

An unusual, tuskless Proboscidean skull, Megabelodon cruziensis (Frick), NSM PEs11-1, from Fish Lake Valley, Esmeralda County, Nevada. Right lateral view. The anterior, tooth bearing portion of the skull has been displaced upward 8-10 cm by a small normal fault. (Drawing by Dian Mawby).

Nevada Archaeological Association

Nevada Archaeological Association



The design for the NAA logo was taken from a Garfield Flat petroglyph by Robert Elston.

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Manuscripts submitted to the Nevada Archaeologist should follow the style guide of the January, 1979 issue of American Antiquity. Manuscripts should be typed and double spaced throughout, including notes and bibliography, and illustrations should be camera-ready with a caption typed on a separate sheet of paper, also double-spaced. Something less than these standards will be accepted reluctantly if what you have to say is more important than the format expressed above.

More manuscripts relating to Nevada archaeology and anthropolgy, in general, are solicited.

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NEVADA Archaeologist

Volume 5, Number 2

1986

A RAPIDLY DEPLETING, NON-RENEWABLE RESOURCE

A statewide paleontological bibliography completed by James F. Firby, Howard E. Schorn and Thomas P. Lugaski in 1981 (*Paleontological Inventory of the Carson City Bureau of Land Management District, Volume 1*) has a total of 1,445 entries. A wide range of species, including non-marine vertebrates are found in Nevada. Tertiary and Quaternary sediments within the state have yielded marvelous paleobiological specimens — most uncovered by chance, and preserved only by the efforts of a dedicated few. Nevada needs a State Paleontologist before it is too late!

TABLE OF CONTENTS

Errata and Additional Notes on the Great Basin Distribution of Clovis Fluted and Folsom Projectile Points	
by Donald R. Tuohy	2
Nevada's Fossil Elephants by Donald R. Tuohy	8
An Unusual Proboscidean Skull from Fish Lake Valley, Nevada by John E. Mawby	19
Discovery and Dating of the Black Rock Desert Mammoth by Betty Stout	21
Collecting Fossils With the Plaster Jacket Technique by John E. Mawby	24
Evidence of Late Pleistocene Lacustrine Fluctuation in North Long Valley, Nevada by Brian C. Amme	26
Archaeological Occurrence of a Large Mammal Horn Sheath from Pyramid Lake, Nevada by Phil W. Hutchinson	28

ERRATA AND ADDITIONAL NOTES ON THE GREAT BASIN DISTRIBUTION OF CLOVIS FLUTED AND FOLSOM PROJECTILE POINTS

by

Donald R. Tuohy

This note is written to supplement data and to correct errata contained in two articles published in Volume 5, Number 1 of the <u>Nevada Archaeologist</u>. The first errata were published in an article I authored on the Great Basin distribution of Clovis Fluted and Folsom projectile points in the Great Basin (Tuohy 1985a:15-18). That article also was written to amplify and to correct data originally published in the "festschrift" for Dr. Emma Louise Davis published by the Great Basin Foundation (Tuohy 1985b).

In fact, the first erratum to be noted here is the incorrect reference to the editor of the "festschrift" (Clark Brott, personal communication 12/12/85). The volume was improperly cited. It should <u>not</u> have been cited with Thomas C. Blackburn as editor, but rather as indicated in the bibliography, and as follows:

Great Basin Foundation 1985 <u>Woman, Poet, Scientist:</u> <u>Essays in New World Anthropology</u> <u>Honoring Dr. Emma Louis Davis.</u> Ballena Press Anthropological Papers No. 29, Editor: Thomas C. Blackburn.

The next errata were noted in Table 1, "Paleoindian Finds in Nevada" (Tuohy 1985:16, Table 1) by Ronald L. Reno and by Brian C. Amme. Ronald L. Reno has been doing field research on the Nevada Test Site under the direction of Lonnie C. Pippen of the Social Sciences Center of the Desert Research Institute. Reno noted that "Site of Locality Number 17" should be labeled Groom Dry Lake (Emigrant Valley), not "Groom Valley" as indicated in Table 1. He also noted that "Locality Number 22" entries "Nevada Test Site; C; and Worman 1969; Davis 1984" should be deleted, and the two bibliographic references added to the "Locality 30" entry (R. Reno,

personal communication, 12/6/85). These changes have been made in the accompanying Table 1.

Since the "Locality 22" entry now would be blank, I have taken the liberty to add in its place reference to two Clovis points from the Gold Flat Basin reported by the Archaeological Research Center at the University of Nevada Las Vegas (1981). The addition does not require a change in the map plot shown in Figure 1.

The errata noted by Brian C. Amme, who has been doing field research in eastern Nevada, involve the crediting of proper sources for the distribution of Clovis points in that portion of Nevada. His paper on a Snake Valley fluted point (Amme 1985) mentioned the discovery of other Clovis points made by Bureau of Land Management archaeologists in the region and "...As a result, and a critical embarrassment to myself, I appear to be responsible for finds in seven valleys in Nevada, according to Table 1 of your 'notes' article in the same publication and also certain articles in the 'festschrift' for Dr. Emma Lou Davis" (B. Amme, personal communication 1/24/86).

To rectify this situation, B. Amme submitted a list of full references to the finds made in eastern Nevada as follows:

"Dry Lake and Groom Valleys	С	Davis and Shutler 1969
Long Valley	С	Hutchinson 1984
Steptoe Valley	С	Private Collection, NAA Meeting
Spring Valley	С	Unknown Reference, Local Collection(?)
Railroad Valley	С	John Zancanella, Ely District Office Files, n.d.
Independence Valley	С	Tim Murphy, Elko District Office files,n.d.

These changes also have been incorporated in Table 1. In addition, Amme (loc cit) notes that Dry Lake Valley is mentioned twice in Table 1 (Tuohy 1985:16, Table 1), as are "Locality 12" and "Locality 16." The latter reference was attributed erroneously to Amme, but actually is a second occurrence in the same valley, as referenced in my own note files. This correction also has been made in Table 1, and again, the map plot (Figure 1) remains unchanged.

Another contribution to the Volume 5, Number 1 issue of the "Nevada Archaeologist" the paper by Richard M. Ryan (1985:10-12), apparently contained some misinformation about Rancholabrean megafauna in the Great Basin. John Mawby (personal communication 10/16/85), vertebrate paleontologist, wrote to say:

"He [Ryan 1985:10] seems to imply that the Rancholabrean megafauna of the Great Basin included Castoroides (which he misspells) and tapirs. I know of no records of tapirs in the Great Basin, nor of <u>Castoroides</u> anywhere west of Nebraska. Also, the North American mylodont ground sloths are now referred to as <u>Glossotherium</u>. Nor is <u>Mammut</u> an elephant. Quite a batch of errors for a single sentence!"

Both the editor and the author wish to thank Dr. Mawby for noting these errata, and we hope such erroneous information as contained in the article did not seriously inconvenience readers of the Nevada Archaeologist. This statement also applies to the Early Man projectile paper (Tuohy 1985a) and corrections thereof (Tuohy 1985b, 1986), for which the editor thanks the many contributors. These persons are, however, absolved from all responsibility for any additional errors of commission or omission of their comments as contained herein, and the editor takes the sole responsibility for them.









Clovis points from Nevada, actual size.

Site or Period of Literature **Locality Number** Occupation Reference С Davis and Shutler 1969; Haynes 1964a; 1. Lake Tonopah Tuohy 1969, 1984 2. C Lovelock area Davis and Shutler 1969 C Davis and Shutler 1969 3. Caliente 4. Carlin F Davis and Shutler 1969 26Ek1 lames 1981 5. Davis and Shutler 1969 Sarcobatus Flat С Washoe Lake C Davis and Shutler 1969; 6. Tuohy 1977 Davis and Shutler 1969 7. Star Peak area F 8. **Black Rock Desert** С Davis and Shutler 1969; Clewlow 1968 9. Mud Lake C Davis and Shutler 1969 10. Lovelock С Davis and Shutler 1969 C 11. Huntoon Valley Davis and Shutler 1969 C 12. Dry Lake Valley Davis and Shutler 1969 С 13. Walker Lake area Tuohy 1971 C 14. Gilbert Dry Lake Elston 1983 15. 26Ek962 (Elko County) C **James** 1981 С Dry Lake Valley 16. Tuohy (notes), 1985 С 17. Groom Dry Lake (Emigrant Valley) Davis and Shutler 1969 Kane Spring Wash C 18. Perkins 1967 26Ck404 (Clark County) С 19. Perkins 1967 C,F 20. Clark and Lincoln Counties Perkins 1968 No. Washoe County 21. С Richards 1968 C C 22. Gold Flat Basin Archaeological Research Center UNLV 1981 23. Rve Patch Reservoir Rusco and Davis 1984; Davis 1984 C C Steptoe Valley 24. Tuohy (notes), NAA Meeting, 1985 25. **Railroad Valley** John Zancanella, Ely District, BLM files C Long Valley 26. Hutchinson and Noyes 1984 Ĉ Lahontan Reservoir 27. Reno 1985 C C C C C C C C 28. Garden Valley Ryan 1985 29. Yucca Mountain Reno 1985 30. **Timber Mountain** Worman 1969; Pippin 1984 31. **Montgomery Pass** Haynes 1964b Truckee River 32. Tuohy (notes) C C Spring Valley 33. 34. Coal Valley Ryan 1985 C 35. Duck Flat Lavton 1977 36. Independence Valley C Tim Murphy, Elko District, BLM files

TABLE 1 PALEOINDIAN FINDS IN NEVADA



5

Amme, Brian C.
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on a fluted point from Snake
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Reno, Ronald L.

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by

Donald R. Tuohy

Nevada's truly white elephants, the fossilized remains of giant pachyderms, mammoths and mastodons, ranging in age from over ten million years to ten to twenty thousand years, are not infreqently found in the Silver State (Map 1). Since most discoveries of fossilized elephant bones are accidental rather than planned, and since vertebrate paleontologists are sometimes more scarce than the specimens they seek, Nevada State Museum personnel have responded frequently to excited requests for assistance in preserving such fossils.

For example, not long ago, former Nevada State Museum Director, James Calhoun, received an urgent telephone message from Jerry L. Fitch, Resident Engineer of the Winnemucca District, who was then working on overpass construction on Interstate 80. A Jack Parson Construction Company blade operator, Sydney Gittens, had exposed a large tusk, and asked if the Museum would be interested in preserving the rapidly disintegrating 8-1/2 foot long specimen? The answer, of course, was "Yes," even though it was later determined that the tusk lay on private property leased for a materials borrow pit, and therefore, was not subject to the provisions of the Nevada Antiquities Act which protects such fossils for the public weal, rather than opening them up for private gain or exploitation. The tusk was duly preserved and removed from the path of the bulldozers, and literally hundreds of Winnemuccans were treated to verbal description of the excavation, and plaster-of-paris jacketing of the specimen, over radio station KWNA.

It has not yet been determined whether this tusk dropped from the upper jaw of either a mammoth or a mastodon, but since it was deposited in lake sediments of the upper Sehoo geological formation, it was probably at least 14,000 years old when discovered. The tusk definitely represented the remains of a Proboscidean.

The Order Proboscidea, which includes the surviving African and Asian elephants, has been divided into five super-families and three families: Mammutidae, Elephantidae, and Gomphotheridae. Both Mammutidae and the Elephantidae are found locally as fossils of the Recent, or postglacial period, and the Pleistocene, or Ice Age, of up to one million years ago. Also found in Nevada are Proboscideans that date as far back as the Pliocene of ten million years ago (see article by J. Mawby, this volume). The more recent Pleistocene Proboscideans, however, seem to be represented by a single species of mastodon, Mastodon americanus, and the mammoths, Mammuthus sp, probably by several subfamilies and genera.

The principal difference between mastodons and the more elephant-like mammoths may be seen in the cheek teeth (Figure 1). All of the cheek teeth of the mastodon functioned simultaneously and are somewhat simpler in structure than those of the mammoth or elephant. The name, mastodon, comes from <u>masto</u> (nipples or breast), and <u>dont</u> (tooth). This breast-toothed beast, like the mammoth, had upper jaw tusks, and many mastodons had enlarged second incisors, or lower jaw tusks.

The mammoth, on the other hand, had only upper jaw tusks, and developed only six cheek teeth in the course of a lifetime, and usually only one tooth functioned simultaneously in each half of the jaw. Mammoth cheek teeth are almost rootless and quite different in appearance from mastodon cheek teeth. Each is made up of a series of enamel plates completely surrounding oblong centers of dentine. Cement of varying thickness in different genera of mammoths binds the enamel plates together. Like a nineteenth century horse-trader, then, a vertebrate paleontologist must check his Proboscidean fossil's cheek teeth to be certain of its Mammutidae or Elephantidae ancestry.

Vertebrate paleontologists doing research in Nevada are far more scarce than the fossils they seek. As noted previously, most discoveries of Proboscidean remains are accidental rather than planned. For example, one



Upper, photograph of a <u>Mastodon</u> molar; lower, side view <u>Mammuthus</u> sp. molar



of the earliest discoveries of Proboscidean remains in Nevada was made by prisoners quarrying well-cemented lacustrine sandstone within the walls of the Nevada State Prison in Carson City. Robert H. Davis, in 1893, described the find as follows:

> One day in blasting rock, the prisoners came upon the remains of an enormous mastodom elephant, lying on its right side. the tusks were in a fair state of preservation and were taken out almost intact, and varnished so as to further preserve them from the action of the air. Time told marvelously upon the fossils, and they now amount to almost nothing, having fallen away in thin flakes of lime and completely lost their shapes.

But what impressed early-day Nevadans the most was a series of tracks uncovered by prison labor. The same Mr. Davis described them as follows:

> ...a great portion of the sandstone had been quarried away for public buildings in all parts of the state, and the wonderful tracks became visible and in increased numbers. They were seemingly made by some gigantic man, walking on the shore of what must have been a lake or an arm of the sea, covering what is now known as Eagle, Carson, and Jack's Valley with an outlet running through Dayton into Churchill County, to the lower sink of the Carson River.

Sam P. Davis, editor of a twovolume work, <u>History of Nevada</u>, published in 1913, summarized his thoughts on these state prison tracks which had attracted considerable attention of the outside world. He wrote:

> There never was any particular controversy about the mastodon, saurian, or bird tracks. They were too self-evident to admit of any quibble for even scientists to quarrel over; and besides, the mastodon was considerate enough to leave a lot of his bones, which rendered his identity indisputable.

But, the creature whose tracks resemble footprints was the one who made the hot trail. Was it a gigantic man or a huge sloth? That is the question over which scientists have raged, and will probably continue to rage until doomsday, unless the mysterious creature itself should chance to be found and thus put an end to the wrangle.

While Sam Davis believed the "mastodon" tracks to be indisputable, and the question of the man-like footprints to be insoluable, a brief one paragraph summary of the fossil footprints contained in the sandstone at the State Prison quarry was published in 1969 by James G. Moore, a geologist. He said:

The skeletal remains, as well as footprints, of birds and mammals are preserved in the sandstone. Some of the best preserved tracks are those of the extinct ground sloth, Mylodon, but tracks of mammoth, horse, bison, deer, peccary, wolf, possibly sabre-tooth tiger, and many species of birds are also present.

So it seems the State Prison "mastodon" who left his bones and tracks in the prison quarry sandstone was a mammoth, after all, and the gigantic "human" tracks were those of a ground sloth, just as Professor Davidson, president of the California Academy of Sciences had argued to tenaciously in the 1870s.

As another example of an accidental discovery, on august 11, 1936, The Elko Free Press reported the finding of "...a giant tooth of some prehistoric animal, possibly more than a million years old." By September 18, 1936, The Elko Free Press erroneously reported that the teeth found in Elko County were those of a mastodon, but correctly reported that the teeth were found by the Weeks brothers, and by Alfred Kinne, son of an Elko city councilman, R.A. Kinne. The younger Kinne was then employed by a contractor of the Nevada Highway Department on the improvement of the Wells to Currie stretch of U.S. 93. by June 4, 1937, the Elko Independent

MAP NO.	LOCATION	COUNTY	<u>AGE</u> **	REFERENCE OR FINDER
1	Tule Springs	CL	Q	Mawby, John E. (1967)
2	Corn Creek Dunes	CL	Q	Mawby, John E. (1967)
3	Lake Mead Rec.Area	CL	Q	Rowland, Stephen (1983)
4	Panaca	LN	Q	Wheeler, S.M. (1957)
	White River Area	LN	õ	Brooks, Richard (1967); Lawlor,
			~	Florine (1967): Dixon. John (1967).
Ę	The Sump $(PEc-3)$	FC	ጥ	McDonald J.R. and Pelletier.W.J.(1958)+
5	The bung (155 SV		T	Clark I M Dawcon and A E Wood (1964)
6	Distanita mit	PC	0	Alberg T. R. and T. H. Stowart (1972)
0	Diacomice pic	5-0	Ŷ	Albers, J_*F_* and J_*f_* below and D_* (1972)
/	vanderblit Site(PES9)		T	Robinson, P., E. MCKee and R.J. Molola (1968)
	Fish Lake Valley(PESII) ES	Т.	Mawby, John E. (1986, this volume)
8	Stewart Valley(PMn1)	MN	TQ	Scudder, Harvey I., James R. Firby,
				Thomas Lugaski, John E. Mawby, Donald
				E.Savage,Howard E. Schorn(1986)
9	Gabbs Valley	MN	Q	NSM collection, Mrs.Schulz, donor
10	Eastgate(PCh1)	CH	TQ	U of California M.P. collection
11	Wonder Area	CH	Q	NSM collection, D.J. Gray
12	E. Walker River	Γλ	Q	NSM collection, D.J. Gray, E.L. Rink and
				Roger Williams, donors
13	E. Walker River(PLy13)	LY	TQ	NSM collection, Joan Jones(1969), Percy
	-			Train(1938)
14	W. Walker River	LY	\mathbf{T}	Keith and Phoebe Lloyd collection.
15	Sand Hill near Smith	LY	?	Ira LaRivers: U.of Nevada.Reno col.
16	Reservoir (PLv16)	LY	Ŧ	G.C. Jorgensen collection, NSM
17	Carson Vallev(PDol)	- DO	ሞ	Clifford Turner collection, NSM
18	State Prison. Carson	ÚR.	0	Marche, Jordan(1984):Tuoby.D.(1986) this yol.
19	Pipe Springs (PDo3)	50	nn M	Ethel Andre collection. NSM
20	Carson River	OR OR	Ô	James W. Calbour collection, NSM
20	Hunter Lake Drive	wix.	2 m	Frank C. Logyitt: INP "Novada State
21	Hunter Dake Drive	MП	1	Tournal [#] March 1 1964
ว ว	Vordi aroa (DWa?)	67 N	ጥ	McDonald I.P. (1956)
22	Wast 7th St Papa	WA MA	2	2
23	Tabontan Recordin	011 C11	· 0	: Alvin Condee, finder, IACM has photon
24	Dradula Dealest (DCh4)	CH	2 m	ATVIT Cancer, TIMEL, LACH TAS photos
20	Blady's Pocket (PCn4)		T O	$\frac{1}{100000000} = \frac{1}{10000000000000000000000000000000000$
	Cold Spr. Valley(Pwals) ₩A	Q	R. YORK (1977)
26	Brinkerhoff Ranch	PE	Q	D.J.Gray, D.R.Tuony, NSM collection
27	Reese River Pit (PLa8)	LA	õ	Randy Johnson collection, NSM
28	Huntington Valley	EK	Т	Emery C.Clayton, 4/70 Elko Co. Museum?
29	Clover Valley	EK	Q	Al Kinne; "Nev Highways & Parks" 4(1)2-3
30	Harris Canyon	EK	T	Stephen James, May 9, 1984
31	Rose Creek Overpass Pi	t HU	Q	"Nevada Highway News"12(5)5/71;Tuohy (1969)
32	Rye Patch Reservior	PE	Q	Ben Hunt collection, NSM; Firby, J.R. (1979)
33	Rush Creek-Smoke Creek	WA	Q	D.J. Gray, NSM collection
34	C.O. Pit	WA	Q	D.J. Gray, NSM collection
35	Clear Creek Ranch	WA	Q	UNR collection
36	Yellow Rock Canyon	WA	-	Elephant petroglyph, Tuohy 1969; Layton
				(1976), Tuohy 1986 this vol
37	High Rock-Virgin Val.	WA	Т	Merriam, J.C. (1910,1911)
38	'n	WA	Q	Merriam, J.C. (1918)
39	Bog Hot Springs	HU	?	D.J. Gray, NSM collection
40	Virgin Valley	HU	?	D.J. Gray notes, no collection
41	Sou Hot Springs	PE	Q	R.E.Wallace and D.B.Tatlock 9/25/59
42	Oreana (PPe20)	PE	~	Elmer Allen collection, NSM
43	(omitted number)	-		•
44	Black Rock Desert	HU	Q	Clewlow, C.W. (1983); Stout, Betty (1986) this vol.
			~	

NOTES * Nos. 41 and 42 should be in Pershing County, not in Churchill Co. as shown ** Q = Quaternary T = Tertiary []



Map 1. Map of Nevada showing the distribution of Tertiary and Quaternary proboscidean fossils and one elephant petroglyph.

corrected the premature "mastodon" identification made by the <u>Free Press</u>, and called the "...foot long, six inches wide, and four inches thick" teeth "mammoth fossils."

An early issue of <u>Nevada Highways</u> and <u>Parks Magazine</u> (Volume IV, Number 1), finally gave a full account of the Elko County find:

While workmen were cleaning out an old water hole about a hundred yards east of the road [Highway 93], their dragline bucket loosened and brought up a strange white substance mixed with local black muck. When examined, the white material was found to be fossilized parts of ancient creatures. Additional excavation brought to the surface hundreds of specimens of the bleached and brittle fossils, teeth of huge animals now extinct. Before the excavating work ended prehistoric [mammoth] molars and grinders had been recovered in sufficient quantity to fill two wheelbarrows.

Fossil Proboscidean remains are still being found on or near Nevada highways as the previously mentioned find near Interstate 80 attests. But the great antiquity of most of the Proboscideans in Nevada seems to put them beyond the known temporal range of one of their most relentless predators, Early Man. this is not so in other western states such as Arizona, New Mexico, Oklahoma, Colorado, and Wyoming where mammoth kill sites have yielded artifacts and other human traces in indisputable association with the fossilized bones of these beasts. In fact, one school of thought in American archaeology has Early Man as the chief cause of extinction of American horses, camels, ground sloths, and twenty-five genera of extinct large mammals. including all the Proboscideans.

Whether some natural calamity overtook these six-ton behemoths, or puny, but even more powerful, tool-using man, was the chief cause of extinction is still open to question. Since all of the New World megafauna kill sites yielding mammoth remains cluster tightly around 11,200 years ago, and megafauna extinction seems to have taken place around 11,000 years ago, there does seem to be a direct cause and effect relationship between human predation and Proboscidean extinction.

(The gathering of small mammals and wild plant foods undoubtedly provided most provender for Early Man. The domestication of plants in aboriginal America and the cultivation of plant foods led to cultural divergence and elaboration of American Indians known to European settlers of the New World).

One of the problems arising from this seemingly logical explanation of the demise of the New World Proboscidians, however, is the fact that several radiocarbon dates on mammoth and mastodon remains and associated materials are post-glacial in age, dating from between 8,000 and 6,000 years ago. This raises the specter of the possibility of relict herds of mastodons or mammoths indelibly incorporated in the living brain cells of man.

In northern Washoe County, Nevada, for example, there is a flat boulder with four pecked petroglyphs, or rock art figures, of the American Indian and his ancestors (Figure 2). One of these petroglyphs is in the form of a wounded elephant. Was it the work of a prehistoric hunter who had seen such a beast and depicted the trailing clouds of glorious mammoth steaks remembered? Or is it the work of an intrepid gold rush 49'er, or the work of an isolated Basque sheepherder, or possibly the idle doodle of a camping hoaxer? Since the other petroglyphs are executed in an authentic prehistoric style, I am inclined to believe the wounded mammoth petroglyph was the art work of a prehistoric hunter who had seen the real thing.

Some support for the authenticity of the petroglyph comes from a curious source, Thomas Jefferson, one of this nation's founding fathers, and one of the founding fathers of vertebrate paleontology, as well. As early as 1781, or perhaps 1782, he wrote:



Figure 2. Upper, elephant-like petroglyph found in Yellow Rock Canyon, Nevada; Lower, Mammutidae and Elephantidae, dominant proboscideans during the Pleistocene (after Bjorn Kurten and Elaine Anderson, <u>Pleistocene</u> <u>Mammals of North America</u>, Columbia University Press 1980, Page 344, Figure 17.1. Drawing by James R. Senior.)

A Mr. Stanley, taken prisoner by the Indians near the mouth of the Tanissee [Tennessee River], relates that after being transferred through several tribes, from one to another, he was at length carried over the mountains west of the Missouri [Rocky Hountains?] to a river which runs westwardly; that these bones [fossil bones] abounded there, and that the natives described to him the animal to which they belonged as still existing in the northern parts of their country; from which description he judged it to be an elephant. (Jefferson 1825:59).

As the eminent paleontologist, Dr. George Gaylord Simpson, writing in 1942, said of Thomas Jefferson, "...when he became President in 1801, he was chiefly responsible for sending out the Lewis and Clark expedition which made the first explicit records of fossil localities, and brought back the first specimens from the West in 1806." The first truly western mammoth remains, however, were found in Alaska by an expedition under Kotzebue in 1816. Kotzebue wrote: "An indisputable proof that what we saw was real ice, is the quantity of mammoth's teeth and bones, which were exposed to view by the melting and among which I found myself a very fine tooth." In the contiguous states, the earliest discoveries of mammoth remains were made on the Willamette River in Oregon 1839, and in western Missouri in 1840.

While there are living glaciers in Nevada, none has yet regurgitated Proboscideans swallowed whole as much as one million years ago, as has happened in Alaska. One swift conflict between Tropical Gulf air and Pacific maritime air, and the resultant rainfall and runof in the Las Vegas area can do wonders exposing fossil bones, however. In 1933, for example, Mr. Penley Hunter examining Tule Springs Wash, some twelve miles north of what is now "the Strip," found an obsidian flake, a man-made discard from stone tool making, in a matrix of what he though was charcoal and the bones of extinct camels, horses, and bison. His conclusion was that he had found an Early Man kill site where these beasts had been butchered and

eaten. Subsequent excavation work at the Tule Springs locality by the Southwest Museum in 1933, 1955, and again in 1956 also produced mammoth bones, and two "charcoal" samples which were dated at "...more than 23,800 years before the present," and "...in excess of 28,000 years." At that time, these dates made Tule Springs, Nevada one of the oldest known aboriginal camp sites in the Western Hemisphere!

Because scientists are eternal skeptics, and because there were magging doubts about the Tule Springs locality's extreme age, and about the presumed "associations" between man-made tools and the bones of mammoths and other extinct beasts, a major research effort was organized and directed at a reexamination of the Tule Springs locality in 1962. This effort was sponsored by the Nevada State Museum in Carson City. The results of this reexamination were published in Nevada State Museum Anthropological Papers, Number 13. this publication comprises a major contribution toward knowledge of the earth sciences in Nevada. The geology, paleontology, biology, and archaeology of the Tule Springs locality are reported in it. In essence, the report pricks the balloon of previous misinterpretations about the natural history of Tule Springs, and places Early Man in the vicinity of foraging mammoths, horses, camels, and other beasts in southern Nevada, not earlier than about 13,000 years ago.

There have been other Proboscidean remains found in Nevada since the Tule Springs report was published in 1967, but, unfortunately, with the exception of the Black Rock find (Betty Stout, this volume), not under controlled circumstances. In southern Nevada, for example, not too far from the Tule Springs locality, a Las Vegas newspaper columnist, a well-known pit-boss at a local casino, his wife, and a friend, announced the finding of a Proboscidean tusk in the Las Vegas Review Journal and the Las Vegas Sun in April 1973. These accounts caused a flurry of "Letters to the Editor" to be published in these newspapers concerning the legality of this amateur excavation of the tusk by untrained citizens working on public land.

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Perhaps the most damaging indictment against untrained persons attempting to expose and to preserve such Proboscidean remains did not appear in the newspapers. This indictment is contained in a letter written by Dr. Richard Brooks, an archaeologist, to Mr. John S. Boyles, then of the Las Vegas District Manager of the Bureau of Land Management. Dr. Brooks, whose permission we have to quote passages of his letter, wrote:

> During the visit to the site area, a small hole was excavated to expose a portion of the mammoth tusk, which had been reburied after its initial exposure. Unfortunately, the original excavators had used a type of preservative designed as a glue epoxy, incapable of penetrating beyond the surface, in order to preserve the tusk itself. In addition, the tusk was then wrapped in rags while the glue was wet, in an apparent effort to further preserve it. The result was that the rags are now sticking to the epoxy, which is sticking to the tusk, and it will be a difficult task for paleontologists to recover and to preserve the full value of the tusk.

Even professional paleontologists have had their hands full trying to preserve tusks. Tusks are next to valueless for distinguishing Mammutidae from Elephantidae anyway, and in cases when bones are preserved and tusks are not, museum technicians often recreate tusks out of paper mache'. Natural tusks often are quite heavy, even though they are mostly dentine and quite friable when dry. Yet there is something quite compelling about these gigantic natural spears. Perhaps man's desire to make a "trophy" of that which is most feared connects modern "big game" hunters to their prehistoric counterparts.

Another Proboscidean find, this time in Northern Nevada, was made by Mr. Rial Brinkerhoff on his alfalfa seed farm in Dixie Valley, located about sixty miles east of the city of Lovelock (Figure 3). Mr. Brinkerhoff, in seeking gravel for his farm roads, had made several trenches into alluvium with a bulldozer, had succeeded in finding gravel beds, and had distributed the gravel on his farm roads. Some of his gravel at first appeared to him to be a "...low grade outcropping of petrified wood." On closer examination of the pieces, he guessed that they were actually tusk fragments. He then went back to inspect his open trenches and found huge bones protruding from not one, but both trench walls, As Dr. J. R. Macdonald, the sagacious paleontologist has said in an article in "Constructor" magazine, whenever a bulldozer meets a mastodon or a mammoth "...generally the mastodon or the mammoth comes out second best."

Again, technicians from the Nevada State Museum were called to Mr. Brinkerhoff's farm to pick up and to preserve the pieces. Several long bones, the pelvis, a few vertebrae, and other smaller bones were recovered. Some of these finds are on display in the paleontology gallery of the Nevada State Museum, thanks to Mr. Brinkerhoff's curiosity and generosity. While these remains have not been identified with certainty, it is believed that they are from the huge Imperial Mammoth which stood seventeen feet high at the shoulder. Had this mammoth been alive, perhaps Mr. Brinkerhoff's bulldozer would have come out second best!

Second best is not really good enough for Nevada's white elephants, however. They are priceless fossils of a bygone age that shall never, in all probability, come this way again. They mirror extinct lifeways adapted to extinct or relict environments. The Proboscideans should be explained and understood in those contexts. Fortunately, fossil elephants are protected by law, just as their living counterparts are in Africa. And it is fitting that such fossils should be regarded as something more than mere trophies of the past. They are giant links with man's own past as a hunter and predator in both the Old and New Worlds.



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AN UNUSUAL PROBOSCIDEAN SKULL FROM

FISH LAKE VALLEY, NEVADA

by

John E. Mawby

The time period of concern to Nevada archaeologists is generally the last 13,000 years or so. This note deals with a fossil nearly three orders of magnitude older than Nevada's earliest archaeological sites. Nevertheless, readers may be interested in learning about the early relatives of the more familiar mammoths of the Pleistocene.

The Order Proboscidea comprises three families: the Mammutidae, the American Mastodon and its ancestors of the Old World kin; the Gomphotheriidae, discussed below; and their descendants the Elephantidae, mammoths and elephants (Maglio 1973). (Some other groups-barytheres, moeritheres, deinotheres-have been referred to the Proboscidea, but their affinities are uncertain. They may represent separate orders.) Gomphotheres have often been referred to as "mastodonts," but this leads to confusion. While they no doubt shared a common ancestor with the true mastodonts (mammutids), the two groups are distinct throughout their known fossil records.

The gomphotheres were a varied group, originating in Africa (Coppens et al. 1978) but later diversifying in Eurasia and North America during the Miocene and Pliocene (Osborn 1936; Tobien 1976). They became extinct by mid-Pleistocene in the Old World and North America; one group survived to the end of the Pleistocene in South America.

Early gomphotheres had tusks, modified incisor teeth, both in the skull and in the elongate fore part (symphysis) of the lower jaw. Although functional details are not well understood, upper and lower tusks and an elongate snout or short trunk must have functioned together as the gomphothere's feeding mechanism. Some late gomphotheres, like their mammutid cousins and elephantid descendants, evolved a short symphysis, reducing or eliminating the lower tusks, and attaining more or less elephant-like trunk (Watson 1946). Seemingly anomalous cases of gomphotheres with elongate mandibles lacking the lower tusks appear occasionally in the fossil record, including one from Mineral County, Nevada (Mawby 1968). One long-jawed gomphothere specimen lacking both lower and upper tusks, from the Miocene of New Mexico, was described by Childs Frick in 1933. Frick made this type of a new species, Trilophodon cruziensis (later transferred to the genus Megabelodon), but later authors have tended to dismiss it as an individual genetic, or sexual, or pathologic oddity from a normally tusked gomphothere species.

This rather lengthy introduction has been necessary to put into context a gomphothere skull (PEs11-1) in the collections of the Nevada State Museum. The skull was discovered in 1970 by Jerry Gray, high in the badlands area ("The Sump") at the north end of Fish Lake Valley, Esmeralda County, Nevada. Jerry called on me to help collect it for the Museum. With the aid of my wife and two of my students, we excavated the skull and encased in in a burlap and plaster cast (one long day's work) and dragged it to the top of the badlands (another hard day's work) for transport to Carson City. Although clearly a significant specimen, being so far as I know the only reasonably complete gomphothere skull from Nevada, the skull then sat untouched in its plaster jacket until 1977, when preliminary preparation showed that this was the second known occurrence of a gomphothere without upper tusks. Several more years elapsed before it was possible to complete the preparation and study of the skull, which is reported here for the first time. A more detailed description and analysis will be published elsewhere.

It was, of course, obvious when the skull was first excavated that no tusks were present, but postmortem loss of tusks before burial is a common feature of fossil proboscideans. It was only when the remaining rock matrix was removed from the anterior end of the skull that it became evident that no tusks had ever been present. Where a normal gomphothere skull would have a pair of tubular bony sheaths for the tusk bases, the Fish Lake Valley skull has only narrow ridges of bone, solid except for a scattering of pneumatic spaces. Only one gomphothere skull with a similar snout has been described: Megabelodon cruziensis. Comparison with Frick's (1933) figures of M. cruziensis shows a number of other similarities. Both are unusually low-domed skulls; both have a somewhat unusual suite of molar tooth characters. In short, even aside from their tusklessness, the two skulls resemble one another more than they do any other of which I am aware. I believe they represent the same, distinct species.

Stratigraphic relationships are consistent with this interpretation. The Fish Lake Valley badlands have produced a diverse fossil fauna (Stirton 1940) characteristic of early Clarendonian age in the North American land mammal sequence (late middle Miocene). This age is confirmed by a potassium-argon date of 11.4 million years B.P. on an ash bed within the fossil-bearing sequence (Robinson et al. 1968). The type <u>M. cruziensis</u> skull is from beds of Clarendonian age in Rio Grande trough, New Mexico (Galusha and Blick 1971).

Why were they tuskless? Individual anomaly, either genetic or pathologic, is a possible explanation, but unsatisfying because it is inherently untestable. Sexual dimorphism, as seen in the present-day Indian elephants, seems unlikely, unless the fossil record of the gomphotheres is amazingly biased against females. I find a functional interpretation more satisfactory. As mentioned, several advanced proboscidean lineages evolved a short, tuskless mandible. This must have followed a change from a trunk-plus-tusks mode of feeding to dependence on the mobile trunk, as in living elephants. This change was typically accompanied by reorientation of the upper tusks from their primitive downward direction beside the mandible to more of an upand-outward curve, presumably thereby allowing more mobility to the trunk (Watson 1946). I propose that Megabelodon cruziensis was a gomphothere population which took a more radical (and ultimately less successful) approach to getting the tusks out of the way of the trunk, by suppressing them entirely. At present, we know far too little about the functional evolution of proboscidean tusks and trunks. Detailed studies of the functional anatomy of gomphothere skulls and further discoveries of gomphothere fossils, especially in the Great Basin, are needed to provide the data to test this hypothesis about the place of the Fish Lake Valley gomphothere in the history of the Proboscidea.

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by

Betty Stout

The searching and digging in Pleistocene sediments in northern Nevada have produced evidence of Early Man in the Black Rock Desert. Several sightings of fragments of fossil bone indicated that prehistoric animals roamed the land. A variety of disciplines were needed to interpret the story these tangible elements were attempting to tell. When two or more scientific disciplines and their practitioners cooperate on a given site, results are dramatic. Such was the case in the summer of 1982 when teams of paleontologists and archaeologists labored together excavating the remains of a mammoth in the Black Rock Desert, Humboldt County, Nevada.

In 1981, under the auspices of the Nevada State Museum, Carson City, Nevada, a scientific excavation was started on the site where a molar of a mammoth had been discovered two years earlier. As work progressed, it was evident that most of the skeletal elements were articulated and were there to be recovered. Also present on the surface and to some depth in the site were flakes of stone indicating the labor of human hands. Hope was running high that man's involvement with the demise of the creature might be established. But man was not the only predator. A deciduous tooth of a sabretooth cat was found in the northeast corner of the site.

Work was not completed before signs of winter appeared. The site was closed to protect it from vandalism and the forces of nature.

The site was reopened in the summer of 1982. Dr. Ruth Gruhn, University of Edmonton, Alberta, Canada, volunteered her services and directed the continuing work of the excavation. Dr. C. William Clewlow, Jr. and his team of skilled workers, along with Richard Reynolds, paleontologist from the George C. Page Museum, Los Angeles, exhibited their

skill at this arduous but rewarding work. The Am-Arcs of Nevada, an organization of amateur archaeologists also provided welcome assistance. All of the work was don on a volunteer basis. A camper for housing Dr. Gruhn and vehicles for transporting supplies and water were supplied by Dr. Ken Taber, a Reno dentist. An interested observer and of invaluable help in indicating sites for future investigation was Sessions "Buck" Wheeler, well-known educator and western writer.

The Black Rock Desert is not a choice place to be on a hot, summer day. Often the thermometer registered 1200 F. in the gridded pit where the workers were excavating their valuable find. Sunset brought blessed relief, and the crews assembled in camp every evening to enjoy the food stored in huge ice-chests which had been transported from Reno, 180 miles away. A sudden violent sand storm one day reduced visibility to zero, but caused no damage except to human eyes and skin.

Archaeologists and paleontologists, working as a team, carefully applied a hardening agent, a lacquer cement called "Glyptal" mixed with acetone, to each bone as it was uncovered. The larger specimens were jacketed in plastersoaked burlap to provide immobility in transportation. The enormous cranium, together with the tusks, were too large to jacket as a single unit. The tusks were removed from the cranium and jacketed separately. Every grain of sediment removed from the site was sifted through 1/8" wire mesh screens. Varieties of gastropods were recovered and collected for dating.

When the project was completed, it was estimated the total weight of jacketed and boxed elements was approximately two tons. They were transported to Carson City by a BLM dump truck and the by the State of Nevada to the Stout Laboratory, Anza-Borrego Desert State Park, Borrego Springs, California. There, the bones were prepared and restored for exhibit by Ralph Danklefsen and Betty Stout and various volunteers. Upon completion of their restoration, the bones were returned to the Nevada State Museum, Las Vegas, Nevada, where the tusks and cranium are on display. All the other elements also are catalogued and stored in the museum.

Measurements indicate this animal stood thirteen feet high at the shoulder. It was an adult male <u>Mammuthus columbi</u>, Columbia mammoth, one of the largest ever recovered on the North American continent. A sample submitted for C14 dating indicates it lived 11,000 years ago (Appendix 1).

It is well documented that several cultures of <u>Homo sapiens</u> have occupied the area known today as the Black Rock Desert. Evidence of this is obvious when one views the great collections of stone tools manufactured and used by these early people (Clewlow 1968:1-93). Likewise, collections of fossil bones indicate that mammoths, horses, camels, bison, and other large vertebrate animals, now extinct, also lived here. Did man and beast share these temperate environs? With today's sophisticated methods of dating, evidence is developing that they did.

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Radiocarbon Age	Determination	Report of Analytical Work		
Our Sample No. Your Reference: Submitted by:	GX~11067 Submission form Betty Stout	Date Received: 04-09-85 Date Reported: 07-22-85		
Sample Name:	PHu 8 (Mammoth). Pleistocene dry lake bed Black Rock Desert Humboldt County, Nevada.			
Age =	11,080 +/- 300 C-14 Years B.P. (C-13 corrected)			
Description:	Sample of bone. Apatite fraction dated, collagen not preserved.			
Pretreatment:	The bone was thoroughly cleaned and washed with dilute acet acid to remove surficial carbonates and other adhering material. the bone was then crushed to less than 1mm in size. The bone powder was then digested in cold dilute acetic acid with constant agitation for 24 hours to remove normal carbonates. The sample was then hydrolyzed under vacuum with HCl to dissolve bone apatite and evolve its CO2 for collection and analysis			

Notes: This date is based upon the Libby half life (5570 years) for 14C. The error stated is ±1 as judged by the analytical data alone. Our modern standard is 95% of the activity of N.B.S. Oxalic Acid. Krueger Enterprises, Inc. 24 Blackstone Street, Cambridge Mass 02139.



Figure 1. View of the Black Rock Desert mammoth as exposed in 1981.

COLLECTING FOSSILS WITH THE PLASTER JACKET TECHNIQUE

by

John E. Mawby

Some vertebrate fossils -- isolated teeth, toe bones, and such -- are solid and strong enough to be collected by simply picking them up, wrapping them for protection, and placing them in your collecting bag. Most large bones and teeth, however, and especially skulls and jaws, have been so weakened and fragmented by overburden pressure, earth movements, and weathering, that any attempt to pick one up will produce only a pile of fragments, beyond the ability of the most dedicated jigsaw-puzzler to reconstruct, and with all scientific value lost. The best thing to do, of course, is get help from a trained vertebrate paleontologist. Unfortunately, paleontologists are a rare species in Nevada. So, if you have found a vertebrate fossil and cannot readily get professional assistance (and have obtained the necessary permission to collect), you can and should apply a professional technique to recover the specimen intact, by encasing it in a plaster jacket.

The basic technique is more than a century old. What follows is mostly how I go about it. Other vertebrate paleontologists have their own favorite variations on the theme.

Materials Needed

Plaster: casting plaster or Plaster of Paris, not wall plaster. usually from burlap bags, Burlap: obtainable from feed or hardware stores. For small specimens, gauze bandage or cheesecloth may be substituted. Toilet tissue, paper towels, and/or newspaper. Glue (see note below). Water, or something to fetch it in. Mixing basin(s): plastic or rubber are best, as they can be flexed to break out dried plaster. * stout knife: a linoleum knife works well. Heavy scissors are also useful. Digging tools, brushes, etc.

Making the Jacket

Start by carefully brushing away loose sediment from the surface of the bone. Protect and harden the exposed bone with one or more coats of thinned glue. (A very thin solution will penetrate best, but takes longer to dry. A thick coat gives surface protection, but probably will have to be removed later when the bone is prepared for study or display.) Dig away the matrix from the top and sides of the specimen, continuing to apply glue to newly exposed bone as necessary. Ideally, the specimen should be exposed only enough to determine its dimensions. In any case, a minimum of exposure consistent with other objectives (such as looking for associated artifacts) is to be preferred.

Dig a trench around the specimen, far enough from it to insure against striking or jarring the specimen, wide enough for easy access, and two to three times a deep as the estimated depth of the specimen. When the trench has been made as deep as needed, its inner wall may then be worked in closer to the specimen, to make a block of reasonable dimensions. The sides of the pedestal should be undercut slightly, unless the matrix is too loose to support itself. Don't forget to watch for more bone as you dig.

This is a good time to make sketch or photograph, especially if the block contains more than one bone.

Cover all exposed parts of the specimen, so that the jacket will not stick directly to the bone. A couple of layers of dampened toilet tissue, followed by a quarter inch or so of wet paper towels or wet, crumpled newspaper are good for this. Deep re-entrants should be filled in with mud or newspaper. Some workers like to add a layer of aluminum foil over the surface.

Cut strips of burlap long enough to reach across the block and nearly to the bottom of the trench on each side. Width depends on the size of the specimen, three to six inches. (For very broad, irregularly shaped blocks, it is sometimes handier to use eight to twelve

inch square patches.) Make more than you think you will need, allowing for overlap. It is usually easier to handle the strips if they are loosely rolled.

Soak the strips in water, and wring out so they are just damp. (This step can be omitted, especially if rapid drying is desired. Usually though, the problem will be that the plaster will dry more rapidly than you expect anyway.) It is also desirable that the surface of the block be dampened.

Mix the plaster. Put into a basin a bit less water than the volume of plaster required. Then fill the water with plaster, sifted from the hand. Add plaster without stirring until the plaster no longer sinks into the water, then mix to get rid of lumps. The moisture should have a thick cream consistency.

Soak the strips in the plaster. I unroll the strip from one hand and reroll it into the other, in the plaster. It is best to have one person soaking the strips and handing them on to another, who applies them to the block.

Drape the strip over the block, then starting from the top, work it down with the fingers, making sure that no spaces are left between the strip and the block. It is essential that the jacket fit tightly against the block at all points. Overlap the successive strips. For small blocks, up to a foot in maximum dimension, an inch of overlap is sufficient. On larger blocks, I prefer an overlap of half the width of the strip, so that there is a double thickness overall. Wrap a long strip around the base of the block, to hold the ends of the other strips in place.

If the block is more than a couple feet long, or very heavy, repeat the whole procedure, with the second layer of strips running perpendicular to those of the first layer. It may also be desirable to reinforce the jacket with splints (sticks, or whatever is handy), held on by applying some of the strips of the second layer, or additional strips, tightly around the splint. Exposed ends of the splints also provide useful handles.

Spread any excess plaster over the surface of the jacket. field numbers or other identification scratched into the plaster when partly set make good permanent marks. Otherwise, use a permanent black marking pen.

Take a break and let the plaster set. Give it a minimum of half an hour; unless you are pressed for time, an hour or more is better.

When the top jacket is hard, you may begin to undercut the block, working in from the bottom of the trench. On very large blocks, or in loose matrix, it may be necessary to add plaster strips on the undercut as you go along, or to tunnel under the block in one or two places and add strips there to bind the block into the jacket. These additions will be only temporary to allow safe turning of the block, and may be less painstakingly applied.

When the block has been undercut sufficiently (about half of the pedestal removed), it may be broken loose. One easy way to accomplish this is to drive a trowel through the pedestal. <u>Roll</u> the block over, quickly but carefully. It is best to prepare beforehand a sufficient flat space to roll it onto.

Excess matrix may now be removed from the bottom of the block, down to, or nearly to, the level of the bone.

Trim off the excess from the edges of the top jacket, and complete the jacket over the bottom of the block, repeating the procedure used for the top.

Your find can now be safely transported and stored. All that remains is the long and delicate process of preparation.

A Note on Glues

There are a great many kinds of cements and glues on the market, and a full discussion of all those used in fossil work would make a long paper in itself. Briefly, there are two major categories to be considered for field use:

1) Plastic and lacquer cements, most of which require organic thinners. These generally have the advantages of being fast drying, and of being relatively easy to soften later, to remove excess or to reposition displaced fragments of the specimen. However, most do not work well on damp bone. Also these materials and their thinners tend to be both flammable and toxic. When using such products, pay careful attention to the manufacturer's warnings and recommendations. Within this category, General Electric's Glyptal 1276 Lacquer Cement and 1511-M Thinner have been long-time favorites among paleontologists, but these are rather costly and not always east to obtain. A workable and readily available combination is Duco Cement and acetone. 2) Water-based glues. Most readily available are the "white glues" such as Elmer's. These products are easy to use, requiring only water as a thinner, and will penetrate damp bone or matrix. However, they set slowly, especially when thinned, and once the glue is set it is very difficult to remove without damage to the specimen.

The choice of what to use will generally depend on a combination of circumstances, personal taste, and experience.

For Further Information

- Converse, Howard H., Jr. 1984. <u>Handbook of Paleo-preparation</u> <u>Techniques</u>. Privately published; available from the author, at Florida State Museum, University of Florida, Gainesville, FL 32611. 125 pp., illus. Written mainly for the preparer, but has much information for the collector as well.
- Kummel, Bernard, and Raup, David, editors 1965. <u>Handbook of Paleontoloigical</u> <u>Techniques</u>. W. H. Freeman & Co., San Francisco. 852 pp., illus. Contains many articles on field and lab techniques in various branches of paleontology. Unfortunately, it is out of print.

EVIDENCE OF LATE PLEISTOCENE LACUSTRINE FLUCTUATION IN NORTH LONG VALLEY, NEVADA

by

Brian C. Amme

On July 15, 1984, the U. S. Soil Conservation Service exposed a bone fragment at approximately 45 inches below ground surface beneath a buried 'A' Horizon. This discovery was made as a result of soil profile trenching regularly carried out by the agency. The trench was excavated by backhoe. As soon as the discovery was made, all trenching ceased, and the Ely District Bureau of Land Management was notified of the find.

On July 16, 1984, an archaeologist was sent by the Ely District office to ascertain the nature of the find. Upon arriving at the trenching site, it became clear to me that the bone was a paleontological find, and not a forensic case for the local Coroner's Department.

The bone fragment was located about 15 cm below a very dark, buried "A" Horizon, and was directly overlying, and in contact with, a thin interbedded lense of small gravels located within a deposit of fine loamy sand. The bone fragment was 132 cm below ground surface. The bone was pinkish in color, mineralized, and very friable. Attempts to excavate the bone virtually caused its disintegration. The bone was pedestalled, then carefully cleaned with fine instruments. In this manner, the bone fragment was described and photographed in situ. The bone fragment appeared to be a medial fragment of a long bone. It was 6 cm wide on one side, and bent to an angle greater than 900, forming another side 4 cm wide. The fragment was 4 cm long, and at least 1 cm thick. Although the discovery of a large mammal bone is always of great interest, the stratigraphic sequence in which the bone occurred is of greater interest.

After excavation of the bone fragment and description of the soil profile, the trench was excavated even deeper with the use of a backhoe. Immediately underlying the horizon of fine loamy sands in which the bone occurs, a bed of graded, rounded gravels was encountered. The bed was approximately 60 cm thick, grading downward from smaller to larger gravels. The gravels, as noted, were well-rounded and reworked from water action. Underlying the gravel beds were find sands that extended downward as deep as the backhoe could dig effectively.

In analyzing the stratigraphic sequence, it immediately became clear that with the presence of a buried 'A' Horizon and beds of reworked gravels underlying it, a sequence showing a Late Pleistocene lake fluctuation had been discovered. The thrilling knowledge that large mammals were present at that time was an added bonus.

The sequence is as follows:

- Horizon I 0-13cm thick, the Al horizon. An Ochric Epipedon, dark loamy soils, 11% clay. The present surface, indicating dryer conditions and less organic matter.
- Horizon II 13-43cm, 30 cm thick, BW, an altered horizon of fine, sandy loam, 5% gravel, 8% clay. Cambic horizon.
- Horizon III 43-89cm, 46cm thick, BKQ, a horizon with weak cementation, 5% gravel, 12% clay. (indicates age of development, 8-10,000 years in creating a durapan)
- Horizon IV 89-117cm, 28cm thick, a buried 'A' horizon, BKQ, A Mollic dark loam, with 15% clay. Indicates high in organic matter with enough available moisture to support perennial grasses. Moist, steppe conditions.
- Horizon V 17-140cm, 23cm thick, the horizon of loamy sands with the bone fragment, IIC, 10% gravel, 3% clay. This horizon and the Mollic Epipedon are classified as

a lithilogic discontinuity, representing formation in a different geologic time from the first three horizons.

- Horizon VI 140-200cm, 60cm thick, a bed of graded gravels, well-rounded and reworked. This bed represents a shoreline or bar feature.
- Horizon VII -Below 300cm. Thick deposits of fine sands, yellow in color, with mottles. This represents a reduced environment.

The sequence described above is esentially a sequence of fluctuating lake levels. Starting from the deepest deposits and working up-section, our interpretation relates the history of this sequence. The fine sands with mottles, Horizon VII, represent a reduced environment of deposition, a time of accumulating of deep water lake sediments. For some reason, possibly climatic, the lake level receded, and shoreline deposits of gravels occurred, Horizon VI. At some point, a minor fluctuation occurred resulting in a slight advance of the lake, creating a shallow water environment of deposition not far off shore. This condition is evidence by the presence of thin gravel lens in which the bone was apparently also deposited. The size of the bone fragment and the gravels indicate near shore deposition, Horizon V. The next stage, Horizon IV, however, shows a complete retreat of the lake level, exposing this area to 28 cm of accumulated soil development. The soil is a Mollisol, indicating fairly moist conditions, with enough available moisture to support perennial grasses. Mollisols also are indicative of Late Pleistocene steppe environments, beyond the limits of glaciation. Above this deposit is 89 cm of fine sands, Horizon III, deposited fairly rapidly as the lake once again advanced to create a deep water environment. Finally, the climatic trend toward dryer overall conditions resulted in the complete desiccation of the lake and hence, the present soil surface, Horizons I and II.

Various questions may be raised by this sequence. First, what is the absolute age of the deposits? The bone may yield interesting results if it can be dated. Once dated, it is conceivable that rates of deposition may be postulated and possibly applied elsewhere. Second. what conditions actually caused the fluctuations to occur? Were the climatic trends such that the mean annual temperature rose, affecting precipitation and evapotranspiration rates, or did the mean annual temperature remain constant and precipitation increase or decrease? If the fluctuations occurred from general climatic trends, what was the lag-time for the lake level to respond? Would the lag-time be more rapid, if a change in the amount of precipitation is postulated? Or evapotranspiration? Are the Mollisols the result of added moisture due to proximity of the lake nearby or the result of general climatic conditions? Definitive answers to these questions would certainly contribute to the overall understanding of the Great Basin Pluvial environment in eastern Nevada.

References

Mifflin, M. D., and M. M. Wheat 1979 Pluvial Lakes and Estimated Pluvial Climates of Nevada. <u>Nevada Bureau of Mines and</u> <u>Geology, Bulletin 94. Reno.</u>

ARCHAEOLOGICAL OCCURRENCE OF A LARGE MAMMAL HORN SHEATH FROM PYRAMID LAKE, NEVADA

by

Phil W. Hutchison

Introduction

I first saw the large mammal horn sheath in 1983. The horn was found in a crevice of a large tufa dome near the Pyramid at Pyramid Lake, Nevada. It was found by a youngster of Indian ancestry who asked me to study the horn.

The Pyramid Lake horn was shown to staff members of the Anthropology Department, University of Nevada, Reno, Nevada, and to D. R. Tuohy and A. Dansie at the Nevada State Museum, Carson City, Nevada. The species of the animal horn could not be positively identified immediately, although it was though to be from a mountain sheep, <u>Ovis</u> <u>canadensis</u>. In addition, I submitted a brief term paper on the horn to my museology class at the University of Nevada, Reno. Here are some of my findings:

Measurements

a.	length of convex surface	40.8	сm
b.	length of concave surface	24.8	cm
C.	circumference at orifice	37.0	сm
d.	large hole	•8	сm
	(width-convex surface)		
e.	medium hole	•6	сm
	(width-concave surface)		
f.	small hole	•5	cm
	(width-convex surface)		
g.	distance between large and		
	small holes	4.0	$\mathbf{C}\mathbf{M}$
h.	average thickness	•3	cm
i.	weight	•9	kg

Note: All holes are approximately .7 cm from the orifice.

Description (Figure 1)

The horn has a rough side and a smooth side. An arc measured across the rough side is 16.0 cm. A similar arc across the smooth side is 19.0 cm. The orifice is eliptical with irregular edges. The interior and exterior grain appears to be longitudinal. The exterior surface shows signs of extensive smoothing. The horn color is dark brown except for a transluscent strip 6.0 cm wide and 20.0 cm long. This strip is located on the convex side and extends from the center of the horn to the tip. It shows where most of the exterior horn surface was removed.

The horn has four streaks of red color on it. One streak extends from the orifice for 8.0 cm and is 1.0 cm at its widest part. The second streak starts 9.0 cm from the orifice and extends for 6.0 cm in an arc across the smooth surface. The third and fourth streaks are similar to the second streak, but are joined at their bases. A small streak of red color starts at the small hole and extends for 4.0 cm on the inside surface. the red pigment was identified as red ochre (S. Miller, personal communication).

A number of small cut marks are located near the midsection of the convex surface. These marks, approximately 30, look like they may have been made by a scraping blade. However, they have almost identical spaces and are the same length. Several long cut marks, or scratches, intersect the small cut marks.

The tip of the horn has been cut and ground. It has two small perforations, apparently due to the removal of horn material. All holes are counter-sunk. The holes protrude at the interior surfaces, indicating the horn may have been "green" when drilled.

Assumptions

The careful finish and position of the holes, in addition to extensive cutting and grinding of exterior surfaces, and smoothing, all indicate a great deal of planning and skill was expended to modify the Pyramid Lake horn.

The horn may have been used as a container. The large and medium holes are opposite each other and could have been used to attach a sling. The small hole could have provided a hinge point for a lid.

Location, Desiccation Cave Tufa Dome

When found, the horn was located on a ledge protected from direct sunlight and weather. The rough side faced up. Dirt and tufa debris partially covered the horn. A small amount of sand was found inside the horn. The horn was found in the same tufa dome that contains Desiccation Cave, a site dug by the Nevada State Museum in 1965.

Species

A number of attempts were made to determine the horn species. Everyone who inspected the horn was puzzled by its large orifice, short length, smooth exterior, and grain. It was compared to a number of bighorn sheep skulls and horn sheaths at the Nevada Department of Wildlife, Game Division. One Game Division member thought it was a California Mountain Sheep. Another member disagreed. Reference to Wild Sheep of the World by Raul Valdez and Messila N. Mexico, did not depict such a photo match. The orifice shape and smooth interior pointed to a big horn sheep species. But the lack of pronounced horn rings, or remainder of horn rings, was of interest to everyone. these rings are a distinctive feature of mountain sheep horns. Perhaps an x-ray would reveal some indication of ring remnants.

Dr. J. Woods of Herritt Museum, College of S. Idaho, submitted the Pyramid Lake horn to Dr. Suzanne S. Miller, paleontologist, Idaho State University, Pocatello, Idaho. Dr. Miller identified the species as big horn sheep <u>Ovis canadensis</u>. She identified the color streaks as red ocher. Also, Dr. Miller believes the holes, grinding and smoothing, and other modifications are the work of aboriginals using stone tools.

The Site, Desiccation Cave

I reviewed the notes on Nevada State Museum site 26Wa291 in an attempt to determine the possible age of the Pyramid horn. Here are some excerpts:

Site name:	Desiccation Cave.
Туре:	An exogene rock shelter
	connected to an endogene or
	true cave, with an entrance
	called Grotto 1.

3,960 feet, the Thinolite Elevation: Terrace level.

Sandstone outcropping Geology: covered with tufa. In 'TSV, Pyramid Sequence of Miocene age.

01, 9002, 4064 Soils:

Artifact Totals: 3,988 artifacts were catalogued, including two human mummies and associated grave goods.

Matrix:

The rock shelter portion of the site was rather small and had a stone wall in front of it. The wall had been rebuilt at least twice. Some of the sandstone blocks comprising the wall had petroglyphs pecked into them. One C14 date was obtained

Dating: on twined matting wrapped around burial 2. This date also dates the mat, and bipointed sinkers associated with the mummy. The date is 1950 plus or minus 100.

Year Excavated: 1965

- Classification: This was a mortuary or funerary cave, or shelter. It was not a habitation site.
- Culture Period: Early Pyramid, ca. 1,000 B.C. through Tybo Phase or A.D. 1,950.

Research

I visited the Nevada State Museum laboratory at Carson City, Nevada and researched records on site 26Wa291. A complete review of the field catalog, archaeological feature records, and osteology records revealed mountain sheep horn fragments occurred throughout the state. It is not possible at this time to determine the age of the Pyramid Lake horn, even though it was found at the same tufa dome that contains site 26Wa291. However, there is a possibility it may date from the earlier rather than the later time period at Desiccation Cave, as the size of the sheep horn indicates a huge animal. By the end of the nineteenth century, mountain sheep had become extinct in the mountain ranges adjacent to Pyramid Lake. Additional study is required, obviously.



The long point Canadensis). arrows nort (Ovis the a mountain sheep (while the sheath, by author). Figure 1. Norked horn sheath from point to holes in or streaks (photo cole arrows red

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	Vol.	3:2	1982	4.00
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The Nevada Archaeological Association was organized in 1972 to provide a bond of communication between professionals in the field of archaeology and its allied sciences, members of various amateur organizations, and the people of Nevada towards the furtherance of public education and involvement in responsible preservation of Nevada's finite archaeological and historical resources.

The need for recording these cultural resources of the past for the enlightenment of future generations grows more pressing with each day of development and progress. The goals of the Nevada Archaeological Association are: to provide a focal point for general information and study of non-renewable cultural resources; to provide a central point for recording artifact collections from Nevada and the Great Basin and the verbal knowledge of provenience and associations accompanying these collections; to correlate this knowledge with that information already professionally recorded for the mutual benefit of the amateurs and professionals with research interests; to provide assistance with education towards responsible public participation in archaeology; to assist in the preservation of sites by the establishment and maintenance of a registry of available, capable, and technically skilled amateurs in Nevada who would be able to work with professionals in accordance with the Code of Ethics and Standards of Research Performance as advocated by the Society of Professional Archaeologists, particularly in the immediacy of salvage archaeology; and to provide a bond of communication between professionals, amateurs, and the general public by publishing a journal, Nevada Archaeologist.

To these ends the Nevada Archaeological Association was incorporated in 1972, in the State of Nevada, with its organizational and editorial offices as listed on the inside cover, and with designated conference and meeting center located in Tonopah, Nevada. Membership is open to all those interested in the archaeology, ethnology, and history of the human inhabitants and their natural habitats in Nevada, the Great Basin, and adjacent environs.

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Residents of all other Nevada communities are asked to join the Nevada Archaeological Association until such time as there are sufficient numbers of people willing to form local chapters of the above organization. Information on the Constitutions and By-laws of the above organizations may be obtained at cost from the secretaries of the above organizations.



R.W. Wilson and H.W. Finney in front, with N. Connelly and F.D. Bode behind (from the California Institute of Technology) drag an excavated and plaster-jacketed mammoth skull across the sandy bottom of the Lahonton Reservoir, August 9, 1931. (Photograph courtesy the Los Angeles County Museum of Natural History)