SPNHC-NSCA 2006
Program & Abstracts

The Road to Productive Partnerships

Hotel Albuquerque at Old Town
Albuquerque, New Mexico
23-27 May 2006

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The 21st Annual Meeting of the
Society for the Preservation of Natural History Collections
and the
Natural Science Collections Alliance 2006 Annual Meeting

Sponsored by KE Software

Hotel Albuquerque at Old Town
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Society for the Preservation of Natural History Collections (SPNHC)

The Society for the Preservation of Natural History Collections is a multidisciplinary organization composed of individuals who are interested in the development and preservation of natural history collections. The Society was formed in 1985 to foster the exchange of information about natural history collections and to promote research on the requirements for their preservation, storage, and use. SPNHC has made a sustained, strategic effort to improve the level of care provided to these collections and actively encourages participation of individuals involved in all aspects of natural history collections.

http://www.spnhc.org

Natural Science Collections Alliance (NSCA)

The Natural Science Collections Alliance is a Washington, D.C.-based nonprofit association that serves as an advocate for natural science collections, the institutions that preserve them, and the research and education that extend from them for the benefit of science, society, and stewardship of the environment. NSCA members are part of an international community of museums, botanical gardens, herbariums, universities, and other institutions that house natural science collections and utilize them in research, exhibitions, academic and informal science education, and outreach activities.

http://www.nscalliance.org

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Welcome

Local Committee welcome:

On behalf of the local organizing committee, we welcome you to Albuquerque, New Mexico for the SPNHC-NSCA 2006 joint meeting. This is only the second time the Society for the Preservation of Natural History Collections (SPNHC) and the Natural Science Collections Alliance (NSCA), formerly Association of Systematic Collections (ASC), have combined efforts to host the meetings. The first SPNHC-ASC joint meeting was in 1994, at the Missouri Botanical Garden.

The timing seemed right for hosting a meeting in 2006 as the City of Albuquerque is celebrating its Tricentennial. In addition, we recently completed construction of the building that houses the Museum of Southwestern Biology (MSB) on the campus of the University of New Mexico, and are eager to showcase the MSB's collections during the scheduled tours.

This year's conference is a change of venue for SPNHC and NSCA, as the meetings will take place in the Hotel Albuquerque at Old Town. We chose the Old Town area of Albuquerque because it is the heart of Albuquerque and is near many popular local attractions including historic Route 66.

Our theme, *The Road to Productive Partnerships*, will highlight collaborations of scientific collections with other organizations that increase the role and value of museum collections to the widest scientific audience possible. We hope you find the meetings enjoyable and informative and that you are inspired to create many future productive collaborative partnerships!

Karen Kajiwara (NSCA)
Jane Mygatt (MSB)
Cheryl Parmenter (MSB)
Cindy Ramotnik (USGS)
Terry Yates (MSB)

SPNHC welcome:

On behalf of the *Society for the Preservation of Natural History Collections,* it gives me great pleasure to welcome you to the 21st annual SPNHC general meeting being held jointly, for a second time, with the *Natural Science Collections Alliance,* formerly the *Association of Systematics Collections* or *ASC*. It is indeed ironic that one of our key speakers, Dr. Peter Raven, is from St. Louis where we last held our joint annual meeting, co-hosted with *ASC*, at the Missouri Botanical Garden in 1994. So from past experience, I can attest that this meeting will provide a platform for promoting our natural sciences collections, both nationally and internationally; communicate relevant developments in collections use and care; and serve as a venue for networking with our many colleagues. Thus, the focus of this meeting " The Road to Productive Partnerships " is appropriate, as we partake in yet another dynamic, thought-provoking meeting.

Iris A. Hardy
President
Society for the Preservation of Natural History Collections (SPNHC)

NSCA Welcome:

Dear Collections Community,

It is my pleasure to welcome you to this historic meeting between the Natural Science Collections Alliance (NSCA) and the Society for the Preservation of Natural History Collections (SPNHC). This joint meeting, hopefully one of many, promises the beginning of a new era of cooperation in the collections community and is consistent with this year's theme of "The road to productive partnerships." The challenges facing our natural science museums and their collections have never been greater and many are actually in peril of being lost. At the same time, the opportunity for our community to play a critical and vital role in helping solve society's greatest problems such as human health, education, global warming, invasive species, and loss of biodiversity is greater than ever before. Armed with new technologies and many conceptual advances across our scientific disciplines we perhaps for the first time have an opportunity to acquire the funding needed to bring our collections to the front line where they belong. This vision can only be achieved, however, by a unified community. I hope this meeting will be the first step towards that unification. On behalf of the NSCA and the University of New Mexico I want to welcome you to the Land of Enchantment and hope this meeting will be fun and productive. This is not only the year of the museum but the beginning of the century of the natural science collection.

Terry L. Yates
President, NSCA
Vice-President for Research and Economic Development
University of New Mexico

Acknowledgements

Organizing Committee
Karen Kajiwara, NSCA
Jane Mygatt, MSB
Cheryl Parmenter, MSB
Cindy Ramotnik, USGS
Terry Yates, MSB

Volunteers
Adrienne Raniszewski, MSB
Kirsten Williams, NMMNH&S

Local Committee members
Sandy Brantley, MSB
Christopher Frazier, INRAM
Patti Gegick, NMMNH&S
Tom Giermakowski, MSB
Andy Johnson, MSB
David Lightfoot, MSB
Rayo McCollough, NHNM
Jackie McConachie
Mike Medrano, NPS
Cathy Osborn, MSB

Tour Hosts
Geology Museum (Barry Kues)
Meteorite Museum (Horton Newsom)
Maxwell Museum of Anthropology (David Phillips)
Museum of Southwestern Biology:
Amphibians & Reptiles (Tom Giermakowski)
Arthropods (Mike Medrano)
Birds (Andy Johnson)
Fishes (Alexandra Snyder)
Genomic Resources (Cheryl Parmenter)
Herbarium (Tim Lowrey)
Mammals (Joe Cook and Bill Gannon)

Field Trip Hosts
Sandy Brantley, MSB
Patti Gegick, NMMNH&S
David Lightfoot, MSB
Jackie McConachie
Mike Medrano, Petroglyph NM
Robert Parmenter, Valles Caldera NP

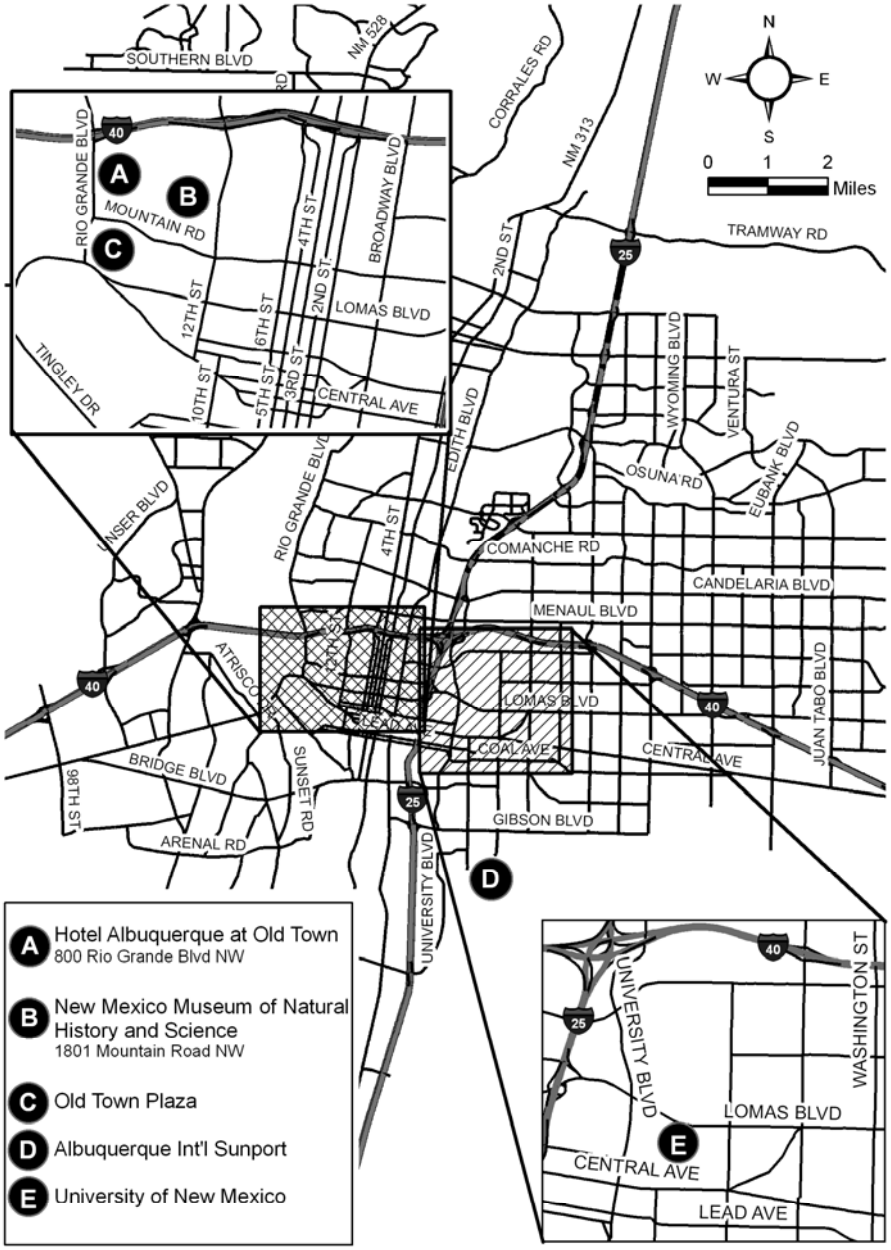
Workshop Instructors/Organizers
Reed Beaman
Arthur Chapman
Gordon Jarrell
Giorgos Ksouris
Hannu Saarenmaa
Larry Speers

Special/Technical Session Moderators
Laura Abraczinskas
Michael A. Bogan
Jean DeMouthe
Linda S. Ford
Christopher Frazier
J. Tom Giermakowski
Michael A. Mares
John E. Simmons

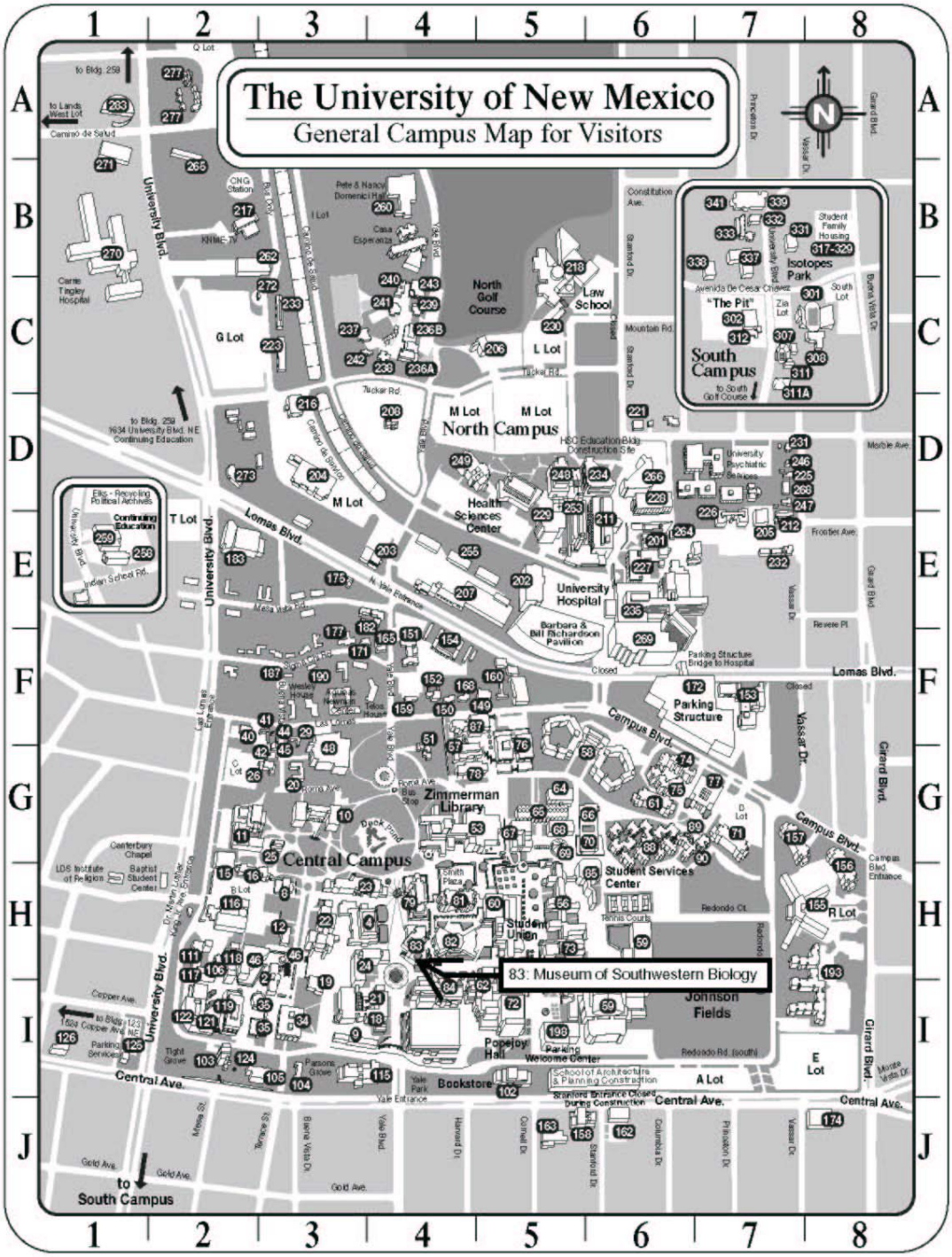
Special Interest Group Moderators
Robert Huxley
Suzanne McLaren
Richard McCourt
Richard Monk
Sally Shelton
Larry Speers

In Addition
We would like to give special thanks to the SPNHC and NSCA executives, Tim White (SPNHC) and Terry Yates (NSCA) for their significant contributions, encouragement, and advice. The New Mexico Museum of Natural History and Science and the University of New Mexico's Center for Environmental Research, Informatics and Arts (CERIA) generously provided space for the ice-breaker reception and workshops. We acknowledge the Museum of Southwestern Biology and the U.S. Geological Survey Fort Collins Science Center for supporting the meeting. And a special thanks to Jane Mygatt for all things graphic: logo, t-shirt, tote bag, and program design, and Chris Frazier for workshop and website development.

Albuquerque Map



Campus Map


The University of New Mexico
General Campus Map for Visitors
83: Museum of Southwestern Biology
Central Campus
North Campus
South Campus
Zimmerman Library
Student Union
Student Services Center
Health Sciences Center
University Hospital
Law School
North Golf Course
Isotopes Park
Johnson Fields
Bookstore
Popejoy Hall
Parking Structure
Lomas Blvd.
Central Ave.
University Blvd.
Girard Blvd.
Campus Blvd.

Campus Map legend

The University of New Mexico Alphabetical List of Campus Buildings

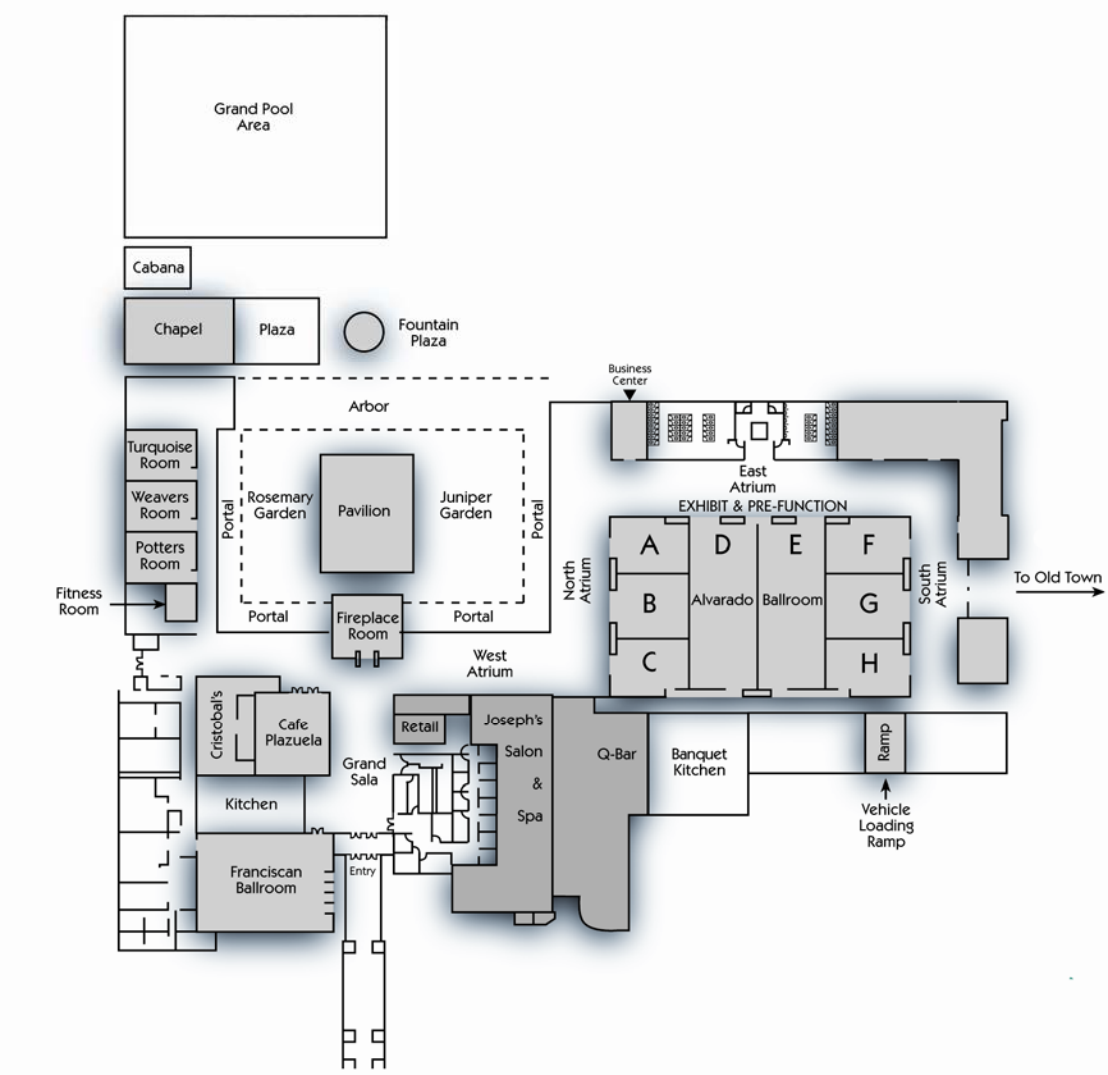
Note: Some buildings may be listed here under several names or have more than one function. Building number shown in boldface, but not all numbered buildings appear in this list.

Building Name (Alternative) (Building #)	Location
Administration Building (Scholes Hall) (10)	C-3
Admissions (85)	H-6
Aerospace Studies (159)	F-4
African American Studies (56)	H-5
Alvarado Hall (157)	C-7
Alumni Memorial Chapel (25)	C-3
Alumni (103)	J-2
Ambulatory Care Center (269)	F-6
Anderson, School of Management (76)	F-G-5
Anderson, Graduate School of Management & **Parish Memorial Library** (87)	F-4-5
Anthropology (11)	C-2
Anthropology Annex (12)	H-3
Archeology (Office of Contract Archeology) (273)	D-2
Architecture and Planning (158)	J-5-6
Architecture and Planning Annex (162)	J-6
Army ROTC (175)	E-3
Art (84)	I-4
Art Annex (105)	J-2-3
Art Museum (72)	H-5
Art Education (Masley Hall) (68)	C-5
Art & Technology Center (83)	F-5
Arts of the Americas (40)	F-2
Athletics Offices (307)	Inset C-7
Automotive (216)	D-3
Bandelier Hall East (8)	H-2
Bandelier Hall West (16)	H-I-2
Barbara and Bill Richardson Pavilion (under construction) (224)	F-5
Basic Medical Sciences (211)	E-6
Basketball Training Facility (Rudy Davalos) (312)	Inset, C-7
Biology (Castetter Hall) (21)	J-3-4
Biology Annex (19)	J-3
Biomedical Research (253)	E-5
Bookstore (102)	J-5
Bratton Hall (Law School) (218)	B-C-5
Bureau of Business and Economic Research / Data Bank (168)	F-4
Campus Safety (Occupational Safety) (233)	C-3
Cancer Research Center (227, 229)	E-5
Carlisle Gymnasium (4)	H-4
Carrie Tingley Hospital (270)	B-1
Castetter Hall (Biology) (21)	I-4
Centennial Science & Engineering Library (46)	H-3
Center for High Tech Materials (CHTM) (338)	Inset B-7
Center for the Arts & Fine Arts Library Art Museum (62)	H-5
CERIA (Center for Environmental Research, Informatics & Art (83)	H-4
Chemical & Nuclear Engineering Laboratory (111)	H-2
Chemistry (Clark Hall) (22)	H-3
Children's Campus & Manzanita Education Center (277)	A-2
Children's Psychiatric Center (236-243)	C-3-4
Civil Engineering (Engr Labs/Wagner Hall) (117)	H-2
Civil Engineering (Tapy Hall) (118)	H-2
Civil Engineering Research Laboratory (106)	H-2
Clark Hall (Chemistry) (22)	H-3
Communications (Journalism) (115)	I-4
Computer and Information Resources & Technology (CIRT) (153)	F-7
Continuing Education (North Bldg.) (259)	Inset, D-1
Continuing Education (South Bldg.) (285)	Inset, D-1
Coronado Hall (155)	H-6
Counseling & Family Studies (Simpson Hall) (66)	C-6
Crystal Growth Facility (331)	Inset, B-7
Dane Smith Hall (48)	F-5
DeVargas Hall (75)	C-6
Dental Programs (Novitski Hall) (249)	D-4-5
Diabetes Control and Complications (264)	E-6
Dispute Resolution (44)	F-5
Division of Government Research (154)	F-4
Domenici Hall (260)	B-4
Earth & Planetary Sciences (Northrop Hall) (24)	H-4
Economics (57)	C-4
Education Administration (Travelstead Hall) (65)	C-5
Education Classrooms (67)	C-5
Education Offices (58, 70)	C-5
Electrical & Computer Engineering/**Centennial Library** (46)	H-2
Engineering and Science Computer Pod (2)	H-2
Equal Opportunity Programs (42)	C-4
Facility Planning (203)	E-4
Faculty Club (160)	F-5
Family Health: University Clinic & Pharmacy (271)	A-1
Family Practice Center (248)	D-5
Farris Engineering Center (119)	J-2
Fine Arts Center (Music, Drama & Museum) (62)	H-5
Fine Arts Library (62)	H-5
Ford Utilities Center (116)	H-2
Health, Physical Education and Recreation (Johnson Center) (59)	H-6
Health Sciences and Services (266)	D-6
Health Sciences Learning Resource Center (See Medical Center Library) (234)	D-6
Hibben Center for Archeology Research (15)	C-2
Hodgin Hall (103)	J-2
Hokona Hall (58)	C-5
Human Resources (Administration) (26)	C-2
Human Resources Service Center (Employment & Benefits) (183)	E-2
Humanities (81)	H-4
Indoor Tennis Dome (311A)	Inset, C-7
Johnson Center (59)	H-6
Jonson Gallery (152)	F-4
Kiva Lecture Hall (69)	C-5
KNME-TV (217 / 265)	B-2

Building Name (Alternative) (Building #)	Location
Laguna Hall (74)	C-6
La Posada Dining Hall (77)	C-6
Latin American Institute (165, 182)	F-4
Law School/Law Library (Bratton Hall) (218)	B-C-5
Logan Hall (Psychology) (34)	I-3
Lomas Parking Structure (172)	F-6-7
Manufacturing Technology & Training Center (341)	Inset, B-7
Manzanita Hall (70)	C-6
Marron Hall (9)	I-3
Masley Hall (Art Education) (68)	C-5
Mattox Sculpture Center (123)	I-1
Maxwell Museum (in Anthropology) (11)	C-2
Mechanical Engineering (122)	J-2
Media Technology Services (in Woodward Hall) (82)	H-4
Medical Center Library (234)	D-6
Mesa Vista Hall (56)	H-5
Meteoritics (Northrop Hall) (24)	H-4
MIND Institute (Mental Illness and Neuroscience Discovery) (260)	B-4
Mitchell Hall (Classrooms) (23)	H-3
Native American Studies (56)	H-5
Naval Science (151)	F-4
New Mexico Children's Psychiatric Center (236-243)	C-3-4
Nursing/Pharmacy (228)	D-6
Northrop Hall (Geology) (24)	H-4
Novitski Hall (Dental Programs) (249)	D-4-5
Nuclear Engineering Laboratory (121)	J-2
Nursing/Pharmacy (228)	D-6
Observatory (208)	D-4
Ortiz Hall (156)	G-H-8
Ortega Hall (79)	H-4
Outpatient Surgery and Imaging (OSIS) (263)	A-1
Parish Library (87)	F-4
Payroll (183)	E-2
Pharmacy (Nursing/Pharmacy) (228)	D-6
Physical Plant Dept. (Service Building) (204)	D-3
Physician Assistant Program (226)	E-7
Physics (Regener Hall) (35)	I-3
Physics & Astronomy (207)	E-4-5
"The Pit" (University Basketball Arena) (302)	Inset, C-7
Police Administration (58)	F-5-6
Popejoy Hall (72)	I-5
Postal Services (262)	B-2
Purchasing (183)	E-2
President's Home (University House) (51)	C-4
Project Link Service Center (20)	G-3
Psychology (Logan Hall) (34)	I-3
Psychology Clinic (44)	F-5
Real Estate (41)	D-5
Records Management (262)	B-2
Recruitment Services (60)	H-5
Redondo Village Apartments (193)	H-7
Regener Hall (Physics) (35)	I-3
Research Incubator Building (RIB) (205)	E-7
Risk, Safety, Health and Environmental Affairs (SHEA) (205, 223, 233)	C-3
Rotunda at Science & Technology Park, 801 University Blvd. SE (339)	Inset, B-7
Santa Ana Hall (71)	G-7
Santa Clara Hall (61)	C-6
Sara Reynolds Hall (Classroom Building) (104)	I-3
Scholes Hall (Administration Building) (10)	C-3
Science & Technology at UNM (332)	Inset, B-7
Simpson Hall (Counseling and Family Studies) (66)	C-6
Social Sciences (78)	G-4
Southwest Hispanic Research Institute and Chicano Studies (171)	F-3
Special Programs (149)	F-4
Speech and Hearing (183A)	E-7
Stadium (Football, Track and Field Facilities) (301)	Inset, C-8
Student Family Housing (317-329)	Inset, B-8
Student Health Center (73)	H-5
Student Residence Center and Commons Building (88, 89 and 90)	G-6
Student Services Center (85)	H-6
Student Support Services (Deaf and Hard of Hearing) (150)	F-4
SUB (Student Union Building) (60)	H-5
Surge Building (226)	E-7
Surplus Property (Elks)	Inset, E-1
Swimming Pools (See Johnson Center) (59)	H-6
Tamarind Institute (163)	J-5
Tapy Hall (Civil Engineering) (118)	H-2
Technology and Education Center (64)	E-4
Telecommunications (255)	E-4
Tow Diehm Athletic Facility (308)	Inset, C-8
Travelstead Hall (Educational Administration) (65)	C-5
University Arena (Basketball Arena, "The Pit") (302)	Inset, C-7
University College (73)	H-5
University Communication & Marketing (103, 198, 221)	I-2, I-5, D-6
University House (President's Residence) (51)	C-4
University of New Mexico Hospitals (235)	E-6
University Psychiatric Services (212, 225, 231, 246, 247, 268)	D-6-7
UNM/SNL Advanced Materials Laboratory at Science & Technology Park (337)	Inset, B-7
Visitor Parking Structure & Welcome Center (198)	J-5
Wagner Hall (Engr Labs/Civil Engineering) (117) (Scheduled for demolition)	H-2
Welcome Center/University Communication and Marketing (198)	J-5
Woodward Hall (Classrooms and Media Technology services) (82)	H-4
Zimmerman Library (53)	C-5

Revised 1/2006

Hotel Layout



Program at a Glance

Tuesday May 23, 2006

9:00 am – 5:00 pm	Registration	Outside of Fireplace Room
10:00 am – 5:00 pm	SPNHC Committee meetings	Fireplace Room, Potters, Alvarado F
7:00 pm – 9:30 pm	SPNHC First Council meeting	Fireplace Room

Wednesday May 24, 2006

7:00 am – 5:00 pm	Registration	Outside of Fireplace Room
	Poster set up	South Atrium
8:00 am – 12:00 pm	Pre-Conference Field Trip	Petroglyph National Monument
8:00 am – 5:00 pm	Pre-Conference Field Trips	Valles Caldera National Preserve, Santa Fe, and Sandia Mountains
9:00 am – 3:00 pm	NSCA Board Meeting	Fireplace Room
1:00 pm – 5:00 pm	Museum tours	University of New Mexico campus
3:00 pm – 5:00 pm	Trade Show set up	East and South Atrium
6:30 pm – 8:30 pm	Ice-Breaker Reception	NM Museum of Natural History and Science

Thursday May 25, 2006

7:30 am – 5:00 pm	Registration	Outside of Alvarado E
7:30 am – 8:30 am	Continental breakfast	East and South Atrium
7:30 am – 8:30 am	Trade Show and poster set up	East and South Atrium
8:30 am – 5:00 pm	Trade Show and poster displays	East and South Atrium
8:30 am – 9:00 am	Welcome and Opening Remarks	Alvarado E
9:00 am – 10:00 am	Keynote Speaker	Alvarado E
10:30 am – 12:00 pm	Plenary Session	Alvarado E
1:30 pm – 3:00 pm	Concurrent Special Session 1	Alvarado E
	Concurrent Technical Session 1	Alvarado G-H
3:30 pm – 5:00 pm	Concurrent Special Session 2	Alvarado E
	Concurrent Technical Session 2	Alvarado G-H
5:00 pm – 6:00 pm	Meet with Poster presenters	South Atrium
6:30 pm – 7:30 pm	Social	Franciscan
7:30 pm – 12:00am	Banquet, entertainment and dancing	Franciscan

Program at a Glance

Friday May 26, 2006

7:30 am – 5:00 pm	Registration	Outside of Alvarado E
7:00 am – 8:30 am	Continental breakfast	East and South Atrium
7:30 am – 8:30 am	Special Interest Groups	Alvarado F
8:30 am – 5:00 pm	Trade Show and poster display	East and South Atrium
8:30 am – 10:15 am	Concurrent Technical Session 3	Alvarado E
	Concurrent Technical Session 4	Alvarado G-H
10:30 am – 11:30 am	SPNHC Annual Business Meeting	Alvarado E
	NSCA Annual Business Meeting	Alvarado G-H
1:00 pm – 3:00 pm	Concurrent Special Session 3	Alvarado E
	Concurrent Technical Session 5	Alvarado G-H
3:30 pm – 4:00 pm	Featured Speaker	Alvarado E
4:00 pm – 5:00 pm	Capstone Speaker and Closing Remarks	Alvarado E
5:00 pm – 7:00 pm	Trade Show move-out	East and South Atrium
5:30 pm – 8:00 pm	SPNHC Second Council Meeting	Fireplace Room

Saturday May 27, 2006

All workshops will be held on the University of New Mexico campus, CERIA (Building 83 on campus map)

8:30 am – 12:00 pm	Workshop 1:	Data quality and data cleaning
	Workshop 2:	The ins and outs of imaging for museum collections
	Workshop 3:	Arctos: a biodiversity informatics tool
8:30 am – 5:00 pm	Workshop 4	Becoming a GBIF data provider
1:00 pm – 5:00 pm	Workshop 1:	Data quality and data cleaning
	Workshop 2:	The ins and outs of imaging for museum collections

Program

Tuesday May 23, 2006

9:00 am – 5:00 pm	Registration, outside of Fireplace Room

SPNHC Committee meetings

9:30 am – 10:00 am	Coffee and tea, outside of Potters Room
10:00 am – 11:00 am	Web Committee, Alvarado F
10:30 am – 12:00 pm	Conservation Committee, Potters Room
11:00 am – 12:00 pm	Conference Committee, Fireplace Room
12:00 pm – 1:00 pm	Lunch on your own
1:00 pm – 3:00 pm	Documentation Committee, Potters Room
2:00 pm – 3:00 pm	Education and Training Committee, Fireplace Room
3:00 pm – 3:30 pm	Coffee and tea, outside of Potters Room
3:00 pm – 4:00 pm	Publication Committee, Fireplace Room Elections Committee, Potters Room
4:00 pm – 5:00 pm	Finance Committee, Fireplace Room
7:00 pm – 9:30 pm	First Council Meeting, Fireplace Room

Program

Wednesday May 24, 2006

7:00 am – 5:00 pm	Registration, outside of Fireplace Room Poster set up, South Atrium

Pre-Conference Field Trips

All buses and vans leave promptly so please arrive at the designated meeting place at least 20 minutes prior to departure.

Petroglyph National Monument (8 am – 12 pm)

Petroglyph National Monument contains one of the most impressive collections of prehistoric Indian rock art in the world. More than 20,000 petroglyphs, images that are pecked or carved in rock, are found throughout the 17-mile stretch along Albuquerque's West Mesa, a volcanic basalt escarpment that dominates the city's western horizon. The petroglyphs are thought to have been created over a period of 3000 to 5000 years by native peoples and early Spanish settlers. The bulk of the petroglyphs consists of Rio Grande Style imagery, some of the most dramatic and complex in the Southwest. Many of the images are recognizable as animals, people, brands and crosses; others are more complex. These images, and associated archeological sites in the Albuquerque area, provide glimpses into a 12,000 year long story of human life in this area. This guided tour will visit Rinconada Canyon, which offers insights to the geologic, cultural and natural resources of the Monument. The approximately 2.5 mile round trip hike will take you through a journey of the history of Albuquerque's land and people. For the trip, hiking boots or other sturdy footwear are recommended, as well as a hat, plenty of water, and sunscreen. The tour will be guided by the National Monument Natural Resource Specialist. Transportation provided from the Hotel Albuquerque to the National Monument.

Santa Fe (8:30 am – 5 pm)

Come spend a day in Santa Fe for a full day of museums, dining, and shopping at Museum Hill and Historic Old Town in Santa Fe. The van will leave the Hotel Albuquerque at 8:30 am for a tour to Museum Hill where you will be able to explore four of Santa Fe's most prestigious museums full of art, history and culture of the Native American Southwest, the Spanish colonial past, and folk traditions from around the world. The Museums on the Hill include the Museum of Spanish Colonial Art, the Museum of Indian Arts and Culture, the Museum of International Folk Art, and the Wheelwright Museum of the American Indian. The van will shuttle visitors between Museum Hill and Old Town throughout the day and leave Museum Hill at 3:30 pm to return to the Hotel Albuquerque around 5 pm. Museum admissions range from $5-7 for non-residents with the exception of the Wheelwright Museum which is free. Museum admissions and lunch are not included.

Valles Caldera National Preserve (8 am – 5 pm)

Take this opportunity to visit one of the most unique public lands in the United States. Formerly a private ranch, the Valles Caldera was designated as a National Preserve in 2000. The 89,000 acre preserve rests inside an ancient caldera that formed 1.1 million years ago. In a unique experiment in public land management, the preserve is also a sustainable working cattle ranch. Located in the beautiful Jemez Mountains, the grasslands of the caldera support the second largest elk herd in New Mexico, over 60 species of birds breed on the Preserve, and vistas include volcanic domes and Redondo Peak at 11,254 feet in elevation. We will learn about the operation and the natural history of the preserve on a short hike with one of the VCNP scientists. For the trip, hiking boots or other sturdy footwear are recommended, as well as binoculars, camera, layers of clothing for warm to cool weather, sunscreen, sunglasses, and a hat. Field trip fee includes round trip coach bus service from the Hotel Albuquerque, an onboard guide for the trip from Albuquerque through the Jemez Mountains, entrance fees, and a box lunch.

Sandia Mountains (9 am – 5 pm)

Basin and range topography of the Southwest is well known for displaying a series of life zones over relatively short distances, with higher elevations representing cool, moist islands surrounded by warm, dry desert landscapes. Our trip will visit each of the life zones found across an elevation gradient in the Sandia Mountains near Albuquerque. The trip will start in Albuquerque at 1,500 m (5,000 ft) and go to the summit of the Sandia Mountains at 3,000 m (10,000 ft). We will make a series of brief 30 minute to one hour stops in each of the following life zones: grassland, juniper, piñon-juniper, ponderosa pine, mixed-conifer, and spruce-fir. Guides will first briefly introduce the natural history features at each stop, then participants will be free to explore on their own. Spring flowers, butterflies, and birds should be abundant. This will be a full day trip, leaving the Hotel Albuquerque at 9 am on a tour bus, and returning at 5 pm. Transportation, lunches and water will be provided, along with two guides. Recommended items to bring: binoculars, camera, comfortable walking shoes, layers of clothing for warm to cool weather, sunscreen, sunglasses, and a hat. There are public restrooms at each stop, and a gift shop and restaurant at the last stop on the summit of the Sandias.

9:00 am – 3:00 pm NSCA Board of Directors Meeting, Fireplace Room

Museum Tours (1:00 pm – 5:00 pm)

University of New Mexico campus.
We will offer behind-the-scenes tours of the Maxwell Museum of Anthropology, Department of Earth and Planetary Sciences' Geology Museum and the Meteorite Museum, and we will finish at the Museum of Southwestern Biology (MSB). A bus will shuttle conference attendees to and from the University of New Mexico. Tour departs from the Hotel Albuquerque at Old Town at 1:00 pm, come 15 minutes early to board the bus. We will depart from the University of New Mexico at 5:00 pm.

Maxwell Museum of Anthropology (1:30 pm – 2:20 pm)

The Maxwell Museum of Anthropology offers exhibits and programs relating to cultures around the world, with a special emphasis on the cultural heritage of the Southwest. Reflecting a broad mission that encompasses the entire history of humankind, the museum's collections are worldwide in scope, with extensive holdings from throughout North, South, and Central America, Africa, Asia, Australia and the Pacific Islands. With its primary emphasis on the Southwest, the Maxwell is world-renowned for its holdings from this region. The Maxwell offers to visitors an

opportunity to experience the richness of human lifestyles in all their diverse expressions, providing a setting for both education and enjoyment unique in our state.

Meteorite Museum (2:30 pm – 2:50 pm and 3 pm – 3:20 pm)

The Meteorite Museum, as part of the Institute of Meteoritics, is located in the Department of Earth and Planetary Sciences. The museum displays many fine samples of stony, stony iron, and iron meteorites. The 75-square-meter museum is located on the ground floor of Northrop Hall.

Geology Museum (2:30 pm – 2:50 pm and 3 pm – 3:20 pm)

The Geology Museum, also located on the ground floor of the Department of Earth and Planetary Sciences, provides public exhibits of mineral, fossil, and rock specimens. Two exhibits focus on world-renowned geologic features in New Mexico -- the Jemez caldera and the Harding pegmatite mine, and another includes a large dinosaur bone available for close inspection. A separate room contains minerals that fluoresce when the lights are turned out. Cabinets of new acquisitions (e.g., a pair of dinosaur eggs) are also on display.

Museum of Southwestern Biology (3:30 pm – 4 pm and 4 pm – 4:30 pm)

The Museum of Southwestern Biology (MSB) contains research collections of vertebrates, arthropods, plants and genomic materials mainly from the Southwest, Central and South America. The museum's collections are housed in the newly remodeled CERIA (Center for Environmental Research, Informatics and Art) and span three floors covering a space of 25,900 ft^2. The MSB consists of seven divisions including, Amphibians & Reptiles, Arthropods, Birds, Fishes, Genomic Resources, the Herbarium and Mammals.

Due to time constraints we will have an ‘Open House’ of the collections, but can only offer two sets of guided tours. You can choose two options below, one starting at 3:30 pm, the other starting at 4 pm.

- Fishes, Amphibians and Reptiles
- Birds and Mammals
- Arthropods
- Genomic Resources
- Herbarium

3:00 pm – 5:00 pm	Trade Show set up, East and South Atrium
6:30 pm – 8:30 pm	**Ice-Breaker Reception** will be held at the nearby New Mexico Museum of Natural History and Science. During the reception the exhibits will remain open for the group.

Thursday May 25, 2006

7:30 am – 5:00 pm	Registration, outside of Alvarado E
7:30 am – 8:30 am	Continental breakfast, East and South Atrium
7:30 am – 8:30 am	Trade Show and poster set up, East and South Atrium
8:30 am – 5:00 pm	Trade Show and poster displays, East and South Atrium
8:30 am – 9:00 am	Welcome and Opening Remarks, Announcements, Alvarado E
	Cindy A. Ramotnik, Local Organizing Committee
	Donald W. Duszynski, MSB Welcome
	Daniel L. James, USGS Welcome
	Iris A. Hardy, SPNHC President
	Terry L. Yates, NSCA President

9:00 am – 10:00 am **Keynote Speaker,** Alvarado E
Jorge Soberón, Senior Scientist, Biodiversity Research Center of the University of Kansas. Lawrence, Kansas. *Museum Collections for Global Biodiversity Management.*

10:00 am – 10:30 am Break, East and South Atrium

10:30 am – 12:00 pm **Plenary Session**, Alvarado E

Moderator, Terry Yates, Office of the Vice President for Research and Economic Development, University of New Mexico.

10:30 am – 11:00 am
Richard M. McCourt, Program Director, Division of Biological Infrastructure, National Science Foundation, Arlington, VA. *So Many Collections, So Little Time--What Role Can NSF Play?*

11:00 am – 11:30 am
James N. Mills, Chief, Medical Ecology Unit, Centers for Disease Control and Prevention, Atlanta, GA. *Museums and Public Health Scientists—Do we need each other?*

11:30 am – 12:00 pm
John Wieczorek, Programmer/Analyst, Museum of Vertebrate Zoology, University of California Berkeley, Berkeley, CA. *BioGeomancer: The future of georeferencing.*

12:00 pm – 1:30 pm Lunch on your own

Notes

Concurrent Special Session 1: Permitting Issues: How to comprehend, cope and comply

1:30 pm – 3:00 pm, Alvarado E

Moderator, Linda S. Ford, Museum of Comparative Zoology, Harvard University

In the last decade, museums have seen a dramatic increase in permitting issues in relation to animals and animal products. The issues have gotten more numerous, noticeably complex, less forgiving for non-compliance, and at times, seemingly unfriendly towards collections and collection research and education. The resulting compliance to permitting laws and regulations has probably become the most consequential legal obligation of museums and educational institutions.

This session will examine different areas of permitting issues including:

- Why permitting issues have become more pressing world wide following the 1992 UN Convention on Biological Diversity, and how museums can respond.
- Overview of federal agencies in the US involved with permits and their requirements.
- Examination of the various international and US laws and regulations which require permits for the import and/or export of biological specimens of listed species.
- How laws to protect commerce animals are affecting museums, and how to comply with regulations not directly intended for museums.

Talks are listed in order and will be approximately 15 minutes with remaining time for open-panel discussion and questions.

Linda S. Ford, Manager of Collections Operations, Museum of Comparative Zoology Harvard University Cambridge, MA.
Permitting Issues: How to comprehend, cope and comply.

Leonard P. Hirsch, Senior Policy Advisor, Office of International Relations
Smithsonian Institution, Washington, DC.
Research (and collection, movement, transfer, use, security) regulations and permits for natural history in the 21st Century.

Monica Farris, Senior Permit Biologist, U.S. Fish and Wildlife Service, Division of Management Authority Branch of Permits, Arlington, VA.
Oh darn! Where's my permit?

Ellen Paul, Executive Director, The Ornithological Council, Chevy Chase, MD.
All about USDA wildlife import permits.

Discussion – open panel and question/answer period.

Concurrent Technical Session 1: Partnerships to improve the quality and relevance of museum collections

1:30 pm – 3:00 pm, Alvarado G-H

Moderator, Michael A. Mares, Sam Noble Oklahoma Museum of Natural History

1:30 pm – 1:45 pm
Overbeck Laise, K. *The State of Preservation of Natural Science Collections: A Report on the Heritage Health Index*.

1:45 pm – 2:00 pm
Lewis, D. and L. Clark. *Pitfalls on the Road to Productive Partnerships*.

2:00 pm – 2:15 pm
James, D.L. *The relevance of natural history collections to the USGS Status and Trends Program*.

2:15 pm – 2:30 pm
Romero, A., T. McKay, T. Risch, and S. Trauth. *Biodiversity Center Project at Arkansas State University*.

2:30 pm – 2:45 pm
Brigham, A. *Forging a Relation Between a Collections-Based Federal Assessment Program and the Museum Community*.

2:45 pm – 3:00 pm
Kronthal, L., S. Standley, and D. Fenkart-Froeschl. *Building partnerships to evaluate risk at the American Museum of Natural History*.

3:00 pm – 3:30 pm Break, East and South Atrium

Concurrent Special Session 2: Just What Do You Think You are Doing?

3:30 pm – 5:00 pm, Alvarado E

Moderator, John E. Simmons, University of Kansas Natural History Museum

North American natural history museums are staffed by an aging workforce. How will the next generation of natural history collections care workers be trained? Who will train them? What should they be expected to know? Are the traditional methods of training sufficient? If not, what new training formats should be developed? A panel of speakers will present three aspects of this complex issue. The first speaker, Stephen L. Williams, will address traditional paths to professional development, the future role of museum studies programs, and the relationship between museums and museum studies programs. Catharine Hawks will evaluate the teaching of preventive conservation in new frameworks for course content and training opportunities. John Simmons will examine a week-long, intensive workshop on collections care and management offered to museum professionals and students in developing countries. An open discussion on the future training of museum collections care workers will follow.

3:30 pm – 3:45 pm
Stephen L. Williams, Assistant Professor, Department of Museum Studies, Baylor University, Waco, TX.
Challenges of Educating and Training Future Workers for Natural History Collections.

3:45 pm – 4:00 pm
Catherine Hawks, Private Conservator, Falls Church, VA.
Preventive Conservation Education in the Natural Sciences: Time, and Time Again?

4:00 pm – 4:15 pm
John E. Simmons, Director, Museum Studies Program, University of Kansas
Lawrence, KS.
A short-term, intensive collections care training program.

4:15 pm – 5:00 pm
Discussion

Concurrent Technical Session 2: Consuming Issues: Keeping Collections Intact

3:30 pm – 5:00 pm, Alvarado G-H

Moderator, Laura Abraczinskas, Michigan State University Museum

3:30 pm – 3:45 pm
Monk, R., N. Duncan, L. Kronthal, C. Norris, and R. Perkins Arenstein. *The Integrated Pest Management Working Group*.

3:45 pm – 4:00 pm
Trock, D.K., M.E. Flannery, and J.E. DeMouthe. *Pest management in a transitional facility: a case study*.

4:00 pm – 4:15 pm
Purewal, V. and B. Colston. *New approaches to the identification and treatment of contaminants in herbaria*.

4:15 pm – 4:30 pm
Cushing, P.E., V. Pliler, C.S. Ware, and **J. Stephenson**. *Effect of residual anti-parasitic compound in meat on museum dermestid beetle colony*.

4:30 pm – 4:45 pm
Florian, M-L. *The overlooked film of the biofilms: curatorial, collections management and conservation concerns*.

4:45 pm – 5:00 pm
Gagnon, J-M., J. Bura, M. Draper, S. Forsyth, and D. Tran. *When Byne's Disease Attacks Bryozoans...*

Poster Session

Thursday, May 25, 2006 5:00 pm – 6:00 pm, South Atrium

Meet with the Poster presenters. Posters are available for viewing 8:30 am – 5:30 pm Thursday and Friday. Posters must be removed no later than 7:00 pm Friday.

Albe, M. *Berkeley Natural History Museums Consortium - Growth beyond old boundaries*.

Allen, B.M., D.E. Pitassy, J.G. Mead, and C.W. Potter. *Beaked Whale identification reference on the web: combining resources to create a virtual comparative collection*.

Barringer, K. and **P. Harwood**. *Ailanthus grows in Brooklyn: curation, data capture and presentation of herbarium specimens from New York, New Jersey and Connecticut*.

Bart, H.L., **J.W. Johansen**, and N.E. Rios. *Computerization and Curation of the Tulane Museum of Natural History Crayfish Collection*.

DeMouthe, J.F. *Partnerships with the amateur communities in natural science*.

Dock E. and P. Purba. *Cooperation and SYNTHESYS: key to progress?*

Gilbert, E., R. Schroeder, L. Landrum, and C. Gries. *Specimen Based Virtual Flora Model for Arizona*.

Golpinar, D. *Creating and maintaining intra-museum partnerships for a successful integrated pest management program*.

Hardy, I.A. and B.J. Dougherty. *Geoscience Cyberinfrastructure - A Virtual Repository Database for sample information online*.

Hussaini, B. and C.A. Norris. *The Fossil Invertebrate Digital Imaging Project at the American Museum of Natural History: A Case Study in Achieving Success with a Volunteer Staff*.

Klise, L.S. and L.J. Hickey. *Moving and Integrating a Paleobotany Collection*.

Leiby, M., H. Perry, J. Shultz, and G. Parsons. *Proposed Development of an Online Photo Library of Marine and Estuarine Fish and Invertebrates From the South Atlantic Bight, Gulf of Mexico and the Caribbean.*

Milligan, B., **R. Spellenberg**, D. Richman, and J. Frey. *Cooperating Organizations Document the Biodiversity of the Land of Enchantment: INRAM, CNHC, and NMSU Collections*.

Newman, K.W. and J. Hatcher. *Triangular Collaboration: A Case Study Bridging Public Education With Dinosaur Paleontology*.

Peurach, S.C. *Hair Identification: Applications and Collaborative Efforts*.

Russell, R., W. Merrill, L. Hollenberg, and **J. Whitacre**. *Ethnobotanical diversity in the border regions of U.S. and Mexico*.

Schroeder, R., E. Gilbert, L. Landrum, and C. Gries. *SEINet: The Southwest Environmental Information Networ*k.

Striley, D. and K. Omura. *Works for Me, Should Work for You: But Is It Science?*

Vanderplank, S. *The Society of Herbarium Curators - Won't You Join?*

Waddington, J. *Dinosaurs on the Move*.

6:30 pm – 7:30 pm Social, Franciscan Room

7:30 pm – 12:00 am **Banquet, entertainment, and dancing**

Franciscan Room at the Hotel Albuquerque. We have booked live musical entertainment for dancing after the banquet. The musical performers are Syd Masters and the Swing Riders, an award winning 3-piece band that specializes in Vintage Western Cowboy Swing. Music and dancing will be from 9:00 pm until midnight.

Friday May 26, 2006

7:30 am – 5:00 pm	Registration, outside of Alvarado E
7:00 am – 8:30 am	Continental breakfast, East and South Atrium

Special Interest Groups

7:30 am – 8:30 am Alvarado F

Below is a list of the Special Session Interest Group (SIG) topics and moderators:

Standards and the SYNTHESYS Project
Robert Huxley, The Natural History Museum

Integrated pest management
Richard Monk, American Museum of Natural History

Transportation of dangerous goods
Suzanne McLaren, Carnegie Museum of Natural History

Funding opportunities for natural history collections
Richard McCourt, National Science Foundation

Permits and other legal issues
Sally Shelton, Smithsonian Institution

Sensitive data access
Larry Speers, Global Biodiversity Information Facility

The continental breakfast is open 30 minutes before the start of the SIGs so that participants have time to select their beverage and pastry and bring it to the SIG table of their choosing.

8:30 am – 5:00 pm	Trade show and poster displays, East and South Atrium

Concurrent Technical Session 3: Biodiversity Informatics I: Building our knowledge community

8:30 am – 10:15 am, Alvarado E

Moderator, Chris Frazier, Institute of Natural Resource Analysis and Management - Biodiversity Division

8:30 am – 8:45 am
Bart, H.L., M. Mares, L. Page, A. Prather, Q. Wheeler, and J. Woolley. *Legacy Infrastructure Network for Natural Environments (LINNE)*.

8:45 am – 9:00 am
Butler, C., N. Thomson, D. Holland, B. Mathe, C. Rinaldo, and G. Waibel. *Natural Collections Descriptions: Update on a joint project*.

9:00 am – 9:15 am
Mosesso, J.P. *The National Biological Information Infrastructure: Building Knowledge Through Partnerships*.

9:15 am – 9:30 am
Cornish, L., C. Collins, **R. Huxley**, and S. Owens. *SYNTHESYS Network activity C; Assessing standards in Nine European Natural History Collections Museums: outcome of the surveys and developing the methodology and outcome of the surveys*.

9:30 am – 9:45 am
Macklin, J.A., R.K. Rabeler, and P.J. Morris, P.J. *Herbarium Networks Part II: Developing a framework for exchange of botanical specimen data to reduce duplicative effort and improve quality using a "filtered push*".

9:45 am – 10:00 am
Morris, P.J., J.A. Macklin, and R.K. Rabeler. *Filtered push: Exploring technical methods for efficient use of community knowledge to improve the quality of collections data*.

10:00 am – 10:15 am
Scotchmoor, J., D. Lindberg, T. White, J. Flynn, and R. Ross. *The Paleontology Portal: a unique partnership*.

Concurrent Technical Session 4: A Biodiversity of Topics

8:30 am – 10:15 am, Alvarado G-H

Moderator, Jean DeMouthe, California Academy of Sciences

8:30 am – 8:45 am
Bentley, A. *Spirited away - shipping dangerous goods*.

8:45 am – 9:00 am
Cosgrove, J.A. *Voucher specimens - specimens you are paid to take*.

9:00 am – 9:15 am
Kageyama, M. *When Mammalogists Started Caring About Voucher Specimens: Journal of Mammalogy Content Research*.

9:15 am – 9:30 am
Burke, M. *The UC Davis Arboretum GATEways Project- Building on Academic Partnerships to Secure a Stable Future for University Collections*.

9:30 am – 9:45 am
Flannery, M.E. *Documenting the biodiversity of the Gaoligong Mountains, Yunnan, China: a multidisciplinary, international collaboration*.

9:45 am – 10:00 am
Molineux, A., L. Benson, C. McCulloch, and S. Fitzsimons. *Taking the acid test: hidden problems brewing within tightly gasketed metal cabinets*.

10:00 am – 10:15 am
Davis, P.G. *The NHM's Collection Management Policy & Procedure Project: implementing best practice and standards in collection management*.

10:15 am – 10:30 am	Break, East and South Atrium
10:30 am – 11:30 am	SPNHC Annual Business Meeting, Alvarado E NSCA Annual Business Meeting, Alvarado G-H
11:30 am – 1:00 pm	Lunch on your own

Concurrent Special Session 3: Federally-associated collections in non-Federal Repositories

1:00 pm – 3:00 pm, Alvarado E

Moderator, Michael A. Bogan, Emeritus Curator, U.S. Geological Survey

The interactions between Federal agencies and non-Federal repositories regarding natural history specimens from Federal lands can be, and often are, characterized by a certain amount of miscommunication, misunderstanding, and mistrust between the two groups. The process, which can be complex, includes applying for a collecting permit on Federal lands, signing repository agreements or other paperwork, acquiring Federal accession and catalog numbers for specimens, and completing annual inventories for the specimens. One way to address these obstacles is through better communication and direct feedback.

This session will bring together representatives from the Department of Interior, National Park Service, and Bureau of Land Management as well as scientists who collect and curate specimens from Federal lands. The audience will learn about current legislation and regulations regarding collections from the Federal agency representatives and will hear how well the regulations work in practice and about some concerns from two museum-based scientists. This session will be of interest to a broad spectrum of professionals including Federal and non-Federal managers, scientists, collection managers, and museum directors.

1:00 pm – 1:20 pm
Ronald C. Wilson, Interior Museum Program Manager, Department of Interior Museum Program, Washington, DC.
Changing Accountability Rules for Federally Associated Collections.

1:20 pm – 1:40 pm
Carolyn McClellan, Chief, Cultural Heritage and Paleontological Resources and Tribal Consultation Division, Bureau of Land Management, Washington, DC.
The Challenges of Managing BLM's Natural History Collections.

1:40 pm – 2:00 pm
H. Greg McDonald, Senior Natural History Curator, National Park Service, Museum Management Program, Fort Collins, CO.
National Park Service Natural History Collections and Partner Repositories: Commensal or Parasitic Symbiosis?

2:00 pm – 2:20 pm
Eric Scott, Curator of Paleontology, San Bernardino County Museum, Redlands, CA, and K. Springer, and J.C. Sagebiel, San Bernardino County Museum, Redlands, CA.
Fossils from federal lands: partnering in preservation.

2:20 pm – 2:40 pm
James L. Patton, Emeritus Professor and Curator of Mammals, Museum of Vertebrate Zoology, University of California, Berkeley, CA.
The legacy of Joseph Grinnell: a century of collaborative science on the public lands of California.

2:40 pm – 3:00 pm
Discussion

Concurrent Technical Session 5: Biodiversity Informatics II: Tools for the museum community

1:00 pm – 3:00 pm, Alvarado G-H

Moderator, J. Tom Giermakowski, Museum of Southwestern Biology

1:00 pm – 1:15 pm
Chapman, A., R. Hijmans, A. Marino, R. De Giovanni, and S. de Souza. *Using the concept of "Outlierness" to identify suspect records in Primary Species Occurrence Data*.

1:15 pm – 1:30 pm
Heidorn, P.B., W. Wu, H. Zhang, N. Cellinese, and R. Beaman. *Machine Learning Specimen Metadata Digitization*.

1:30 pm – 1:45 pm
Bentley, A. *Specify 5.0 - Enabling Cyberinfrastructure for Biological Collections*.

1:45 pm – 2:00 pm
Spears, R. *Specify 6 - To Biodiversity and Beyond*.

2:00 pm – 2:15 pm
Murrell, Z.E. *Using partnerships to build a regional network of herbaria: SERNEC (SouthEast Regional Network of Expertise and Collections*).

2:15 pm – 2:30 pm
Lapham, C. and S. Ginzbarg. *SERNEC_LegacyConversion MS Access Application in Beta*.

2:30 pm – 2:45 pm
Heidorn, P.B., H. Zhang, W. Wu, E. Chung, and J. Wieczorek. *Machine Learning in BioGeomancer's Locality Specification*.

2:45 pm – 3:00 pm
Liston, A., M. Boock, M. Chau, K. Mitchell, and T. Reese. *Online access to specimen images and associated literature: a productive partnership between the Oregon State University Herbarium and Library*.

3:00 pm – 3:30 pm Break, East and South Atrium

3:30 pm – 4:00 pm, Alvarado E
Larry Speers, Program Officer, Global Biodiversity Information Facility, Copenhagen, Denmark.
The Global Natural History 'Metacollection' and the Future of Collections.

Capstone Speaker

4:00 pm – 4:50 pm, Alvarado E
Peter H. Raven, President of the Missouri Botanical Garden and Engelmann Professor of Botany at Washington University in St. Louis, Missouri.
World's Collection Resource: Critical Elements for Preserving Biological Diversity.

4:50 pm – 5:00 pm	Closing Remarks, Alvarado E
5:00 pm – 7:00 pm	Trade Show move-out, East and South Atrium
5:30 pm – 8:00 pm	SPNHC Second Council Meeting and dinner, Fireplace Room

Notes

Saturday May 27, 2006

Workshops

We are offering four workshops which will be held on the campus of the University of New Mexico in the Center for Environmental Research, Informatics and Art (CERIA, Building 83).

Workshop 1 - Data quality and data cleaning
8:00 am – 12 pm and 1 pm – 5 pm
Organizer: Larry Speers
Presenter: Arthur Chapman

The rapid increase in the exchange and availability of taxonomic and primary species data has made the consideration of the quality of these data an important agenda item as users of these data begin to require more detail on the quality of the information. No matter how efficient the process of data entry, errors will still occur. Thus, museums must apply to their data principles of error detection, validation and cleaning.

This workshop will examine the principles of data quality that should become core to the business of museum collections around the world as they release their data to the broader community. We will also examine methods for preventing, detecting, and cleaning errors in primary specimen databases, in general, and with respect to nomenclatural and spatial information.

Workshop 2 - The ins and outs of imaging for museum collections
8:00 am – 12 pm and 1 pm – 5 pm
Organizer/Presenter: Reed Beaman

This workshop will cover the basic concepts and methodology involved with imaging museum specimens. They will include discussion of methodology and best practices and discussion of the ins and outs of providing images on-line.

Workshop 3 - Arctos: a biodiversity informatics tool
8:00 am – 12 pm
Organizer: Gordon Jarrell

Arctos is a partnership among several museums to build a full-featured suite of Web applications over the evolving data model descended from the "MVZ Model." The University of Alaska Museum of the North and the Museum of Southwestern Biology are now the first museums to post their working collection data in a single system on the Internet. The University of California Museum of Vertebrate Zoology is reengineering its database to use Arctos and extending the system to include its ~100,000 pages of historic field notes and ~14,000 images cross-referenced to collection data. Software (GreF) also has been written to facilitate data capture from images and field note scans and to incorporate them into the specimen database. The session will have presentations describing the system and its several developing features.

Workshop 4 - Becoming a GBIF data provider
8:00 am – 5 pm
Organizer: Hannu Saarenmaa
Teacher: Giorgos Ksouris

Objective
This is a one-day hands-on training workshop about the basic technologies for data providers that are used in the Global Biodiversity Information Facility (GBIF) network. During the workshop attendees will learn the basics of how to install a DiGIR data provider, how to connect it to

database, how to map their local data model to the Darwin Core 1.2 standard, how to register the data provider with GBIF, and how to search data through GBIF data portal. Detailed agenda and prerequisites are given in http://www.gbif.org/Support/training/courses/course01.

The DiGIR network is designed to serve primary data on species occurrences derived from museum specimens and observational records. This training is designed to facilitate the development of a network of DiGIR providers serving primary data. In most instances these servers will be hosted by the Natural History Collections or other institutions that hold this type if data. *It would be expected that trainees already have access to these types of data sets or are preparing to train others that are willing to serve this type of data*.

Target Audience
The course is designed for database custodians and scientists who want to understand how GBIF data is provided.
The trainees should have some technical competence in these areas:

- Server operating systems covered (Linux/Unix and/or Windows 2000/XP): Basic to intermediate level of knowledge.
- Relational databases: Basic knowledge of the concepts.
- Internet: Basic knowledge of web servers such as Apache and IIS.
- XML: Basic knowledge.

Oral Presentation Abstracts

Bolded author name indicates presenter

Legacy Infrastructure Network for Natural Environments (LINNE)

The Legacy Infrastructure Network for Natural Environments (LINNE) is a new cyberinfrastructure initiative that aims to increase access to specimens and information in natural history collections, and accelerate the pace of taxonomic research. LINNE will establish an interactive network of taxonomists and institutions incorporating the latest technologies to seamlessly link researchers, biological collections and other research facilities, and state-of-the-art instruments for efficient species discovery, description, identification, and classification. LINNE will transform taxonomy and make comprehensive information on the world's species easily accessible to those who depend on knowledge of biological diversity. Nodes of the LINNE network will be existing institutions across the nation with biological collections and taxonomic research programs. Resources at each node (e.g. specimens, images, literature) will be available to researchers, educators, and policy-makers everywhere via the Internet. LINNE will modernize infrastructure for taxonomic research, enhance the nation's taxonomic workforce, modernize collection facilities, and update and verify specimen identifications. LINNE will support and benefit from linkages to a wide range of activities in ecology, ecosystem science, bioinformatics, information sciences, geology, land planning, and resource management, including NEON (National Ecological Observatory Network), GBIF (Global Biodiversity Information Facility), and CHRONOS (an Interactive Network of Data and Tools for Earth System History). In this talk, we provide an overview of LINNE and explain why this effort is vital to the natural history collection community.

Bart, H.L. *Tulane University Museum of Natural History, Belle Chasse, LA, USA*
Mares, M. Sam Noble Oklahoma Museum of Natural History, Norman, OK, USA
Page, L. Florida Museum of Natural History, Gainesville, FL, USA
Prather, A. Michigan State University, East Lansing, MI, USA
Wheeler, Q. The Natural History Museum, London, UK
Woolley J. Texas A&M University, College Station, TX, USA

Technical Session 3 - Friday, May 26

Spirited away - shipping dangerous goods

In the post 911 era, it has become increasingly difficult for those natural history collections preserved in alcohol or formaldehyde to fulfill one of their primary tasks - the loaning and exchange of material with scientists and other organizations. Due to the nature of the preservatives we use, packages containing wet natural history specimens were classified as hazardous materials long before 911. There are regulations in place, however, that alleviate the majority of the headaches and expense associated with this practice. Even still, the majority of people seem to either be unaware of these regulations or are blatantly ignoring them, while there appears to be a large amount of confusion regarding the interpretation of these regulations. A discussion of the regulations as they stand, what options exist for natural history specimens and how these regulations are enforced by the different shipping organizations (USPS, UPS, Fed-Ex, DHL etc.) will be discussed. A discussion on the possibility of having regulations put in place for natural history collections by the national (DOT) and international (IATA) governing bodies will also be outlined.

Bentley, A. *University of Kansas Natural History Museum, Lawrence, KS, USA*

Technical Session 4 - Friday, May 26

Specify 5.0 - Enabling Cyberinfrastructure for Biological Collections

The Specify Software Project is a systematics and biodiversity research community technology initiative which supports biological collections with database software, and with data management and helpdesk services. The effort operates as a software development collaboration; collections managers and curators are frequently consulted to establish priorities for new functions, to obtain beta-test feedback on new releases, and to address the unique and unusual requirements of individual collections. The Specify Project is based at the University of Kansas Biodiversity Research Center and the project has been funded for 19 continuous years by the U.S. National Science Foundation and has funding until 2009. Specify is in production use in over 150 collections in 16 countries, though most collaborating collections are in the U.S. The Specify database application, data management and software helpdesk services are backed by eight professional staff. In 2005, the Specify Project initiated a multi-part usability research process that included several site visits and interviews with hundreds of collections managers and curators across the country. The result of that work is a significant re-working of the "behavior" or usability of the Specify Windows interface including new options for navigation, searching, report creation and usage. Existing users will find expected functions and features, but both new and existing Specify users, will find the redesigned capabilities and "look-and-feel" of Specify to be more easily approachable and powerful for the day to day tasks of collections management and for publishing collections data through web and DiGIR interfaces.

Bentley, A. *University of Kansas Natural History Museum, Lawrence, KS, USA*
Specify Team University of Kansas Natural History Museum, Lawrence, KS, USA

Technical Session 5 - Friday, May 26

Forging a Relation Between a Collections-Based Federal Assessment Program and the Museum Community

The U.S. Geological Survey (USGS) uses high-diversity aquatic assemblages (algae, benthic invertebrates, and fishes) as environmental indicators in its National Water-Quality Assessment (NAWQA) Program. There is a biodiversity value to this continental-scale sampling program that extends beyond the original organizational objectives of resource interpretation. These large numbers of samples, over 6,000 to date for benthic invertebrates alone, represent a significant taxonomic and biogeographic resource if made accessible to the scientific community. Although the samples are collected for USGS objectives, the specimens have value beyond the original project's needs. This value may be viewed as a "triple-duty" scenario that includes (1) original assessment objectives, (2) a snapshot or time-capsule view of biodiversity at a particular time and place, and (3) as raw material for systematic, distributional, and other research to a diverse group of scientists. Storage, maintenance, and accessibility of these specimens are essential to their value, but the USGS only intended to be a short-term repository and is not equipped to handle this responsibility in perpetuity. We wish to implement a program that develops agreements with organizations known to the scientific community as repositories for such specimens, which can assimilate reference and voucher material of various groups transferred permanently into their collections if funds are available to cover accessioning. Automated metadata are associated with the specimens, and the USGS would create and maintain a web-based, single portal site identifying available material by taxon, site, and repository. We are here to begin the process with the museum community - identifying the criteria for developing agreements, assessing reasonable levels of curation support, identifying appropriate repositories for various taxonomic groups, and establishing a link between a national environmental assessment program with collections and their databases.

Brigham, A. *US Geological Survey National Water Quality Laboratory, Lakewood, CO, USA*

Technical Session 1 - Thursday, May 25

The UC Davis Arboretum GATEways Project- Building on Academic Partnerships to Secure a Stable Future for University Collections

In January 2003, the Director and Curator of the UC Davis Arboretum, an 100-acre living museum of plants used for education and research, decided to focus on developing deep and lasting partnerships with our most closely linked academic disciplines on the University of California, Davis campus. We also sought a way to link together the academic neighbors whose facilities border our physical site, as well create a meaningful partnership with the City of Davis. Beginning with a series of wide-open meetings with key partners to explore needs, opportunities, and possibilities, a new vision for the future of the UC Davis Arboretum began to emerge that links the regional visitor to the research, teaching, and scholarship of the university. This so-called "Big Idea" is now being considered as a serious contender to launch a full-campus comprehensive campaign. It has also positioned the UC Davis Arboretum for both the support of its basic museum operations and for the campus funding to launch a full-scale master plan for our garden and collection. Key faculty and staff across the campus now act as advocates and partners for the Arboretum, as we work together to secure a future for the collection that will serve and engage a much wider regional audience.

Burke, M. *University of California Davis Arboretum, University of California Davis, Davis, CA, USA*

Technical Session 4 - Friday, May 26

Natural Collections Descriptions: Update on a joint project

This presentation is an update on a multi-national collaborative project to provide access to collections-level information on natural history materials. The Natural Collections Description (NCD) project has developed a descriptive standard, and currently investigates strategies for a testbed implementation. The standard will allow institutions to share their data via an online database for the benefit of specialist and non-specialist audiences. NCD brings together museums, libraries, archives, herbaria and universities in a partnership supported by RLG (a non-profit cultural heritage organization) and the Global Biodiversity Information Facility (GBIF). The outcome of this collaboration, an XML schema for collection-level descriptions, will become part of the Taxonomic Databases Working Group (TDWG) suite of standards. The partners intend for this project to record the existence of collections throughout the world. This project was first presented at the SPNHC annual meeting in 2004.

Butler, C. *National Museum of Natural History, Smithsonian Institution, Washington, DC, USA*
Thomson, N. Natural History Museum, London, UK
Holland, D. Missouri Botanical Garden, St. Louis, MO, USA
Mathe, B. American Museum of Natural History, New York, NY, USA
Rinaldo, C. Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA
Waibel, G. Research Libraries Group, Mountain View, CA, USA

Technical Session 3 - Friday, May 26

Using the concept of "Outlierness" to identify suspect records in Primary Species Occurrence Data

Outliers in both environmental and geographic space can be identified using a "reverse-jackknifing" technique. This technique has been used to identify georeferencing error in species occurrence data. Recently, it has been incorporated into on-line applications using distributed data. The original technique was not successful in identifying errors using variables with small ranges (such as temperature and latitude). We have now refined the technique to better cater for the use of data sets with large value ranges (such as altitude and annual precipitation). We introduce the concept of "Outlierness" to provide an indication of the degree to which a record may be regarded as an outlier. We have used it in programs such as Diva-GIS, and an on-line data-cleaning tool. The concept will be incorporated into the BioGeomancer program to provide users with a simple method of identifying suspect records in their datasets, and to refine choices where a number of options exist when determining a georeference (e.g. where there are a number of possible alternate places identified from a locality description - such as towns with the same name, etc.).

Chapman, A. *Australian Biodiversity Information Services, Toowoomba South, Qld, Australia*
Hijmans, R. International Rice Research Institute, Los Baños, Philippines
Marino, A. Centro de Referência em Informação Ambiental, Barão Geraldo, SP, Brazil
De Giovanni, R. Centro de Referência em Informação Ambiental, Barão Geraldo, SP, Brazil
de Souza, S. Centro de Referência em Informação Ambiental, Barão Geraldo, SP, Brazil

Technical Session 5 - Friday, May 26

SYNTHESYS Network activity C; Assessing standards in Nine European Natural History Collections Museums: outcome of the surveys and developing the methodology and outcome of the surveys

SYNTHESYS is a five year project comprising 20 European natural history museums institutions and botanic gardens aiming to create an integrated European infrastructure for researchers in the natural sciences. The project has two parts, one providing support for researchers to access collections in Europe, the second a series of networking activities. Network activity C (NA_C) is focussing on identifying and improving standards of care management and access to European natural history institutions. In order to assess how SYNTHESYS partners meet these standards, a standardised survey methodology has been developed that benchmarks levels of attainment that European natural history museums currently meet. Over the past year, nine museums and herbaria have now been assessed using this methodology. The results and particularly the graphic representations used highlight areas of strength and weakness and can and have been used by institutions for internal management purposes, funding proposals etc. as well as contributing to a database of standards in Europe. Partly in response to feedback the methodology has been modified during the project and a risk assessment module has been added. Although intended originally to function at institution level the methodology can be adapted to work at lower granularity such as an individual collection, a specific room and/or at department level. The next stage will be to assess a further nine institutions using the strengthened methodology and if time allows to reassess some of the original nine to detect any changes. The spreadsheet design allows information to be extracted on training needs and this will inform the next phase of the NA C project which is devoted to identifying training needs and establishing a collections training network in Europe. Whilst this assessment methodology has been trialled in Europe it is hoped that it will find application in all natural science collections.

Cornish, L. Natural History Museum, London, UK
Collins, C. Natural History Museum, London, UK
***Huxley, R.** Natural History Museum, London, UK*
Owens, S. Royal Botanic Gardens, Kew, Surrey, UK

Technical Session 3 - Friday, May 26

Voucher specimens - specimens you are paid to take

Voucher specimens are generated for many reasons and by many diverse groups. The retention of voucher specimens is often part of a contract or may be required by law yet few contractors or agencies have the knowledge of infrastructure to document, preserve and store natural history specimens. Museums are the ideal institutions to deal with voucher specimens. This paper will talk about sources of specimens, how you can get paid to hold the specimens and how you can retain the specimens in your collection.

***Cosgrove, J.A.** Royal British Columbia Museum, Victoria, BC, Canada*

Technical Session 4 - Friday, May 26

Effect of residual anti-parasitic compound in meat on museum dermestid beetle colony

Many natural history museums with vertebrate collections process the skeletal material using dermestid beetles (Dermestidae, *Dermestes* spp.). The present study experimentally tests the postmortem effects prophylactic drug treatment of vertebrates can have on dermestid beetles. Meat from a wolf specimen obtained from the Denver Zoo was given to the Denver Museum of Nature & Science dermestid beetle colony for processing. Subsequently, a dramatic decline in the health of the colony was noted. We conducted a controlled experiment to determine if the wolf meat was, in fact, responsible for the decline. Dermestid beetles fed the wolf meat showed much more pronounced mortality, particularly in the larval stages, than dermestids fed beef. With the assistance of veterinarians at the zoo, we obtained the medical history of the wolf and determined that the most recent medicine the animal had been administered on a regular basis was a monthly dose of lufenuron, an antiparasitic compound used to control fleas, and milbemycin oxime, used to control endoparasitic worms. According to the product information, lufenuron primarily affects the egg development of fleas. We propose that lufenuron remaining in the muscle tissue of the wolf, approximately two months after its last treatment, had a profound effect on the development of the larval stages of the dermestid beetles and on the ability of adults to successfully pupate.

Cushing, P.E. Denver Museum of Nature & Science, Denver, CO, USA
Pliler, V. Denver Museum of Nature & Science, Denver, CO, USA
Ware, C.S. Denver Museum of Nature & Science, Denver, CO, USA
***Stephenson, J.** Denver Museum of Nature & Science, Denver, CO, USA*

Technical Session 2 - Thursday, May 25

The NHM's Collection Management Policy & Procedure Project: implementing best practice and standards in collection management

From June 2003 to February 2004 the Natural History Museum London undertook the Collection Management Standards Project. This project identified current global best practice and the frameworks of standards in Natural History collection management. To ensure that these identified standards were embedded in the day-to day activities of collection management at the NHM a policy and procedure project was undertaken. Whilst the NHM has had Collection Management Policies in place since 1998, the standards project highlighted that this was in need of revision. The major reasons for this is that the policies needed to be consistently applied across the whole museum and that the scope of the policies needed to be as wide ranging and as encompassing as possible to ensure that no area of activity was not covered. In total 24 policies were solely required for collection management activities, covering a range of topics from acquisition to valuation control. In addition a further seven policies that have a wider museum remit (e.g. security, volunteers, access) will form a second phase of the project. The range and content of these policies and procedures will be discussed along with the techniques that were used to introduce them.

***Davis, P.G.** Natural History Museum, London, UK*

Technical Session 4 - Friday, May 26

Oh darn! Where's my permit?

The USFWS presentation will discuss the various laws and their associated regulations which require permits for the import and/or export, interstate and foreign commerce of biological specimens of listed species. These laws include the U.S. Endangered Species Act, Marine Mammal Protection Act, Migratory Bird Treaty Act, African Elephant Conservation Act and the Convention on International Trade in Endangered Species of Wild Flora and Fauna. I will briefly mention the possibility of needing permits for live specimens under those laws and the Wild Bird Conservation Act and Injurious Wildlife provisions of the Lacey Act. The primary purpose of these laws is the protection of the species in the wild, to facilitate their conservation, meet the U.S. obligations under international treaties and monitor the effect of commerce on listed species. The talk will outline the procedures for obtaining the required permits and clearing and validation of the permits.

Farris, M. *United States Fish and Wildlife Service Management Authority, Washington, DC, USA*

Special Session 1 - Thursday, May 25

Documenting the biodiversity of the Gaoligong Mountains, Yunnan, China: a multidisciplinary, international collaboration

After an invitation in 1997 from the Yunnan Commission on Science and Technology, and a successful pilot expedition in 1998, the California Academy of Sciences (CAS) was awarded a $2.4m NSF grant to survey and research the biodiversity of the Gaoligong Mountains (GLGS) of southwestern China. The GLGS is part of the Hengduan Mountain Range in Yunnan Province and is an important region of high endemism and biodiversity within China. The GLGS Biodiversity Project is broadly multidisciplinary, with participants from a wide-range of research departments including: Botany, Entomology, Vertebrate Zoology, and Vertebrate Paleontology. The project is multi-national with participants from various institutions throughout China, the United Kingdom and the United States working together towards the goal of improving the knowledge of the native flora and fauna of the GLGS through rigorous sampling, collecting, and study of the modern and Pleistocene biota. More than 100 collaborators around the world examine material and data collected in the field each year. Through this collaborative work, CAS scientists have provided training in systematic biology, paleontology, specimen curation, and collections management to many Chinese colleagues. During expeditions, project participants also provide valuable, informal science education to Chinese foresters, teachers, local government officials, and local residents. A project of this magnitude takes much planning and coordination to be successful. Throughout the past four years of this project we have worked through many issues including: permitting problems, difficulties importing and exporting specimens, weather delays, and cultural differences among participants. In this talk, I will discuss various lessons we have learned that will be useful to anyone contemplating an international collaboration of this kind.

Flannery, M.E. *California Academy of Sciences, San Francisco, CA, USA*

Technical Session 4 - Friday, May 26

The overlooked film of the biofilms: curatorial, collections management and conservation concerns

Biofilms are fungal, bacterial and algal colonies which grow as a surface growth on a slimy film. In reality it includes all microorganisms and some protozoans. The film is not just slime, extracellular polysaccharides (EPS), it is a structured extension of the cell, covering all cells. It is an interface structure that buffers the cells from the environment and substrate. It has many roles. It is the site of enzymatic activity re nutrients. Oxygen, carbon dioxide and water interactions between cells and their environment and substrate occur here. It has many other roles, i.e., substrate detoxification, antibiotic resistance, metal chelating, ultraviolet and desiccation protection, etc. In chemical analyses using dry weight of the structures of the microorganisms it is not included despite the fact that is commonly over 50% of the biomass of the colony. It has not been collected as a part of the microorganisms and it has not been addressed in conservation treatment of fungal infested materials.

Florian, M-L. *Royal British Columbia Museum, Victoria, BC, Canada*

Technical Session 2 - Thursday, May 25

Permitting Issues: How to comprehend, cope and comply

In the last decade, museums have seen a dramatic increase in permitting issues in relation to animals and animal products. The resulting compliance to permitting laws and regulations has probably become the most consequential obligation of museums and educational institutions. The seriousness of this responsibility stems from permitting issues having a broad application and potentially harsh legal consequences if not followed, especially in the US. Compliance applies regardless of whether the animal material is an elephant, feather, insect, or tissue; whether the material is collected/acquired for the first time or an incoming/outgoing loan of accessioned animals; or whether the purpose is for scientific research, or not. In the US, an added complexity is that legal compliance may involve not only multiple agencies but multiple US Executive Departments including the Department of the Interior, Department of Agriculture, Department of Commerce and Department of the Treasury. Consequences for noncompliance generally fall under the Lacey Act and can potentially include civil and/or criminal penalties. The Lacey Act not only enforces US laws, but also the relevant laws of foreign countries within the borders of the US.

Ford, L.S. *Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA*

Special Session 1 - Thursday, May 25

When Byne's Disease Attacks Bryozoans...

Byne's disease, often recognized by the formation of mineral efflorescence from the degradation of calcium carbonate structures by exposure to acidic vapours, is generally observed on mollusc shells. A collection of dry bryozoans at the Canadian Museum of Nature now suffers from this disease. The collection was acquired about 26 years ago and subsequently stored in an oak slide cabinet. Each bryozoan is mounted within a well, on a wood slide lined at the bottom with a paper-based board. The combination of these materials, each capable of releasing acidic vapours, and the highly variable environmental conditions experienced in our old facility is likely to have contributed to the observed damage. However, since not all bryozoans have an exoskeleton composed of calcium carbonate, the effect of acidic vapour exposure varied significantly amongst specimens. Furthermore, some specimens encapsulated in Canada Balsam are protected partly or completely from the "Disease". Considering the new, "cleaner" environment of the new storage (i.e. custom-made acrylic cabinet and polystyrene trays) and the new museum facility, it may be unnecessary to risk extracting the Bryozoa specimens from the remaining acidic slide mounts (e.g., physical damage, lost of pieces, remounting). Baseline data from the 2005 condition survey, including photos of each slide, will allow detection of any sign of further deterioration in subsequent condition surveys.

Gagnon, J-M. *Canadian Museum of Nature, Ottawa, ON, Canada*
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Draper, M. Applied Museum Studies Program, Algonquin College, Ottawa, ON, Canada
Forsyth, S. Applied Museum Studies Program, Algonquin College, Ottawa, ON, Canada
Tran, D. Applied Museum Studies Program, Algonquin College, Ottawa, ON, Canada

Technical Session 2 - Thursday, May 25

Preventive Conservation Education in the Natural Sciences: Time, and Time Again?

The recent Heritage Preservation publication, A Public Trust at Risk: The Heritage Health Index Report on the State of America's Collections, clearly demonstrates that preventive conservation concepts have not reached most stewards of cultural property. Not only is it rare to have paid staff assigned to collections care, those who do have the responsibility often lack the necessary training to make cost-effective and informed decisions. Preventive conservation is about outwitting time and finding means to slow the inevitable deterioration of materials. As a consequence, preventive conservation has been a component of a number of museum studies graduate programs for nearly 30 years. The syllabi for most courses in North America cover similar material, including the science of the materials that comprise all heritage collections, an understanding of the impact of agents of deterioration on these materials, conservation ethics, handling guidelines, condition documentation, preservation assessments, emergency preparedness, and testing materials used with collections. The content is taught in three basic modes: semester-long, campus-based courses; intensive short-courses (3-4 week periods); and distance learning. Anyone who has taught in all three modes is likely to have a preference for intensive, short courses. Courses at the graduate level involve adult learners who are often working professionals. The intensive format seems to work with this audience and was extremely successful as the model for the Bay Foundation Natural Science Collection Care Training Courses in the 1980s. The semi-quantitative risk assessment short courses pioneered by Robert Waller and others hold promise as one mechanism for delivering preventive conservation in an effective and efficient manner. Museum studies programs could experiment with short, 3-credit courses offered in summer programs and at off-campus venues. Experimenting with new frameworks for course content and expanding training opportunities are important, if not imperative, given the current status of collection care.

Hawks, C. *Falls Church, VA, USA*
Special Session 2 - Thursday, May 25

Machine Learning Specimen Metadata Digitization

The value of data on museum specimens is greatly enhanced when it is converted to digital format where is can be readily accessed within the museum, through the world-wide-web or through data federation efforts such as DiGIR and GBIF. The HERBIS project demonstrates the usefulness of machine learning (ML) techniques to reduce the costs of the digitization process. ML techniques are integrated into the data flow in the HERBIS project, allowing people to verify and correct data rather than requiring them to enter all data by hand. In the supervised ML techniques used in HERBIS, a small fraction of representative labels are processed by hand to make a training set. This represents the information that should be extracted by the ML system. In the training phase, the ML system builds a computational model that encode statistical and structural consistencies in the training set that will be used to process new sets of labels coming directly from optical character recognition (OCR) software that converts herbarium labels to unstructured character strings. These unstructured strings are channeled through ML modules that use the previously generated computational models to return the label information is a structured XML format containing a superset of the Darwin core elements that were included in the original labels including "genus", "species", "collector name", "collection date" and 22 other data components. These data elements can be verified by the users for final data entry into databases. Performance of the system does not depend on the individual structure of the labels as it would in a machine learning approach. Future work in HERBIS ML could allow users to train the system on their own data sets insuring maximum performance without the need for programming staff.

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Wu, W. Computer Science Department, University of Illinois, Urbana, IL, USA
Zhang, H. Graduate School of Library and Information Science, University of Illinois, Champaign, IL, USA
Cellinese, N. Peabody Museum of Natural History, Yale University, New Haven, CT, USA
Beaman, R. Peabody Museum of Natural History, Yale University, New Haven, CT, USA

Technical Session 5 - Friday, May 26

Machine Learning in BioGeomancer's Locality Specification

One of the most exciting areas of information utilization in natural history collections is the unlocking of locality information for specimens. The location information on specimens can help to determine the historic distribution and environmental requirements of species. Unfortunately, the majority of the information is usually in Natural Language (NL) such as "5 miles NW of Champaign, IL" rather than the latitude and longitude that is needed for mapping and modeling applications. The BioGeomancer Project (http://www.biogeomancer.org/) provides a computer-based system that helps people world wide to more efficiently and accurately make the conversion from NL to latitude, longitude, precision and accuracy information. BioGeomancer demonstrates the usefulness of machine learning (ML) techniques to reduce the costs of the digitization process. While the regular expression approach to information extraction from natural language locality strings is quick and effective on well structured texts, the advantage of ML is that it can adapt to new information formats and is comparatively more robust in the face of data errors than standard regular expression approached. ML techniques are integrated into the data flow, allowing people to verify and correct data rather than requiring them to enter all data by hand. There are three steps to the ML process here. First, the system uses human generated information extraction from the NL to "learn" a computational model of correct information extraction. Then, using this model each clause in the locality string is assigned to one of several dozen locality types such as "Offset from a Feature" (FOH). Then the information imbedded in the NL is stored in a single data structure. This data structure is used by non-machine learning components of BioGeomancer such as "Spatial Interpretation", "Mapping" and other subsystems to calculate and verify the latitude and longitudes.

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Wu, W. Computer Science Department, University of Illinois, Urbana, IL, USA
Chung, E. Linguistics Department, University of Illinois, Urbana, IL, USA
Wieczorek, J. Museum of Vertebrate Zoology, University of California, Berkeley, CA, USA

Technical Session 5 - Friday, May 26

Research (and collection, movement, transfer, use, security) regulations and permits for natural history in the 21st Century

We are the problem, we are the solution: Collections organizations as users of genetic resources--policies, ethics and policing. The brave new world of the UN Convention on Biological Diversity is pitting the providers of biodiversity against the users. What must collections organizations do to rebuild trust and respond to the needs arising from the obligations and expectations of the Convention?

Hirsch, L.P. *Smithsonian Institution, Washington, DC, USA*

Special Session 1 - Thursday, May 25

The relevance of natural history collections to the USGS Status and Trends Program

The USGS Status and Trends Program (Program) provides biological data on the distribution and abundance of plants and animals for local, regional, and national assessments of our living resources. Ultimately, the Program seeks to understand the status and trends of plant and animal populations and to discern large-scale patterns of ecosystem health. USGS staff activities in the Program include performing biological inventories on national parks and other Federal lands, developing monitoring standards and protocols, providing specimen identification services, and conducting taxonomic and systematic research on North American vertebrates. Voucher specimens that result from biological inventories are archived in natural history collections and are available for scientific study. The USGS manages and curates two important natural history collections for the Department of the Interior. USGS staff at the National Museum of Natural History, Washington, DC, are responsible for North American vertebrate collections at the Smithsonian Institution, while USGS staff at the Museum of Southwestern Biology in Albuquerque, NM, manage and curate Federal specimens in this collection and conduct biological inventories on western Federal land.

James, D.L. *U.S. Geological Survey, Biological Resources Discipline, Reston, VA, USA*

Technical Session 1 - Thursday, May 25

When Mammalogists Started Caring About Voucher Specimens: Journal of Mammalogy Content Research

The natural history research community has continued influence on the professional standards and best practices in museum collection management - what, why, and how we should collect and preserve as voucher specimens. The author considers that a long-term series of scientific papers published in a particular field of natural history studies reflects the historical transition in researchers' views on vouchers and their public accessibility. Specifically, standard formats of Materials and Methods in biological papers have undergone major changes over the decades, due to not only sophistication and specialization in subject matter and research techniques, but probably also change in authors general perspectives on museum specimens that were collected and/or examined in their study projects. In the first attempt to elucidate such historical trends in literature, content published in the 87 volumes (1919-2006) of the Journal of Mammalogy was extensively investigated. Papers containing the term voucher(s) as well as those citing catalogued museum specimens were extracted and analyzed with particular attention to publication years, subject categories, authors affiliations, collection- or specimen-specific data, and the usage of related terminology in context. The online JSTOR journal archive was used to search for key phrases that occurred in articles. Results suggest that the late 1960s can be understood as an initial phase when the concept and practices of voucher specimens started to materialize in a more comprehensive manner than ever among North American mammalogists.

Kageyama, M. *University of Colorado Museum, Boulder, CO, USA*

Technical Session 4 - Friday, May 26

Building partnerships to evaluate risk at the American Museum of Natural History

The American Museum of Natural History is conducting a comprehensive evaluation of the risks to their research collections. Such an endeavor demands that currently available risk assessment techniques and tools be customized to suit the collection/institution of focus. This is done in partnership with the developers of the model but also requires endorsement and support from upper level administration, collaboration among staff from science and facilities operations for gathering buildings/collections data and alliances with regional experts and agencies in obtaining risk data applicable to a specific location. Strategies developed for efficiently tapping into internal staff resources will be presented, as will methods for identifying external resources to provide site-specific data - such partnerships are invaluable to the success of an effort of this magnitude. Additionally, development of a database for better organizing and linking collections, building, site and risk data provides an exceptionally time-saving management tool and is a strong example of how a successful partnership works to improve a process.

Kronthal, L. *American Museum of Natural History, New York, NY, USA*
Standley, S. American Museum of Natural History, New York, NY, USA
Fenkart-Froeschl, D. American Museum of Natural History, New York, NY, USA

Technical Session 1 - Thursday, May 25

SERNEC_LegacyConversion MS Access Application in Beta

SERNEC is Cooperative group dedicated to getting South Eastern US herbarium data on Portals. The SERNEC_DataConverter will convert legacy data in a wide variety of formats into the proposed V1.4 version of Darwin Core Schema (DwC). Any data that can be imported into MS Access, is likely useable. One can export to DwC from local formats but, if the local format is DwC, then DwC data, such as GBIF dumps, will import without conversion. This will help improve data sharing. The DwC schema does not restrict text data; anything can be entered and will be accepted. This can cause consistency problems. SERNEC is using shared look-up tables which allow look-ups and validation of existing verbatim data. Three taxonomic dictionaries are included. All are in the DwC format: 1. ITIS; 2. Plants; 3. A user defined taxonomy. All three will write 12 DwC fields when one clicks a taxon. ITIS and Plants should be ICBN compatible. For georeferencing, SERNEC has assembled a collection of fast batch programs for: 1. County centroids; 2. TRS centroids; 3. UTM coordinates; 4. Gazetteer matches; 5. A freeware mapper has been integrated to make state maps to display the batch data for checking questionable input. A rare taxa database will permit flagging rare taxa so sensitive data can be "dummied up" before it gets on the web. As yet it only contains US data from plants. The Application is available without charge. The code is open so it can be customized for other regions.

Lapham, C. *Kentucky Native Plant Society*
Ginzbarg, S. University of Alabama Herbarium, Tuscaloosa, AL, USA

Technical Session 5 - Friday, May 26

Pitfalls on the Road to Productive Partnerships

The herbaria of the University of Iowa (IA) and Iowa State University (ISC) were each founded ca. 1870 and grew to become major resources of international prominence. Beginning at least as early as 1999, a series of events and decisions led to the proposal in 2001 by University of Iowa administrators to merge IA with ISC. Opposition began with a letter-writing campaign and culminated in the filing of a lawsuit to block the merger. Packing and moving the holdings of IA (ca. 230,000 specimens), incorporating these into available space at ISC (which had ca. 430,000 specimens prior to the merger), and seeking funding for these activities had to be handled while maintaining routine operations at ISC. In addition, communicating with the parties involved, the scientific community, and the media about conflicting issues and goals was inescapable and essential. The first attempt to move IA's holdings in March 2004 resulted in a temporary restraining order. Later, the restraining order was lifted and the move was resumed. In the absence of external funding, the universities provided resources for the move, the installation of a mobile storage system, and other renovation of ISC. Still, the merger remained in limbo until the court case was heard in June 2005, and the judge's decision supporting the universities' right to merge the collections was announced in August 2005. Lessons learned from these experiences include aspects of planning and organizing the moving and housing of the collections, ensuring care of the collections at each step of the process, understanding and working within the institutional chain of command, and becoming knowledgeable about the legal issues. Perhaps the most important lesson is the need to promote a strong and active collection indispensable to a wide array of users.

Lewis, D. *Ada Hayden Herbarium, Iowa State University, Ames, IA, USA*
Clark, L. Ada Hayden Herbarium, Iowa State University, Ames, IA, USA

Technical Session 1 - Thursday, May 25

Online access to specimen images and associated literature: a productive partnership between the Oregon State University Herbarium and Library.

The Oregon State University (OSU) Herbarium is an essential resource for biodiversity research in the Pacific Northwest. With over 400,000 specimens, it maintains the world's largest collection of Oregon plant and fungal specimens. The OSU Valley Library is dedicated to creating targeted digital collections in support of academic research. In partnership with the OSU Valley Library, we have digitized the original descriptions (protologues) of 750 Oregon plant taxa represented in the herbarium's type collection, and imaged the associated 1250 type specimens. The type specimen database was completed as part of the NSF-sponsored databasing of all Oregon specimens in the OSU Herbarium. The compilation of protologues was carried out by the herbarium, while the library obtained reproduction permission from authors and publishers of copyrighted materials. Digital capture of specimens, scanning of original descriptions, data migration and metadata processing was handled by the OSU Libraries' Digital Production Unit. ContentDM is the digital collection management software used. The specimen images and protologues are publicly available through the OSU Valley Library Digital Collections: http://osulibrary.oregonstate.edu/digitalcollections/ We will present an overview of the project, describe future directions and discuss some of the lessons learned during its implementation. Our ultimate goal is to make available digitized protologues of all 4500 plant taxa in the Oregon flora. We hope this project will serve as a model and catalyst for other major state and regional herbaria in the United States, ultimately leading to a networked resource that would serve local, regional, and international interests.

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Boock, M. Oregon State University, Corvallis, OR, USA
Chau, M. Oregon State University, Corvallis, OR, USA
Mitchell, K. Oregon State University, Corvallis, OR, USA
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Technical Session 5 - Friday, May 26

Herbarium Networks Part II: Developing a framework for exchange of botanical specimen data to reduce duplicative effort and improve quality using a "filtered push"

The Herbaria community's goal of capturing all specimen data (approx. 90 million sheets!) by 2020, looms. Last year the authors reported that a significant amount of duplication of specimens was inherent within North American botanical collections. This duplication is an advantage in two ways: if only captured once it reduces the number of specimens that will require capturing, and when done collaboratively using common resources, a high level of quality control can be maintained. Two long-standing impediments to sharing specimen data between institutions have been a lack of data standards and the diversity of database platforms in use. Progress is being made in standardizing botanical information for incorporation into schema to facilitate exchange in distributed networks. These distributed networks allow unidirectional request-response queries to be made at a node, which has access to the records of any member institution. The limitation of this network becomes apparent when a user identifies an error in a record, has additional knowledge to append to a record, or has an expert opinion on the object associated with the record. The second impediment is a significant roadblock to achieving direct exchange with an institution's herbarium database, as they must be safeguarded from non-verified community data being directly inserted. Thus, we propose a framework for bi-directional flow involving a central repository and a local holding database that acts as a gateway in and out of an institution's herbarium database. Three core needs are addressed: 1. Gated access with human review of sets of "filtered" information gathered from the community pool before insertion into the herbarium database; 2. Pre-pooling of community data based on a user request to avoid latency issues while doing live capture; 3. "Pushing" annotations based on authoritative specimens and/or expert opinions to a central repository for distribution to relevant local holding databases.

Macklin, J.A. *Harvard University Herbaria, Harvard University, Cambridge, MA, USA*
Rabeler, R.K. Herbarium, University of Michigan, Ann Arbor, MI, USA
Morris, P.J. Academy of Natural Sciences, Philadelphia, PA, USA

Technical Session 3 - Friday, May 26

The Challenges of Managing BLM's Natural History Collections

The BLM manages over 261 million acres that contain some of the largest body of cultural resources of any Federal land managing agency. The BLM, as a multiple-use agency, has the extra challenge of balancing the public's demand for both protection and extraction of those resources. The vast majority of natural history collections generated from public lands are housed in non-federal repositories. This session will cover successful partnerships, in addition to challenges encountered by permitting activities, increased reporting requirements and the alarming lack of space many repositories are facing.

McClellan, C. *Bureau of Land Management, US Department of Interior, Washington, DC, USA*

Special Session 3 - Friday, May 26

National Park Service Natural History Collections and Partner Repositories: Commensal or Parasitic Symbiosis?

Natural History collections in parks are one of the many tools available to NPS natural resource managers. These collections often serve as one of the primary sources of documentation of park natural resources and historical collections can play a critical role in documenting changes in park resources and can indicate the success or failure of management policies. Despite the importance of this resource both to parks and outside researchers many parks often lack the funding, staffing or physical facilities to provide the appropriate level of care required by different biological materials. In order to ensure the proper stewardship of these resources parks often partner with nonfederal repositories, whether universities or museums, that can provide the technical expertise or appropriate storage conditions. While storage of NPS natural history specimens in partner repositories can be mutually beneficial it can be a challenge. This challenge stems from two factors: natural history specimens originating from parks seem to carry an added importance (which may be imaginary, implied or real) not associated with similar specimens from other federal lands and because the National Park Service has an active museum management program with many policies and regulations related to the management and accountability of collections, not associated with other federal land management agencies. The partnership between parks and outside repositories works because ultimately we share a common goal and vision to ensure the long-term protection of these specimens and their availability for scientific research, exhibits and education. The challenge is to ensure that both parties understand the needs and limitations of the other and to create a mechanism that will allow each to accomplish their respective missions while ensuring the appropriate level of stewardship and accountability to the American public for these specimens while faced with decreasing financial and staffing resources at both parks and the partner repositories while maintaining a true partnership in which both parties benefit.

McDonald, H.G. *Park Museum Management Program, National Park Service, Fort Collins, CO, USA*

Special Session 3 - Friday, May 26

Taking the acid test: hidden problems brewing within tightly gasketed metal cabinets

Deterioration of several carbonate rich type specimens caused immediate concern within the Non-vertebrate Paleontology Laboratory of the Texas Natural Science Center. The collection is climate controlled with un-vented, metal, gasketed cabinets with wooden drawers. A project to monitor acidity, out-gassing of organic acids from the drawers, and sulfur fumes from specimens began in May 2005 and was later broadened to include multiple repository environments. Initial testing used proprietary testing kits containing acid detection strips, lead and silver coupons and glass jars. The extended study added regular litmus paper for testing acidity. Procedures strictly followed test kit guidelines using closed jar environments where feasible. Common components of repository conservation, acid free boxes, inert foams, plastic bags and an empty control jar were included. Closed cabinet environments, more normal to the collections, were also tested. Uncapped control jars were placed within each major room environment. Initial results indicated no problems with standard conservation materials, but an increase in acidity was observed within wooden drawers inside metal cabinets. Lead coupon reactions confirmed organic acid problems from wooden drawers. Noticeable acidity was recorded in metal drawer and cabinets housing "pyrite diseased" specimens. Experimental problems included the subjectivity of estimating "color change" of acid detection papers even with a color guide pencil, and uncertainty surrounding the quality of these "air" acid tests. The data indicate that several procedures need to be re-examined. The presence of organic acids in both treated and untreated drawers confirmed earlier suspicions based on odor. Well-sealed metal cabinets housing wooden drawers, selected in a struggle for economy, are producing a problematic microenvironment. Interactions between specimens hint that cabinets with such restricted airflow are deleterious under such circumstances. Isolation of deteriorating specimens removes reactive material; however, our data suggests that their environment is not ideal.

Molineux, A. *Non-vertebrate Paleontology Laboratory, Texas Natural Science Center, University of Texas, Austin, TX, USA*
Benson, L. Texas Natural Science Center, University of Texas, Austin, TX, USA
McCulloch, C. Non-vertebrate Paleontology Laboratory, Texas Natural Science Center, University of Texas, Austin, TX, USA
Fitzsimons, S. St. Andrews High School, Austin, TX, USA

Technical Session 4 - Friday, May 26

The Integrated Pest Management Working Group

The Integrated Pest Management Working Group was set up in 2002 as an ad hoc group of museum professionals dedicated to the development of pest management resources for the general museum community. All museums are concerned about insect pests and many use IPM as a method for addressing these concerns. The group's goal is not to teach IPM, but rather to focus on resources to make IPM easier for museum staff. Museums have similar challenges with regard to pest management and the aim of the group is to help solve problems while alleviating the need for each and every museum to come up with separate solutions. This presentation will describe some of the initiatives being pursued by the group, including the development of on-line resources for collections care personnel to use in identifying real or potential threats to their collections; assessing the need for IPM databases; and developing training resources, both printed and electronic, for museum staff with pest management responsibilities; as well as compiling best practices documents and information regarding various treatment methods.

Monk, R. *American Museum of Natural History, New York, NY, USA*
Duncan, N. American Museum of Natural History, New York, NY, USA
Kronthal, L. American Museum of Natural History, New York, NY, USA
Norris, C. American Museum of Natural History, New York, NY, USA
Perkins Arenstein, R. Conservator in Private Practice, New York, NY, USA

Technical Session 2 - Thursday, May 25

Filtered push: Exploring technical methods for efficient use of community knowledge to improve the quality of collections data

Efficiency and stewardship form a central tension in biodiversity informatics. Collections personnel are stewards of objects in their collections and the data that gives these objects scientific value. Large scale data capture projects (90 million herbarium sheets in 15 years) cannot be accomplished without significant improvements in efficiency over specimen by specimen data capture and quality review. How can we balance the competing needs of stewardship and efficiency? Under what circumstances will I allow the broader biodiversity community in through a network to alter the authoritative collection databases over which I have stewardship? We propose a network of institutional nodes and replicated central servers exchanging XML documents with digital signatures over encrypted connections to separate record by record data capture from both network queries and quality control processes. A sine qua non for this network is secure communication. Stewardship demands a human gateway between local authoritative databases and the network. Efficiency requires separating record by record data capture from the execution of queries and data checking routines, so network latency would not slow data capture. Local nodes would thus include databases to store preloaded queries. Addressing the bottleneck imposed by the human gateway, central servers will store annotations and corrections that have not yet been accepted into local databases. These servers would also batch analyze new records after capture, comparing them to related records in the community and flagging records for review. Because many different database platforms are used in collections, a defined and stable programming interface is needed between local network nodes and local authoritative collections databases. The user interface to the network would use familiar metaphors (e.g. sorted email mailboxes for incoming annotations and corrections). The code for the local and central nodes should be open source with a shared modular architecture and run cross platform.

Morris, P.J. *Academy of Natural Sciences, Philadelphia, PA, USA*
Macklin, J.A. Harvard University Herbaria, Cambridge, MA, USA
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Technical Session 3 - Friday, May 26

The National Biological Information Infrastructure: Building Knowledge Through Partnerships

Biological information infrastructures are being developed at national and international levels around the world. In the United States the National Biological Information Infrastructure (NBII) http://www.nbii.gov/ fills that role. The NBII is a broad, collaborative program to provide increased access to data and information on the nation's biological resources. Coordinated by the U.S. Geological Survey, the NBII links diverse, high-quality biological databases, information products, and analytical tools maintained by NBII partners and other contributors in government agencies, natural history museums, academic institutions, non-government organizations, and private industry. NBII partners and collaborators also work on new standards, tools, and technologies that make it easier to find, integrate, and apply biological resources information. Resource managers, scientists, educators, and the general public use the NBII to answer a wide range of questions related to the management, use, or conservation of this nation's biological resources. Natural history museum collections contain a world of knowledge that can be used to support the needs of these users and we need to develop the infrastructure, technology, and collaborative framework to make the collections electronically available to a world-wide audience.

Mosesso, J.P. *United States Geological Survey, Biological Informatics Office, Reston, VA, USA*

Technical Session 3 - Friday, May 26

Using partnerships to build a regional network of herbaria: SERNEC (SouthEast Regional Network of Expertise and Collections)

Development of a searchable collective database at a regional scale can provide a powerful research tool. By combining the 150 years of botanical information housed in herbaria in the Southeast with models of past plant migrations and current ecological parameters, we can revolutionize studies in biodiversity, evolution, ecology and systematics. As a regional network of herbaria, SERNEC (SouthEast Regional Network of Expertise and Collections) is designed to facilitate the process of making herbarium collection information electronically available and searchable, by building partnerships, encouraging the utilization of the collective expertise of the network, and assisting herbaria in providing information to the public. SERNEC is 1) networking the 150 herbaria in southeastern North America, 2) developing a strategy for advancing each state's ongoing databasing effort, and 3) working to publish online botanical resources that will be available to scientists, land managers, state and federal agencies, educators and the general public. Three major challenges are associated with this project: 1) the need for community standards to increase the power of this research tool, 2) the disparity in resources available to the various collections, and 3) the need for effective forms of communications among state, regional, and taxonomic working groups. SERNEC is supported by the infrastructure already available in The Society of Herbarium Curators, the Southern Appalachian Botanical Society, and the Association of Southeastern Biologists to assist with meetings and information flow. SERNEC is partnering with NBII/SAIN (National Biological Information Infrastructure/Southern Appalachian Information Node), University of Tennessee SunSITE, and the University of Tennessee-Chattanooga Interdisciplinary Geospatial Research Center to provide technical expertise. This expertise will provide data capture and curation advice, data manipulation and modeling expertise, and will facilitate the use of appropriate technologies to promote communication within the network, to the greater scientific community and to the public.

Murrell, Z.E. *Department of Biology, Appalachian State University, Boone, NC, USA*

Technical Session 5 - Friday, May 26

The State of Preservation of Natural Science Collections: A Report on the Heritage Health Index

Kristen Overbeck Laise, director of the Heritage Health Index, will present the findings of the first comprehensive survey on the condition and preservation needs of U.S. collections. Heritage Preservation conducted the Heritage Health Index in partnership with the Institute of Museum and Library Services in late 2004 and the results were published in December 2005. The survey included collections held in museums, scientific research organizations, libraries, archives, and historical societies. Institutions of all sizes and in every U.S. state and territory participated. Heritage Health Index data includes information on all types of collections and the full range of preservation issues that face them. In addition to reviewing the overall findings, the presentation will include Heritage Health Index results pertaining to natural history museums and government and academic scientific research collections. The data provides institutions that care for natural history specimens and supporting materials with an opportunity to benchmark the care they are providing for collections. The survey's statistics also underscore the need to prioritize collections care and gives institutions compelling evidence to present to their stakeholders and funders. Ms. Laise will discuss the publicity that the Heritage Health Index findings have generated and how the data can be used to increase support for preservation.

Overbeck Laise, K. *Heritage Preservation, Washington, DC, USA*

Technical Session 1 - Thursday, May 25

The legacy of Joseph Grinnell: a century of collaborative science on the public lands of California

The Museum of Vertebrate Zoology at UC-Berkeley (MVZ), over its near century-long existence, has been both the major research organization responsible for the documentation of terrestrial vertebrate diversity in national parks and other public lands in California and adjacent states as well as the repository of specimens of amphibians, reptiles, birds, and mammals collected as part of those inventory efforts. This partnership continues to this day, through the "Grinnell Resurvey Project" http://mvz.berkeley.edu/Grinnell/index.hmtl in Yosemite, Sequoia-Kings Canyon, and Lassen-Volcanic national parks, BLM, and National Forest lands in California. In this presentation I will describe the historical collaboration between the public land managers in California and the MVZ regarding documenting terrestrial vertebrate diversity, describe how this relationship has benefited both the agencies involved as well as the general citizenry of the United States, and argue that the concept of "ownership" serves only to obfuscate the type of partnership that is required to ensure the proper documentation and maintenance of the organismal diversity of this nation.

Patton, J.L. *Museum of Vertebrate Zoology, University of California, Berkeley, CA, USA*

Special Session 3 - Friday, May 26

All about USDA wildlife import permits

Importing materials of animal origin requires permits from the U.S. Department of Agriculture's Animal and Plant Health Inspection Service, Veterinary Services National Center for Import and Export. The primary purpose for this regulatory and permit system is to preclude the introduction of foreign animal diseases into the United States, and is intended to safeguard livestock and poultry (as opposed to wild animals or human health, although this may be a secondary benefit of these controls). This talk will outline the permit and import procedures for materials of avian and mammalian origin.

Paul, E. *The Ornithological Council, Chevy Chase, MD, USA*

Special Session 1 - Thursday, May 25

New approaches to the identification and treatment of contaminants in herbaria

It is generally accepted that most natural history collections have been treated with pesticides and fungicides to prevent biodeterioration. Past methods favoured applications of inorganic chemical pesticides and fungicides to the prepared specimens, many of which remain stable and still pose a threat to health and safety. Pesticide applications have invariably not been documented, therefore identity, quantity and date of application is unspecified. There is also the added hazard of organic fumigants, such as naphthalene, still present on the collections. Naphthalene is a natural component of fossil fuels such as petroleum and coal; it is formed when products such as fossil fuels, wood or tobacco are burned, making it ubiquitous within our atmosphere. With its added presence in the working environment, personnel are becoming sensitised and readily suffer from irritation to the eyes, nose, throat and skin. Research has established that herbarium sheets regardless of paper type or institution, fluoresce under UV light if they have been treated with an historic, aqueous application. The fluorescence varies in colour and it may be due to a combination of organic compounds such as degradation products or a pesticide application reacting with the inorganic elements present within the paper. This paper discusses the correlation with metal ion, concentration and the specific coloured fluorescence. This research has determined that the majority of botanical specimens within the National Museum Wales have been exposed to organic fumigants and residual pesticides. Due to the persistence of naphthalene within the collections and the complaints from staff, it has been necessary to find methods of reducing the concentration present on the sheets. This paper discusses the effectiveness of reducing naphthalene from the sheets after employing simple methods such as airing, freeze drying and oven heating.

Purewal, V. *Department of Biodiversity and Systematic Biology, National Museum and Galleries of Wales, Cathays Park, Cardiff, South Glamorgan, UK*
Colston, B. Department of Forensic and Biomedical Sciences, University of Lincoln, Brayford Pool, Lincoln, UK

Technical Session 2 - Thursday, May 25

Biodiversity Center Project at Arkansas State University

The Department of Biological Sciences at Arkansas State University has developed a project aimed at building a new facility to house its biological collections. Since the first specimens were deposited in the 1940's, these biological collections count now with more than 500,000 specimens of virtually all major biological taxa. The collections house dozens of type specimens, specimens from species considered as sensitive ones (different levels of threat) by federal and state agencies. Therefore, all these specimens are a valuable resource for state scientists, personnel at state and federal agencies, and the public at large. They document the diversity and distribution of fauna and flora species throughout Arkansas and the Mid-South providing, for example, direct records of environmental change via chemicals incorporated in their tissues. In the last 35 years more than 400 papers and presentations at scientific meetings have been produced that have acknowledged use of collection resources. In that same period, several graduate students and post-doctoral students have received part of their training working with the collection and more than 50 people have personally visited the collection, including professional researchers and non-ASU graduate students doing thesis research. The Department has received certification as a CITES (Convention for International Trade of Endangered Species) site by the U.S. Fish and Wildlife Service, is a voucher specimen repository for the National Park Service, and is a member of the Natural Science Collections Alliance. These collections continue to grow but are now housed under less than satisfactory conditions. We are in the developing phase of a Biodiversity Center as a place to house these collections in state-of-the-art facilities that will include space for research and teaching. The information from these collections will be computerized and will be made available via free and electronic access.

Romero, A. *Department of Biological Sciences, Arkansas State University, State University, AR, USA*
McKay, T. Department of Biological Sciences, Arkansas State University, State University, AR, USA
Risch, T. Department of Biological Sciences, Arkansas State University, State University, AR, USA
Trauth, S. Department of Biological Sciences, Arkansas State University, State University, AR, USA

Technical Session 1 - Thursday, May 25

The Paleontology Portal: a unique partnership

The Paleontology Portal website is unique in content, development, and management. The site provides access to a spectrum of reviewed paleontological resources from a single starting interface that enables users from novice to professional to access background-appropriate information. The Portal successfully blends research and education, pulling together information with reviewed and annotated website links for a wide variety of informal learners. Using web-based technology and relational databases, users can explore an interactive map and associated stratigraphic column to access information about particular geographic regions, geologic time periods, depositional environments, and representative taxa. Users are also able to search multiple museum collection databases using a single query form of their own design. Other features include highlights of famous fossil sites and assemblages and a fossil image gallery. Throughout the site, users find images and links to information specific to each time period or geographic region, including current research projects and publications, websites, on-line exhibits and educational materials, and information on collecting fossils. The Paleontology Portal serves as an effective partnership model, as it involves a wide range of stakeholders - professional societies, universities, museums, and individuals. Built by the UC Museum of Paleontology, PaleoPortal is a unique collaborative project of the Society of Vertebrate Paleontology, the Paleontological Society, and the US Geological Survey, in partnership with the American Museum of Natural History, the Denver Museum of Nature and Science, the Fort Worth Museum of Science and History, the Paleontological Research Institution, and the Yale Peabody Museum. The project is funded by the National Science Foundation under award no. 0234594.

Scotchmoor, J. *University of California Museum of Paleontology, Berkeley, CA, USA*
Lindberg, D. University of California Museum of Paleontology, Berkeley, CA, USA
White, T. Yale Peabody Museum, New Haven, CT, USA
Flynn, J. American Museum of Natural History, New York, NY, USA
Ross, R. Paleontological Research Institution, Museum of the Earth, Ithaca, NY, USA

Technical Session 3 - Friday, May 26

Fossils from federal lands: partnering in preservation

Fossils from Federal lands are important natural, scientific, and educational resources, protected in trust for the American people as part of our national heritage. Non-Federal repositories for these resources enjoy exceptional opportunities to participate in fossil recovery, conservation, and study. In turn, these repositories provide intellectual and professional capabilities and expertise. Federal partnerships with non-Federal repositories can therefore be beneficial for all participants, as well as for the general public. Consideration of fossils as cultural rather than as geologic resources remains a point of concern; paleontology is a geological and biological discipline, not a branch of either history or anthropology. Fossil resources have greater temporal depth, are distributed more extensively in the subsurface and in a broader suite of rock units, and require very different recordation, recovery, treatment, and storage techniques than cultural materials. Discrepancies among various Federal agencies regarding procedural logistics can also present challenges. The San Bernardino County Museum is a non-Federal repository, accredited by the American Association of Museums, with a long history of recovering and preserving fossils and data from Federal lands throughout the American southwest. The Museum's experiences exemplify the advantages of partnering with the Federal government to collect and conserve fossil resources. Museum protocols emphasize the paramount importance, not only of the fossils, but also of their associated geological contextual data. All other aspects of the partnership - permitting, fossil sampling and recovery, data recordation, conservation, reporting, and exhibition - are conducted with this emphasis in focus. Effective communication of this approach is essential to ensure that the benefits of the partnership are fully realized by all participants.

Scott, E. *San Bernardino County Museum, Redlands, CA, USA*
Springer, K. San Bernardino County Museum, Redlands, CA, USA
Sagebiel, J.C. San Bernardino County Museum, Redlands, CA, USA

Special Session 3 - Friday, May 26

A short-term, intensive collections care training program

Natural history collections in many parts of the developing world are growing, and the rates of collection use are increasing. In response to the need for professional collections care training in Latin America, we developed a comprehensive workshop to provide on-site, intensive training. The workshop uses a combination of lectures, readings, and hands-on activities to teach participants how to better manage collections and identify locally available archival quality materials. The workshop is structured around a conceptual model for teaching the theoretical bases of collections management that integrates preventive conservation with concepts of order and collection growth, and includes the history of collections, emphasis on the quality of the storage environment, and collection assessment. The workshops have identified several new areas for collections care research, and the model has been successfully applied to another developing region outside of Latin America.

Simmons, J.E. *University of Kansas, Lawrence, KS, USA*

Special Session 2 - Thursday, May 25

Specify 6 - To Biodiversity and Beyond

The Specify Software Project is a biodiversity community technology initiative, based at the University of Kansas, which supports biological collections with database software, data management and helpdesk services. In 2005, we began to rewrite Specify in Java to transform it from a stand-alone collections data management system into a modular, extensible computing platform, wholly re-designed for networked collaboration. We are targeting the first half of 2007 for our initial release. Specify 6 will empower collections managers and research project directors to productively manage, import, compare, and analyze specimen and observation data through network interactions with (1) biodiversity data and service providers, (2) other Specify collection databases, and with (3) data consumers, such as public web servers, disciplinary DiGIR federations and the Global Biodiversity Information Facility. Specify 6 will easily adapt to the evolving opportunities of collaborative, web-services-based computing, work-flow architectures and the semantic web. It will be designed for more effective integration with other kinds of ecological and environmental data. Specify 6 will run on Windows, Mac OS X, and Linux; and it will be licensed as open-source software. We invite collaboration on software development with other projects and organizations.

Spears, R. *University of Kansas, Lawrence, KS, USA*

Technical Session 5 - Friday, May 26

Pest management in a transitional facility: a case study

The California Academy of Sciences occupied its buildings in Golden Gate Park from 1914 until 2004. Damage from past earthquakes and the gradual corrosion of the Steinhart Aquarium's infrastructure led to the Trustees' recent decision to rebuild the entire museum, tearing down the old buildings, and replacing them with a new, modern facility. In 2004, all of the collections and offices were relocated to a renovated temporary location, in downtown San Francisco. It was decided to maintain a public space at that site, including most of the aquarium, and to continue research activities. This involved the storage and care of collections in such a way as to make them fully accessible during this "transition" period, anticipated to last at least four years. The temporary facilities are very different from those in the old building, with people and collections housed in close contact with each other. Departments are operating in shared space, the environmental conditions are not tightly regulated, and layoffs have reduced collections staff to less than a third its original size. The presence of the aquarium's living collections in the building also adds risks associated with environmental changes and from pests imported into the building with aquarium food items. No special preparations were made to the renovated warehouse into which the museum moved, nor were collections fumigated or otherwise treated before, during or after the transfer. This resulted in a pest management problem which was first discovered in the new building in early 2005. This talk will define the extent of the problem and summarize the efforts made by research and operations staff to deal with the situation, utilizing limited personnel, space and monetary resources.

Trock, D.K. *Department of Botany, California Academy of Sciences, San Francisco, CA, USA*
Flannery, M.E. Department of Ornithology & Mammalogy, California Academy of Sciences, San Francisco, CA, USA
DeMouthe, J.E. Department of Invertebrate Zoology & Geology, California Academy of Sciences, San Francisco, CA, USA

Technical Session 2 - Thursday, May 25

Challenges of Educating and Training Future Workers for Natural History Collections

People affiliated with natural history collections characteristically have post-baccalaureate education, extensive and diverse career-related experiences, an understanding of science and the scientific method, and a direct or indirect orientation toward research. Beyond this commonality, the natural history community tends to either specialize in a specific discipline, in museum studies, or both. In either case the long-term commitments individuals make to home institutions clearly serve the interests of the collections, as long as these individuals fill these positions. Because natural history collections tend to be staffed by an aging workforce, a loss of highly educated and experienced personnel is expected over the next 15 years. With disciplinary education focusing on molecular studies as a replacement to whole organismal/object studies, and education in museology focusing on the humanities, there is a growing concern about finding qualified staff for natural history collections to replace future retirees. Post-baccalaureate education is a place to begin. Traditionally, museum studies programs have provided an efficient and holistic approach for individuals to enter the museum field. Currently, such programs often include semester-long courses in collection management, and possibly preventive conservation and information management. While education and training related to collections has improved over the years, there are challenges facing the museum community as a whole, as well as museum studies programs assuming the responsibility. The museum community is in need of focusing on its identity, further professionalizing, and better serving individuals in the field. Museum studies programs need to standardize curricula and degree requirements, as well as deal with inherent issues such as biases related to disciplines and gender. Recognition of these needs represents some of the initial steps needed to build a future for collections.

Williams, S.L. *Department of Museum Studies, Baylor University, Waco, TX, USA*

Special Session 2 - Thursday, May 25

Changing Accountability Rules for Federally Associated Collections

Federal agencies are asking non-federal repository collection managers more and more questions about the care of museum collections originating from federal lands. These questions are prompted by Inspector General reports, new annual reports required by Statement of Federal Financial Accounting Standards #29, auditors of federal financial reports, higher professional standards adopted by federal agencies, and by increased awareness of federal fiduciary trust responsibilities created by laws, regulations, and ethics standards. This session reviews these changing rules.

Wilson, R.C. *United States Department of the Interior, Washington, DC, USA*

Special Session 3 - Friday, May 26

Notes

Poster Abstracts

Berkeley Natural History Museums Consortium - Growth beyond old boundaries

Over the past 100 years, and especially recently, there has been a decline in support for natural history museums. As the sciences and society have changed over time, the popularity of collections has waned within the professional and general community. This inhibits further developments in research, outreach capabilities, and innovation. It is remarkable to see this, as museums are only gaining in value to their associated fields and the public through time. How can museums cope with these disturbing trends? The six Berkeley Natural History Museums and their associated Laboratories and Field Stations have banded together to pool their resources, increase dialogue to the public, and generate new research prospects. Each museum in the consortium brings its own unique experience and interests and inspires the other participants to grow in new ways. Not only that, but as a group, we are able to endeavor into several novel programs and projects that would not be possible for any individual unit. The consortium has focused on four major areas for development: education and public programs, building knowledge networks in support of scientific research, digitizing museum specimens and ancillary materials, and targeted research projects. We also share costs of some administrative staff, and are in the process of creating a core IT group that supports some of the computer needs of all of the museums.

Albe, M. *Museum of Vertebrate Zoology, University of California, Berkeley, CA, USA*

Beaked Whale identification reference on the web: combining resources to create a virtual comparative collection

Identifications of stranded beaked whales are difficult due to morphological similarities between species and the paucity of reference material in comparative museum collections. Most diagnostic characters are found in the skull, mandibles, and teeth, and many are ontogenetic and sexually dimorphic. Accurate species identifications are imperative for developing conservation and management strategies, as well as for understanding the overall biology of individual species. More rapid identification of stranded ziphiids enhances the life history data received by marine mammal stranding coordinators and subsequent researchers investigating these specimens and data. These identifications should ideally be made before biological samples and data from stranded specimens are distributed to various research labs. Up until now, no comprehensive reference tool existed for making rapid, positive identifications of stranded ziphiid species. By combining beaked whale resources from multiple collaborating institutions, including the National Museum of Natural History, NOAA Fisheries, Woods Hole Oceanographic Institution, and other museums, governmental and research institutions, we have created a website to serve as a centralized resource for making morphological identifications of beaked whales. These pages include an introduction to the family Ziphiidae, historical information on beaked whale research, images of skulls and diagnostic characters, links to museum research collections, and a bibliographic reference of ziphiid publications. This project is an on-going collaborative effort between the marine mammal and museum communities, and will continue to draw from contributions from collaborators.

Allen, B.M. *NMNH, Smithsonian Institution, Washington, DC, USA*
Pitassy, D.E. NMNH, Smithsonian Institution, Washington, DC, USA
Mead, J.G. NMNH, Smithsonian Institution, Washington, DC, USA
Potter, C.W. NMNH, Smithsonian Institution, Washington, DC, USA

Ailanthus grows in Brooklyn: curation, data capture and presentation of herbarium specimens from New York, New Jersey and Connecticut

An NSF grant has been awarded to Brooklyn Botanic Garden for AILANTHUS Grows in Brooklyn: Curation, Data Capture, and Presentation of Historical Specimens from New York, New Jersey and Connecticut. The goal of this project is to make data on 90,000 contemporary and historical herbarium specimens from New York, New Jersey, and Connecticut available on the Internet. The project is part of a long-term effort to catalog the complete holdings of the Garden's Herbarium. The Herbarium contains a valuable collection of 290,000 contemporary and historical plant specimens used by researchers from around the world to study plants and their distribution. The largest part of the collection represents plants of eastern North America, with 90,000 specimens from the tri-state area. The majority of contemporary specimens (approx. 20,000) have been collected through the Garden's New York Metropolitan Flora (NYMF) project, an active 20-year study of the flora of the tri-state area. Among the historical specimens from the region (approx. 70,000) are collections found nowhere else, such as the George Scarborough collection from southern New Jersey, the George Hulst collection (1860's), the Henry Dautun collection (1890's), and others from Lake George and Long Island. This project will enable researchers to compare these contemporary and historical records in new ways - from analyzing changes in the distribution of plant species over time, to exploring the decline of native species, and the spread of invasive species - helping to build a more accurate model of the contemporary environment. Specifically, the project will add data on 60,000 historical specimens to the Herbarium database, AILANTHUS, which are now partly universally accessible via the Garden's Web site, http://www.bbg.org

Barringer, K. Brooklyn Botanic Garden, Brooklyn, NY, USA
***Harwood, P.** Brooklyn Botanic Garden, Brooklyn, NY, USA*

Computerization and Curation of the Tulane Museum of Natural History Crayfish Collection

Tulane University Museum of Natural History (TUMNH) possesses one of the more valuable invertebrate collections in North America. The collection comprises over 8000 cataloged lots including large numbers of freshwater crabs from central and South America, North American freshwater clams (including several extinct and threatened species), and crayfish from throughout the United States and Mexico. However, the full value of this collection is still unknown because many specimens remain unidentified and uncataloged, records of cataloged specimens are not computerized, and all of the specimen records need to be georeferenced. We have partnered with Dr. Guenter Schuster of Eastern Kentucky University and Dr. Chris Taylor of the Illinois Natural History Survey to start the process of computerizing, curating and georeferencing the TUMNH invertebrate collection as part of a project to document the crayfish fauna of Alabama. Through this partnership TUMNH's Alabama crayfish lots will be identified, curated, cataloged and georeferenced. This project will establish a format for databasing the entire invertebrate collection. It will also allow us to start the process of reorganizing the collection in a phylogenetically significant way. Additionally, we are georeferencing all Alabama crayfish records from invertebrate collections at several institutions, including University of Alabama, Illinois Natural History Survey, Auburn University, and the Smithsonian. Through this work the state of Alabama will be provided with a current database of historic Alabama crayfish records. This project will also demonstrate the valuable role natural history collections can play in wildlife conservation.

Bart, H.L. Tulane Museum of Natural History
Johansen, J.W. Tulane Museum of Natural History
***Rios, N.E.** Tulane Museum of Natural History*

Partnerships with the amateur communities in natural science

Many members of the general public have deep and abiding interests in natural history. People collect specimens and study specific subjects, sometimes attaining professional-level knowledge and skills. This community of amateurs is extremely diverse in terms of background and education. In some cases, people with similar interests come together to form societies or informal groups dedicated to the study and enjoyment of particular natural science subjects. There are international societies in various disciplines, some of which boast thousands of members. In other cases, groups may consist of only a handful of people who get together to study dinosaurs, or use a microscope. Whatever their interests, and whoever they are, these people are a vast resource for managers of natural history collections. In dealing with the amateur community in any area of natural science, museum staff must achieve a balance of friendliness and professionalism. Making and maintaining relationships with amateurs, either individually or in groups, takes time and effort, but the results can be very rewarding. Local amateur groups can provide volunteers for field work, paperwork, or hands-on collections work. They also can provide moral support, and donations of specimens or money. The relationships established should, however, be mutually beneficial. They can learn from you about collections care and field work, microscopy, or databases and documentation. An annual meeting at your institution, with a lecture from you or another staff member or a behind-the-scenes tour can go a long way toward making amateurs feel involved.

DeMouthe, J.F. *California Academy of Sciences, San Francisco, CA, USA*

Cooperation and SYNTHESYS: key to progress?

The Swedish Museum of Natural History (SMNH) is the largest museum in Sweden and its collections are counted amongst the top ten in the world. Some of these collections are unique and of historical interest such as Linnaeus' Type Collections that date back to the 18th century. The primary goal of the museum is to look after, register, scientifically process and enrich the collections by means of new acquisitions. A selection of the collections is also available for the general public and other pedagogical activity. The Swedish government as well as other funding bodies such as the Swedish Species Information Centre, the Swedish Research Council and the EU Commission, financially support the activities at the museum. The Research Division consists of 11 departments that run interdisciplinary research. We represent the Department of Invertebrate Zoology, which focuses on diversity, structure, distribution and evolutionary history of invertebrates, and contributes to the classification of species. The scientists at the department mainly study flatworms, nematodes, oligochaetes, tardigrades, echinoderms, and molluscs. Apart from being a GBIF provider the museum is also actively involved in various projects. One of such project is SYNTHESYS, a collaboration between 20 of Europe's most prestigious natural history institutions, including museums and botanical gardens.

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Specimen Based Virtual Flora Model for Arizona

Over the last couple decades, collection managers have put forth significant effort towards digitizing biological collections. Now that the collection data have been brought out of the cabinets and made web accessible, the next challenge is establish tools that utilized this valuable information. Collection data is a rich source of species distribution which now makes it possible to dynamically create checklists of any well-collected area. A web interface that incorporates this ability to build dynamic checklists with a digital image library, morphological character data, and a taxonomic thesaurus would create a solid foundation for an extremely flexible virtual flora. We propose the development of a web-based application for the automated preparation of specimen-based taxonomic checklists, florulas, image galleries, and electronic identification keys for any region within the state of Arizona. By linking tables of character states to existing taxonomic and specimen databases, the proposed JSP and PHP application network will enable the user to extract information on morphology, distribution, and conservation status of essentially any subset of species, as determined by the user. Taxa will be selected based on multiple criteria such as geographic coordinates and administrative boundaries (e.g., Pima County, Saguaro National Park), taxonomic group (e.g., grasses, pines), and morphological characteristics (e.g., habit, leaf arrangement, flower color). This platform-independent application will run within existing web browsers, will have stand-alone capability (for use in field settings), and will have a simple user interface with optional features for advanced users and developers. The Arizona Virtual Flora will provide a powerful tool for research, conservation, and education by tapping into the wealth of existing specimen and taxonomic information currently available for Arizona via the SEINet search engine.

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Schroeder, R. Arizona State University Lichen Herbarium, Tempe, AZ, USA
Landrum, L. Arizona State University Vascular Plant Herbarium, Tempe, AZ, USA
Gries, C. Arizona State University Institute Of Sustainability, Tempe, AZ, USA

Creating and maintaining intra-museum partnerships for a successful integrated pest management program

An institution-wide approach is touted as best practice for IPM programs. In order to be fully successful, an institution-wide approach requires "buy-in" assistance and support from staff who may not otherwise have a direct role in collections care. However, persuading and encouraging staff to modify their behavioral habits can be a challenging and difficult process. How can museums encourage all staff to identify themselves as stakeholders in the care of collections? The Lower East Side Tenement Museum employs several techniques of formal and informal training to educate and train all staff on the role they play in the efficacy of their institution's IPM program. These techniques have resulted in the creation of successful partnerships between the Museum's various departments and ultimately, improved collections care.

Golpinar, D. *Lower East Side Tenement Museum, New York, NY, USA*

Geoscience Cyberinfrastructure - A Virtual Repository Database for sample information online

Geoscience data and information management for earth material geological projects, have been recognized by the emerging Earth Science Sector Data Management and Dissemination Branch, as beginning and ending with sample collections. The Geological Survey of Canada's (GSC) diverse collection community have independently developed and shared data models, database applications, best practices in collections procedures, and have now formalized a set of standards to allow better communication regarding these collections to enhance sharing of this data. Concurrently a new system of seamless flow of samples and data from the field- to the lab- to the archives, has also been under development (Hardy IA and BJ Dougherty, 2005, Connecting and Enabling Broad Discovery and Access to Geoscience Data and Information Sets of Natural Resources Canada: SPNHC 20th Annual meeting and workshops - 12-18 June 2005; Realizing Standards abstract volume pg. 51). The new system will provide the necessary conduit to provide effective management of sample movement, data and analyses within the GSC through an online system accessible from all GSC computers via the intranet. Key metadata about each sample will therefore form the initial backbone of an emerging cyberstructure, that will provide the means to develop and access these same diverse collection knowledge databases for research, education and outreach. One mandate of this new Branch will be that all GSC repositories will need to be consistent in their collection policies, practices and uses. The ultimate achievement over the next two years will be to develop a virtual repository database for sample information and locations online.

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Dougherty, B.J. Geological Survey of Canada, Ottawa, ON ,Canada

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The Fossil Invertebrate Digital Imaging Project at the American Museum of Natural History: A Case Study in Achieving Success with a Volunteer Staff

The main goal of the AMNH invertebrate paleontology digital imaging project was to create an online database with high quality images and taxonomic information gathered from publications in which AMNH specimens appear, and to make this information available to professional users and the general public via an interactive, user-friendly website. Because of limited staff resources, a decision was made to use volunteer labor to capture, manipulate, and upload images. In this presentation, we discuss the identification of tasks; recruitment of appropriate volunteers; provision of hardware; setting up of workspace (on a limited budget); and the creation of protocols and guidelines for photography, image manipulation, housekeeping, and quality controls suited to a volunteer workforce. Implementation of these protocols has led to consistently reproducible image standards, which have exceeded our expectations for the project. We discuss the reasons for the success of the project, including motivation of the workforce, the commitment of volunteers, and the provision of appropriate resources and a pleasant working environment. We will also show how the volunteers themselves benefited from participation in the project. The AMNH fossil invertebrate digital imaging project provides a case study of how collection imaging projects can be undertaken economically by investing in a trained volunteer workforce.

Hussaini B. *Division of Paleontology, American Museum of Natural History, New York, NY, USA*
Norris, C.A. Division of Paleontology, American Museum of Natural History, New York, NY, USA

Moving and Integrating a Paleobotany Collection

In 2000 the National Science Foundation awarded a grant (DBI 9987475) to the Yale Peabody Museum's Paleobotany Division to support the compactorization, reorganization and the electronic cataloguing of its fossil plant collection in the University's new Environmental Science Center (ESC). Beginning in 1982 the Paleobotany collection saw unparalled growth, increasing from around 30,000 to 150,000 specimens through the acquisition of two orphaned collections, as well as increased collecting due to the revitalization of the paleobotanical discipline at Yale. This resulted in four separate collection's units: the original Yale collection, the New York Botanical Garden Collection, the Princeton Collection and the more recent holdings of Peabody curators and students. However, severe overcrowding precluded any large-scale effort to physically integrate these four collections. The move into the ESC building provided the Division a unique opportunity to integrate and reorganize these collections stratigraphically into new cases and drawers. In order to meet all objectives of the grant on time, the collection had to be moved swiftly. Meeting the deadline for moving and integrating these four collection's units was a major challenge. A key aspect in meeting our goal was the development of a color-coded plan. Cases and drawers were both numbered and colored-coded to denote the 16 geological periods represented in the collection. The following information was entered into an Excel spreadsheet for each period: original collection, current room number, case number, drawer number, locality, formation, and the estimated expansion factor, if any, required to uncrowd each drawer. These data were also used to design the overall space plan for the collection in the ESC. Using this master plan, the Collections Manager and two assistants, along with help from volunteers, moved and stratigraphically integrated the entire collection of 150,000 specimens in eight weeks.

Klise, L.S. *Peabody Museum of Natural History, Yale University, New Haven, CT, USA*
Hickey, L.J. Peabody Museum of Natural History, Yale University, New Haven, CT, USA

Proposed Development of an Online Photo Library of Marine and Estuarine Fish and Invertebrates From the South Atlantic Bight, Gulf of Mexico and the Caribbean

We have all been in a situation where we needed a particular picture for a presentation, publication, class, etc., but we didn't have the picture we needed. We knew that Out There - Somewhere there was Someone who had precisely the picture we needed --- but we had no idea who, or where, that Someone was. Over the years we have had numerous conversations about this problem with many of our colleagues from the Southeast U.S. and Caribbean. We are proposing to address this problem by establishing an online photo library. We currently plan to start this project by soliciting the contribution of quality .jpeg photos of reliably identified marine and estuarine fish and invertebrate species, as well as .jpeg photos of quality illustrations, from colleagues who have previously expressed an interest in this concept. Thus far, our efforts have received strong support and encouragement from many of our colleagues. We are strongly encouraging all potential photo library contributors to copyright their photos personally or institutionally in order to limit the probability of misuse of the photo library. The Gulf States Marine Fisheries Commission has expressed interest in hosting the photo library on their website.

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Perry, H. Gulf Coast Research Laboratory, Ocean Springs, MS, USA
Shultz, J. National Oceanic and Atmospheric Administration's Fisheries Service, Pascagoula Laboratory, Pascagoula, MS, USA
Parsons, G. University of Mississippi, University, MS, USA

Cooperating Organizations Document the Biodiversity of the Land of Enchantment: INRAM, CNHC, and NMSU Collections

Documenting the biodiversity of New Mexico requires continued effort and diverse skills ranging from collecting specimens, to managing collections, to delivering information via the Internet. At New Mexico State University the Center for Natural History Collections (CNHC) was founded in 2000, uniting the curators and interested faculty and staff from all over the campus. Currently a total of 11 NMSU collections collaborate to develop resources, share administration, and sustain the valuable biodiversity resources on campus. The statewide Institute of Natural Resource Analysis and Management (INRAM) was formed the next year, in part to integrate information on the vast biodiversity collections throughout the state. At each academic institution in New Mexico with biodiversity collections (NMSU, the University of New Mexico, Eastern New Mexico University, and Western New Mexico University) INRAM fostered the electronic capture of specimen information. Concurrently, NMSU, working with other INRAM members, developed a core database that distributes over 300,000 specimen records worldwide via web forms and the Global Biodiversity Information Facility (GBIF). The success of this endeavor is a direct result of the cooperation between the CNHC, INRAM, NMSU, UNM, ENMU and WNMU. New Mexico is a highly diverse and species rich part of the United States, but is generally poorly represented in available data sets. The collaborations represented by the CNHC and INRAM bring together the skills required to rectify this situation.

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Spellenberg, R. *Department of Biology, New Mexico State University, Las Cruces, NM, USA*
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Triangular Collaboration: A Case Study Bridging Public Education With Dinosaur Paleontology

Primary and secondary education in the United States has been changing in recent years, as the traditional ways of teaching have given way to a more interactive hands-on approach. Education in natural history museums is no different, and they are always looking to reach a larger audience with their education programs. Dinosaur paleontology is an excellent catalyst for bringing science to the public, and making dinosaurs interactive is fairly easy. Dinosaur field expeditions that are open to the public are an excellent interactive beginning, although most paleontology departments are already stretched thin and do not have the time or resources to take on such a project. Enter the small independent nonprofit research organization for hands-on public field programs. But what is to become of the fossils that are collected by the research organization? Enter again the museum. Where the fossils can be prepared for study, be available to other researchers and be kept within the public trust. Additionally, political ideologies and the philosophies of vertebrate paleontology create an essential need for useful partnerships in the natural sciences. For smaller non-profit research organizations, it is becoming increasingly more difficult to compete with commercial institutions. Binding together for mutual benefit, collaborative partnerships between research institutions can be a source of salvation for some, and public education and/or the advancement of science for others. Here we present a triangular case study based on three institutions that have found mutual and multiple advantages through such collaborative partnerships.

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Hatcher, J. PaleoWorld Research Foundation, Garfield County Museum, Jordan, MT, USA

Hair Identification: Applications and Collaborative Efforts

The identification of mammal hair has many applications within the scientific community, the military, and in commerce. The USGS Biological Survey Unit, stationed within the Smithsonian Institution, National Museum of Natural History, performs identifications of mammalian remains, including identification of hair under the microscope. Cases are submitted primarily by the United States Air Force and the Federal Aviation Administration in the form of aircraft strike evidence. Cases are also received regarding the identification of mammalian hair from textiles, burial bundles, garments, and other artifacts from the Smithsonian Institution, Department of Anthropology. Remains are submitted for identification from military runways and grounds collected by the United States Department of Agriculture Animal and Plant Health Inspection Service (USDA/APHIS), and food contaminants are submitted from the National Food Processors Association. Lastly, items such as scat, owl pellets, and stomach contents are received from the general public, educational institutions, graduate students, and wildlife biologists. The research collections housed at the National Museum of Natural History serve as an invaluable reference material supporting these collaborations.

Peurach, S.C. *United States Geological Survey Patuxent Wildlife Research Center and Smithsonian Institution, National Museum of Natural History, Washington, DC, USA*

Ethnobotanical diversity in the border regions of U.S. and Mexico

One of the intrinsic values of herbarium specimens is that they can assist in illustrating the historical and cultural importance of plants to native peoples. They provide basic information about plants and plant distribution. The collections of the United States National Herbarium are being canvassed for specimens that provide these data. Our targets include 1) plant specimens collected by Edward Palmer, an early ethnobotanist in the border regions, 2) plants acquired by naturalists affiliated with the mid-19th century Mexican Boundary Survey and the later International Boundary Commission, and 3) all collections from the Mexican state of Chihuahua. Innovative features of this project include a) the coordination of plant vouchers and cultural museum objects, collected by Edward Palmer throughout the southwestern U.S. and northern Mexico between 1878 and 1910, that have been separated since their original acquisition, b) the interpretation of ancient locality information within a framework available to modern GIS tools, c) the incorporation of Latino expertise to enhance the taxonomic and interpretive value of the museum collections and, d) collaboration with the Project on Diversity in the Sierra Tarahumara to help document the plant diversity of a poorly known region of northern Mexico. And, finally, given the increasing interest in cultural heritage shown by ever-growing U.S. Latino communities, these data will allow us to tell stories that highlight these issues by means of an online resource that interprets a century of biological and ethnographic change within the region.

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Merrill, W. Smithsonian Institution, Washington, DC, USA
Hollenberg, L. Smithsonian Institution, Washington, DC, USA
***Whitacre, J**. Smithsonian Institution, Washington, DC, USA*

SEINet: The Southwest Environmental Information Network

SEINet (http://seinet.asu.edu) is a central gateway to environmental data for the Southwestern United States. It includes access to 10 natural history collections from Arizona and California as well as software tools for accessing and analyzing the data. Created in 2002 by the Global Institute of Sustainability (GIOS), SEINet accesses over 440,000 collection records of vascular plants, lichens, mammals and pollen, with herps, insects, and fish coming online later this year. SEINet also includes an Image Library with over 10,000 images, an online specimen keying system powered by Navikey, a dynamic checklist maker, and a distribution mapper. The newly implemented "Distribution Maker" is a fully-integrated mapping application that dynamically plots the distributions of two taxa on one map. Appropriate collection records from various databases are combined in these maps. Features include zooming, panning, different background layers, and tracking of each point to the respective specimen information. We intend to expand the new Distribution Maker to include rich background layers for not only Arizona but the entire desert southwest. This application, built using OpenMap technology, has been an extremely valuable tool for botanists and lichenologists in the desert southwest.

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Gilbert, E. Department of Plant Sciences, University of Arizona, Tucson, AZ, USA
Landrum, L. School of Life Science, Arizona State University, Tempe, AZ, USA
Gries, C. Global Institute of Sustainability, Arizona State University, Tempe, AZ, USA

Works for Me, Should Work for You: But Is It Science?

Have you ever wondered how best to fix and preserve polychaetes for both morphological study and DNA analysis? Should labels be prepared differently for isopods in 95% ethanol versus sponges in 10% formalin? How effective is Bacardi 151 Rum as a preservative for small crustaceans? These are a few of the questions plaguing collection managers everywhere. Many of these questions are resolved using traditional techniques, acquired by trial-and-error. Often it's the anecdotes and hearsay that determine the curation techniques that are implemented: "Well it worked for Tom, Dick and Harry for 15 years, it should work for me", or "the Acme Company assures me these lids will maintain their seal for at least 20 years." Should we rely on these untested attributions or use scientific methods to rigorously test our curation techniques? The many factors that influence what works in specific situations are rarely considered. What was the temperature and humidity of the collection room when those particular jar closures worked so well? Scientific experimentation is the only means to obtain reliable answers to our many curatorial questions. The same criteria that define quality experimental science apply equally to answering curatorial questions. Hypothesis formation, repeatable tests, and appropriate statistical analysis of test results can help us determine which curatorial techniques would be best for our collections. At the Marine Biodiversity Processing Center (MBPC), we have begun using a Wiki as a tool to start thinking about curation issues that deserve research: http://collections.nhm.org/library/ . The MBPC uses the Wiki as a forum to showcase information regarding collection care as well as general information, such as how to ship hazardous materials. It is a place to share concerns and knowledge that could lead to meaningful experimentation and scientific inquires.

Striley, D. *Marine Biodiversity Processing Center, Natural History Museum, Los Angeles County, Los Angeles, CA, USA*
Omura, K. Marine Biodiversity Processing Center, Natural History Museum, Los Angeles County, Los Angeles, CA, USA

The Society of Herbarium Curators - Won't You Join?

The purpose of the society is to promote and expand the role of herbaria in botanical research, teaching, and service to the community at large, to provide a forum for discussion and action on all issues confronting herbaria, and to extend its efforts and interject its influence toward the protection and preservation of endangered herbaria. Our newsletter "The Vasculum" is out now, this is a great time to join us and help support herbaria around the world.

Vanderplank, S. *Rancho Santa Ana Botanic Garden, Claremont, CA, USA*

Dinosaurs on the Move

When the Royal Ontario Museum first opened its doors in 1914, the palaeontology collections were stored and exhibited on the third floor. Among the specimens installed in the early galleries was the ROM's first large mounted dinosaur, a plaque mount of a hadrosaur collected in Alberta in 1918. In 1931, the palaeontology galleries were moved from the third floor of the original building to the second floor of the new wing, with the addition of several more dinosaurs and other large skeleton mounts. In the early 1970s the vertebrate palaeontology gallery again underwent major renovation entailing the relocation of all the mounts. The ROM is once more in the throes of major renovations, which will see the dinosaurs move again, into newly built space. The challenges, size and weight, have not changed. This poster follows the progression of several dinosaur mounts, some of which are heading toward their fourth exhibit location.

Waddington, J. *Department of Natural History, Royal Ontario Museum, Toronto, ON, Canada*

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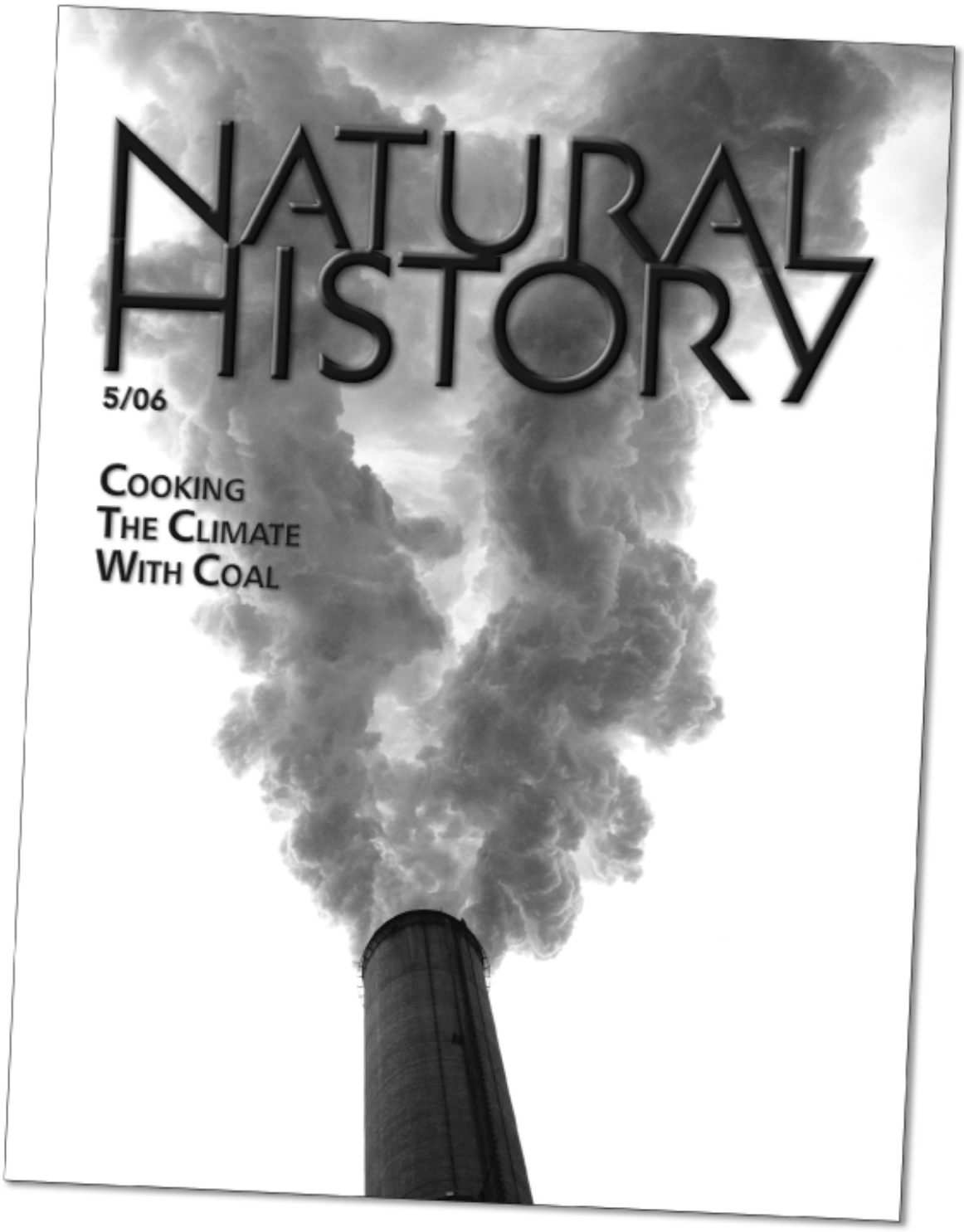
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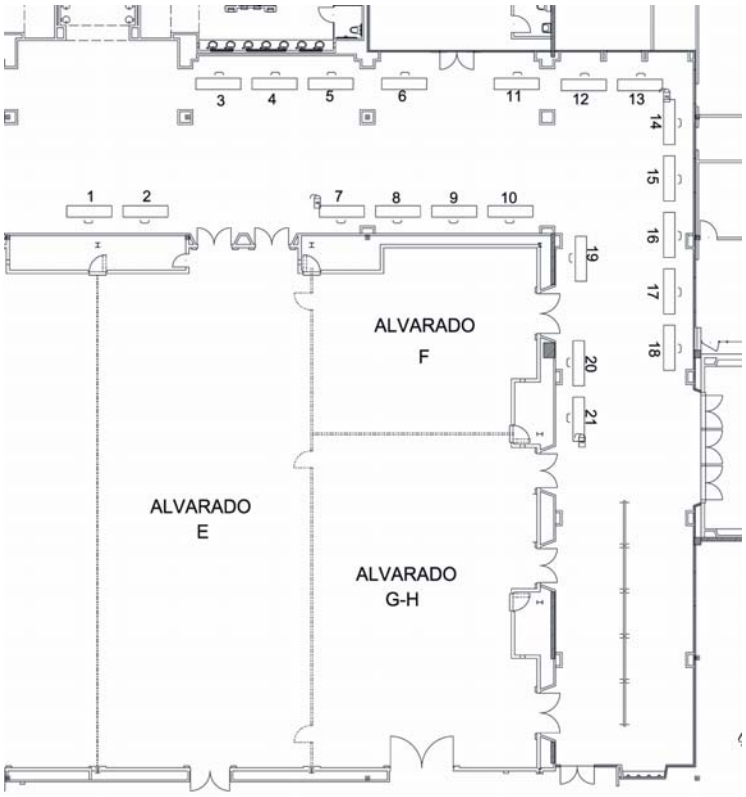

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