are currently being refined and may result in changes in the rank of some risks. Some of the results appear counter-intuitive, suggesting that generally held "feelings" about the significance of certain threats may be incorrect.

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### ***The Roylean Herbarium Conservation Project at the National Museums & Galleries on Merseyside***

Angus S. Gunn  
Donna M. Hughes  
Sally Ann Yates  
  
Department of Botany  
Liverpool Museum  
William Brown Street  
Liverpool, UK L3 8EN

Paper and Textiles  
Conservation Department  
Merseyside Maritime  
Museum, Albert Dock  
Liverpool, UK L3 4AA

The herbarium of John Forbes Royle, one of the most important collections of natural history specimens in Liverpool Museum, was acquired in the early 1950s. Before then, this herbarium of late 18th and early 19th century specimens from the Indian sub-continent had lain neglected for almost a hundred years. Emergency remounting of many specimens at the time of acquisition had caused further problems for the long term preservation of the specimens. In 1992 the decision was taken to conserve the entire herbarium, numbering over 10,000 sheets.

This conservation project is a collaborative venture between two departments of the National Museums and Galleries on Merseyside, using principles, materials and equipment developed in paper conservation science, and marrying them to traditional methods of herbarium mounting. To date, just over half the collection has been conserved.



***The Upgrade of Type Specimens at the Lichen Herbarium (CANL), Canadian Museum of Nature, Ottawa, Canada***

Pak Yau Wong  
Canadian Museum of Nature  
Box 3443, Station "D"  
Ottawa, Ontario  
Canada K1P 6P4

As part of a programme to upgrade the level of care and maintenance of the National Herbarium, type specimens of 750 lichens and lichenicolous fungi in the lichen herbarium (CANL) were provided with special storage. All the specimen packets, labels and material inside the packets have been replaced with acid-free stock. Various kinds of lichens were provided with different types of protection depending on their fragility, bulk, substrate and size.

All type specimens were arranged in alphabetical order according to their published names, in herbarium trays that have been placed in a fire-proof, locked metal herbarium cabinet. An index card filing system, containing duplicate label information, was set up to allow easy access to type information without disturbing the actual type specimens. A cross-reference system for locating type specimens was incorporated into the general collection.

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***Temperature and Relative Humidity Observations in the Freezing and Thawing of Botanical Specimens for Insect Pest Control***

Michael J. Shchepanek  
Botany Section  
Canadian Museum of Nature  
Box 3443, Station "D"  
Ottawa, Ontario  
Canada K1P 6P4

An experiment was conducted using a domestic type of freezer monitored by data loggers to see if the freezer could produce and maintain the necessary conditions to eradicate insect pests in the Canadian Museum of Nature's botanical collections. This was done by: 1) determining the length of time required to lower internal temperature of a plant parcel to -30° in a freezer, 2) monitoring the temperature of the freezer and inside the plant package during the freezing period, 3) determining the length of time required for the entire plant parcel to reach room temperature after removal from the freezer, 4) monitoring relative humidity (RH) changes produced by the freezer on the plant specimens in relation to room RH during the experiment, and 5) determining if sealing the plant parcel in a polyethylene bag would protect against possible condensation during the freezing and thawing process.

The experiment demonstrated that a domestic type of freezer is adequate for achieving and maintaining temperatures required to eradicate insect pests. Some modifications related to the time allowed for freezing and thawing and the packaging of specimens are recommended to insure complete success of the freezing technique. The experiment also showed that changes in RH and moisture content of specimens throughout the process appear not to be significant concerns.





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**Density to Volume  
Percent: Computer  
Models for Ethanol  
and Isopropanol**

Thomas J.K. Strang  
Canadian Conservation  
Institute  
1030 Innes Road  
Ottawa, Ontario  
Canada K1A 0C8

The measurement of density in ethanol-water and isopropanol-water solutions with digital density meters is a reliable technique for determining solvent concentration. To estimate the volume of solvent lost in large collections or to correlate this to other phenomena, several hundred density measurements usually are taken. These two programs were written as tools for processing this survey data. The mathematical models implemented by the programs had to accommodate a range of temperature at the time of measurement. The programs had to accept individual values or ASCII files, retain identifying comments, and produce output compatible with spreadsheets or databases. The programs, run under DOS on PCs, are available as a set from the Canadian Conservation Institute for \$10.00 Canadian.

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**Stable Molecules: A  
Sponge from the Tomb  
of Philippos II**

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

Philippos II, father of Alexander the Great, died in 336 B.C. and was buried in Vergina, Macedonia, northern Greece. In his tomb were bath utensils for his journey after death. Among these was a sponge which was analyzed for any changes in amino acid content, and the presence of polysaccharides to determine its state of preservation. Although the samples were somewhat friable, they were identified as belonging to the genus *Hippospongia*, a common commercial sponge from the Mediterranean.

Spongins, the protein of which sponges are composed, is closely related to collagen, the very strong and flexible protein of mammals. Amino acid analysis of this 2300 year old sponge indicated that relatively few bonds had been broken in the original molecules. Only approximately 10% of the amino acids were completely hydrolyzed and existed in the "free" state, with the remainder still linked in the peptide bonds of proteins. The amino acid composition of this sponge resembled that of spongin, and also was similar to modern samples from the same area of the world. In addition, carbon, hydrogen and nitrogen (CHN) analysis indicated that the C/N ratio fell within the values expected for proteins, indicating that the sponge was composed primarily of protein, and not a combination of protein and polysaccharide.

What is remarkable is that this archeological material not only has not deteriorated completely during its 2300 years of interment at high humidity, but also that it has retained sufficient morphological and chemical features so that it was able to be identified. Clearly, spongin is a very stable molecule and resistant to chemical attack, especially from water.



***A Novel Application of  
Confocal Microscopy  
to Render Complex  
Insect Exoskeletal  
Features***

Daniel K. Young  
Charles Thomas  
(presented by Steven Krauth)

Department of Entomology  
University of Wisconsin  
Madison, Wisconsin USA  
53706

Integrated Microscopy  
Resource  
University of Wisconsin  
Madison, Wisconsin USA  
53706

The goal of this study was to elucidate the phylogenetically important three-dimensional complex of characters associated with males of the Asian fire-colored beetle genus, *Pseudopyrochroa* (Coleoptera: Pyrochroidae). Most species in this study are represented in collections by very few specimens; often they are known only from the type or a very limited syntype series. With these constraints, the samples are too unique and valuable to be altered in any way, as would typically be required for traditional scanning electron microscopy (SEM) and photomicrography. Initial attempts to resolve this dilemma called upon use of a variety of low voltage SEM iterations in combination with uncoated specimen preparation protocols. Charging, electron beam damage, and the logistical problem of getting relatively large, pinned specimens into the specimen chamber thwarted these attempts to produce publication quality photomicrographs. Standard confocal techniques such as a 3D z-series reconstruction or projection were unsatisfactory because exoskeletal opacity inhibited laser penetration and the full vertical range of the cranial complex could not be imaged.

In a nod to time-honored SEM "stereo-pair" techniques, we collected images of exoskeletal autofluorescence from straight vertical and tilted views. A lens with a large field of view and depth of focus was used to observe cranial exoskeleton autofluorescence in the laser-scanning confocal microscope. By combining the confocal's detection of the autofluorescent signal and the technique of tilt-stereo imaging, satisfactory elucidation of these complex cranial structures was accomplished, quickly and with no specimen alteration or damage.

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# ABSTRACTS

## TECHNICAL SESSION

(IN ORDER OF PRESENTATION)

***The National Fish and Wildlife Forensic Laboratory:  
A Multi-disciplinary Facility Designed to Support the Wildlife Law Enforcement Effort***

Stephen D. Busack  
National Fish and Wildlife  
Forensic Laboratory  
1490 East Main Street  
Ashland, Oregon USA 97520

In July of 1989, the U.S. Fish and Wildlife Service opened a 23,000 square foot forensic laboratory in Ashland, Oregon. The laboratory's basic mission is to provide the law enforcement community with court-defensible, species-specific identification of evidence items. During fiscal year 1989, the laboratory handled 38 cases, and provided identifications for 509 individual items; by fiscal 1993, case load had increased to 695, with the number of items exceeding 4,000.

While divisions within the laboratory may easily trace their origins to university laboratories of zoological research, police crime labs, and to the world's natural history museums, this laboratory is truly unique. This presentation will provide a general overview of the laboratory, its mission, trials, and tribulations.

***Conservation of Subfossil Vertebrate Material in situ and Beyond, Mezhirich Dwelling #4, Ukraine***

Julianne Snider  
Illinois State Museum  
Research and Collections  
Center  
1011 East Ash  
Springfield, Illinois USA  
62703

Mezhirich Dwelling #4 located in Ukraine on the Central Russian plain is a Paleolithic structure consisting primarily of subfossil Mammoth bone and ivory. Excavation of the dwelling began in 1980 leaving most elements partially exposed but *in situ*. Conservation of the site and its osteological material has now become a priority of the Academy of Sciences of the Ukraine. Successful preservation of these subfossils will allow better examination of the dwelling and provide new archaeological and taphonomic information about the site.

An active conservation program was begun in July 1993. Massive and complex Proboscidean elements in a subfossil (not fully mineralized) state, available conservation materials and facilities, and the uncertain political future of Ukraine are considerations that combine and result in interesting challenges for the conservator.



---

***Conservation of  
a Paleobotany  
Collection—  
A “Case” Study***

Charles Messenger  
University of Nebraska State  
Museum, W436 Nebraska  
Hall, Lincoln, Nebraska USA  
68588-0514

A conservation project was recently completed in our paleobotany collection. This project was planned and executed with help from a professional conservator, Catharine Hawks. Previously, this collection was stored in stacked cardboard boxes on open shelves with incomplete and/or inaccessible data, making it impossible to use.

An Institute of Museums Services conservation grant enabled us to move the specimens into new cases, providing an optimal storage environment. All specimens with data were catalogued, providing proper documentation for the collection. Special procedures were developed to correct problems created by unacceptable specimen pH, label deterioration, and specimen abrasion.

---

***What Does It Mean  
When the Pink Strip  
Turns Green?  
A Comparison Study  
of the Efficacy and  
Accuracy of Test Strips***

Sally Y. Shelton  
San Diego Natural History  
Museum  
Box 1390  
San Diego, California, USA  
92112

Strip tests for a variety of environmental variables, in vapor phase or in solution, are becoming increasingly popular as a quick and relatively easy means of assessing the presence and often the degree of contamination. Questions concerning the accuracy of these tests are less easy to answer. This presentation studies the efficacy of both commercial and in-house strip tests for a variety of pollutants. Pre-packaged strips and reagents may have been stored longer than their useful shelf life, and the consequent color change may be deceptive. Most tests cannot be accurately calibrated against a standard of exposure, and delays in interpreting the strips may also lead to deceptive appearances. Finally, these tests do not in themselves constitute any form of preventive conservation and must be viewed as data gathered only in the context of a comprehensive preventive program. Recommendations for effective use are made.



***Considerations When  
Rearranging and  
Updating a Mid- to  
Large-Size Herbarium***

Deborah Q. Lewis  
Ada Hayden Herbarium  
Department of Botany  
Iowa State University  
Ames, Iowa, USA  
50011-1020

A large part of the Ada Hayden Herbarium was recently reorganized. The process involved determining the sequence of major collections, choosing a system for arranging the plant families, refolding many of the specimens, examining individual specimens, and communicating these changes to the users. Our goals for rearranging the major collections included maximizing the use of available space and allowing flexibility for growth. Two considerations when filing the families within the collections were: which system to use, and the best sequence for moving the specimens to follow the new system. When refolding the specimens, considerations included ascertaining if the folder color correctly indicated the geographic arrangement, if it was badly worn or poorly labeled, if it contained too many specimens, and if the "correct" name was on the folder.

When individual specimens were examined, each was checked to verify that it was in the proper folder, and any with a problem needing curatorial attention were pulled from the collection. New labels on the cabinets, "drop-tags," and a handout outlining the current sequence informed users of the changes. The efficient accomplishment of the project required yet other considerations, including acquiring needed supplies, scheduling the project to optimally use staff and volunteers, and coordinating the project to provide minimal disruption of normal herbarium activities.

While the specific plans for reorganizing herbaria and natural history museums may vary, many of these stated considerations should apply. These factors should encompass making best use of available space, making the collections as "user friendly" as possible, maximizing specimen conservation practices, and accomplishing the project in the most efficient way possible.

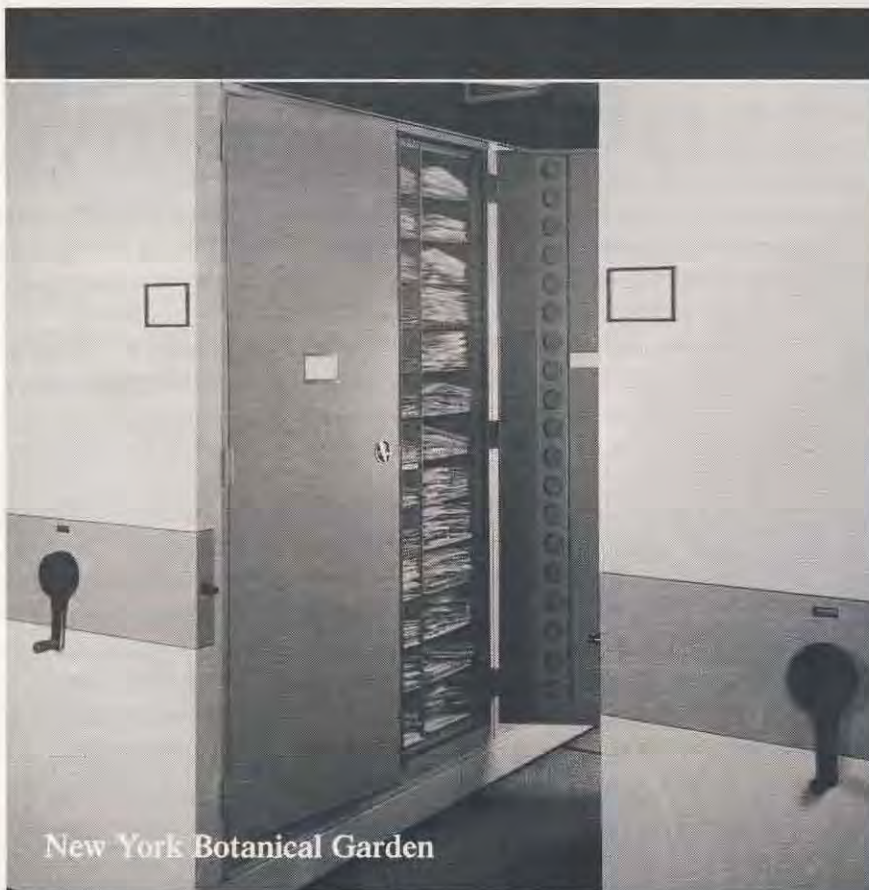


**Practical  
Considerations in the  
Design and  
Development of  
Museum Storage Trays  
for Three-Dimensional  
Objects**

Virginia M. Deucher  
NMAH/MSM Move Project  
National Museum of  
American History (NMAH)  
Department of Conservation  
Room BB017  
Smithsonian Institution  
Washington, DC USA 20560

A primary tenet of contemporary museum management is preventive care of collections through a variety of means including systematic rehousing. One key element in providing systematic rehousing is the use of containers that are appropriately designed and are constructed of stable materials. For three-dimensional objects, trays allow component parts of an object to be housed together in a space-efficient and organized manner that facilitates safe access. In the process, they reduce unnecessary handling and protect fragile and vulnerable objects. Commercially available trays are not always suitable for the needs of a particular collection or the storage system in use.

The NMAH move of collections to offsite storage facilities highlighted: 1) the need for specially designed trays to meet space limitations; 2) collection requirements related to size, weight, and type; 3) storage configurations; and 4) the budget. To date, the NMAH Move Project has developed six different trays that fit these parameters. This presentation focuses on practical considerations for designing and developing new housing products (*i.e.*, trays for a range of three-dimensional objects) that can be commercially and cost-effectively manufactured in quantity. It covers developing design criteria, selecting appropriate materials, working with vendors, evaluating prototypes, *etc.* This presentation seeks to de-mystify the process of product development and provide an effective model for general use.



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### ***Comparison of Two Computer Conversion Methods for Hard Copy Records***

Elaine R. Hughes  
Denver Museum of Natural  
History  
2001 Colorado Blvd.  
Denver, Colorado USA 80205

The process by which a museum or repository decides to enter hard copy records into a computer system is an important step which should be given careful consideration. This task may be accomplished through in-house data entry personnel or by contracting with a data entry company. Due to participation in two data entry projects, a comparison of these methods was possible.

Both of these data entry projects used the same software (Argus). One project occurred at the Museum of Northern Arizona (NSF funded) and involved in-house data entry. The other project occurred at the Denver Museum of Natural History (NEH funded) where catalog data was transferred to data sheets which were then sent to a data entry company (Amarc).

The advantages and disadvantages of in-house and out-of-house conversion depend upon certain variables. The state of collection data, available personnel, staff time commitment, funding levels, and software complexity will all affect an institution's decision. Through an assessment of these variables, an institution can come to a decision which will maximize its limited resources and take into account its own specific situation.

---

### ***Documenting the Collections Care of Invertebrates***

Sheila C. Byers  
Department of Invertebrate  
Zoology  
Royal Ontario Museum  
100 Queen's Park  
Toronto, Ontario  
Canada M5S 2C6

Seven years of progress in collection management in the Department of Invertebrate Zoology has resulted in a level of collections care beneficial both to the specimens and the staff. Improvements to the access, organization, maintenance, preservation and conservation of the specimens are obvious. Documentation of the development of the collections has been an integral part of their management and has resulted in the compilation of a 97-page collections care manual for the department. Major categories covered in the manual include: collections statement, policies and procedures for appraisals, loans and disposals; field collection standards, procedures and checklists; a collection organizational chart, consecutive floor plans, and organization of taxa within cabinets; sample processing forms, primary sorting procedures, and treatment of major invertebrate groups; photographic and reprint collection procedures; departmental equipment and supplies; health and safety issues; computer standards; and primary phylogenetic and taxonomic references. Just as collections care is a continuing process so is its documentation, and the manual is by no means considered complete. Documentation of collection care in the *form* of a manual has proven invaluable in identifying not only how the collections have been treated in the past, but also in providing *working* guidelines for permanent staff, casual employees and volunteers.



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### ***A Program to Locate "Lost" Paleontological Collections***

Donald G. Mikulic  
Joanne Kluessendorf

Illinois State Geological  
Survey  
615 E. Peabody Dr.  
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61820

Department of Geology  
University of Illinois  
1301 W. Green Street  
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Numerous natural history collections were assembled during the 19th and early 20th centuries by colleges, universities, natural history societies, museums, and government agencies. Many are no longer maintained and have been essentially lost as research tools. Some institutions have closed, and other collections have been warehoused, used for teaching, dispersed or discarded. Surviving collections, including type specimens, are unknown to potential researchers, and many of the institutions are unaware of their collection's contents, value and origin.

An historical survey of paleontological collections in Illinois and Wisconsin illustrates the magnitude of this problem. Only 17% of the Illinois and 15% of Wisconsin collections existing in 1900 are still listed in museum directories; only 30% (IL) and 43% (WI) of collections known to contain fossil types have ever been listed. In addition to types, many of these "lost" collections contain specimens of historical significance, comprehensive collections from specific localities or strata, or irreplaceable material from localities long inaccessible.

The Paleontological Society is sponsoring a program to locate all historically-known fossil collections in the U.S. to determine their current contents and condition. This program will be active, with institutions contacted directly, instead of relying on mailed questionnaires. The primary goals are to account for as many collections as possible, to determine their scientific usefulness, to document their origins, and to produce a database of existing collections and their collectors.

---

### ***A Instructional Design Model for the Use of University Research Collections in Undergraduate Education***

Llyn Sharp  
Virginia Tech Museum of  
Natural History  
428 North Main Street  
Blacksburg, Virginia USA  
24061-0542

The systematics and collections community has realized that it is imperative for the public and administrators to *personally value* the natural history collections in our care. University collections are particularly vulnerable to administrative and faculty changes of direction; their inherent value notwithstanding, collections not seen as directly related to the University or Department mission (primarily undergraduate education) may appear to be unaffordable luxuries.

Direct experience with the "real thing" makes science exciting and leads students to scientific inquiries of their own. Undergraduate education has always used teaching collections for hands-on experience; this can be enhanced by the resources of research collections. This model shows a way to integrate research collections into the curriculum while minimizing risks to their preservation for future uses.

Recognizing limited collections budgets, this design uses both physical and procedural controls for collections safety, provides a streamlined structure for the interactions of museum staff, faculty, and students, and can be phased in slowly to build in preparation time. Student, faculty, and museum staff evaluations of its effects will be presented. The implementation of this model invites additional audiences to appreciate the wealth of information in natural history objects, so that these collections become not unaffordable luxuries, but additional investments in educational excellence.



---

***Dealing with  
Photographic  
Collections: Gifts,  
Valuations, Losses***

Deborah A. Metsger  
Department of Botany  
Royal Ontario Museum  
100 Queen's Park Crescent W.  
Toronto, Ontario  
Canada M5S 2C6

For many natural history disciplines, photographic images (slides, prints *etc.*) serve not only as documentation for objects, but as collections (and/or specimens) in their own right. The acquisition and management of photographic collections raises a number of questions. Are the evaluation criteria used to arrive at "fair market value" by a photographic stock house applicable to a museum slide collection? Is there a different "academic" value for these images? What is the compromise between loss of quality when reproducing from duplicates and potential loss or damage when using originals? What safeguards are required to prevent loss during production operations? What procedures are required to deal with issues of liability when borrowing images from colleagues? As the custodian of several collections of botanical images, the Royal Ontario Museum Department of Botany has wrestled with these issues and developed policies and procedures with which to address them. Their intent is to provide guidelines that are tailored to the specialized nature of natural history photographic collections.

---

***Appraisers and the  
Collections***

John A. Woods  
John A. Woods Appraisers  
347 Main Street  
South Windsor, Connecticut  
USA 06074

Appraisers are often called by families in confusion after the death of a family member who was a collector (*e.g.*, a professor). The appraiser must determine what constitutes the collection(s), determine and define the ownership of the material, define the amount of inventory description that is necessary, and determine the Fair Market Value. In addition, the appraiser advises the family on the disposition of the material. It is the appraiser's responsibility to try to insure that the collection items are offered to the appropriate repository. All this must be undertaken within the context of tax laws and the ethics of the appraisal profession.





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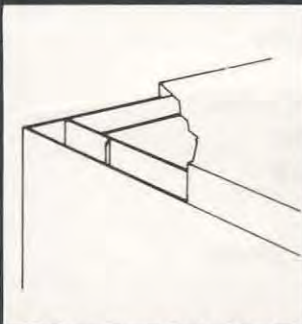


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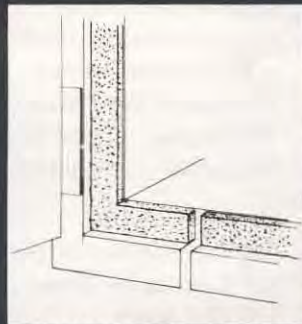
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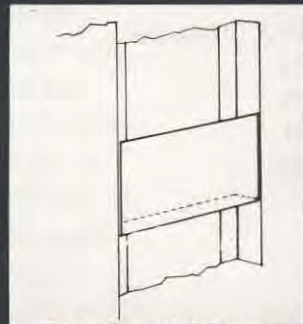
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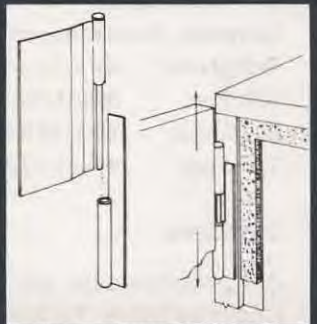
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