

M.A.P.S. *Digest*

Official Publication of
Mid-America Paleontology Society

Volume 25, Nos 6 & 7
October & July-September 2002



MARK YOUR CALENDARS

Oct 12 MAPS MEETING

Trowbridge Hall, University of Iowa, 123 N. Capital St. Iowa City, IA. Main Lecture Room, #125.

1:00 Board and General meeting

2:00 Program

Sep 11-Jan 1 ANTARCTICA'S INCREDIBLE FOSSILS EXHIBIT

Falls of the Ohio State Park, 201 West Riverside Dr., Clarksville, IN

Features spectacular fossils collected on Seymour Island by Dr. William Zinsmeister, Purdue paleontologist.

Contact: 812-280-9970 or www.falloftheohio.org

Oct 25-27 FOSSILMANIA

Somervell County Expo Center, Hwy 67, Glen Rose Texas

Fri. & Sat. 9 am - 6 pm

Sun. 9 am - 12 noon

Dealers from all over the country. Free educational programs on Fri. and Sat. Free fossils for all kids. Hourly door prizes. Talk by Charles Finsley on Fri. night. Fossil Auction on Sat. night.

817-355-4693 or www.dalaspaleo.org

Nov 8-10 FOSSIL FEST 2002

Old Settler's Park, on Hwy 79, 3.3 miles east of IH35, Round Rock, TX

Fri.-Sun. 10 am - 5 pm

Displays, demonstrations, dealers, door prizes.

Contact: Michael Smith 512-288-6582 mksmith@acm.org

www.texaspaleo.com/ctps

Nov 18 "A PACK OF GIANT THEROPODS IN ARGENTINA"

Washington High School Auditorium, 2205 Forest Drive SE, Cedar Rapids, Iowa

7:00 p.m.

Program by Dr. Philip J. Currie. Free and Open to the Public

Dr. Currie was co-leader of the Argentina-Canada Dinosaur Project, which discovered a pack of theropods much larger than T-rex. Other important finds will also be discussed.

Contact Bill Desmarais 319-398-2161, WDesmarais@cr.k12.ia.us;

Sharon Sonnleitner 319-396-4016; or www.angelfire.com/ia3/cvrms

Dec 5-7 4TH CONFERENCE ON PARTNERSHIP OPPORTUNITIES FOR FEDERALLY ASSOCIATED COLLECTIONS

Smithsonian Institution, Washington, DC

<http://hqinet001.hqmc.mil/hd/doi/main.htm>

Mar 28-30, 2003 MAPS NATIONAL FOSSIL EXPOSITION XXV - CEPHALOPODS & AMMONITES

Western Illinois University, Macomb, IL

Fri., Mar 28 8 am - 5 pm—Keynote Speaker @ 7:30

Sat., Mar 29 8 am - 5 pm—Meeting & Live Auction @ 7:00

Sun., Mar 30 8 am - 12 noon

Information will be included in the December issue.

992/09 AND 992/10 DUES ARE DUE

Are your dues due? You can tell by checking your mailing label. It reflects dues received by October 5. The top line gives the expiration date in the form of "99year" followed by month--992/10 means 2002/October. Dues cover the issue of the Digest for the month in which they expire. We do not send notices but will let you know if you are overdue by highlighting your mailing label and stamping your Digest. We carry overdues for two issues before dropping them from our mailing list.

Please include on your check your due date and name exactly as it appears on your mailing label - or include a label.

Dues are \$20 per U.S./Canadian household per year. Overseas members may choose the \$20 fee to receive the Digest by surface mail or a \$30 fee to receive it by air mail. (Please send a check drawn on a United States bank in US funds; US currency; a money order; or a check drawn on an International bank in your currency.) Library/Institution fee is \$25.

**Make check payable to MAPS and mail to:
Sharon Sonnleitner, Treas.
4800 Sunset Dr. SW
Cedar Rapids, IA 52404**

ABOUT THE COVER

**Sent by Bruce L. Stinchcomb
Ferguson, Missouri**

This month's cover photo is a pair of *Helicotomas* from the Gasconade Formation, Lower Ordovician, Sullivan Missouri.

PROCEEDINGS OF THE BOARD

The summer meeting scheduled for July 28 in conjunction with the MAPS field trip was canceled because of the lack of a quorum.

This issue of the Digest is a double issue.

**MADELYNNE LILLYBECK
PASSES AWAY**

Former MAPS editor Madelynne M. Lillybeck died Saturday, August 10, 2002 at her home. Madelynne joined MAPS in 1978 and served as editor from 1979 until 1988 when she relinquished the position because of poor health. Past president Karl Stuekerjuergen states, "In the 1980's Madelynne played a critical role in helping amateur collectors gain respect with professional paleontologists. At the time, there was a lot of resentment among professionals toward amateur collectors, but she was a driving force in building bridges between the two groups. Now, when professionals look for input from amateurs, they look to MAPS. Madelynne absolutely had a lot to do with that."

Our deepest sympathy to her husband Norman and family. Condolences can be sent to the family at 1039 33rd Street Court, Moline, IL 61265.

**MAPS MEMBER FRED HOTCHKISS
RECEIVES PRESTIGIOUS AWARD**

MAPS member Fred Hotchkiss, Harvard, Massachusetts, received the year 2002 Mary Anning Award from The Palaeontological Association (UK). The award is "for outstanding contributions to the study of palaeontology." The award is made to persons who are not professionally employed as palaeontologists. Fred and his wife Anita traveled to Birmingham, England, to receive the award at the Annual General Meeting. Fred's research is on Paleozoic brittle stars and sea stars—ophiuroids and asteroids.

This is another fine example of the contributions of amateurs. Congratulations to Fred! Editor

**SUPPORT PRI'S
NEW MUSEUM OF THE EARTH**

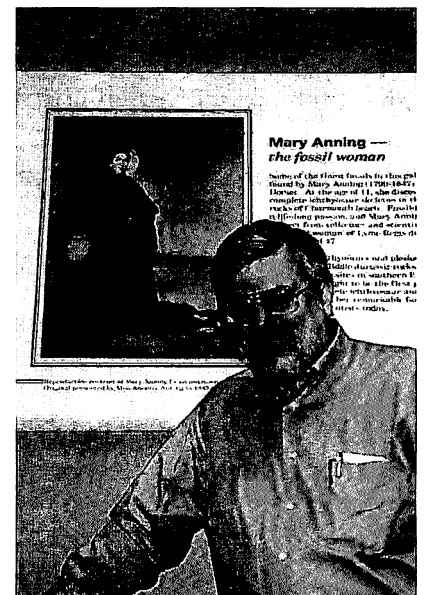
Info sent by Warren D. Allmon, Director

The Paleontological Research Institution invites *you* to help advance Earth Science education by participating in the public campaign to build the new Museum of the Earth. Opening in Summer, 2003, the Museum of the Earth presents an exciting opportunity for PRI to share high quality science education, as well as one of the largest fossil collections in the United States, with a wider audience than ever before.

Utilizing magnificent examples of PRI's collection of nearly three million specimens, the Museum of the Earth will be the only major earth science and natural history museum in Central New York and Northern Pennsylvania. Visitors will take a trip through time and discover the history of life on Earth in three hands-on laboratory areas devoted to three "moments" in geological history: the Devonian, Triassic-Jurassic, and Ice Age; a preparation lab, and four audiovisual object theatres. Educational displays complement programs offered in our state-of-the-art museum classroom.

Make an investment in the Earth—in accessible Earth Science education, stewardship, and interpretation of one of America's great fossil collections—by supporting the Museum of the Earth. For more information call 607-273-6623 ext. 11 or visit museumoftheearth.org. Donations may be sent to:

Museum of the Earth Capital Campaign
1959 Trumansburg Road
Ithaca, NY 14850



MAPS MEMBER TOM WALSH IN THE NEWS

An article on MAPS Board member Tom Walsh appeared recently in a Quad Cities (Iowa-Illinois) paper. Tom has been collecting fossils since he was a kid but got more serious about collecting when he joined MAPS 25 years ago. He has traveled to Utah, Florida, Michigan, and Indiana in search of specimens, spending countless hours handling chunks of rocks, reading books, and enduring both heat and cold.

Tom and a friend have discovered many trilobites around his area, but their most exciting discovery was a soft-body site in a quarry in Clinton, Iowa. One of the most intriguing specimens was a phyllocarid (shrimp-like fossil) nearly three feet long. Since soft-body fossils are relatively rare, the two men donated most of their better pieces to professional Bill Hickerson for further study.

According to Tom, "we were pretty excited by our find. They don't even know what phylum they belong to. Who know? Maybe one day they will name a fossil after us." At 75, Tom shows no signs of slowing down in his search for fossils.

STOPS ALONG THE ROAD

BY Jim and Sylvia Konecny

Anyone driving through Arizona on Interstate 40 is in for a treat. Between mile posts 291 and 294 there are a number of dinosaurs to be seen on both sides of the highway. These almost life-size models are there to attract attention to a "Dinosaur Museum." Their dinosaur exhibit isn't much, but if one is interested in petrified wood or prehistoric pottery, then it is worth a stop.

Anyone driving through Kansas on Interstate 70 should stop at the Sternberg Museum in Hays, Kansas. This museum is an absolute must. We have been there twice and plan on stopping there on every trip to the MAPS Expo.

SMALL SHREW-LIKE CREATURE SHEDS NEW LIGHT ON EVOLUTION OF PLACENTAL-BORN MAMMALS

Summarized from "Five-inch fossil is a huge find." By
Tim Friend in USA Today, 4/25/02 P. 9D

A complete skeleton of a five-inch-long fossil found in China has caused excitement among scientists who study placental-born mammals. The shrew-like critter, which lived 125 million years ago, is the oldest known specimen of a placental mammal. Possibly the oldest known relative of humans as well as other placental-born mammals, it is excellently preserved. Scientists expect to glean from it knowledge of how other mammals as diverse as primates and elephants evolved.

The new discovery fills a gap of about 50 million years. The only other placental mammal fossils older than 75 million years are a skull fragment from about 85 million years ago and three teeth from about 100 million years ago.

Eomaia (Greek for "dawn mother"), as the specimen is called, lived among the big meat-eating dinosaurs of the Cretaceous period. It had fur and its elongated toes and curved claws indicate it could climb and live in trees. The more recent placental mammal specimens of 75 million year ago and younger were ground-dwellers.

Eomaia was found in the same northeast China deposit that yielded the feathered dinosaurs. The area was a former lake bed where animal remains were preserved in fine detail. According to the article, Duke University Paleontologist Anne Weil says the detail of *Eomaia* makes it a "treasure-trove of information about early mammalian evolution and ecology."

A FOSSIL "FIRST"

CARCHARODON MEGALODON TEETH FROM OCEAN FLOOR SEDIMENTS

By Bruce L. Stinchcomb

Among the plethora of fossils at the recent MAPS Expo were specimens of the teeth of the giant shark *Carcharodon*. Teeth of these giant sharks are generally found in sediments of Miocene age (~15 million yrs old) of the coastal plain of North and South Carolina, Georgia and Florida, preserved in soft marly sandstone or in phosphatic sediments. These teeth are generally of a black, grey or blue-gray color and are often spectacular and well preserved. Large, well preserved specimens of these teeth are highly collectable and have been going up in value.

What was available at MAPS Expo for the first time were whitish *Carcharodon* teeth dredged from the floor of the Pacific ocean and therefore coming from sediments lying upon the ocean floor. To my knowledge, these are the first fossils available to the collector from sedimentary rocks on the ocean floor. 70 percent of the Earth's surface is covered by oceans and one wonders what fossils lie in the sediment beneath all that water. These giant shark teeth are one such fossil, although deep sea sediments are usually thought of in terms of their microfossil content, such as radiolarians, diatoms, foraminifera and other micro and nanno fossils.

Considering the extent of sea floor sediments, these teeth are probably, at least locally, quite abundant; however, the required equipment to obtain them is costly and costly to operate.

What is clear with fossils from sea floor sediment is that most of them will be geologically young. The oceans of today, and their sediments on the sea floor, have all formed within relative recent geologic time. Relatively recent geologic time is the Cenozoic Era, so sediments (and associated fossils) of Precambrian and Paleozoic age will not occur. From comparison with *Carcharodon* teeth of the eastern USA these teeth would probably be Miocene in age, as they appear identical except for color. The possibility exists, however, that they are younger, that is Pliocene, Pleistocene or even Recent in geologic age. It has been hypothesized that the giant sharks which bore these teeth, may have survived in the open oceans until relative recent time. The Pacific Ocean specimens don't have a hard, "fossil" look about them. They don't appear to be extensively mineralized as is usually the case with east coast specimens.

Perhaps they are younger?

KING OF THE CROCODYLIANS:

The Paleobiology of *Deinosuchus*

By David R. Schwimmer

Life of the Past

240 pages, 70 b&w photos, 24 figs.

Append., refs., index, 7 x 10

Cloth; 0-253-34087-X \$45.00

Published June 14, 2002, by Indiana University Press

Available at bookstores or by calling 1-800-842-6796

This book is the biography of these giant beasts, called *Deinosuchus*, including the long history of their discovery, new research about their prey. Neither a crocodile nor an alligator, it was at the base of the ancestry of both modern groups; but it reached weights of many tons and it had some features unique to the species. Average-sized individuals were bigger than the carnivorous dinosaurs with which they cohabited; the largest specimens were as the size of a T-rex. Toward the end of the Age of Dinosaurs, during a time known as the Late Cretaceous, this new type of giant predator appeared along the southern coasts of North America.

"... Suddenly, an enormous mass explodes from the bottom of the salt marsh, covering the 10-m distance to the theropod in three seconds. Jaws nearly a meter long open wide and close on the lower back of the theropod, which lies close to the swamp's surface because of the water depth and soft bottom. An elongate, huge thrashing back, covered with lumpy, bony projections, emerges from the swamp, extending 8 m from the tip of the tail to the front of the jaws. Short, powerful limbs steady the huge animal on the marsh bottom, and its enormous, laterally flattened tail thrashes back and forth to provide more force for the attack and to enhance the bite forces. The jaws are studded with pointed front teeth, 8 cm long, which pierce and hold the theropod's flanks. But the real damage to the prey is inflicted by blunt, low crowned rear teeth, enormously thick and 3 cm wide, nearly solid enamel and dentine for two-thirds of their diameter, located close to the maximum leverage region of the jaw hinge where the jaw-closing muscles are at their most powerful..." —from Chapter One

HR 2974 AND S 2727 COMMENTARY

By Marion Zenker, Legislative Liaison

American Association of Paleontological Suppliers, American Lands Access Association
c/o Black Hills Institute, PO Box 643, Hill City, SD 57745 605-574-4289; fx 605-574-2518

Here are my primary objections to the *Paleontological Resources Preservation Acts* introduced as HR 2974 in October 2001 and S2727 in July 2002.

It is not possible to write good law when you begin with false premises. These Acts state that "all vertebrate fossils are rare," which is on its face a false statement for those who understand that vertebrate fossils include every shark tooth, every mouse, squirrel, snake, bird or fish bone that has ever been preserved. Paleontologist Dr. Charles Love estimated years ago that in just one-half mile of the Green River Formation alone, there are enough fossil fish specimens to provide two to each man, woman and child who live on this earth.

Following from this false premise, these Acts state that the collection of any vertebrate fossils on federal lands can be legally carried out only under permit and that all fossils collected under permit remain the property of the United States—the Federal government. Given that all U.S. museums already have more material than they have staff or monies to house, curate or exhibit, where are these fossils going to be housed?

The Acts also mandate that the Federal government retain ownership of all fossils collected on public lands. This provision leads me to ask: How much money are taxpayers willing to pay to provide for the housing, accession and curation of all the vertebrate fossil material on our more than half billion acres of Federal Land—let alone to pay for the enforcement of an Act which assumes that every fossil shark and mouse tooth and fish bone must be housed in an "approved repository (since these are all vertebrate fossils)"? It seems a very relevant question when the fossils on these public lands could be collected, preserved and made available for exhibit and research by amateur and private, professional fossil collectors and paleontologists at no cost to the taxpayer **while** creating jobs and generating tax dollars rather than spending them.

Both Acts state that "nothing in subsection(a) (under prohibited acts) shall apply to any person with respect to any paleontological resource which was in the lawful possession of such person prior to the date of the enactment of this Act." However, unless each person who has any vertebrate or rare invertebrate or plant fossil in their possession prior to the enactment of this Act can provide unassailable proof of where, when and by whom those fossils were collected, this provision would open the door to accusations and charges by law enforcement, thus damaging reputations and even destroying many small businesses.

Other provisions that give law enforcement the right to seize not only fossils that are deemed to be collected illegally under this Act but also "all vehicles and equipment of any person that were used in connection with the violation" are especially frightening. Law enforcement officials will have the ability to create financial ruin for individuals and businesses (even if your business was not actively involved in fossil collection). Unless every fossil in your possession was collected at the same time from the same site, you can be charged under this Act with multiple violations, which vastly escalates the dollar amount of the fines that can be levied and the prison time to which you can be sentenced.

Below are further concerns raised by the provisions of HR 2974*

written by: George Loud

Chair: Conservation Legislation Committee
American Federation of Mineralogical Suppliers
LaRusso and Loud Attorneys at Law
3137 Mount Vernon Ave., Alexandria, VA 22305

*All the objections Mr. Loud outlines below about provisions in HR 2974 apply as well to S2727

I personally find a number of things objectionable in the bill as introduced. Firstly, it perpetuates a lie. Section 2 entitled "Findings" states: "(10) Some paleontological resources, including all vertebrate fossils, are rare and should only be collected under

permit.” My own personal experience in fossil collecting, although limited, belies that statement. As a teenager I collected bone fragments of Pleistocene mammals and Eocene shark teeth in Arkansas, and more recently, I have led youth groups along the shores of the Potomac collecting fossil shale bone and shark teeth. While all of the fossils I collected at these two sites are vertebrate, none would justify the expenditure of federal dollars for their curation. The most in-depth study to date on the subject of fossil collecting on public lands, undertaken by the National Research Council with public funding, resulted in the 1987 report “Paleontological Collecting” and is in agreement with the views expressed here. At page 18 the report stated “Finding another Pleistocene bison bone in Idaho or another Carboniferous fern leaf in Illinois adds little to paleontologic knowledge.”

My second objection to the bill has to do with the rather draconian penalties that would be imposed upon an individual for a violation of the act. “If the sum of the scientific or fair market value of the paleontological resources involved and the cost of restoration and repair of such resources exceeds the sum of \$1000.00 this person shall, upon conviction, be guilty of a Class E felony.” [My emphasis.] The bill would further provide for forfeiture of “all vehicles and equipment of any person that were used in connection with the violation.” In view of the fact that each Land Manager would be empowered to close any area under their jurisdiction to the collection of all fossils, including invertebrates, an individual, with no knowledge as to whether or not a given area is so protected, would be prudent to avoid fossil collecting altogether. The net effect of the bill, should it become law, would be to cast a chill over fossil collecting in general, the direct opposite of the recommendations of the National Research Council in the aforementioned 1987 report entitled “Paleontological Collecting,” which concluded:

“In general, the science of paleontology is best served by unimpeded access to fossils and fossil-bearing rocks in the field.”

And

“The science of paleontology will be advanced by eliminating much of the unnecessary complexity of the present (and proposed) regulation of fossil collecting on public lands.”

A third objection to the bill is that, while section 9(d) makes an exception for possession of a “paleontologic resource” which dates from a time prior to enactment, it is less than clear as to where the burden of proof would lie in any attempt to invoke that exception as a defense.

The prohibition against “false labeling” found in section 9(b) is also objectionable (and laughable). It provides: “A person may not make or submit any false record, account, or label for or any false identification of, any paleontological resource excavated or removed from federal lands.”

With regard to an almost identical “false labeling” provision in the 1994 Baucus Bill, in this column published in the May 1994 AFMS Newsletter I wrote:

“Pity the poor collector or curator, amateur or professional, who mistakes a *Psittacosaurus* bone for a *Chasmosaurus* bone. If the bone came from federal lands, the unfortunate misfeasor would be a criminal. Three wrong labels and you’re out? Those with poor eyesight would be well advised to try a different hobby or profession. The bill in its present form has the potential to decimate the already thin ranks of vertebrate paleontologists.”

My final objection relates to the prohibition against resale, even of fossils the amateur is allowed to collect without permit. What other collector can legally own items which cannot be sold? Why should fossils be different from minerals, gold nuggets, coins, etc., found on public lands? The amateur fossil collector should be free to dispose of his collection through the same channels and in the same manner in which other collectibles, including items legally collected from Federal lands, are marketed.

Paleontology is referred to as a “gateway science” because it is often the first hands on experience one has with any science. It was for me. Thomas Jefferson was an amateur paleontologist and had fossils collected from public lands on display in his home. This country needs more citizens with Jefferson’s intellectual curiosity, not less. Unfortunately, the net effect of HR 2974 would be detrimental to the growth and development of scientific curiosity.

URGENT NOTICE REGARDING SENTATE BILL 2727

By Marion K. Zenker, Black Hills Institute, PO Box 643, Hill City, SD 57745

A "Paleontological Resources Preservation Act" Senate bill 2727 was introduced into the U.S. Senate on 10 July and referred to the Senate Energy and Natural Resources Committee. It is urgent that if you live in one of the States whose Senator serves on that Committee that you, and anyone else you can persuade to, write, call and fax that Senator immediately. Request that the Committee member work to ensure that the bill dies in Committee, and if a co-sponsor, to withdraw their support. I have just received information that the Senate bill has two co-sponsors at this time—they are Daniel Inouye-Hawaii and Dianne Feinstein-California (Dianne is also a member of the Senate Energy and Natural Resources Committee).

If enacted the provisions of this legislation will eventually put all mom and pop rock shops out of business as well as destroy the Tucson (as well as all other) Fossil Show. **But your most important argument against the enactment of this legislation is that IT WILL BE TREMENDOUSLY EXPENSIVE TO THE TAXPAYER since it calls for the land managers to inventory their paleontological resources.** Those of you who know the vast number of fossils exposed with every rain and wind storm and the number also destroyed by the same storm, know that an inventory of paleontological resources is truly a futile exercise—but it will keep a lot a academic paleontologists in grant monies—they can simply re-inventory the same piece of geography every year.

This bill is not an exact duplicate of HR 2974 introduced into the House in October 2001—there are a few minor changes in language and some of the House sections have been omitted. These changes in no way ameliorate the negative aspects of the bill—it still states that all fossils collected from public lands remain the property of the United States and be repositied in acceptable institutions. Even for amateur casual collecting it further restricts what can be collected since there is no provision for casual collecting of any vertebrate fossil material—only "abundant" plant and invertebrate fossils may be collected under the casual collecting provision, not vertebrate material. The penalties required for violation of this Act call for charges of a Class E

Felony to be brought if it is determined that the resource in question is worth \$1,000 in fair market value and/or the cost of restoration or repair of such resources costs \$1,000 or more. It also calls for the forfeiture of all vehicles and equipment that may have been used in the acquisition of any fossils in violation of this Act.

It has also come to my attention that there are now 25 sponsors on the House Bill 2974—They also need to be contacted wherever possible by residents of their own Congressional Districts to drop their support of this legislation. Please contact any people you may know in any of the states represented on this committee who may be willing to contact their member of the House.

Here is the updated listing of those sponsors:

<u>NAME</u>	<u>DISTRICT/STATE</u>
Douglas Bureuter	3 rd /Nebraska
William J. Coyne	14 th /Penn.
Phillip English	21 st /Penn.
Tony P. Hall	3 rd /Ohio
Dale E. Kildee	9 th /Mich.
Jim Matheson	2 nd /Utah
Jim McDermott	7 th /Washington
George Miller	7 th /California
Earl Pomeroy	North Dakota (at large)
Mark E. Souder	4 th /Indiana
Mike Thompson	1 st /California
Mark Udall	2 nd /Colorado
Henry A. Waxman	29 th /California
Robert A. Borski	3 rd /Pennsylvania
Tom Davis	11 th /Virginia
Felix J. Grucci, Jr.	1 st /New York
Joseph M. Hoeffel	13 th /Pennsylvania
Barbara Lee	9 th /California
Betty McCollum	4 th /Minnesota
Scott McInnis	3 rd /Colorado
Grace E. Napolitano	34 th /California
Lynne N. Rivers	13 th /Michigan
Ellen O. Tauscher	10 th /California
Todd Tiahrt	4 th /Kansas
Tom Udall	3 rd /New Mexico

ALL LETTERS TO HOUSE MEMBERS SHOULD BE COPIED TO JAMES HANSEN, CHAIR: HOUSE RESOURCES COMM.—ALL LETTERS TO SENATE MEMBERS SHOULD BE COPIED TO: JEFF BINGAMAN, CHAIR: SENATE ENERGY & NATURAL RESOURCES COMM.

If you wish to have more information about this legislation or about contacting your members of Congress, call me at 605-574-4289 or fax me at 605-574-2518. I have the locations of all the Congressional field offices in each state and the names, addresses, emails where available, phone and fax numbers of all the Members of Congress easily accessible.

Here is a listing of all the members of the Senate Energy & Natural Resources Committee:

DEMOCRATS

Jeff Bingaman	New Mexico (Chair) 703 Senate Hare OB. DC 20510
Daniel K. Akaka	Hawaii (bill sponsor)
Byron L. Dorgan	North Dakota
Bob Graham	Florida
Ron Wyden	Oregon
Tim Johnson	South Dakota
Mary Landrieu	Louisiana
Evan Bayh	Indiana
Dianne Feinstein	California
Charles E. Schumer	New York

REPUBLICANS

Frank H. Murkowski	Alaska Ranking Member
Pete V. Domenici	New Mexico
Don Nickels	Oklahoma
Larry E. Craig	Idaho
Ben N. Campbell	Colorado
Richard C. Shelby	Alabama
Conrad Burns	Montana
Joh L. Kyl	Arizona
Chuck Hagel	Nebraska
Fordon Smith	Oregon

Here is a listing of the House Natural Resource Committee members—they need to be contacted by people from their congressional districts in their respective states re: HB 2974:

DEMOCRATS

James V. Hansen, Chair	1 st – Utah 242 Canon HOB, DC 20515
Don Young	At large – Alaska
W.J. Tauzin	3 rd – Louisiana
Jim Saxton	3 rd – New Jersey
Elton Gallegly	23 rd – California
John J. Duncan, Jr.	2 nd – Tennessee
Joel Hefley	5 th – Colorado
Wayne Gilchrist	1 st – Maryland
Ken Calvert	43 rd – California
Scott McInnis	3 rd – Colorado
Richard Pombo	11 th – California
George Radanovich	19 th – California
Walter Jones, Jr.	3 rd – North Calolina
William Thornberry	13 th – Texas
Chris Cannon	3 rd – Utah
John E. Peterson	5 th – Pennsylvania
Bob Schaffer	4 th – Colorado
James A. Gibbons	2 nd – Nevada
Mark Souder	4 th – Indiana
Greg Walden	2 nd – Oregon
Mike Simpson	2 nd – Idaho
Thomas G. Tancredo	6 th – Colorado
J.D. Hayworth	6 th – Arizona
C. L. Otter	1 st – Idaho
Tom Osborne	3 rd – Nebraska
Jeff Flake	1 st – Arizona
Dennis Rehberg	At Large - Montana

REPUBLICANS

Nick J. Rahall	3 rd – West Virginia
George Miller	7 th – California
Edward J. Markey	7 th – Massachusetts
Dale E. Kildee	9 th – Michigan
Peter A. DeFazio	4 th – Oregon
Eni F.H. Faleomavaega	American Samoa
Neil Abercrombie	1 st – Hawaii
Solomon P. Ortiz	27 th – Texas
Frank Pallone, Jr.	6 th – New Jersey
Calvin Dooley	20 th – California
Robert A. Underwood	Guam
Adam Smith	9 th Washington V. Islands
Donna M. Christian-Christensen	
Ron J. Kind	3 rd – Wisconsin
Jay Inslee	1 st – Washington
Grace F. Napolitano	34 th - California
Tom Udall	3 rd – New Mexico
Mide Udall	2 nd – Colorado
Rush Holt	12 th – New Jersey
James P. McGovern	3 rd – Massachusetts
Anibal Acevedo-Vila	Puerto Rico
Hilda I. Solis	31 st – California
Brad Carson	2 nd – Oklahoma
Betty McCollum	4 th - Minnesota

CURATION OF COLLECTIONS—PART I

Special Paper in Paleontology, Number 1, July 1995, Revised January 2002

Paleontology Section, HGMS

By Wayne S. Barnett

This paper was reviewed for content and was originally presented July 1995. The Paleontology Section, HGMS, did not pay original publication costs.

INTRODUCTION

There are several reasons that individuals collect. Because of this there are several levels of curation that may be exercised. The most casual form of collecting is done by those individuals that collect a few specimens that they happen onto during an outing and sees a specimen in the outcrop. To these individuals the collection is a reminder of a pleasant day along a riverbank or roadside stop. These individuals will usually never attempt to classify or identify the material they have collected.

Other individuals collect as part of an organization that they belong or a family member belongs. Collections made by these individuals may settle into the collections of a more serious collector in the group. If not they may be saved in a box or on a shelf as a reminder of a trip that was made "over near Austin last year where we stopped at some roadcuts". After a while the locations are lost from memory and they become just some fossils we collected in Texas.

Some collectors acquire a passion to collect a particular class of objects or a select set of specimens of a given type. In the mineral collecting community there are individuals who specialize in quartz or calcite varieties. In the paleontological and shell collecting communities there are individuals that collect only specimens of a given age or class. These collectors need to track their acquisitions so that they can more effectively expand the types of specimens in their collection.

Collectors who are more serious about the collections they make attempt to save the specimens with as much information as possible to retain the specimens scientific value. Specimens are usually kept at a level of curation that the collector feels will meet his needs. This may be in a box that has a locality tag, to a series of cleaned and sorted specimens that are arranged in a cabinet for storage and retrieval. These more advanced collections are usually made by individuals who are attempting to collect a series of specimens in a systematic way or collect as many species as possible of a particular variety or fossils from a specific time period.

DEFINITION OF CURATION

A definition of curation that the department of interior uses is:

The management, preservation and use of museum objects/specimens, which includes acquisition and disposal, documentation and cataloging, preventative conservation, storage access, interpretation and exhibition, and research and publication.

This definition covers all of the aspects of collecting and managing specimens. While the definition designates the objects of interest are museum items; the same principles can be applied to a private collection. The extent that a collector wishes curate his collection will influence the elements of the definition that are used. In a well-curated private collection the ultimate use of the material may well be a museum.

Briefly stated, curation is the process of caring for something.

PURPOSE OF CURATING A COLLECTION

Curation includes all the steps in caring for a collection. One of the first goals to curation is the preservation of the specimens in as good a condition as possible while reducing the volume of waste material. In a paleontological or mineral collection the reduction in volume may be a major step in the curation of a collection. If the object of the collection is microminerals or microfossils a large volume, relatively speaking, of matrix may have been collected. Just the removal of the unwanted matrix may represent a major part of the curation. If the unneeded matrix material is not reduced, the volume of material that needs to be stored may be significantly larger than necessary. The residues in a microfossil sample may represent less than 1% of the original sample volume and weight. The same may be true of a mineral collection.

Collectors who are interested in obtaining a complete set of specimens of any type should have a systematic method to organize their collection. Using the data recorded in the catalogue they have a gauge to evaluate if they have reached their goal. If the collections are not kept in some sort of order and a catalogue of the

collected material retained, the retrieval of a particular specimen may also be difficult, if not impossible. Retrieval of a particular specimen or lot becomes important when comparing specimens from different locations. As a collection grows the material from similar time horizons or locations may need to be compared to check identification of species. Proper curation of a collection will make this task much easier.

In addition to the collecting and preparation of the specimens in a collection the amount of time and money invested in collecting should justify the proper curation of a collection. Even though a collection is made by personal expeditions, the amount of money spent could be considerable over a period of time. The total spent could be even more if specimens were purchased.

The time that is spent making a collection in the field could add up to weeks, months or years when added together, not to mention the amount of time that it takes to clean and identify the specimens retained in a collection. The additional time that it takes to record the information for the collections is well worth it as it adds value to the long-term investment into the collection.

In any collectors life there is a time when their interests may change or the collection may get to large to be retained. Most collectors will not want to just throw away the material that they have spent many years collecting. In most cases it is hoped that their collection can become a part of a museum holding or a part of another individual's collection. If the collection has been properly curated then others can use the specimens. If a collection is received by a museum that has no documentation then most, if not all, of the specimens will probably be given to schools for student use or thrown away. These specimens usually last only a few years in student's hands until handling destroys them. If the material had proper documentation then they could have become a part of the core collection of the receiving institution or individual.

CURATION BEGINS IN THE FIELD

Because location and/or stratigraphic position are very important to the proper curation of a specimen, curation of a collection actually should begin in the field. With every collection made a label should be put in the collection bag or box at the location site. This label should have enough information that the location will be easily recognized as the specimens are catalogued. This label may be a code that relates to an entry in a field book or it may be a more extensive description of the location. The label should be printed on a good quality paper that will not come apart easily. Old business cards usually work quite well. Other options include manila

folders cut in small pieces and good quality paper. The need for good quality paper is important as many collections will be damp or wet when collected. The labels that are put with the field collection need to be of high enough quality to withstand being wet and being roughly handled during the processing of the collections. These labels need to be kept with the collection until the final sorting and storage of the specimens. The label should be recorded with pencil or waterproof ink. If water-soluble ink is used the label may become useless when the text runs and becomes unreadable.

Each location that is identified needs a separate location designation. When collecting in a cut along a river, road or quarry, the separate lithologic units need to be designated as separate locations. This is particularly important when there are more than one formation at a particular outcrop. It may also be beneficial to designate the different stratigraphic layers as separate locations. In outcrops where there are distinctive lithologic differences the collections should be kept separate. For example if a collection is made in an outcrop that has mainly shales it may be important to designate the collection from a thin layer of sandstone as a separate location.

When collecting in streams or other areas where the stratigraphic relationship may not be very clear it is best to designate every collection as a separate location until the relationship of the layers can be determined. In some museums (Smithsonian) each collection is designated as a separate location, even though they may be from the same layer. The philosophy that has been stated is 'there can be no certainty that the collection came from the same hole that a previous collection had been made'. While most collectors may not have to be as rigorous it is better to be over cautious until a set of units have been better understood.

Curation at the outcrop should include an entry into the field book. The field book entry should be as complete as possible. Enter as much detail in the field from direct observation as possible. Data that should be entered into the field notes include:

- Location ID or Code
- Formation
- Physical geographical relationship of location
- Description of the lithology
- Description of any internal structures of the unit
- Description of the distribution of the fossils or minerals
- Description of any distinctive layers in the unit
- Were pictures taken
- Date of visit
- Type of collection made: surface, mass or bulk,

stratigraphic**Outline or profile of outcrop**

A location ID schema should be developed early in the collectors trips so every location can be recorded uniquely. There are several different ways to code locations. One method of assigning a code to locations is to generate a system where the state and county are significant elements in the code. For instance a location in Texas may be TX_21_2. This would indicate that the location is in Texas in the 21st county in an alphabetical list and is the second location in that county. Another method of assigning codes is to use your initials and a series of numbers that follow. The code WSB_28 is the unique identifier to one location visited by this author. Most collectors will collect at a limited number of locations compared to the number of locations that a large museum or state survey may need to track. The latter system may fit their needs better than trying to generate a complex system that would better suit a large institution.

Once a location is entered into the field book, if it is revisited, it is only necessary to enter the date of the additional visit and any additional information that may have come to your attention. Many if not most outcrops change over time so additional information may be required in your field book to document those differences.

SPECIMEN FIELD CONTAINERS

Curation includes getting specimens back to the lab in as good a condition as possible. As specimens are being collected place them in containers that will protect them. Containers to transport specimens might include used egg cartons, empty (and washed) plastic food containers, zip lock bags and vials of various sizes for individual specimens. Each container that is not within another container should have its own location label enclosed. If several similar outcrops are visited and there are no location labels included in the collection containers it may be difficult, if not impossible, to sort out the collections to individual locations if containers without location labels become mixed.

If there are large fragile specimens being collected or specimens that may need special protection, a plaster jacket may be the method of choice for protecting the specimen until it is safely delivered to the lab. A plaster jacket is layer of plaster that is placed over the specimen then allowed to harden in order to protect the specimen and to keep the pieces in place. The process is to first place a damp layer of paper over the specimen then lay layers of burlap soaked plaster over the paper until all of the specimen is covered. Once the plaster is hard the

underside of the specimen is freed then the lower side is covered in a similar manner. If the specimen is large then the cast is reinforced with boards or sticks within the layers of plaster.

CLEANING YOUR SPECIMENS

Depending on the type of collection that has been made it needs to be prepared for final storage. A collection of seashells may need to be only washed off if they were collected dead on the shore or may need to be cleaned of the animal if collected live. A collection of minerals may require some trimming or washing of mud from any crystals. A collection of fossils may require the breakdown of surrounding sediments or the removal of significant amounts of consolidated matrix.

The methods that may be used to clean your collection will vary, depending on the composition of the specimen and the type of material that needs to be cleaned from the specimens. Whatever methods are used the primary requirement is to not do damage to the specimen and to retain the location information with the material being cleaned. It may be easy to get the location labels misplaced during the cleaning process. If the location information is kept with the collection during the cleaning process it retains the integrity of the collection. If a series of collections are made during an outing and the matrix and/or the contained specimens are *similar*; it may be easy to mix the material between locations. This will be especially true if several locations are being cleaned at one time.

When several collections have been made from similar outcrops it may be advantageous to clean one location of a given type at a time. In this manner it makes it easier to keep the locations separate. As each collection is cleaned of it's matrix it should be boxed with the location information enclosed until it is sorted into its component species.

SORTING SPECIMENS

Sorting of the specimens after cleaning is usually the next step to the curation of a collection. Many collections are retained as mass samples and not divided into the component species. These collections may retain their value if they have proper location labels kept with them. If the collection was of only a few items then the sorting should be easy. A set of minerals from a mine location may have only a few species of minerals represented, whereas a collection of shells or fossils may have over a hundred species that represent several phyla.

The first step in sorting a collection is to determine the level of sorting required. This is usually done subconsciously as the specimens are cleaned and boxed.

With minerals or shells there usually will not be a great amount of loose, unusable material. In many fossil collections there is a great amount of broken material and coarse matrix material from which the desired specimens must be picked.

In the washing of fossils from a shale or sandstone matrix the reduction of weight and volume may be over 95%. After the usable specimens are removed from the screened residues the reduction may be another 95%. These are the specimens that most collectors are interested in keeping.

Sort the keepable specimens into as fine a partition as possible on the first pass. However, it may take several passes to finish the job with a fossil or shell collection as several genera or species may be combined in the initial sort. The large, distinctive species can usually be sorted on the first pass and those that are less distinctive and/or smaller may need more attention.

IDENTIFYING SPECIMENS

Identification of specimens collected is an important step to the proper curation of a collection. Identification should be to the lowest level possible. This means that, if possible, a specimen should be identified to the species or subspecies level. Often this may be difficult because of lack of literature or access to literature that may be obscure. Sometimes the specimen may represent a new species. If the species is new to science it should be named and published in a recognized journal so the rest of the scientific community is aware of its existence. Typically the publication of a series of scientific papers will lead to the better understanding of the paleoecology or mineralogy of the rocks being studied.

LABELING SPECIMENS

Each specimen or lot in the collection should have its own label. This label should contain all of the information that is pertinent to the specimen. This will commonly require a large label. An alternative used by many, if not most, museums and private collections, is to assign a number to the specimen or lot. This number is usually written directly on the specimen(s). For smaller specimens the number is usually printed on a small piece of paper, then inserted in a vial or bag that contains the lot of material. In a journal or electronic database the number is recorded and the information for the specimen is recorded next to the number. When the specimen is used in a study the technical data is retrieved from these journals or databases.

STORAGE OF SPECIMENS

Once the specimens have been identified, they need to be stored in containers that will help retain their integrity

and make it easy to retrieve any given specimen as needed. There are several ways to do this economically.

Boxes are best for larger specimens and lots. The boxes may be any type but the size should relate to the specimens being stored. A box that will not allow too much waste space without causing the specimen to be damaged because it was pushed in too tightly is best. Boxes can be acquired in lots of equal size so their storage will be efficient. In this way a series of equal sized boxes may be grouped together with associated sized specimens. If boxes with tops are available they will be best, as they will help keep specimens contained. If tops are used on the boxes it is important to label the box tops so the contents of the box can be determined without opening the box to examine the contents.

Bags can be used to contain the specimens if the specimens are very small and a label can not be attached or written on the specimen. The label for the lot should be included in the bag. If needed, all specimens can be kept in bags to help protect them from damage or becoming dusty. Zip lock bags come in a variety of sizes and may be purchased in lots of hundreds. Bags have the advantage of being able to place a number of them in a common container for more efficient storage. Care should be taken as to not pack the container too tight. If the specimens are fragile they may be crushed in the bag when it is packed tightly in the primary container.

Vials are another type of storage container that has been used in collections for many years. The specimens are stored in the vials with a number in the vial with the specimen. A catalogue number can also be put on the outside of the vial to make finding a given specimen easier. Vials have the advantage of better protecting specimens because they do not collapse and possibly crush the specimen(s).

Slides are normally used to hold microfossils such as ostracods and foraminifera. These same slides may also be used to hold other small specimens. There are several types of micro-paleontological slides available. The normal slide contains a grid with up to sixty small squares where specimens are glued with water-soluble glue. Other slides may have fewer squares or a single round cutout to hold several micro specimens or a single smaller specimen.

PHYSICAL ARRANGEMENT OF A COLLECTION

Once the specimens are cleaned and identified the need to be stored in such a way as to make it most efficient to recover them as needed. One scheme would put specimen one (1) in the first box or drawer and continue on from there, adding specimens in each box or drawer

until each is filled. This probably would be an acceptable method if the retrieval of specimens were to be only from the catalogue. For most collections this method would become cumbersome after a short time. A perhaps better method of arranging a collection would be by group or age and group.

For paleontological collections arrangement of the specimens by age then class or family may be better. In this manner the specimens from like ages and class would be stored together. This would make it easier to retrieve a specimen if only the age and/or genus or species were known. In an arrangement such as this it would also make it easier to compare specimens from different locations without having to pull similar specimens from several different storage locations.

If the collection is from a few locations then to store them by location then class may be more logical. A collection of modern shells, for example, will more likely be stored like this where one section of the storage would be dedicated to a region, such as Texas or California, and all the material from that region would be stored together. Within each regional area could be a division of the specimens by class etc.

The arrangement of a mineral or rock collection could follow the same order as the fossil or shell collection. The arrangement of specimens needs to be such that they are easy to retrieve and that they follow some order in their storage. Minerals and rocks may be stored by mineral class, location or alphabetically by name. The same rules may be also used for cut stones or an inventory of material that is waiting to be cut.

SPECIMEN CASES

Once the specimens have been sorted, identified and boxed they should be stored in a safe repository. This may take several forms. Keeping specimens as display specimens is one way a few specimens may be stored. If more than a few specimens are collected the use of other methods will probably be required.

Ricker cases may be used if the specimens collected are small and will survive being kept between the glass and cotton padding of these cases. These cases make good display cases for showing the specimens in your collection and eliminating some of the hazard of the individual specimens being handled. If Ricker cases are used to store specimens, material from a single location can be conveniently be kept together. If material from several locations is kept in the same Ricker case then each specimen needs to be labeled. Many times the specimens in Ricker cases or similar cases will be tilted and the specimens will slide together. If similar

unlabeled material, from different locations, is being stored in the same case then it may be impossible to sort them to their respective locations after being mixed.

Flats such as those that sodas and beer are delivered in can be used to store specimens. These flats can be used as the top and bottom of a box. One flat is pressed over the other to form a complete box. These boxes can then be stacked several high for storage. The specimens inside can be labeled on the ends or sides of the flats to make it easier to locate a particular set of specimens.

Wood or metal cases with drawers 1.5 (3.8 cm) to 2 inches (5 cm) deep are best to store collections. If each drawer is be supported by runners 3/4 inch (2 cm) in thickness, then the clearance for specimens would be 2 (5 cm) to 2.5 inches (6.3 cm). This is enough room to store most specimens. If additional space is required for larger specimens a drawer or two can be left out to allow for additional space. These cases should be high enough to contain several drawers per unit. Each unit can be stacked on top of each other until the combination is five or six feet high. The length and width of each drawer should be between twenty to thirty inches square. Metal cases such as these may be purchased. Wood cases can be made if the collector is handy at woodworking.

RECORDING AN INVENTORY OF A COLLECTION

Recording of the specimens in an organized fashion is an important step in the curation of a collection. The recording of the pertinent information in an organized manner will help the collector in retrieving any of the specimens that may be in the collection. Depending on the level of sophistication of the database that is used, the collector may be able to easily filter to the type of specimen, species, or particular specimen that is desired from a collection.

Of the methods that can be used to record a collection, **no listing** is the easiest. Unfortunately this is the path that is taken by many collectors. As a result their collections become basically worthless when they decide to dispose of them. Museums receive many collections each year where the specimens are good to excellent but there is no location or collection information. These collections are discarded or given to schools to be used as student specimens because of the lack of location information. Without good location and other information on each specimen the private collection cannot become an important addition to a museum's collection.

Notes in loose-leaf notebooks are a good start to the organization of a collection. In this type of system any amount of information may be kept. As new information is gathered it may be entered or inserted in

the proper place. As the collection increases in size and variety the notebook can expand. The main hazard to this type of system is the loss of pages from the notebook or the difficulty of updating the information that was put in first. Unless the collection is small retrieval of a specimen or the information on a given specimen may be a challenge.

Bound notebooks with technical information, such as a listing of locations with the species found at each location, is also an acceptable way to keep track of a collection. This type of record keeping is a bit easier to manage as the information for each location is on a limited number of pages. It is also more difficult to misplace the pages from bound notebooks. One of the major drawbacks of using bound notebooks is it is difficult to update the information. Once the data is entered it must be overwritten or, if in pencil, erased and reentered. As nomenclature is changed the ability to keep up with the changes may become impossible. Data entered in this type of system is locked in the order that it is entered. To attempt to sort the information for any reason is not possible. As the collection becomes larger additional notebooks will need to be added to accommodate the larger collection. Unless some sort of reproduction of the notebook is made, if the notebook is lost or destroyed the record of a major part of the collection will be lost.

Card Files can be used as a way to record the information on a collection or a way to help cross-reference a collection. The advantage of this type of system is the records of a collection may be sorted in several ways. In this way the information on a type of fossil or stratigraphic unit can be easier to retrieve. For example if the collector is interested in retrieving the specimens based on class and species, the sorting and storage of the cards would be by class then the species or each class could be sorted to genus and species. Additional subdivisions could be placed in the sorting of the cards, such as order and family. In this manner a rather efficient system could be developed to retrieve the information on a particular specimen.

A **computer managed database** with all technical information entered is presently the best way to catalogue or curate a collection. The database may be started with only part of the data that will ultimately be put in the tables. The important part is to begin to enter the data in an organized manner as possible. With a computer database the information may be entered and then sorted and corrected or crosschecked in several ways in a relatively short time. As additional information is acquired it may be added in several ways.

Presently (1995) there are several easy to use computers and software programs available. The cost for these types of machines and software is nominal. Most database applications do not need a powerful full graphics capable computer. Many computers that are not at the state of the art in technology can be obtained for a very reasonable cost. These machines are usually more than able to do the job that is required to keep a database.

The computer chosen should have a clear monitor or CRT. For use as a data entry or word processing, a computer that has a hard disk of 200 megabytes or more should be enough to hold the programs and the resultant files to manage a large collection. As technology improves the types of computers and the accessories that are available with them will become faster and better. This will also effect the quality of the lower level machines that will be available. They will improve as well. At any time that a machine is purchased, the best machine that can be afforded should be obtained. Most computers will be out grown in time. This is not to say that the computer will become useless, but that the hard disk may become inadequate for the programs or data files being used. The user may want to upgrade their capabilities as they become more familiar with the programs or add software that requires a faster computer to be used for efficient processing. If a good computer is purchased at the outset, the useful life of the computer will be extended. As one member of a household may outgrow a computer other individuals may be able to use it, thus extending the useful life of any given computer.

DATABASE SOFTWARE

The software that is chosen to manage the data may vary, depending on the needs of the user. There are several brands of programs that can be used to manage data. Prices for software can vary from a few dollars to several hundred dollars. Usually the cheaper the price of the software the more restricted the functionality that is available. Try to purchase a product that will serve your needs for an extended period of time.

The types of databases that are available come in three classes. Depending in the size of the collection that is to be curated the minimum functionality that can be used probably comes with a **Spreadsheet** that is used as a program to do book keeping. **Flat File** systems are programs that contain the data in a single table. On the high end are the full **Relational Database** programs that can keep large files of information and then manipulate them in several ways.

Spreadsheets are programs that are usually used by accountants for balancing their records. They can also

be used as a **Flat File** filing system to keep records of small collections or keep a record of a collection in several smaller files. Since the files that are in the spreadsheet program are not tied together it suffers the same drawbacks as the Flat File data programs. Spreadsheet programs may be a good place to begin keeping a record of a collection as they are rather common and there are several database programs that will import the files if the decision is made to move to a more powerful database program. Many spreadsheet programs have a database mode where the information that has been entered may be sorted in several ways. Some spreadsheets are integrated with other programs. This makes it easier to check the information entered through a spell checker or easily integrate it into the files of other programs.

Flat File programs are programs that keep all data on a subject in a single file that is not connected to other files. These programs are usually easy to use and maintain. If the information required is not too extensive these types of programs will usually be enough to keep most records. With flat file programs each field of each record in the file needs to be filled out for every type of data in the record. If there is a lot of common information between specimens it may be better to keep the common information in another file. A code is used to connect or relate that information to an entry in the original file. The drawback to this type of record keeping in a flat file system is that it is not very easy to generate a report with all of the information easily tied together. When the files need to be tied together relational databases are more efficient.

Relational Database programs are capable of keeping the complete set of information on a specimen in a single file or table or in several tables that hold a particular part of the information. The information in each table is tied to the parent table by a unique identifier. The unique identifier will not necessarily be unique in the parent table. There may be several records in the parent table that will use the information on a particular record in the daughter table. In this way the information is recorded in as little table space as possible. In the ideal database no information is repeated between tables and no information is duplicated in the same table. In this manner the information is kept in as efficient manner as possible.

An example of a parent table in a relational database would be one that contained the information about the genus and species of the specimens in a collection. In this table would be kept the columns with the data on genus, subgenus, species, subspecies, and author-date. These would be the columns that may be indexed. In

addition a field to contain a code or key to the table on location would be needed for each entry. This key could be a numbering system or code for each location that have specimens represented in the collection. In the table for locations information such as state, county, and physical description of the location may be retained. To hold the information on the biologic tree, represented in the parent table by perhaps a family listing, would be a table containing family, order, class, phylum, and maybe kingdom.

DATA TO BE RECORDED IN A DATABASE

What data should be kept in a database? The short answer is: Anything that relates to the specimen. The longer answer may be to consider what you are trying to do with your collection. If the collection is to be a set of collections that were made on a given trip and not sorted to species then a location index may be all that would be needed. If, however, the collection is to be sorted to species then much more information may be stored.

The **Scientific name** of the specimen is the primary piece of information that most collectors keep for individual specimens. In a paleontological database this information should be in the table that includes the genus, subgenus, species, subspecies, author and date the species was identified. Not all of this information may be available when the specimen is first recorded into the database. The data that is not available at the time the record is created may be entered as that data becomes available.

In a minerals or non-biological collection the information listed would be tailored to the type of material in the collection. Non-biologic collections would not have the biologic tree information listed but may have a field for the type of mineral or rock class being curated. This information could be kept in the parent table instead of creating a daughter table to store the information.

The **Family tree** table should include all of the biological stages up to and perhaps kingdom. These include family, order, class, phylum and kingdom. A record of "unknown" should be created for each phylum and class in the Family tree table to accommodate those specimens where the family is not known at the time of the initial data entry. As the family is determined the record in the parent and child tables can be updated with the correct information.

Location information where data on the physical location and condition of the collecting site, including state, county, and country, should be recorded in a separate table in the database. This information should

also include a detailed description of the outcrop and the distance from the nearest town or major highway intersection. Use landmarks that are likely to be there for many years. Describing something as '500 feet north of the large oak tree' may be dangerous because the large oak tree may be used for firewood some winter. **Stratigraphic information** that will be useful in the curation of a collection should also be recorded in the location table. This information should include age, formation, stage, and facies of the collection site. This information should be gathered for each site a collection is made.

Other information that might be useful to a collection or specimen would be the **reference** used to identify a specimen, a status field and a verification field. The status field could also be used to mark records that need to be extracted from the database for some reason. The reference that is used to identify a specimen could be saved as a database element or elements. The extent of information that is kept on the reference could be as sparse as the title or author or all of the information that would be needed as a bibliographic entry. In the latter case the reference should be a code that points to a record in a table where a library listing is kept.

WHEN SHOULD CATALOGING A COLLECTION BEGIN?

When is the best time to start a catalogue and to begin to curate a collection? Many individuals believe that the best time to begin cataloguing a collection is when there are sufficient numbers of specimens in the collection to make it worth while. The best time to begin a catalogue, whether on a computer or in a ledger, is when the first specimen is collected. If the collector waits until there are lots of specimens from lots of locations it becomes a more daunting task. Unfortunately, most collectors begin collecting not knowing where they are going with their collection. Once there is a direction developed or it is realized that many collections have been acquired the number of specimens may be significant.

If a few specimens are done at a time the job is more manageable. If the specimens are catalogued soon after they are collected it is also easier to remember the details of the location information if good field notes were not kept. It is also easier to maintain the integrity of a collection from a site if the material does not have the chance to become mixed with material from other locations before being catalogued. The chance that the material from different but similar locations becomes mixed increases as time passes if the collecting and storage containers are not properly labeled. Once specimens from different locations are mixed it may be impossible to separate them into their proper locations.

If complete identification and labeling does not take place soon after the specimens are collected, they should be put in boxes that can be sealed and location information placed in the box. As time permits the final sorting and identification of the collection can be done in a systematic way.

MAINTAINING THE CATALOGUE

Once a catalogue has been established *documentation* for the structure and codes used in the catalogue should be generated. If the catalogue is kept on a computer a short document that details the tables and fields in those tables should be printed and kept in a location that is easy to locate. If you need to reference this type of information it is usually best to have it as hard copy rather than a file on a computer. The source file, with a directory path, on the computer, needs to also be recorded on the report so an update of the report can be generated if necessary.

Periodically the electronic catalogue should be printed to hard copy so the data can be checked for accuracy and to have a copy to use as a reference to the specimens in the collection. This printout can be designed to contain as much or as little information as required. If it is being used as a backup to the electronic file it should contain all of the information that in the database. If it were being used just to locate the specimens in the collection then it would need only that information that is needed to find the desired specimens.

While a hard copy of the catalogue may be generated periodically, an electronic backup of the data should be made regularly. This can be done by saving the files to another name or to making a backup on media such as floppy disks. A routine can be generated that makes a backup of the required files by typing in a simple command. In this manner a fresh backup can be generated each time the files have something added or corrected. If the computer fails or the data is needed on another machine it is much easier to restore the data from these backup files to the new disk or machine.

If the catalogue is not kept electronically then xerographic copies need to be made periodically. These copies should be kept in a location different than the original catalogues. If the original catalogue is lost or destroyed then the backup copy can be used to document the collection.

BURPEE MUSEUM DIG TURNS UP POSSIBLE COUSIN OF T-REX

Summarized from "Museum dig team finds fossil in Montana", by Jared Miller in *Great Falls (MT)Tribune*, 8/8/02

David Jones sent the news clipping on the dig with a note saying: "Once again we have a good example of small museums and colleges putting their talents together to collect, conserve, prepare, and publish good fossils. MAPS members note: This specimen will be at the Burpee Museum in Rockford, Illinois. Stop and enquire about it once in a while."

A dinosaur dig sponsored by the Burpee Museum of Natural History in Rockford, Illinois, uncovered a skeleton in southeastern Montana which may be that of T-rex's smaller cousin nanotyrannus. If that is the case, it is a very important find, being only the second known specimen of its kind.

The other specimen is housed in the natural history museum in Cleveland, Ohio. There is, however, some debate over the specimen, with one camp holding it is a distinct species of carnivorous dinosaur and the other camp believing it to be a juvenile T-rex. The Ohio specimen was reconstructed with some "creative" molding techniques, and examination with modern technology did not shed any further light on the specimen's true identity.

Time will tell for the new specimen. Paleontologists in Rockford will remove the matrix and study the skeleton over the next year or two. At the conclusion of the reconstruction, they will publish their findings. The skeleton, which includes the pelvis, leg bones, backbone and jaws with teeth, is at least one-third complete. Even if it turns out to be "just a T-rex," it's still an important find.

HUNTING SITES IN OHIO

Excerpt from "Columbus knows where the fossils lie."
By Alyson Borgerding in *Dry Dredgers*, Greg Hand, Ed.

Some public places to hunt for fossils are:

Caesar Creek State Park in Waynesville. Fossil hunting at the park requires a permit, which is free and good for one day only. Fossil hunters may not bring tools or use anything to break rocks and cannot take anything larger than the palm of their hand. Permits are issued at the Army Corps of Engineers visitors Center, 4020 N. Clarksville Rd., which is open weekdays 8:00 a.m. to 4:30 p.m. and weekends 8:30 to 5:30. For more information, call 513-897-1050.

Hueston Woods State Park near Oxford. The park has two open areas where visitors can search for fossils. One is at the south end of the dam near the park's only bridge. The other is on the opposite end of the park, at the quarry picnic area. No permit is required. The park's nature center also offers regular programs on fossil hunting. For more information, call 513-524-4250 or 513-523-6347.

For general information about fossil hunting in Ohio, visit the Ohio Geologic Survey at:
www.dnr.state.oh.us/geosurvey/geo_fact/geo_fl7.htm

ADVERTISING SECTION

Ads are \$5.00 per inch. Send information and checks payable to MAPS to : Mrs. Gerry Norris, 2623 34th Avenue Ct., Rock Island, IL 61201. Phone: (309) 786-6505

This space is a \$5.00 size.

To extend currently running ads, please send request and remittance to Editor by the 15th of the month. We do not bill. Ads do not run in the EXPO issue (April). Ads can be printed in different sizes of type to fit a 1" space.

Over 200 Museum Replica Fossils



PALEOCLONES
The Museum Where You Can Purchase Every Exhibit™



www.PaleoClones.com

1-800-822-6788

NEWS | MUSEUMS | LINKS | CLUBS

PREHISTORIC
PLANET.COM

The World
Of Fossils
And
Natural
History
Online

PLEASE ADD THE FOLLOWING NEW OR REJOINING MEMBERS TO YOUR DIRECTORY:

<p>Harry Bartholomew 13150 Royal Pines Dr. St. Louis MO 63146 314-434-0479 Hbartho369@aol.com</p>	<p>Manager Voice Communications. Main interest dinosaurs. Member of E. Mo. Soc. For Paleontology. Interested in field trips.</p>	<p>Wendell Ricketts 35 Russia Avenue, Apt. O San Francisco CA 94112 415-586-6909 fx 415-586-6909</p>	<p>Educator. Main interest Paleozoic inverts; brachiopods and gastropods from all periods, microfossils, especially ostracods. Will rarely trade, but will gladly donate dupes or less-than-perfect specimens to schools or anyone who wants them. Member of Fossils for Fun, Sacramento, CA. Wants to be able to contact (and be contacted by) other members/collectors across the U.S. in order to trade collecting-site info and go on field trips together! John Deere--General Supervisor. Main interest Ordovician--Iowa. Will trade.</p>
<p>Ethan James Carpenter 504 45th Place Norwalk IA 50211 515-981-5516 Dodrio724@aol.com</p>	<p>Student (02).</p>	<p>Reggie Schmitt 1515 Audubon Dr. Waterloo IA 50701 319-233-4818 RSSCHMITT@MCHSI.COM</p>	
<p>Terry L. Chase 205 Wolf Creek Rd. Cedar Creek MO 65627-9720 John Hedley 1419 Speers Ave San Mateo CA 94403-1129 650-638-2512 ncanvas@aol.com</p>	<p>Paleontologist. Main interest arthropods, dinosaurs. Will trade. Has for trade dinosaur material, trilobites, mammals, plants, Mazon Creek, arthropods. Wants to meet other fossil fans</p>	<p>Marlene Ann Short Jennifer, Kathleen, Ricky 524 Columbia Ave. Sumner IA 50674 563-578-5379</p>	<p>LPN. Interested in digging fossils.</p>
<p>Gary Leonard 1466 Lakeview Pkwy Villa Rica GA 30180 770-830-0802 Tullymonster@aol.com</p>	<p>Chemist. Will trade. Interested in all fossils, but especially echinoids and blastoids. Has for trade a variety of fossils form the SE U.S.</p>	<p>Dan Stone 1024 CR #365 Taylor MO 63471 573-769-2286 dstone@dinodiscovery.com</p>	<p>Business Owner. Wants to keep up with the current information through MAPS Digest and wants association with others interested in fossils.</p>
<p>David L. Malm 1314 Carol Court Cedar Falls IA 50613 319-266-6433</p>	<p>Engineer. Main interest Iowa fossils. Wants to collect.</p>	<p>Dave Treffinger RR2 Box 60 Loogootee IN 47553 812-295-3463</p>	<p>Retired.</p>
<p>Jack Petersen 1256 Hammond Ave. Waterloo IA 50702 319-232-5689 MRSP1026@MCHSI.com</p>	<p>Retired. Main interest ammonites, nautiloids, baculites. Wants to learn more about fossil preparation and more about Iowa fossils.</p>		

PLEASE NOTE THE FOLLOWING CHANGES OF ADDRESS OR CORRECTIONS:

<p>John D. McLeod 609 E. Burkwood Ct. Urbana IL 61801 john@cageo.com</p>	<p>Geologist. Interested in all phyla, with particular interest in ammonites and arthropods. No material to trade.</p>	<p>David R. Lambert 2040 San Remo Dr. Laguna Beach CA 3651-2628 fx 617-573-8345 dlambert@suffolk.edu</p>	<p>Professor. Will trade. Major interest trilobites. Has for trade Oreodont skull. Member of Dry Dredgers, Cincinnati.</p>
--	--	--	--

The Mid-America Paleontology Society (MAPS) was formed to promote popular interest in the subject of paleontology; to encourage the proper collecting, study, preparation, and display of fossil material; and to assist other individuals, groups, and institutions interested in the various aspects of paleontology. It is a non-profit society incorporated under the laws of the State of Iowa.

Membership in MAPS is open to anyone, anywhere who is sincerely interested in fossils and the aims of the Society.

Membership fee: \$20.00 per household covers one year's issues of DIGESTS. For new members and those who renew more than 3 issues past their due date, the year begins with the first available issue. Institution or Library fee is \$25.00. Overseas fee is \$20.00 with Surface Mailing of DIGESTS OR \$30.00 with Air Mailing of DIGESTS. (Payments other than those stated will be pro-rated over the 9 yearly issues.)

MAPS meetings are held on the 2nd Saturday of October, November, January, and March and at EXPO in April. A picnic is held during the summer. October through March meetings are scheduled for 1 p.m. in Trowbridge Hall, University of Iowa, Iowa City, Iowa. One annual International Fossil Exposition is held in April.

The MAPS official publication, MAPS DIGEST, is published 9 months of the year—October through April, May/June, and July/August/September. View MAPS web page at <http://midamericapaleo.tripod.com/>

- President: Marvin Houg, 3330 44th St. NE, Cedar Rapids, IA 52402
- 1st Vice President: Dale Stout, 2237 Meadowbrook Dr. SE, Cedar Rapids, IA 52403
- 2nd Vice President: Gilbert Norris, 2623 34th Avenue Ct., Rock Island, IL 61201
- Secretary: Alberta Cray, 1125 J Avenue NW, Cedar Rapids, IA 52405
- Treasurer (Send Dues To): Sharon Sonleitner, 4800 Sunset Dr. SW, Cedar Rapids, IA 52404
- Membership: Dale Stout, 2237 Meadowbrook Dr. SE, Cedar Rapids, IA 52403
- Directors: Tom Walsh (02), Allyn Adams (03), Blane Phillips (04)

Dated Material – Meeting Notice

CYATHOCHRITES



Mrs. Sharon Sonleitner
 MAPS DIGEST Editor
 4800 Sunset Dr. SW
 Cedar Rapids, IA 52404

FIRST CLASS MAIL