

Editorial Comments

Contemporary science is being shaken by many surprises and uncertainties. High temperature superconductivity experiments have revealed how little we really know about the solid state of matter. The controversy over desk-top nuclear fusion shows how easily the basic assumptions of science can be challenged. In genetic engineering, no one can accurately predict the implications and possible dangers that lie just ahead. With these multiple unknowns, scientists no longer feel confident in predicting future technology, whether 100 years ahead or just a decade. However, extrapolation into the past is another matter! There is little hesitation in talking about past eons of time with pompous authority. The contrast between future caution and past dogmatism is obvious.

The Library of Congress receives 55,000 scientific periodicals, and it estimates that there are at least 15,000 more. Each year there are over one million different science articles published worldwide. One must read an article every three seconds, nonstop, to keep up! Instead of this impossible task, we hope you will study and enjoy the enclosed articles. We believe the CRS Quarterly makes a unique, essential contribution to the countless annual topics in print.

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Don DeYoung, Editor

ARE HUMAN AND MAMMAL TRACKS FOUND TOGETHER WITH THE TRACKS OF DINOSAURS IN THE KAYENTA OF ARIZONA? PART I: A HISTORY OF RESEARCH AND A SITE DESCRIPTION

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Abstract

A history of current research on quasihuman ichnofossils (supposed man tracks) in Mesozoic strata is offered herein. The authors review literature relative to studies of human-like tracks along the Paluxy River, Glen Rose, Texas. They also present a history of work on humanoid tracks in Arizona.

A general geographic and geologic description of the study sites near Tuba City, Arizona, is given together with some pictures of representative tracks. A full presentation of results and conclusions will appear in Part II.

Introduction

Evolutionists believe (1) that our planet is billions of years old, (2) that organisms have evolved since life began in Precambrian times, and (3) that the evolution of organisms continues. Such beliefs are held even though there is an obvious absence of transitional life forms in the fossil record. It is also common knowledge among evolutionists that sedimentary strata have yielded an unsatisfactory record of evolutionary stages for any one kind of plant or animal, be it horse, clam, elephant, or man. Scientific evidence exists which does not fit with the belief in geologic time and evolution. For example, land plant pollen is found in Precambrian strata (Howe *et al.*, 1988) and millions of years are "missing" from Grand canyon rocks (Waisgerber *et al.*, 1987). Other anti-evolutionary evidence includes the likely existence of human footprints in pre-Cenozoic strata.

Those who believe in geologic time and evolution insist that ancestors of *Homo sapiens* first appeared a few million years ago, about 60 million years after

the Mesozoic era had closed with its complete dinosaur extinction. If the coexistence of man tracks and dinosaur tracks could be substantiated, this would seriously damage current trust in geologic time and evolution. If geologic time and evolution were abandoned, this would require a search for a more adequate origins model.

Unfortunately many evolutionists no longer test their evolutionary beliefs for accuracy but simply assume that macroevolution and geologic time are facts. Consequently, too many of these people (for example Cole, 1985 or Stokes, 1974) merely ignore or ridicule the opinion that man tracks could exist in strata yielding fossil dinosaurs, without using the scientific method on existing data.

On the other hand, evolutionists have analyzed alleged man-tracks in the more recent Pleistocene and Pliocene—see Leakey and Hay (1979) and Behrens-meyer and Laporte (1981)—but evolutionary literature offers little which is for or against the existence of man tracks with dinosaur tracks. Evolutionists have for the most part refused to study or even acknowledge the possibility of Mesozoic man tracks, as DeVilbiss (1986) noted. Evidently the mindset of many evolutionists is such that they are incapable of even considering the possible synchronism of *Homo sapiens* with dinosaurs. Thus the creationists who also believe in a young earth have led in the study of supposed man tracks in dinosaur-bearing strata—see Rusch (1971) and DeVilbiss (1986). It is regretted however that some creationist authors have lacked objectivity and/or method-

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ological rigor in their studies. Some of their foot track publications reveal scientific shortcomings as Rusch (1971), Cole (1985) and DeVilbiss (1986) have rightfully noted.

Scientific criticisms of creationist publications must be understood by those creationists who intend to enter the research arena. Lessons learned from the mistakes of certain creationists will allow others to undertake future studies in a more credible manner. Creationists must weld themselves to accepted principles of scientific investigation showing how facts support reasonable hypotheses and theories so they can truthfully practice "creation science." They must be more studious and more completely objective. Creation researchers must exude professionalism at all times. Rusch (1971, p. 201) has admonished the creation scientists who believe in a young earth that, concerning human tracks, we must not exhibit "... misplaced enthusiasm ... and too great a willingness to jump to unjustified conclusions."

But in today's scientific arena, it is often the macro-evolutionist rather than the creationist who has jumped to preconceived conclusions. Many critics of Mesozoic man track studies are themselves lacking in objectivity as Howe (1982, pp. 141-2) has indicated. They sometimes submit incomplete reports leaving out important data and then drawing biased conclusions. They have offered some misleading summaries of current research which have received widespread publicity via popular media as with Kuban who is quoted in Time (Lemonick *et al.*, 1986) without rebuttal.

Quasihuman Ichnofossils

In this paper and the one to follow, we will describe and evaluate possible man tracks, mammal tracks, dinosaur tracks, and other fossils from northern Arizona. In an effort to be scientifically objective, alleged man tracks should be designated as "quasihuman ichnofossils," which is a neutral term offered by DeVilbiss, (1986, p. 1) to describe man-like foot or hand impressions in stone. For purposes of variety, however, references in these two papers are made to footprints, impressions, imprints, tracks, or man tracks. Such references are not to be taken as implying positive identification but they are all to be understood as being quasihuman ichnofossils—rock marks that are still being evaluated as regards their possible human origin.

Alleged Human Evidences in Dinosaur Strata:

A Brief History and Current Assessment of Research

Since the late 1800's possible man tracks, human artifacts, inscriptions, and human bones have been reported from Mesozoic sites in North America and in other continents. These sites include the USA, the Gobi Desert in Asia, England, Switzerland, Germany, the USSR, and Nicaragua. Sites within the United States are in West Virginia, Kentucky, Ohio, Pennsylvania, Oklahoma, Texas, Colorado, Utah, Nevada, and Arizona—Morris and Whitcomb (1961), Meister (1970), Rusch (1971), Burdick (1973, 1975), von Fange (1974), Jochmans (1979), Corliss (1980), Anon. (1985) and Anon. (1988). Published reports concerning the presence of man in the Mesozoic demand greater consideration from all scientists, especially from evolutionists who have ignored the data (Howe 1982). Scientists

should study those publicized sites to determine what in fact these tracks, artifacts, inscriptions and bones really are. The existence of such a vast array of evidence is in itself impressive.

Foottrack Discoveries along the Paluxy River

Quasihuman ichnofossils have been found in abundance in Mesozoic calcareous strata at the Paluxy River, near the town of Glen Rose, Texas. Strata under the Paluxy River are assigned to the Cretaceous Period. According to evolutionary beliefs, the Cretaceous Period is the youngest of three intervals of time which are assigned to the Mesozoic Era. The next older geologic interval is the Jurassic Period and the oldest is the Triassic Period.

These geologic periods were placed in the Mesozoic Era because of presumed paleontologic similarities. It was conceded by early 20th century geologists that dinosaurs were the dominant life-form on earth during this era. According to the evolutionary view, dinosaurs completely disappeared several million years after deposition of Paluxy River calcareous sandstones so the possible presence of human tracks in the Glen Rose Dolomites would falsify the evolutionary scenario.

Certain workers (e.g. Neufeld, 1975) believe that the Paluxy River tracks of C. L. Burdick, geologist, (illustrated in Morris and Whitcomb 1961, pp. 172-5) were sculpted by Texas residents to collect tourist dollars. Other writers agree—Neufeld (1975), Cole (1985), and Godfrey and Cole (1936). DeVilbiss (1985, p. 9) disagrees because he maintains that tests to distinguish carved tracks from natural tracks are not conclusive. DeVilbiss writes, "... neither the carving nor the authenticity of Burdick's prints has been demonstrated." J. Morris (1980, pp. 109-26) offers evidence pro and con that certain of the tracks were manufactured by local artisans. Even if some Paluxy River man tracks were shown to be of recent manufacture, it should not be concluded that all of the Paluxy tracks are forgeries. Evolutionists are cognizant of the Piltown Man caper which was obviously concocted to support evolution. They would object if evolution were rejected on the basis of this one fraud.

Abundant quasihuman ichnofossils (not hand wrought forgeries) are found in situ under and along the banks of the Paluxy River. These strata are known to exhibit walking sequences of tracks with man-like strides. The tracks together with their humanoid resemblances have led many to conclude that these impressions in stone are human tracks—Burdick (1950, 1975), Taylor (1971, 1973), J. Morris (1976, 1980), Beierle (1977), Dougherty (1979), Fields (1980), Bartz (1982a and 1982b), Lang (1980, 1983a, 1983b), DeVilbiss (1985, 1986), Miller (1986), and Baugh and Wilson (1987). A motion picture documentary "Footprints in Stone" authenticated the tracks (Taylor 1973). One sequence of tracks was followed photographically to a low rock ledge. After the ledge was removed using heavy equipment, other tracks were discovered in the same stratum. These were consistent with the originally exposed tracks. The extended sequence of tracks was photographed.

Other workers studied the Paluxy tracks long after Taylor's motion picture was distributed. They argued that the sequences of alleged human tracks photo-

graphed by Taylor are actually from dinosaurs. Resemblance to dinosaurs was both in size of foot and pattern of stride-Cole (1985), Godfrey and Cole (1986), Edwors (1983), Milne and Schafersman (1983), and *Creation/Evolution* Special Issue (1985). Kuban (1986b, p. 8) also studied the Taylor tracks in the early 1980's about 10 years after issuance of "Footprints in Stone." Kuban determined that the Taylor tracks were real but asserted that they were elongated dinosaur tracks. He argued that the tracks were made by a dinosaur which traveled in a "quasi-plantigrade" style. He suggested that this unknown reptilian placed its weight on its metatarsus as well as its digits, thereby producing elongated human-like impressions.

In 1984, 11 years after the release of Taylor's film, Kuban restudied the Taylor tracks and further reported that most of the Taylor tracks exhibit tridactyl pointed toes with colored patterns along their leading edges. The marks were attributed by Kuban to dinosaurs (1986a and 1986b), and he asserted that the Taylor tracks gradually acquired these "colorations." Evidently such "colorations" were not observed when the tracks were excavated earlier by Taylor and others. After acknowledging and evaluating these colored marks, J. Morris (1986a, p. 4) questioned Kuban's conclusions (1986a, p. 4) and Kuban (1986c) offered answers to Morris. It should be noted that even if one concludes with Kuban that certain tracks with tridactyl color marks were made by dinosaurs, not all impressions along the Paluxy have these marks so other prints there might still be of human origin. Neither Kuban, nor any other investigator, has reported observing colored marks in freshly excavated "man tracks." No one has satisfactorily explained why the tracks change color over the years following exposure. Kuban's self propulsion "quasi-plantigrade" system for dinosaurs is in need of an honest review.

DeVilbiss (1986, p. 3) challenged Kuban's conclusions by asserting that 10 years of exposure may have caused a change in the Taylor documented tracks, before Kuban observed them. DeVilbiss raised questions and, as of the date of this publication, it is our opinion that Kuban has not provided adequate answers. Kuban suggested that infilling material somehow caused coloration of the dinosaur toe prints on previously excavated quasihuman ichnofossils. J. Morris has rightly concluded that, "... there is still much that is not known about the tracks and continued research is in order." (1986a, p. 4). Because of Kuban's findings and the beliefs of others, Films for Christ has withdrawn Taylor's film "Footprints in Stone" (see Films for Christ 1986). J. Morris (1986b) stopped publication of his 1980 book, and the Institute for Creation Research, San Diego, has likewise removed its museum display concerning the Paluxy River tracks.

Any renewed discussion about Paluxy River quasihuman ichnofossils must include the work of C. Baugh of Glen Rose, Texas. DeVilbiss (1986, p. 2) is a geophysicist who has observed Baugh's work from a proximate position. Concerning Baugh, DeVilbiss (1986b, p. 2) writes that:

No one has uncovered more of the footprints in question and no one knows as much as he [Baugh] does about the location of important trails. . . . The principal qualification to be an explorer for foot-

prints is to be a digger. Not much can be done from an armchair position. Baugh has been in contact with fresh data. No one has sacrificed his personal life for the sake of the research as much as Carl Baugh.

During the 1980's Baugh cleared a higher dolomitic stratum of Cretaceous age across the river from the Taylor and unearthed "... at least three footprints showing non-trivial resemblance to the modern human foot which has been witnessed independently by people trained in the sciences. . . ." (DeVilbiss, 1986, p. 2). Then following this trail, Baugh and coworkers uncovered a hand print perhaps attributable to a human who slipped. Based on the discoveries of Baugh, DeVilbiss concludes that man tracks do exist in the Cretaceous dolomites of Glen Rose, Texas and he recommends that further research be carried out on a more technical basis.

Baugh and Wilson (1987, pp. 144-5) published data about the Baugh tracks and also reported the discovery of a human tooth. They cited dental authorities who identified the tooth as an upper maxillary right central deciduous juvenile human incisor. The tooth was found in Cretaceous strata. DeVilbiss intends to initiate in-depth archeological analysis of the Baugh findings. Because of the discoveries in Texas dolomites and the worldwide evidence for man in the Mesozoic, the footprint sites within Mesozoic strata near Tuba City, Arizona deserve detailed study. One of us (Howe) researched publications looking for references to the existence of man tracks in Arizona. Only one such paper was discovered in which Cole (1985) after attempting to debunk the man-tracks in Texas, wrote that at a convention he had heard someone say (about mantracks) that there were "good ones" in Arizona.

History of Tuba City Humanoid Ichnofossil Research

In the late 1960's E. Cummings (1985) was forced to land his private plane on a dirt road along the Moenkopi Wash, near the Little Colorado River of northern Arizona. Next to the road where the plane came down, Cummings discovered some alleged fossil tracks which appeared to be a northerly extending trackway of a barefoot human child and some dinosaur tracks in sandstone. He recognized the sandstone as being at the base of the the Kayenta, which is believed by macroevolutionists to be about 190 million years old. As an experienced archeologist who has searched for the Ark on Mt. Ararat, Cummings recognized the importance of these human-like tracks and attempted to interest scientists in the site. He was not successful in finding anyone who would finance or undertake such a project.

In 1984 Lorraine Austin, author and creationist lecturer, informed one of us (Rosnau) of human-like fossil tracks she had seen in limey sandstone beds that also contained dinosaur foot impressions near Tuba City, Arizona. That same year, 1984, Rosnau visited the dinosaur print area which we now designate as site-1. Here he located many quasihuman ichnofossils and what appeared to be the fossil track and handprint of a child located near alleged dinosaur trackways—see Figures 1-4. In 1985 Rosnau met Cummings and received directions from him for the fossil human trailway located approximately 3 km from site-1. After this talk with Cummings, Rosnau made another trip to

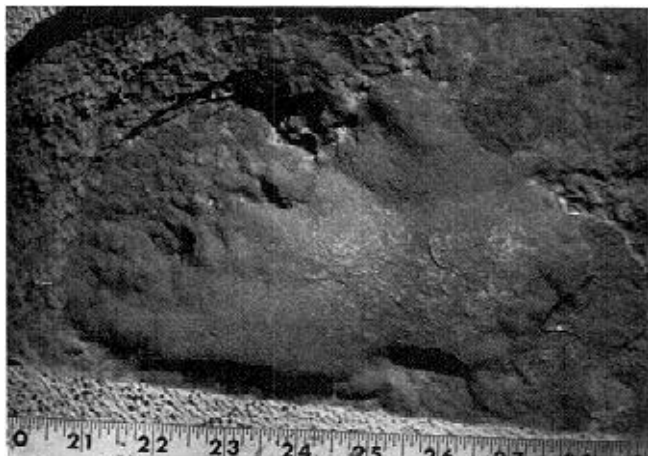


Figure 1. Possible print of juvenile hand and foot. For interpretation of this print, see Figure 2. Note the foot track to the left, with toes somewhat visible. Then the left hand print is seen at the right with palm and thumb visible. It measures 19.5 cm x 12 cm. It was found by W. Horrmann. Dimensions of ruler in inches.

Tuba City in 1986. He was unable to locate the specific Cummings' trackways. He concluded that they had been destroyed when the dirt road upon which Cummings had landed was later widened with a bulldozer. However, about 100 meters west of that same road, Rosnau discovered dozens of fossil man-like impressions. We now call this second location site-2.

Following discussion with Rosnau, and a visit to the Paluxy River Texas track site, Auldaney traveled to site-1 in 1985, where he discovered what appears to be a double impression of the left foot of a child, showing toe-like marks at the front of the impression and two heel-like marks in the rear—see Figures 5 and 6. Toe-like impressions were found on the side of this track. On other trips in 1986 Auldaney and Rosnau located additional human-like tracks and a possible hand print. In 1987 Rosnau and Auldaney contacted Howe who organized some CRS research trips. Between 1987 and 1989 the CRS research committee sponsored a series of three such visits to these Tuba City sites. On the first trip Waisgerber located an area of concretions at site-1, while Auldaney noted fossil clams, phytosaur bones, teeth, and some possible dinosaur bones. On the third trip Auldaney located an additional area of quasihuman ichnofossils about 1 km north of site-1 where he also located more fossil bones and teeth. On the third research trip Howe also discovered a trail of 4 alleged fossil humanoid tracks at site-2.

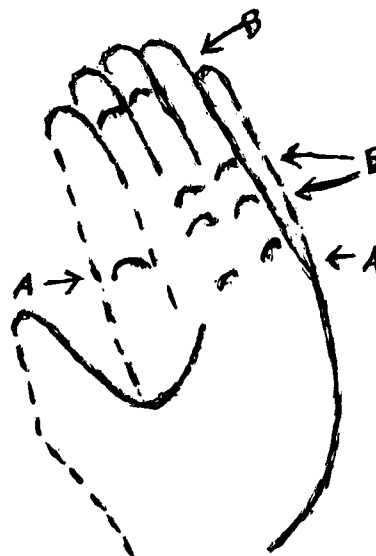
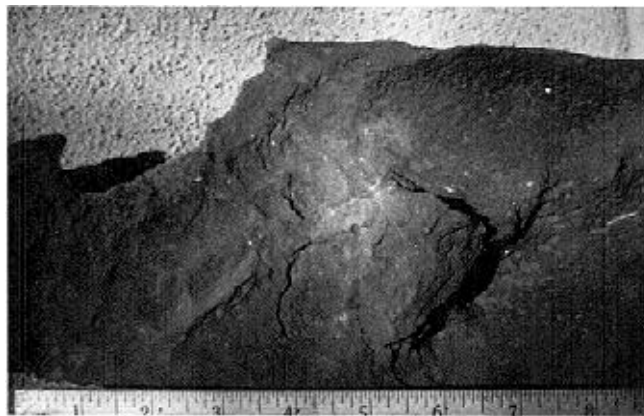


Figure 2. Interpretive sketch of hand and foot print from Figure 1.

General Site Information and Geography

The Navajo and Hopi Reservations occupy the northeasterly corner of Arizona. Tuba City, Arizona, lies within the southwesterly corner of the Navajo Reservation and has an altitude of about 1525 m above sea level. Both reservations are a part of an extensive geomorphic province known commonly as the Colorado Plateau. This plateau extends easterly into New Mexico, northeasterly into Colorado, northerly into Utah and westerly to include the Grand Canyon region. Our two research sites are about 40 km easterly of the northern section of Grand Canyon National Park.

From the south, access to Tuba City is secured by turning northward from U.S. Interstate 10 (east of Flagstaff, Arizona) onto Highway 89. Follow Highway 89 northerly to the junction with Highway 160. Then turn to the east and drive towards Tuba City. About 0.3 km east of mile marker 316 turn northward onto a



Figures 3 and 4. Possible skid track of human right hand (left, Figure 3) and its interpretation (right Figure 4). Dimensions of ruler in inches. Measuring 21 cm x 12 cm x 2.8 cm, this print, located by Rosnau, displays successive impressions of the fingertips. The fingers were first retracted (A) as the person stumbled into the mud, then extended flat as the person regained balance. Half-moon marks (B) show progressive fingertip impressions. Broken lines indicate portions of the hand not clearly delineated in the matrix. The half moon marks might otherwise be joint lines on the handprint.



Figure 5. Double impression of possible juvenile left foot located at site-1, about 3 m northwest of the tracks from Figure 1-4. Note apparent heel print visible here. See caption of Figure 6 for other interpretive details. This double print was found by Auldaney.

public gravel road. At the junction of this gravel road and Highway 160 there is a sign with an arrow publicizing dinosaur tracks. Drive about 250 m northerly of the sign. This public gravel road is approximately 10 km westerly of Tuba City and can be used to reach the oasis of Moenave, farther to the north. Parking is available near wooden structures where native American jewelry is on sale—see Figure 7. For a gratuity, Navajo guides direct tourists to a dinosaur track area

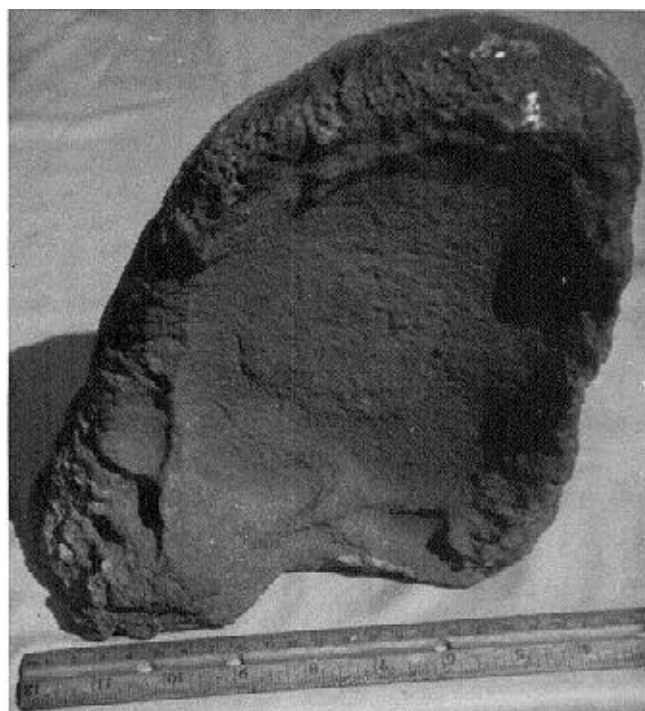


Figure 6. Same double print as Figure 5. Note toe-like prints on the side of the cast which are quite clear in the limey sandstone. They are also juvenile in size. There are marks correlating to the right foot leaving impressions of a large toe and successively smaller ones (including a little toe print) angling off to the left, as if the individual's next step was the left foot (facing left) at a right angle to the right toe-like impressions. These impressions shown in Figure 1-6 are at site-1 and are about 120 meters south of a large area of limey red sandstone, covered with tridactyl dinosaur prints. All these prints and others will be located on maps to be published in the next paper.

that is near the sales structures. Our site-1 is located 100 m on a line 45° west of south from the sales structures. During the authors' studies, Navajo guides did not take tourists to our site-1 human tracks. The Navajo guides were aware of these nearby humanoid track sites, however, and referred to the quasihuman ichnofossils there as "cave man tracks."

We will supply specific directions to dinosaur, humanoid, and other fossil locations at site-1 in our second paper. However, we will not publish explicit directions to site-2. Although most of the humanoid tracks at both sites are firmly attached to the rock strata, some at site-1 have weathered loose and subsequently disappeared. We do not wish to subject site-2 tracks to theft or vandalism. Responsible researchers may write to Rosnau for the precise locations of site-2 study areas.

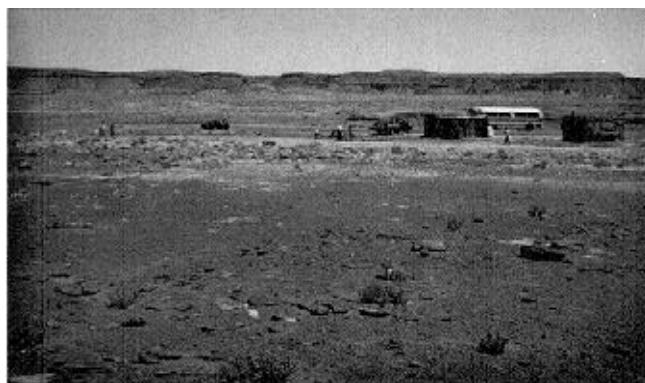


Figure 7. Navajo jewelry sales structures near site-1. In this photograph one is looking northeasterly at a tour bus stopped along the gravel road to visit the sales structures and dinosaur area D-1. Our mantrack area H-1 is in the foreground and H-2 is off the picture to the right.

Individuals desiring to conduct geological, paleontological or other related investigations on the Navajo Reservation must first apply for and receive a permit from the Navajo Nation Minerals Department, P.O. Box 146, Window Rock, AZ 86515. The permit application fee of \$100.00, a map detailing the area of investigation and a description of all proposed activities is required for processing the application. Navajo regulations deny random access to Navajo Reservation terrain by non-Navajos. Denial includes land which is contiguous to public roads. A permit is not required to visit or photograph study areas at site-1 near the jewelry stands. Here one is presumed to be a guest of Navajo proprietors. However, even here collecting and/or removing any kind of specimen from tribal lands without specific permit is prohibited.

Topographic and Geologic Information

Evolutionary geologists view the Colorado Plateau as an extensive, exceptionally flattened (peneplaned) geomorphic feature which exhibits unusual geologic stability. According to them, the Colorado Plateau has risen above sea level and fallen below sea level during evolutionary geologic time with little erosion or deformation of successively deposited Paleozoic, Mesozoic, and Cenozoic sedimentary formations. Nearly flat-lying strata within this province contrast with

similar strata under adjoining geomorphic terrains, where folding and faulting of similar strata are decidedly more intense than here. Evidence of extensive diastrophic volcanic activity within the Colorado Plateau is also relatively rare. In contrast, evidence for volcanism is common where significant diastrophism has occurred. Observe for example, volcanic action to the south of the Colorado Plateau, near Flagstaff, Arizona. Volcanism is also associated with repeated stratal sequences near Jerome, Arizona.

According to the Arizona Bureau of Mines (and USGS) Geologic Map of Arizona (1969), strata within most of Navajo and Hopi Reservations (including the Tuba City region) exhibit structural geological elements with general southeast to northwest trends. These structural elements consist principally of (1) broad folds in sedimentary strata and (2) localized normal faults of apparent minor vertical displacement. Strata within the Tuba City portion of the Colorado Plateau are assigned to the Glen Canyon Group of



Figure 8. Chinle formation. This is volcanic ash and clay, layered in water. The picture was taken along Highway 160, several miles west of site-1. The view is similar to the famous Painted Desert which lies many miles to the south.

formations. The evolutionary related age for the Glen Canyon Group is deemed to be from late Triassic to early Jurassic times. Thus the strata are presumed to have been deposited during an interval from 175 million to 100 million years before the present. The Glen Canyon Group of formations from the youngest downward consist of:

1. the uppermost (Early Jurassic) Navajo Sandstone under which is
2. the Kayenta Formation, below which there is
3. the Moenave Formation, which lies above
4. the oldest, (Late Triassic) Wingate Sandstone.

It is presumed from evidence on the Geologic Map of Arizona and from the field that early Jurassic Navajo Sandstone lies under cliffs which exist near Tuba City, east of our study areas. In contrast the oldest Wingate Sandstone is nearer to and parallels northerly trending Highway 89, to the west of our sites. The Triassic, Wingate Sandstone, lies on very colorful bentonitic beds assigned to the older Chinle Formation of late Triassic age. It is the Chinle Formation which contributes greatly to the natural panorama known as The Painted Desert (see Figure 8) and occurs northwesterly of our study areas.

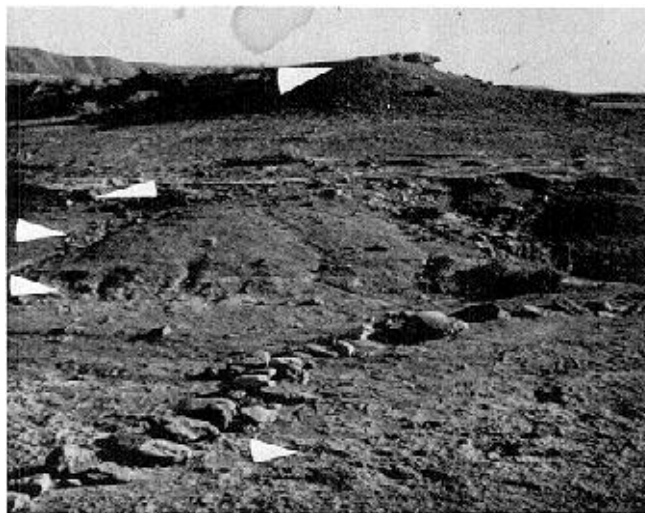


Figure 9. Landscape profile at site-1. On this side of the line of rocks are tracks of dinosaurs, probably *Dilophosaurus* (lowest arrow). The second arrow up signifies a white volcanic clay while the third arrow from the bottom points to a layer of red volcanic clay (bentonite). The fourth arrow points to a thin white limy sandstone layer, similar to the lower layer where the tracks are found. Above the fourth arrow is white and red bentonite grading into a red paleosoil. The fifth arrow up points to a conglomerate sandstone layer approximately 30 m thick with a greenish tinge, a layer like that where bones and teeth of a phytosaur (crocodile-like reptile) and many *Unio* clams were found. These specimens will be described in our second paper. In the background at the left, topographically higher than the top arrow, are cliffs of interbedded sandstone, clay, and conglomerate mixed with volcanic clay topped by Navajo Sandstone.

Field evidence suggests very strongly that the four formations of the Glen Canyon Group grade laterally and vertically, one into another. Hence throughout any part of the Tuba City region, it is difficult if not impossible to determine precisely where one formation ends and another begins. This is obviously why the four formations were combined into the Glen Canyon Group. In this report site-1 lies to the west of the previously described public gravel road to Moenave. These strata are assigned tentatively to the Kayenta Formation. They are here represented by very pale



Figure 10. Bentonite deposits, Moenkopi Wash. Layers rich in volcanic ash (bentonite) are seen here beneath overlying sandstone, a short distance from site-2. This same material rises in the hills to the south.

green to white, fine-grained to medium-grained or even coarse-grained sandstones, locally calcareous. The sandstones are overlain by interbedded red shales, red mudstones, and some bentonite. Red mudstones lie under the jewelry stands and can be seen to dip regionally about 10 degrees or less, downwards easterly. In contrast, to the east of the public gravel road, beds of red sandstones of the Kayenta formation are exposed. To the north are hills, the upper strata of which are cross bedded eolian (windblown) sandstones of the younger Navajo formation, see Figure 9.

Mention is made again of the bentonitic strata of the older Chinle Formation, a formation which extends across the Painted Desert from south to north for many miles. This 20 meter thick outcrop consists of volcanic ash which has been altered into bentonite clay. This bentonite or volcanic ash is found above and below site-2. It is most commonly found in the Triassic Chinle, but is also present well up into the Jurassic strata. Bentonite is found in Moab, Utah overlying dinosaur bones in the Jurassic, Morrison formation. It is also seen overlying Cenozoic mammal bones in the Oligocene beds in Wyoming and North Dakota, and the Pleistocene beds in the Rainbow Basin near Barstow, California. These are but a few examples of the distribution of bentonite which is found in Utah, Colorado, Wyoming, and New Mexico. The outcrop is visible from our sites-1 and -2 in the Moenkopi Wash, which is a westerly descending gulch found to the south of our site-1, see Figure 10. The bentonite outcrop is extremely fossiliferous. It yields petrified wood segments by the millions as seen in Figure 11. The Chinle bentonitic material also yields amphibians, phytosaurs, and dinosaurs—Nations and Stump (1981).

Site-1 is at an elevation of 1406 m above sea level (USGS Map). Higher mesas to the north and east average 1550 m in elevation. This variation in elevation suggests that the tracks and fossils of site-1 were originally covered with at least 150 m of Glen Canyon Group strata. These superjacent beds were presumably removed from atop site-1 by the processes of erosion. Site-1 is relatively flat—see Figure 7. Dinosaur and quasihuman ichnofossils are to be seen in slabs of

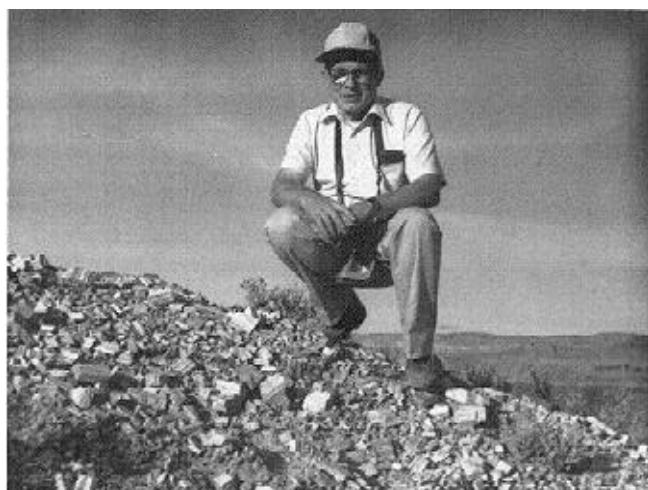


Figure 11. Petrified wood in bentonite of the Triassic Chinle formation. Rosnau stands above a bed of shattered petrified wood west of our site-1, near Highway 89.

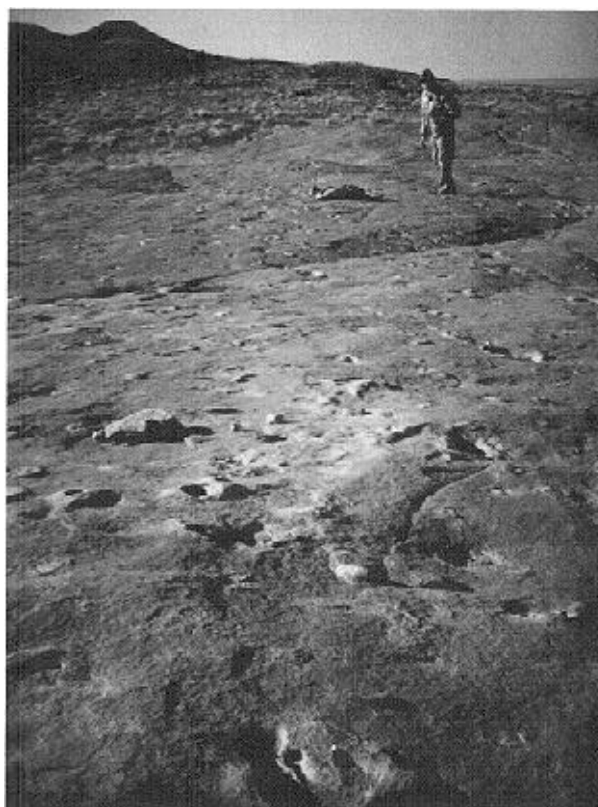


Figure 12. A view of the pockmarked terrain near site-2. Looking westward, this photograph shows the many ridged impressions characteristic of the red and white fluvial sandstone mounds at site-2. Note the foot-like nature of some impressions in the foreground. Lang stands in the background. A tridactyl track is seen at the bottom of the photo — foreground.

sandstone which are locally calcareous and/or conglomeratic.

Site-2 is about 1450 m above sea level and is therefore more than 40 m higher than site-1. At site-2 alternating red and white bentonite colorfully layered beds crop out. These resemble the strata seen to the east of the public gravel road for site-1. Proximate relationships



Figure 13. "Classic" print, site-2. Note the ridge around this possible human track, a ridge suggesting that the impression was made while the matrix was soft and wet. The ball and heel are concave while at the arch there is a prominent ridge. The length is 31 cm and the width at the ball is 13 cm. The sharp periphery supports the belief that it was made by a human wearing a soft-soled moccasin. This one and many other quasi-human ichnofossils will be mapped and more fully discussed in the next paper. Dimensions of ruler in inches.

between site-1 and site-2 suggest that fluvial sandstones under site-2 are a higher part of the Kayenta Formation. At site-2 there are a number of sandstone mounds on terrain which ascends to the north—see Figure 12. Certain mounds that contain tracks at site-2 rise nearly 1.5 m above the sloping terrain. Some of the mounds are about 15 m in diameter and are pockmarked with small craters. They contain ridged impressions of various shapes, some of which suggest human footprints and mammalian tracks with splash ridges around them—see Figure 13. In the second paper we will display, map, and evaluate numerous possible human, mammal, and dinosaur tracks from specific areas at site-1 and site-2. At the conclusion of that paper, each author will state his own views regarding the possible authenticity of the supposed man tracks.

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