

NPS Paleontologists Present Papers at GSA Conference

By Jeff Solleck

Paleontologists from the NPS and affiliated universities recently shared 35 papers on paleontological research in the national parks as part of the 46th annual Rocky Mountain Section meeting of the Geological Society of America. The meeting was held on May 4 at the Tamaron Resort north of Durango, CO, where some 60 individuals listened in on diverse research presentations that spanned 300 million years in 11 national park system areas. Twenty of the papers, not reviewed here, focused just on Florissant Fossil Beds NM and the surrounding area, and were presented the following day.

Paleontologist and former Petrified Forest NP Chief of Resource Management Vince Santucci coordinated the NPS effort and introduced the sessions. Santucci is deeply proud of his association with the paleontology work going on in the national parks. He speaks enthusiastically of the vast fossil treasures we protect. "The history of life on earth," he says, "is well represented within the units of the national park system. Around 100 of the 370 plus park areas have significant paleontological resources that need our attention and care." Pre-cambrian stromatolites in Glacier NP, early sea organisms in Grand Canyon, dinosaurs in the Colorado Plateau parks, early mammals at John Day and Hagerman Fossil Beds NMs, among others, combine, he asserts, to tell a story of the evolution of life.

Now on staff at the department of parks and recreation at Slippery Rock State University, Pennsylvania, and a part-time professor of paleontology at the University of Pittsburgh, Santucci maintains a strong link with the NPS, currently as a resource management advisor to Grand Canyon NP.

Before introducing the speakers, Santucci recounted the contributions made by Ted Fremd of John Day Fossil Beds and Dan Chure of Dinosaur NM in the gradual evolution of the NPS paleontology program. He explained that just 10 years ago there were few paleontologists within the Service, and archeologists often were the only staff with field excavation experience. When a fossil issue arose, archeologists were the natural choice to deal with it, even though their expertise was cultural sites.

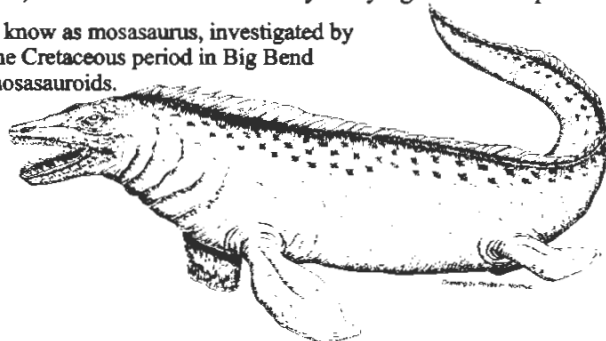
The association between archeologists and fossils in the NP system may have led to the incorrect categorization of fossils as cultural rather than natural resources—an error that Chure and Fremd managed to correct. Also a problem then, managers often viewed the discovery goal of paleontology and the resource protection goal of the parks as incongruent, and denied research projects.

Since those troublesome early days, NPS paleontologists have organized their human

resources, as demonstrated by this symposium, and developed a respectable fledgling fossil research and protection program. Critical to this transformation has been educating park managers and staff, as they turn over, about the role and value of paleontology.

Paleontologists began to publish some of their findings in *Park Science* and in the technical report series of the Natural Resource Publications Office. They held conferences on fossil resources in 1986 at Dinosaur NM, in 1988 at Petrified Forest NP, and two years ago at Fossil Butte NM, to work

The 30-foot long marine reptile known as mosasaurus, investigated by Gordon Bell, diversified during the Cretaceous period in Big Bend NP evolving into two groups of mosasauroids.



through the growing pains and to build their track record. In these open exchanges, superintendents, researchers, resource managers, and interpreters, all contributed their perceptions of the value of research and the need for fossil protection.

The culmination of this endeavor and a triumph in Santucci's mind was the adoption of NPS-77, the Natural Resource Management Guidelines, that includes a brief chapter defining how we manage paleontological resources and promoting paleontological research.

Santucci also credits Fossil Butte Supt. David McGinnis for helping legitimize paleontology in the parks by demonstrating the benefits that can be derived from an integrated program of paleontological resource management and research. While the NPS conducts some fossil research, most is done by outside cooperators in the academic world. These partners often fund their projects independently of the NPS and help us understand in their published works the significance of our resources. They and experienced volunteers also can help us set up cyclic prospecting and inventorying and monitoring programs that identify the variety of fossils in an area, determine the relative importance of the fossils, and list the threats they face. Resource managers can then plan excavation priorities. Increased presence in the field also helps us protect the resources, and the information shared aids in interpretation.

Dr. Santucci is pleased with the progress toward building a foundation for paleontology and fossil resource protection in the parks in the past decade, but he sees this as

only a beginning. He went to Durango with colleagues from around the park system to continue building the program, to share research findings, and to generate further support.

Many fossil resource parks did not participate in the conference, but those that did demonstrated sophisticated and useful research. Presenters Ted Fremd and Carl Swisher from John Day Fossil Beds discussed techniques for reconstructing the collection localities and subsequent dating of fossils gathered initially with poor locality information. By studying volcanic deposits

and other chemical characteristics of the soils and correlating date findings with the distribution of fossil species, they hope to improve their understanding of the time period when some of the early mammals unique to the John Day area lived.

Other studies centered on Petrified Forest NP. Spencer Lucas discussed his bio-stratigraphy work on one of the world's most significant upper Triassic Carnian-Norian transition-preserving strata. He inventoried a wealth of fossils including vertebrates, molluscs, fossil pollens, ostracods, coprolites, tetrapods, logs, and other plants. Also interested in the upper Triassic, Tim Demko used a road cut to examine closely associated soil deposits and flora of the Chinle Formation in order to reconstruct the paleogeography of the time. He found that different fossils, while deposited concurrently, may indicate differences in landscape features.

William Davis concentrated on plants, anatomically detailing the preserved reproductive structures seen in plants from the Late Triassic. Finally, Adrian Hunt looked at early to late Triassic dinosaur tracks and fossils in both Petrified Forest NP and Dinosaur NM to learn of their beginnings and why they became so successful. He found that the dinosaurs appear to have evolved in the late Carnian; theropods in Dinosaur NM became more common with time, and the prosauropods began to diversify then.

Reporting on other parks of the Rocky Mountains, Stephen Hasiotis discussed the earliest known fossil evidence of burrowing crayfish at Canyonlands NP, while Jeffrey Eaton described the complexities of verte-

brate paleontology of the Cretaceous rocks in Bryce Canyon NP. James Kirkland detailed his high resolution stratigraphy of the Mancos Shale in Mesa Verde NP, a Cretaceous marine strata rich in fossils. The study was successful as much for its yield of 90 taxa (yet to be described) as for cooperation with the park in working through the necessary archaeological clearances along the half-mile trench.

Pat Jablonski, an active caver at Carlsbad Caverns NP, described an easy-to-manage technique for excavating deep cave fossils; Carol Manganaro detailed her study of fossil animals found in Graveyard Cave at Wind Cave NP. Both presenters highlighted the potential of caves to reveal relationships among species trapped within them.

Badlands NP researcher William Wall told of a bio-mechanical change in the jaw structure of oreodonts in response to a late Eocene to Oligocene climate shift that favored grazers over browsers. Robert Hunt reported on his research at Agate Fossil Beds NM, where he excavated the earliest known (Miocene) carnivore den communities on record. Discovered in association with fossils of the bear dog animal group, these chambers measure 10m in length by 2m in width. To close the full day of sessions, Gordon Bell reported on his work in Big Bend NP in dating a fork in the evolutionary tree of the marine reptiles known as monasaurs.

The symposium demonstrated that good things can come to parks that integrate paleontology into their programs. Most of the presentations detailed significant advances in our understanding of life on earth from research conducted just within NP units. But as Santucci commented later, this kind of gathering is just one component needed to further paleontology in the parks. Also important is to develop partnerships with universities, use volunteers to carry out projects, train resource protection rangers to identify fossils at risk, encourage interpreters to share the stories in the rocks, and motivate parks to participate in paleontology information exchanges.

Those who missed this discussion of paleontology within the parks have another opportunity to participate when the fourth conference on fossil resources is held in Colorado Springs this October 31 to November 4. The conference has broadened its scope to include fossil resources on all public lands and the list of cooperators is now made up of the BLM, USFS, USGS, and the Colorado State Lands Board, along with the sponsoring Florissant Fossil Beds NM. Contact Maggie Johnston for further information at PO Box 185, Florissant, CO 80816; 719/7483253.

Selleck is the incoming editor of Park Science