

PARK PALEONTOLOGY

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Fall 1999

NPS Paleontology Meeting in Denver

The Geologic Resource Division (GRD) hosted a paleontology meeting in Denver on Tuesday, October 19, 1999. Over twenty-five individuals representing ten different National Park Service areas participated in discussions on a variety of paleontological resource issues. The meeting was held in conjunction with the Society of Vertebrate Paleontology annual meeting.

The meeting raised issues and key points on paleontological resources inventory and monitoring. Rick Harris led discussions on developing a servicewide GPRA goal for paleontology and the NPS Natural Resource Initiative. IMR GPRA coordinator Ron Thoman joined the discussions and provided suggestions for developing technical guidance. Ted Weasma (MOJA) volunteered to coordinate a small workgroup involved in the development of technical guidance for the servicewide GPRA goal.

The outcome based goal that was adopted for the NPS is, "By September 2005, 20% of known paleontological resources will be in good condition". The group discussed the concept of good condition as a measureable goal.

Vince Santucci (FOBU) presented an overview of strategies implemented by the GRD to assist parks with paleontological resource inventories. Compre-

hensive paleontological resource inventories have been completed in Yellowstone and Death Valley national parks. Similar resource inventories have been initiated in Arches, Big Bend, Zion, and in NPS areas in Alaska.

Bruce Heise and Tim Connors of the GRD provided information regarding the I&M Division's Geologic Resource In-

ventories (GRI). GRIs have been completed in the NPS areas within Colorado and Utah.

The group discussed the concept of a NPS Paleontology Database. Tim Connors displayed a draft database that he developed for servicewide use by the GRD staff. Some of the comments related to a servicewide database included: design, security, access, and compatibility with other databases. A work group will be established to provide guidance to the development of a paleontological database.

Julia Brunner (GRD) briefed the group on the Interagency Fossil Report to Congress. Julia presented a timetable for the report and highlighted some of the significant aspects of the report. She distributed a copy of the draft executive summary and offered members of the group to review and provide her with feedback.

Mike Woodburne and Pat Lieggi from the Society of Vertebrate Paleontology's Government Liaison Committee met with the group in the afternoon. Pat explained the new regional organization of the GLC.

The paleontology group concluded the meeting by providing recommendations regarding the desired role of GRD

related to paleontological resources. There

was overwhelming consensus that future meetings should be help between NPS staff involved with the management of paleontological resources. ■

<http://www.nature.nps.gov/challengedoc>

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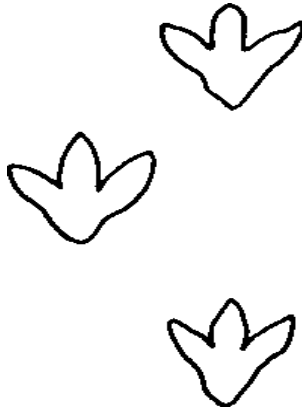
Paleontology and the U.S. Presidents

staff writer

We continue the series of the relationship of the U.S. Presidents and paleontology. James Monroe, the fourth U.S. President, has an interesting connection to fossils. Monroe owned an estate called Oak Hill in Loudoun County, Virginia. Currently, this site is a registered National Historic Landmark. In the flagstone walkways around the estate and on the floor of the side porch are the footprints of dinosaurs.

The site is privately owned and not open to the public. The current owner claims that when he was a boy, he and his sister would hide in the brush when visitors arrived. The young boy would

routinely claim to his sister that the sounds of the footsteps were those of a dinosaur. ■



Invitation for contributions

To keep the Park Paleontology Newsletter fresh and informative we would like to hear from you. If you have paleontological news relevant to the national parks please write a few paragraphs and send to:

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Written opinions regarding the Fossil Forum topic are also welcomed. Park Paleontology is a quarterly publication. The winter issue is planned for publication in February 2000. ■

Late Pleistocene Vertebrate Communities of the lower Grand Canyon: Rampart and Muav Caves

staff writer

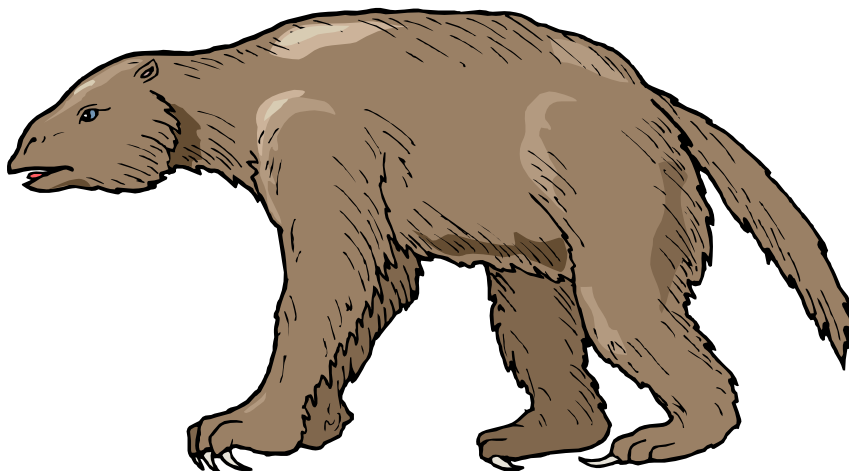
Two workers at Northern Arizona University (NAU) are examining the deposits of two cave systems in the Grand Canyon National Park (GRCA). Mary Carpenter and Dr. Jim Mead are investigating these Late Pleistocene sites and prepared the following summary of this project.

Deposits discovered in Rampart and Muav caves during 1936 Civilian Conservation Corps (CCC) work consist primarily of dry *Nothrotheriops shastensis* (Shasta ground sloth) dung. Dung, bones, and soft tissue remnants of the sloth and other taxa are in the deposits. Specimens collected from Muav are stored in Grand Canyon (GRCA) collections, but lack assessments or analyses. Rampart specimens are in GRCA collections, preliminary identified and published by Wilson in 1942. During 1942 excavations by

Kellogg recovered vertebrate remains now curated in the National Museum of Natural History, but lack systematic analyses and publication. Since 1942, research at Rampart and Muav has been limited to sloth dung and packrat

Oreamnos harringtoni (extinct mountain goat) dung and bones, crystalline (guano?) layers, and hairs tentatively assigned to sloth and mountain goat. Profile materials are being processed for microfaunal remains and fossil DNA.

They also assessed Muav Cave for CCC and public visitation damage, and for future excavation sites. The project goal is the recovery and interpretation of late Pleistocene vertebrate communities in the lower GRCA river corridor, as viewed from Rampart and Muav cave deposits. These data are essential in



midden recovery.

In 1976 a fire destroyed about 70% of the Rampart Cave deposits. In March 1999, they created a new profile in the unburned Rampart Cave sloth dung bed. Strata revealed sloth dung,

reconstructions and in GRCA cave assessments and monitoring. In addition to new research in both caves, they will assess, identify, and publish the 1936 and 1942 collections and compile old records to complete GRCA cave files. ■

Skulldiggery at DINO: Tricky Sauropod Skull quarried from new site

by David Hays, DINO

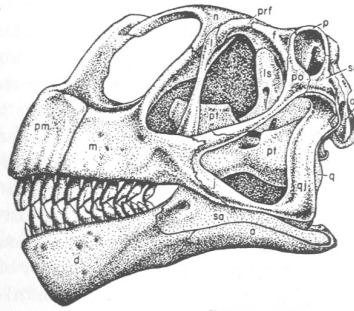
Clearly odd, was the reply from Dinosaur National Monument (DINO) paleontologist Dan Chure, when asked about a sauropod skull recently unearthed in a new dig site. Ann Elder and Scott Madsen of DINO paleontology staff are currently excavating the site, not far from the Quarry Visitor Center. It has produced a wealth of bones in the Cedar Mountain Formation, until recently not considered very fossiliferous. Some of these bones, like this new sauropod skull, are unusual.

Bob Bakker discovered the first bones at the site in 1977. In the 1980's sauropod limb bones were collected from the surface by DINO preparator Tobe Wilkins. It wasn't until the summer of 1998 that the site was opened for major excavation by Ann, Scott, and DINO volunteers.

Cedar Mountain rocks are around 20-40 million years younger than the Morrison Formation of the DINO quarry building. This places them in the Lower-Middle Cretaceous, approximately 100-120 million years old. "Of some 200

[known] species of sauropods, less than 10 have adequate skull material, and most of those are Jurassic," Chure explains.

Near perfect preservation and odd



Sauropod skull from Romer. 1957. *Osteology of the Reptiles.*

dental and cranial structure make the new sauropod skull even more unique. Found with four or five cervical vertebrae attached, the complete skull's bone structure is surprising. On the one hand, it shares some traits with braichiosaurs, but also displays characteristics of primitive sauropods not expected to show up in the Cretaceous. Chure is unsure whether this is a species that retained

these older features over the years, or reacquired them, or that these features are of suspect value in unraveling sauropod evolution. An analysis of the evolutionary position of the new beast will help answer those questions.

The teeth are puzzling. This species possesses neither "spoon" nor "pencil" shaped like most sauropods. The long, conical teeth angle forward on the lower jaw near a 45-degree angle, while the upper set stand perfectly perpendicular to their base. Chure considers this "really mysterious functionally, assuming it reflects what it really looked like," and is not due to post-depositional shifting of the teeth. Scott Madsen, who is currently doing lab preparatory work on the teeth to further expose them, isn't sure what this means, though he has casually proposed that it might reflect a tooth-replacement scheme.

The skull is on display, while being prepared in the paleontology lab at the DINO quarry visitor's center. Chure is working on publishing preliminary information in an issue of *Nature*. ■

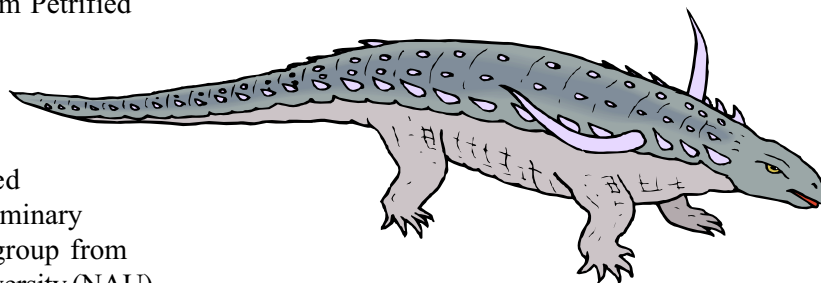
A New Specimen of Aetosaur *Desmatosuchus* sp. uncovered near PEFO

staff writer

In 1997, a large horn was discovered in the mudstones of the Lower Petrified Forest Member of the Chinle Formation, northeast of Many Farms, Arizona; a few miles from Petrified Forest National Park (PEFO). The Museum of Northern Arizona (MNA) in Flagstaff was notified and conducted a preliminary investigation with a group from Northern Arizona University (NAU). The reconnaissance revealed the presence of a disarticulated skeleton of a single animal.

Permits were obtained and the logistics approved to retrieve this animal with the unusually large horn. Excavations were conducted in the winter of 1998,

culminating in the summer of 1999 by a crew from MNA led by the new Colbert Curator of Vertebrate Paleontology, Dr.



David Gillette. Eleven blocks of material, roughly ten tons of rock, were removed from the site. Preliminary preparation by Bill Parker, NAU, has revealed the presence of several articulated vertebrae, associated armor and ribs, and a

complete articulated pelvis. Bill has also uncovered faunal elements in the form of metoposaur and phytosaur remains.

A small, laterally compressed serrated tooth found with the skeleton suggests that a small theropod dinosaur scavenged the specimen.

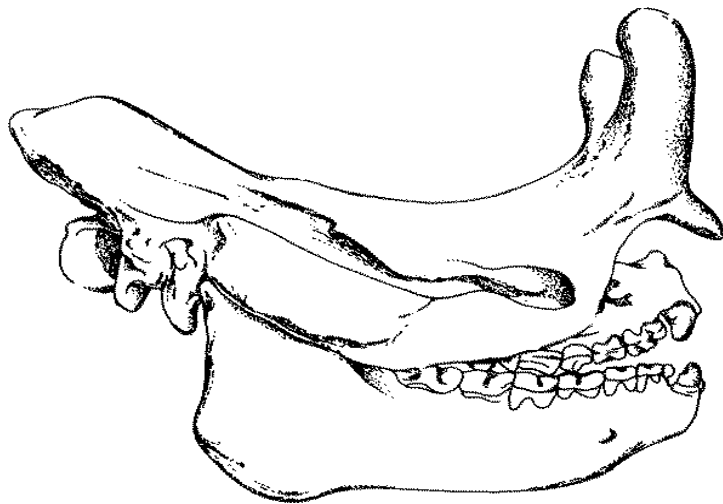
The diagnostic features of the aetosaur *Desmatosuchus* are large, recurved shoulder spines. The shoulder spine recovered near Many Farms is the largest spine ever discovered, greater than 54 cm in total length. This opens up new questions regarding taxonomy, specimen size, and sexual dimorphism within the genus *Desmatosuchus*. ■

Theft of Paleontological Resources: Titanothere Graveyards, Badlands National Park

by Rachel Benton, Badlands

On October 26, 1999, while visiting a remote paleontological site in the South Unit of Badlands National Park known as the Titanothere graveyards, Park Ranger Aaron Kaye discovered two illegal fossil poaching pits excavated into the hillside. Aaron reported his find to Chief Ranger Scott Lopez and Park Paleontologist Rachel Benton. A follow up investigation was organized on December 2nd and 11 more illegal excavation pits, 2 partially excavated fossils and large blocks of plaster were found at the site. Park staff returned to the site on December 9th to develop some baseline information including; a site base map, a GIS data layer, and tagging and photo-

graphs of each excavation pit. A total of 18 poaching sites were found in the area. This information will be used for monitoring purposes until a quarry operation can be set up at the site. Rachel Benton is presently drafting a NRPP proposal to evaluate and excavate the remaining brontothere material preserved in the area. Dr. Russel Graham from the Denver Museum has expressed interest in working cooperatively with the park on the site excavation. Due to the remoteness of the site, basic logistics will be extensive, including helicopter airlifts, base camp facilities and additional interpretive and law enforcement staff onsite. ■



Rt. 240 Realignment Impacts Park Fossils

by Rachel Benton, Badlands

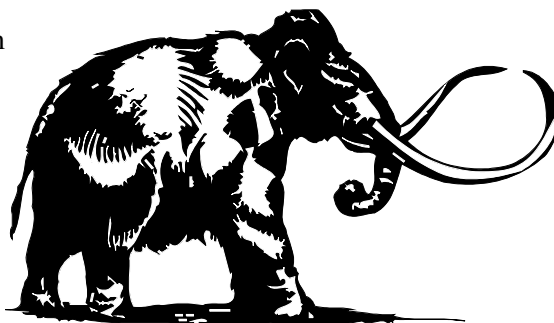
Plans are underway at Badlands National Park to either stabilize or realign a portion of State Route 240 that crosses the Cedar Pass Slide. The landslide is Quaternary in age and has been relatively active since the spring of 1993 due to a 6 year wet cycle. The Loop Road, paved since 1957 has broken apart in many areas where the slide is most active.

Both the realignment of Route 240 and the construction of a stability berm at the toe of the Cedar Pass Slide would involve the removal of thousands of cubic yards of the very fossiliferous Poleslide member. Badlands National Park and Denver Service Center staff are in the process of drafting a EA for this project. Unfortunately, the above listed solutions are temporary stopgaps until a larger reroute for the loop road can be designed. The temporary nature of the project makes the resource damage tradeoff very difficult to evaluate. Park staff will be soliciting comments from concerned professionals and the general public during the coming months. Please contact Rachel Benton if you would like your name added to the comment list. ■

Mammuthus exilis: Pygmy Mammoths on the Channel Islands

by staff writer

Paleontologist Larry Agenbroad, from Northern Arizona University, has been working on Santa Rosa, San Miguel, and Santa Cruz in Channel Islands National Park(CHIS). These islands contain the remains of a pygmy mammoth, *Mammuthus exilis*. Radiocarbon dating provides a date of



12,840 before present for one individual. Dates derived from associated materials present a date as early as 41,000 years ago. Dr. Agenbroad is undertaking further radiocarbon dating at numerous localities to constrain the history of these animals on CHIS. ■

FOSSIL FORUM

Where Have All the Invertebrates Gone?

by Phil Brease, Denali

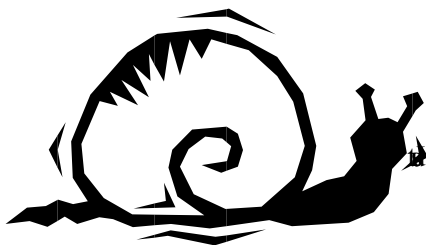
The following Fossil Forum comments were prepared by Phil Brease, Geologist at Denali National Park, Alaska. Letters published in Fossil Forum do not necessarily reflect the opinions of the National Park Service or any other agency, however, the letters address key issues related to the management of geologic/paleontologic resources on federal lands.

First, I applaud any efforts to acknowledge paleontological resources, and to provide for additional understanding, attention, and proactive management of the same. They are often the single available key to understanding large segments (up to billions of years) of our natural history, biological and ecological evolution, paleogeography, paleoclimate, and nearly everything we know that existed before now.

I do object to the use of the word “rare” as if it has a specific definition or legal connotation on fossil value. (Does it?) Also a large disparity on value is implied by the treatment of vertebrates versus invertebrates. It is frequently stated that most if not all vertebrates are rare (valuable) while only some invertebrates are rare (most are worthless?). This is a common attitude that is frequently promoted (possibly inadvertently) by vertebrate paleontologists themselves, whom are often in the lime-light (everybody loves those warm fuzzy dinosaurs), and naturally tend to promote their charismatic vertebrate projects and interests.

The idea that “some” invertebrates are rare, for instance, places a black and white view of fossil value. One might believe that there are good, or valuable fossils, and then there are bad or worthless fossils.

This value can and often does change with time & technology. For instance, most people, even geoscientists, had little need for microfossils (i.e. forams, radiolarians, conodonts) just barely 30 years ago. These tiny, mostly one celled organisms, seemed uselessly abundant in most marine rocks throughout the world. Through recent geo-economic research (oil companies) most of these fossils were found to demonstrate rapid evolutionary signatures that time-correlated rocks to a much finer degree, thus providing new petroleum targets, as well as a wealth of cataloged natural geologic history that is applicable to countless rock units and land masses.



A few years back Conodonts (seemingly extremely abundant) discovered to provide a view of depositional and alteration histories based on their color change due to heat and pressure affects. On the western cordilleran and in Alaska, this little discovery led to developing the accretionary terrane theory, changing all understanding

of Californian, Oregon, Washington, and Alaskan geology and the entire view of tectonic evolution. Yet just as little as 3 or 5 years ago nobody even knew what Conodonts were!

My point is that most of us are too quick to write off the inverts as worthless or expendable, yet most of what we understand about many areas (essentially the entirety of Alaska) is based on invertebrate fossils. Undoubtedly, we will know even more in the near future as additional fossil finds and fossil technologies provide new fodder for vast segments of our earth history. This is not to further slight the fossil floras, which are also frequently written off as abundant and only useful for personal samples or decorative materials.

All species and site localities deserve an evaluation based on more than just a yes-no (rare or nonrare) categorization. Perhaps we can develop a management methodology that is a little more middle ground. Granted, the small plant and animal evidence will never get as much management and protection as the charismatic megapaleofauna, but we can try to close the gap a little in our guidance documents and everyday language. Maybe bumper stickers would help.....**HAVE YOU HUGGED YOUR RADIOLARIAN TODAY?■**

Paleo Interns Present at SVP

staff writer

Three former NPS paleontology interns presented posters at the 1999 Society for Vertebrate Paleontology meeting held in Denver, Colorado. Collectively, these three, Torrey Nyborg, Joshua Smith, and Kristine Thompson, addressed fossil tracks, known as ichnotaxonomy.

Torrey Nyborg was recruited as an intern at Fossil Butte National Monument and took on the task of a paleontological inventory in the largest national park outside Alaska; Death Valley National Park (DEVA). Torrey worked tirelessly on the Death Valley National Park Paleontology Survey, published in September 1999. While conducting this survey, Torrey recorded and discovered new track sites of carnivore, artiodactyls, and tridactyl tracks. Torrey presented a poster on the Late Tertiary vertebrate tracks from DEVA with these new tracks described and named.

Joshua Smith was recruited as an intern for the initiation of the Zion National Park Paleontology Survey. Prior to Josh's arrival, only four vertebrate

tracks were known from within the boundaries of Zion National Park. Over two dozen new vertebrate track and traces were discovered and documented this year and has greatly enhanced the database of Zion. Josh presented a poster on the inventory of vertebrate ichnofossils from Zion with these new tracks and traces illustrated and described.

Kristine Thompson was recruited as an intern for Fossil Butte National Monument. Her interest in birds was encouraged and she began to inventory the NPS areas for fossil avian localities. During this endeavor, Kris became intrigued by bird tracks in the fossil record. Kris presented a poster on a review of fossil bird tracks, with much of the information derived from localities in the national parks.

The key to the past is the present as stated by Scottish geologist James Hutton. To unlock these secrets to the geologic past, continued work through interns in the NPS areas is necessary. The work presented by these three interns at a professional meeting encourage future investigations. ■

Park Paleontology

Recognition Pin

staff writer

Individuals making noteworthy contributions to promote paleontology in the national parks and to the National Park Service Paleontological Resource Program are recognized and rewarded with gold pins modeled after the Park Paleontology Resource logo.

Russ Kucinski, Alaska Region Chief of Physical Sciences, and **Betty Knight**, Alaska Regional Curator, are each awarded the gold Park Paleontology Program pins for their efforts in promoting paleontological resources in the parks in the Alaska Region.

Laura Joss, Chief of Cultural Resources at Yellowstone National Park, is awarded the gold pin in recognition of her role as a champion for paleontology at Yellowstone. Laura has enthusiastically opened the door of discovery for fossils and has helped "paleontology" to be incorporated into the vocabulary of Yellowstone's park management. Honorable mention to Laura's daughter Lindsay, who participated in the plesiosaur excavation in 1998. ■

Footnotes In Time



One day in the Animal Kingdom peasants from the LOWER CLASSES protest to the King, "rex".

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