CLIMBING UP SAND DUNES IN THE PERMIAN: NEW TRACKSITES FROM GRAND CANYON NATIONAL PARK, ARIZONA

Vincent L. Santucci
Department of Parks & Recreation
Slippery Rock University
Slippery Rock, Pennsylvania 16057

William P. Wall
Department of Biology
Georgia College
Milledgeville, GA 31061

ABSTRACT

Grand Canyon National Park, Arizona, is famous for Late Paleozoic ichnofossils. However, little work on the vertebrate trace fossils has been done in the park for nearly 70 years. A preliminary reconnaissance of the Coconino Sandstone within the park, during 1993, indicates that tracks are very common. Further work should be conducted on the Paleozoic tracks in the Grand Canyon for both scientific research and to assist park management.

INTRODUCTION

Grand Canyon National Park (GRCA) has been well known for Late Paleozoic tracks since 1918 when Richard Swann Lull of Yale University described some specimens collected by Charles Schuchert in the Hermit basin. Charles Gilmore, of the Smithsonian Institution, later visited GRCA and collected many specimens. Gilmore described these trace fossils in a series of papers (Gilmore, 1926, 1927, and 1928). Over the next 40 years other specimens were described from the same strata outside the park, but virtually no further work has been performed within GRCA. We have recently conducted a preliminary survey for tracks in the area around the Hermit Trail in the Permian Coconino Sandstone. The purposes of this paper are to briefly review the ichnology of the Coconino and to present some initial observations on the new finds.

PREVIOUS ICHNOLOGICAL WORK IN THE COCONINO SANDSTONE

Gilmore (1926, 1927, 1928) and Lull (1918) described all of the known ichnotaxa from the Coconino at GRCA (Tables 1, 2). Gilmore collected most of his Coconino specimens along the then Hermit Trail which has subsequently been abandoned (Spamer, 1984). Additional work has been carried out south of GRCA by Brady and Alf. Baird (in Spamer, 1984) provided a partial revision of the ichnotaxonomy although further work needs to be done. Most of the described ichnogenera are probably monospecific, notably *Laoporus*. Middleton (1990) illustrated additional specimens from the Coconino Sandstone but it is not clear if they came from GRCA.

NEW TRACKSITES

We conducted a preliminary reconnaissance of the Coconino sandstone in the area of the present Hermit Trail. The ichnofauna in this area is abundant and merits further study. The majority of specimens appear to be in the lower two- thirds of the formation. Most trackways represent *Laoporus* although another four ichnogenera are also present. Virtually all specimens occur on inclined bedding planes in crossbedded strata with dips averaging about 40-60°, representing individuals walking up dune faces. Analysis of in situ trackways could help resolve the recent debate as to whether any of the Coconino footprints could have been formed underwater (Brand and Tang, 1991) which we consider doubtful on sedimentological characters.

Table 1. Invertebrate Ichnofauna of the Coconino Sandstone at Grand Canyon National Park (Spamer, 1984).

Diplopodichnus sinuosus
Mesichnium benjami
Octopodichnus didactylus
Paleohelcura tridactyla
Triavestigia niningeri

Table 2. Vertebrate Ichnofauna of the Coconino Sandstone at Grand Canyon National Park (Spamer, 1984).

Agostopus matheri
A. medius
Amblopus pachypodus
Anomalopus sturdevanti
Baropezia arizonae
B. eakini
Barypodus palmatus
B. metszeri
B. tridactylus
Laoporus schucherti
L. coloradoensis
L. merriami
L. noblei
L. tetradactylus
Palaeopus regularis

FURTHER WORK

It is abundantly clear that there are numerous undescribed vertebrate trackways in the Coconino Sandstone at GRCA. There is a need for an inventory of sites, as inscriptions in the rocks indicate that many tourists are aware of their presence. The park management needs to be provided data regarding the distribution and abundance of this valuable resource. Selected excavation could greatly enhance visitor interpretation at the Visitor Center and in situ displays could be of great interest to hikers. Scientifically, much work needs to be accomplished in order to understand the ichnotaxonomy of the Coconino Sandstone and its potential for interpreting ancient environments.

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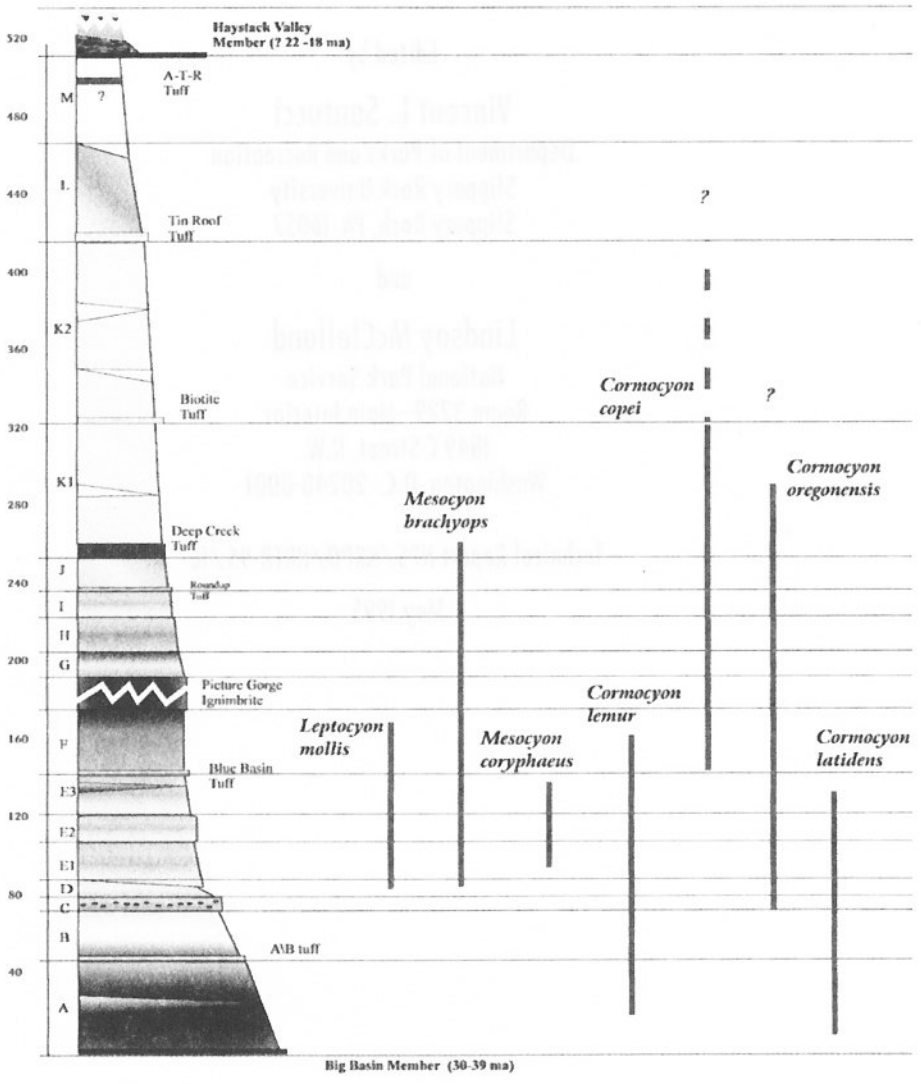
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