

FOSSIL MAMMALS AT ASTOR PASS
NEAR PYRAMID LAKE, NEVADA

BY JOHN C. MERRIAM



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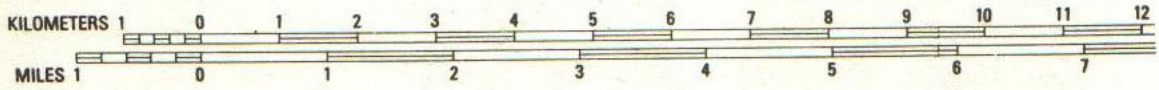
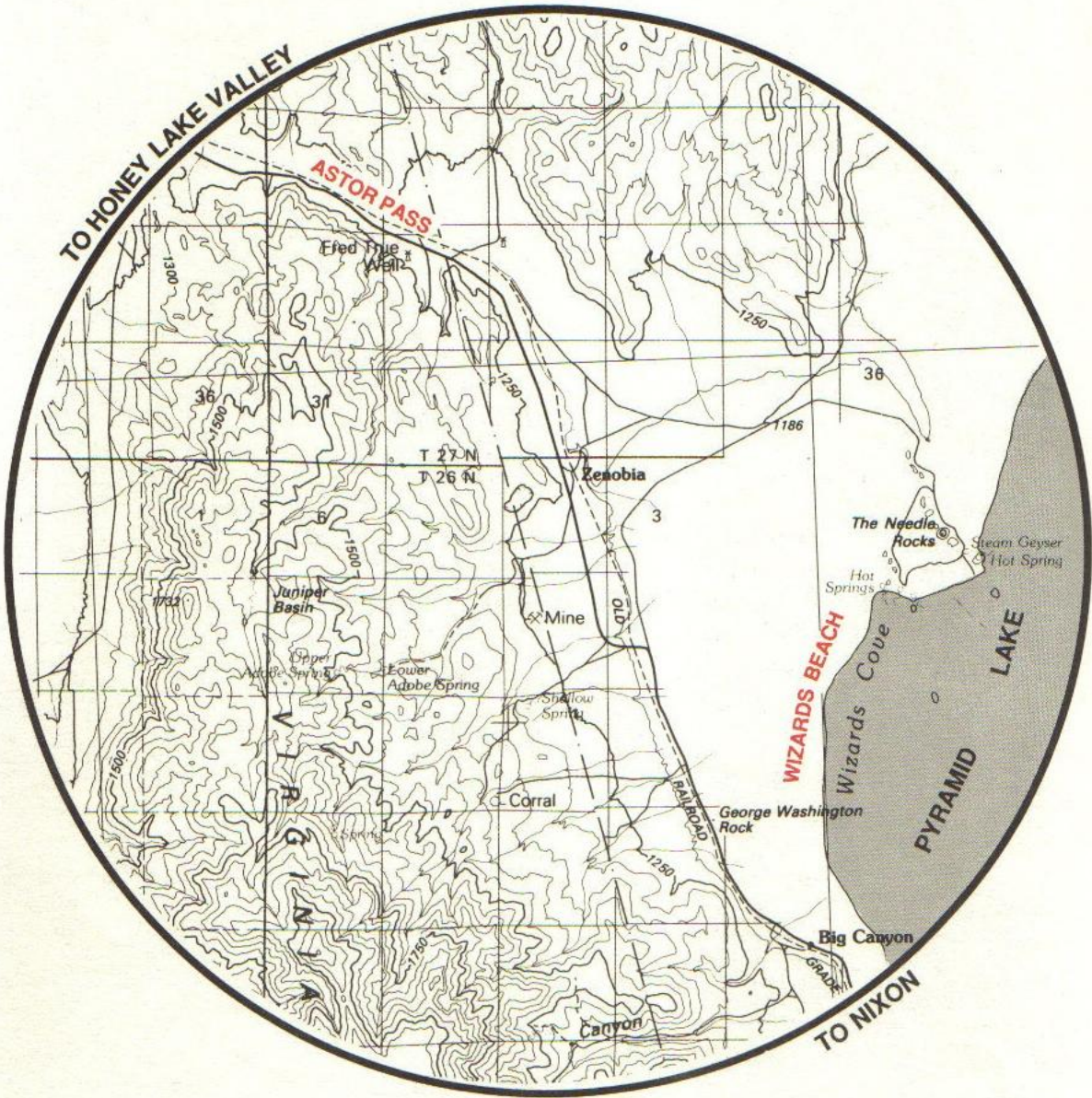
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IN A PLEISTOCENE LAKE DEPOSIT AT
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INTRODUCTION TO THE REPRINT

The relatively recent discovery of the fossilized skeletons of extinct species of camel and horse at Wizards Beach, Pyramid Lake, Nevada, focusses renewed attention on related paleontological finds some seventy years earlier at nearby Astor Pass. In fact, a report* on the new discoveries suggests a geological relation between Astor Pass and the Wizard Beach fossils.

Jack Harrelson of Grants Pass, Oregon, discovered, in the early 1980s, two complete Pleistocene camels (*Camelops hesternus*) and the first complete fossil horse (*Equus cf. pacificus*) from Nevada. Radiocarbon dating indicates one of the camel specimens is about 25,500 years old.

In the early years of this century, incomplete fossil specimens of extinct cats, camels and horses were found in a railroad cut at Astor Pass, only a few miles from the Wizards Beach sites, and John C. Merriam's obscure 1915 report, reprinted here, assumes renewed value in light of the Harrelson discoveries. Merriam's Rancholabrean correlations are especially interesting.

*Amy J. Dansie, et al, "The Wizards Beach Recession: Farmdalian (25,500 yr. B.P.) Vertebrate Fossils ..." in *Anthropological Papers Number 21* (Carson City: Nevada State Museum, 1988), 153-174.

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A PLEISTOCENE LAKE DEPOSIT AT
ASTOR PASS, NEAR PYRAMID
LAKE, NEVADA

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JOHN C. MERRIAM

INTRODUCTION

Some months ago Professor J. C. Jones of the University of Nevada kindly offered to the writer for examination a small collection of mammalian remains obtained by him at Astor Pass, Nevada, in gravel deposits which were evidently formed along the shore of the Pleistocene Lake Lahontan. As the physical history of the Nevada region during a portion of Pleistocene time has been the subject of exhaustive discussion, while of the biological history very little has been known, the specimens secured by Professor Jones are of unusual importance. Particularly is this true as the occurrence evidently represents one of the phases of the great lake, Lahontan.

The writer is much indebted to Professor Jones for the opportunity to examine this interesting collection and for a description of the occurrence of the specimens. The origin of the deposits in which the mammalian fossils occur is fully discussed by Professor Jones in a recent paper.¹ In addition to the specimens obtained by Professor Jones from the gravels at Astor Pass, it has been the writer's privilege to examine a considerable portion of a horse skull found in a tufa deposit at Astor Pass. For the use of this specimen, the writer is much indebted to Mr. William Hood, chief engineer of the Southern Pacific Railroad, who secured the skull during the course of the excavations.

¹ Jones, J. C., *Science*, n.s., vol. 40, pp. 827-830, 1914.

Professor Jones informs the writer that the material obtained by him was found in a railway cut in gravel deposits at Astor Pass four miles west of the north end of Pyramid Lake. The gravel beds at this point lie on the western slope of a narrow ridge of andesite, and are largely composed of andesitic pebbles evidently derived from this outcrop. The gravels are covered by a four-foot layer of dendritic tufa similar to that found above the thinolite tufa in the Lahontan deposits. A few isolated crystals of thinolite were found at the base of the gravel deposit. In the midst of the gravels, and about ten feet below the dendritic tufa cap, there is a layer of typical lithoid tufa several inches in thickness. Judging from all the evidence available, Professor Jones is convinced that the gravel deposit was formed along the shore of Lake Lahontan.

The occurrence of the fossil remains is described by Professor Jones as follows:

The majority of the bones were found in the outward end of the bar and in the upper twenty feet of the deposit. All of them were isolated from each other and no complete skeletons were reported. Many of them were more or less coated with the dendritic tufa and in excavating a ditch through a layer of the dendritic tufa one hundred and fifty feet to the east of the deposit, a skull of a horse was found in the tufa. In addition to the bones secured, a large number, including several skulls and a large leg-bone described as being the size of an elephant's, were uncovered and afterwards lost.

It is evident from the disjointed condition of the bones that they were washed about by the waves to a considerable extent before their final burial in the gravels. Two hypotheses may be considered as to the time when the animals lived: first, they may have existed in pre-Lahontan time and been first covered by an earlier deposit that was reworked by the waters of Lahontan; second, they may have lived in Lahontan time and were buried in the deposits of that lake.

As the deposit is composed exclusively of the basic andesite found in the ridge to the immediate south, evidence of a deposit earlier in age should be found along its flanks. While it was impossible in the time available to entirely cover the ridge, no such evidence could be found within a mile of the gravels and as no evidence of shore drift could be found south of the end of the bar, it is not probable that the bones and gravel could have been washed from a pre-existent deposit. An alternate suggestion would be that the gravel deposit was formed in an earlier lake and was simply worked over by the waters of Lake Lahontan. If this were true, the entire bar must have been worked over, for no evidence could be discovered in the exceptionally good exposures of the cut and gravel pit of any structural discordance. The tufas are entirely conformable with the gravels and it is known that the thinolite at least is characteristic of the Lahontan period in this basin. Further, if the deposit was worked over in its entirety, it seems remarkable that the bones should be limited practically to the upper and outer parts of the bar rather than being promiscuously scattered through the deposit. The only other pos-

sible suggestion is that as the waters of Lahontan rose and fell, they failed to leave their impress on the bar, which seems to be beyond the realms of probability.

Under the circumstances, as far as our present knowledge goes, there seems no other conclusion probable than that the animals represented by the bones found in the gravels lived and died along the shores of the former lake and were buried in its sediments.

The forms obtained in the deposits at Astor Pass include the following:

- Felis atrox Leidy.
- Camelid, near Camelops?
- Equus, sp.
- Fish, vertebrae, indeterminate.
- Bird, vertebra, indeterminate.

The specimen referred to *Felis atrox* seems not to differ essentially from corresponding teeth of large individuals of this gigantic feline from the Pleistocene of Rancho La Brea. The camel remains are of a large form near the type of the camel of Rancho La Brea. The single tooth of a horse obtained from the gravels at Astor Pass by Professor Jones might, if taken alone, be referred to the Rancho La Brea species *Equus occidentalis*. In some of its characters the dentition of the specimen obtained from the tufa deposit by Mr. Hood resembles *E. pacificus*, a species unknown at Rancho La Brea, but represented in the Pleistocene of Fossil Lake in eastern Oregon. The Astor Pass specimen is not certainly to be referred to *E. pacificus* and may be a distinct form.

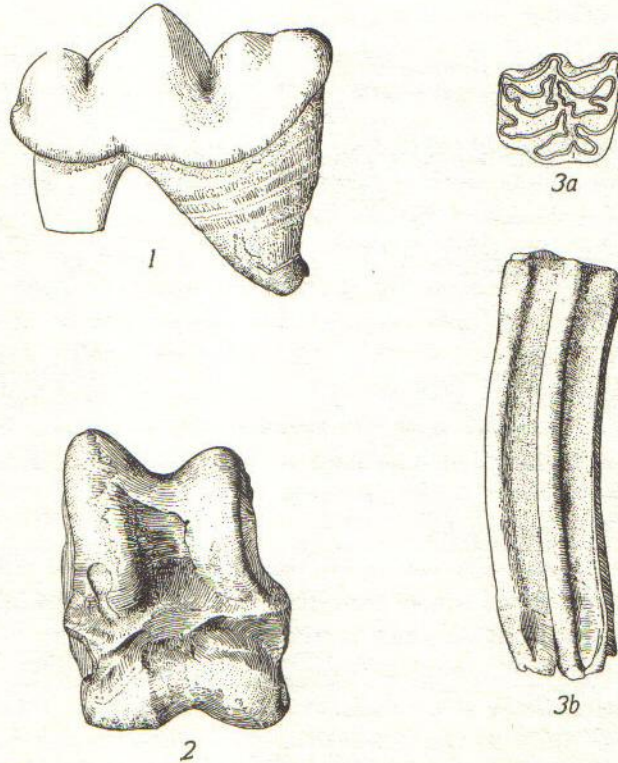
The few forms represented in the Astor Pass gravels represent a Pleistocene stage not remote from that of Rancho La Brea. The fact that the horse skull does not correspond in type to the average of specimens from Rancho La Brea, and is comparatively near the characteristic species of Fossil Lake, may mean that this fauna represents a stage different from that of Rancho La Brea, or that in Rancho La Brea time the horses of the middle and northern Great Basin region were different from those of the southern Pacific Coast region. The succession of mammalian faunas of the Pacific Coast and Great Basin Pleistocene is not yet sufficiently well known to permit the construction of a satisfactory chronology, and it is not yet possible to state to what extent the faunas of various localities overlap.

As very little has been known of the fauna inhabiting the Great Basin province during the time of deposition of the Lahontan sediments, the material obtained by Professor Jones from Astor Pass gives us a distinctly important contribution to our knowledge of this subject.

DESCRIPTION OF MATERIAL

FELIS ATROX Leidy

An upper carnassial (fig. 1) of a very large cat from the Astor Pass gravels represents a form not distinguishable from *Felis atrox* of the Rancho La Brea Pleistocene. The measurements of the specimen approximate those of the largest male individuals from Rancho La Brea.



Figs. 1 to 3b, from Pleistocene gravels, Astor Pass, Nevada.

Fig. 1. *Felis atrox* Leidy. P⁴, outer side. No 21699, natural size.

Fig. 2. Camelid astragalus. No. 21385, $\times \frac{1}{2}$, superior view.

Figs. 3a and 3b. *Equus*, sp. M²?, No. 21698, $\times \frac{1}{2}$. Fig. 3a, occlusal view; fig. 3b, outer view.

MEASUREMENTS

	No. 21699 Astor Pass	No. 14001 Rancho La Brea
P ⁴ , greatest anteroposterior diameter	44.3 mm.	43.
P ⁴ , greatest transverse diameter across deuterocone..	20.9	21.5
P ⁴ , height of protocone	22.	.....

CAMELID, near CAMELOPS?

An astragalus (no. 21385, fig. 2) represents a camel near *Camelops*, the form known at Rancho La Brea.

DIMENSIONS OF ASTRAGALUS, No. 21385

Greatest anteroposterior diameter	80.5 mm.
Greatest width at distal end	54.

A fragment of the distal end of a metapodial represents a large camel. It is too incomplete for determination.

EQUUS, sp.

The specimen (pl. 41) which Mr. William Hood kindly placed at the disposal of the writer, comprises the portion of the skull situated between the anterior borders of the orbits and the anterior ends of the nasals. The cheek-tooth dentition is complete with the exception of M³. The teeth are unusually well preserved and are in an early stage of wear. P⁴ shows beginning wear, but the enamel pattern is not completely outlined.

The enamel pattern is distinctly more complex than that seen in the Rancho La Brea specimens of *Equus occidentalis*, and approaches the degree of complexity found in *E. pacificus*. The anterior and posterior fossettes may be somewhat wider than in the type of *E. pacificus*. The form of the protocone may be approximated in either *E. pacificus* or *E. occidentalis*. The dimensions average slightly larger than those of *E. occidentalis* of Rancho La Brea, although some individuals of the Rancho La Brea species may show measurements slightly exceeding those of the Astor Pass specimen. The measurements are somewhat smaller than those of the type of *E. pacificus*, but may fall within the limits of variation in that species.

As yet the variation within *Equus pacificus* is not sufficiently well known to make possible an exact statement of the characters of that species. In general, it would seem that the cheek-teeth are distinguished from those of *E. occidentalis*, as represented in the Rancho La Brea collections, by large size, narrow fossettes, and more complicated pattern of the enamel bordering the fossettes and the outer end of the post-protoconal valley.

As nearly as one can judge from the material available, the Astor Pass specimen resembles *Equus pacificus* more closely than do any of the horses as yet observed in the Rancho La Brea collections. It is not clear that this form is certainly to be referred to *E. pacificus*.

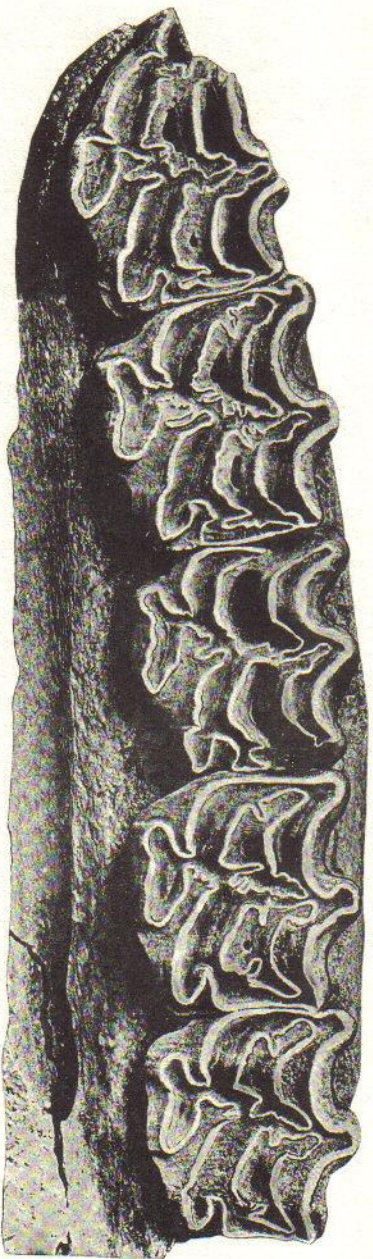
More information on the range of variation in that species is necessary and especially is it desirable to have more definite knowledge of the characters separating it from *E. occidentalis*.

A single cheek-tooth (no. 21698, figs. 3a and 3b) from Astor Pass, kindly presented by Professor Jones, represents a type with dimensions smaller than those in the skull obtained by Mr. Hood. The fossettes are rather narrow. The enamel is somewhat less complicated than that in the skull specimen. This specimen taken by itself might be referred to *Equus occidentalis*, but the writer is inclined to think that it represents the same species as that seen in the skull specimen.

MEASUREMENTS

	Hood Specimen Astor Pass	No. 21698
Length of upper premolar series, without P ¹	107. mm.	.....
P ² , anteroposterior diameter	40.4	.....
P ² , transverse diameter	28.4	.....
P ³ , anteroposterior diameter	34.	.....
P ³ , transverse diameter	31.2	.....
P ⁴ , anteroposterior diameter	31.	.....
P ⁴ , transverse diameter	29.	.....
M ¹ , anteroposterior diameter	30.6	.....
M ¹ , transverse diameter	29.4	.....
M ² , anteroposterior diameter	31.5	30.5
M ² , transverse diameter	27.5	26.8
M ² , length of crown .....	.....	a103.

Transmitted October 24, 1914.



Equus, sp. Dentition of specimen obtained from Pleistocene tuff deposit at Astor Pass, Nevada,
by Mr. William Hood. Superior cheek-teeth, natural size.