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# Man and Pleistocene Fauna at Potter Creek Cave, California

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**D**ESPITE more than seventy years of discussion and controversy, the validity of the evidence for the contemporaneity of man and extinct Pleistocene fauna at Potter Creek Cave, Shasta County, California, has never been resolved. It is most fitting that on the centennial of the first published account of the discovery of fossil bones within this cavern—by Livingston Stone's exploring party of 1874 (Stone 1876)—we are now able to present evidence providing a partial solution to this problem.

While Stone (1876:464) speculated as to whether his specimens "were human bones or otherwise," the actual question of the period of man's occupancy of Potter Creek Cave did not begin until just after the turn of the century. Under the leadership of John C. Merriam, investigators in the newly formed Department of Anthropology at the University of California (Berkeley) turned their attention to the question of the time when man first appeared in western North America. Limestone caves were selected as possible locations in which traces of "early man" and extinct animals might be found. Such locations were selected since this type of site had yielded so much significant archaeological and human paleontological material in Europe. It was in this context that Potter Creek Cave was relocated and excavations begun by E. L. Furlong in the summer of 1902. The excavations were completed the following season by William Sinclair (Merriam 1906; Sinclair 1904).

Furlong and Sinclair's extensive digging produced many thousands of Quaternary faunal specimens representing 52 species of which 21 were extinct. These included such large mammals as the short-faced bear (*Arctotherium simum*), shrub ox (*Euceratherium collinum*), Shasta ground sloth (*Nothrotherium shastense*), horse (*Equus*), mammoth, bison, and camelid (Sinclair 1904:17-18; Merriam and Stock 1925:10). Many of these bones were broken and split, leading Sinclair (1904:12-15) to suggest the possibility that man may have broken such bones to extract the marrow. Among these splintered fragments were several specimens with pointed or bevelled ends and polished surfaces. They appeared, to Sinclair, to be "relics of possible human origin." These implement-like pieces were recovered at considerable depth in undisturbed earth and below teeth of the extinct ungulate *Euceratherium*. However, Sinclair also considered natural means to account for the smashed bones. He suggested that large bone-crushing carnivores could have produced the fracturing, and exposure to the action of dripping water could have produced the wear and polish. Nevertheless, he stated "at the present time no explanation of the origin of the fragments has been discovered which accords with all the observed facts, though the suggestion that they were made by man appears on the evidence of occurrence to be open to the fewest objections" (Sinclair 1904:15).

In addition to the bone specimens, Sinclair (1904:15) reported:

In the clay flooring of the passage leading to the top of the swinging ladder, a sharp-edge stone chip, flaked from a river-worn pebble, was found associated with the charcoal mentioned as occurring in the clay. A *Margaritana* shell, several bone fragments, a tooth of the large ungulate, *Euceratherium* and a fragment of a mammoth tooth were associated with the stone chip.

The polished bone items were declared the work of man by F. W. Putnam in 1906. His conclusion was based in part on the examination by a group of eminent comparative anatomists, including Aleš Hrdlička, of several of the fragments which contained notches and perforations. All agreed that the apparent modification, particularly the perforations, were not natural, but attributable only to human handiwork. Along with the stone specimen, the bone implements certainly provided strength for the case of man having been in the cave at the same time as the extinct animals. In an accompanying paper, Merriam (1906) adopted a somewhat more conservative position. To him, the splintered, perforated, and polished bones had the appearance of human artifacts, "but could not be pronounced such with certainty at present."

Paleontologists such as Henry Osborn (1910) and O. P. Hay (1918, 1927) were willing to accept, or at least consider, the Potter Creek Cave finds as possible evidence for Pleistocene man in North America. On the other hand, W. H. Holmes, the chief spokesman for the archaeological community during this period, found the bone implements unacceptable and favored a natural explanation for the artifact-like features (Holmes 1919:92-93). One may recall that Holmes, along with his colleague at the Smithsonian, Hrdlička, usually took a rather negative and sometimes hostile attitude toward claims of great antiquity for man in the

New World, or at least demanded demonstrable evidence.

Discoveries of artifact materials in direct, unambiguous association with extinct Pleistocene fauna, beginning in 1926 with the Folsom, New Mexico finds, tended to rekindle interest in the question of early occupancy of North America. Archaeologists, such as M. R. Harrington (1933), Edgar Howard (1936), and E. H. Sellards (1952), stated their acceptance and drew heavily on Potter Creek for comparative evidence for man's association with animals such as ground sloth, camel, and horse.

Potter Creek Cave took on even greater significance in the 1950s and 1960s in light of the proposed "Pre-Projectile Point" stage of cultural development in the New World. Proponents of this hypothetical cultural expression, A. D. Krieger (1951; 1953; 1964) and A. L. Bryan (1965), argued that this stage antedated the fluted point-using, megafauna hunters as typified in the Clovis or Llano Complex. They accepted the bone items from Potter Creek Cave as artifacts, and listed it as one of several sites they believed represented this early cultural expression. R. F. Heizer (1964:119-120) took strong exception to this view, declaring that the bone specimens were certainly not artifacts. Likewise, H. M. Wormington and H. Müller-Beck, while noting that some did seem to be of human manufacture, found that the bone objects, when viewed under a microscope and compared with known bone tools, did not appear to have been shaped by human agency (Wormington 1966:114; personal communication 1972).

Since it seemed that the Potter Creek Cave problem could not be resolved with the existing evidence, the cave was visited in the fall of 1964 by one of us (L. A. P.) to determine if any unexcavated portions remained for re-examination. The large lower chamber appeared to have been completely excavated by the earlier investigators. However, significant

undisturbed areas were present in the entrance chamber and upper passage. A small field party was organized and excavation was carried out during the summer of 1965.

Trenching in the entrance chamber disclosed four strata. The first layer was a dark midden ranging from 15 to 30 cm. in thickness. Underlying this thin cultural deposit was a yellow to reddish-brown sediment containing numerous angular limestone fragments. The deposit became increasingly cemented with depth, forming a very hard breccia. This fill was tested to a depth of over two meters where, near the entrance, it rested on calcite flowstone (stalagmite), the fourth stratum. The true cave floor was never reached and probably lies at a considerable depth. A thin layer of a charcoal-rich cultural deposit was also found overlying the yellowish-brown rocky clay in the upper chamber and passage (Fig. 1). Though less complex than the stratigraphic record reported by Sinclair (1904:5-8) for the lower chamber (e.g., the lack of volcanic ash and gravel lenses), the primary deposition in the two sections of the cavern probably had a common origin, namely, colluvium washed in from the surface.

Examination of the stratigraphic position and content of the cultural deposit indicated it to be a superficial, post-Pleistocene accumulation that had heretofore been unrecognized and/or confused with the older cave sediments. Numerous core tools and flakes made from basalt stream pebbles and cobbles, not unlike those reported from the earlier explorations, were plentiful in the midden and upper few centimeters of the underlying deposit in both the entrance chamber and in the upper room and passage. A few obsidian scrapers and projectile points were also recovered, as were the shells of the freshwater clam, *Margaritifera*. In addition, a cache of perishable artifacts was found in the small room directly above the cave entrance chamber. Included in this lot was an atlatl, dart foreshafts, and main shafts. This is the first

example of a prehistoric atlatl found in California. These specimens have been described elsewhere in detail (Payen 1970). At that time, they were assigned a tentative temporal placement between 1000 B.C. and A.D. 300.

Below the first 30 cm., no artifact forms were found. Split mammal bone was present throughout. However, none of these pieces resembled implements or exhibited polished surfaces. The presence of *Euceratherium* teeth and bones within this fill suggested that the deposit may, in part, be coeval with that found in the lower chamber.

As a test of the apparent stratigraphic separation between the archaeological and fossil bone deposits, both radiocarbon and obsidian hydration values were obtained. Three  $^{14}\text{C}$  determinations have been obtained on samples recovered from the cultural level (Taylor 1975:402-403). These samples were pre-treated in HCl and NaOH, and boiled in distilled water to remove post-depositional contaminants including inorganic carbonates common to limestone cave environments and the possible presence of solidified woodrat urine, especially in the case of UCR-148. Two of the radiocarbon values (UCR-148 and UCR-151) were obtained from fragments of the wooden dart shafts. The third sample (UCR-150) was charcoal excavated from the same zone of the cave where Sinclair (1904:10) reported finding the flake, charcoal, clam shell, shrub ox, and mammoth teeth in association. The radiocarbon ages of the three samples were statistically identical. Their calendar age, corrected for secular variation (Suess 1970), places them in the first century A.D. (Table 1).

In addition, obsidian hydration measurements were obtained on artifacts and flakes from the midden deposit in the entrance chamber. Of the eight samples examined, four exhibited no observable hydration rim. The remaining four samples exhibited hydration values ranging from 3.2 to 4.1 microns, with an average of 3.8 microns. Given the major

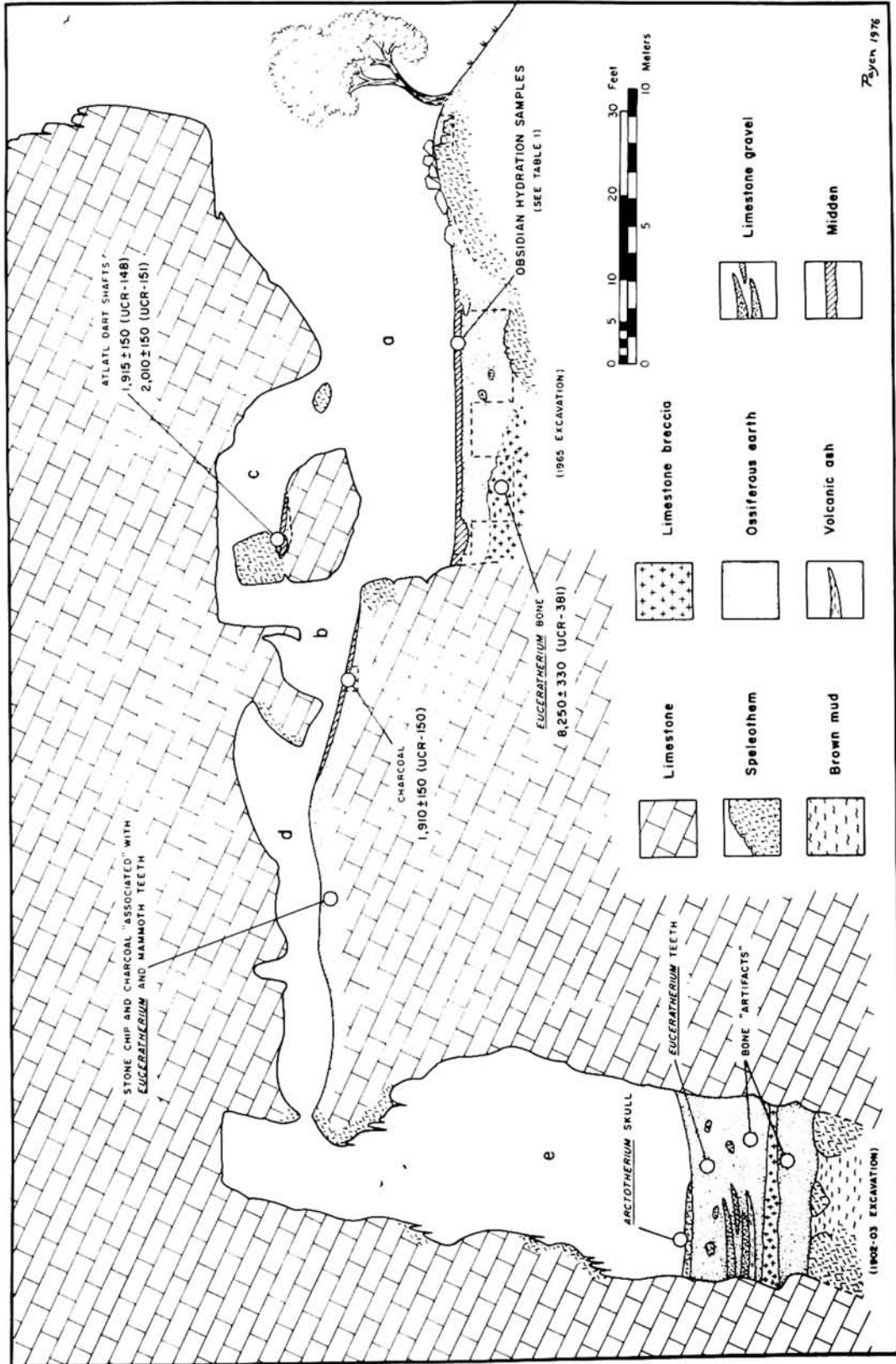


Fig. 1. Generalized cross section through Potter Creek Cave, Shasta County, showing the position of radiocarbon and obsidian hydration samples in relation to stratigraphic profiles. a: Entrance chamber, b: Upper room, c: Cache room, d: Passage, and e: Lower chamber. Section for upper portion of cave based on preliminary map by T. Rohrer, 1965; lower profile compiled from Sinclair (1904:Pl. 13).



**Table 1**  
**RADIOCARBON AND OBSIDIAN HYDRATION DATA**  
**FOR POTTER CREEK CAVE, CALIFORNIA**

**A. Radiocarbon**

Lab No.	Sample Material	Radiocarbon Age (yrs. B.P.)	Calibrated* (yrs. A.D./B.C.)
UCR-148	Atlatl dart shaft wood	1915±150	A.D. 50
UCR-150	Midden charcoal	1910±150	A.D. 50
UCR-151	Atlatl dart shaft wood	2010±150	A.D. 50
UCR-381	<i>Euceratherium</i> bone collagen	8250±330	—

\*After Suess 1970

**B. Obsidian Hydration**

Sample No.	Artifact Type	Hydration Reading (microns)	Tentative Approximate Age (yrs. B.P.)
22-304	Flake	NOR**	—
22-305	Flake	NOR	—
22-340	Scraper	3.2	2050
22-341	Scraper	4.5	3250
22-343	Scraper	3.3	2150
22-348	Projectile point	4.1	2900
22-349	Flake	NOR	—
22-352	Flake	NOR	—

\*\*No observable rim

uncertainties surrounding the obsidian hydration method (Ericson 1975; Friedman and Long 1976), it is not possible at present to provide precise equivalent "ages" for these samples. However, the ages almost certainly would not exceed a few thousand years. To provide tentative approximate values for Table 1, Clark's (1964) published hydration rate for central California has been used to calculate a calendar age for the four samples having measurable rims.

In contrast with the ages for the cultural horizon, a value of 8250±330 radiocarbon years B.P. (UCR-381) was obtained on bone collagen from the distal ends of a *Euceratherium* radius and ulna found imbedded in breccia 170 cm. below the surface in the entrance chamber. A six millenium hiatus is indicated between the use of the cave by man and the presence of shrub oxen in the region. Such an age for this cow-sized, goat-like animal is somewhat surprising, but is in line with

terminal dates falling in the 8000 year B.P. range for many North American Pleistocene species (Hester 1960). In Burnet Cave, New Mexico, *Euceratherium collinum* was found associated with a hearth dated at  $7432 \pm 300$  radiocarbon years (C-823) by the solid carbon method. Hester (1967:183) has questioned this date since a Clovis point was found in association, suggesting an age closer to approximately 11,500 years B.P. Shrub ox remains from an archaeological context within a cave near Lake Winnemucca, Nevada, have been assigned a date of 5000 B.C. (Shutler 1961:518; 1968:25), but as pointed out by Heizer and Baumhoff (1970:3), it is not clear if this is based upon Burnet Cave or on dates obtained at the site. The Potter Creek determination is, to our knowledge, the first direct age obtained on this species.

The bone implement-like pieces found in 1903 belong to the Pleistocene deposit and are at least 8000 years old, but the question still remains if these are the result of human work. From our own examination of these specimens, we must concur with those who have argued for a natural origin. Until more convincing evidence is available to the contrary, the most economical explanation is that these pieces were produced by bone-crushing carnivores and smoothed through water action. Passage through the digestive tract of large carnivores may also account for the smoothed appearance and perforations of the bone fragments (cf. Heizer 1964). A detailed analysis is beyond the scope of the present paper. The difficulties encountered in the study of very similar bone objects is manifestly clear in the divergent interpretations for the so-called osteodontokeratic culture reported from cave accumulations in South Africa (Dart 1957; Klein 1975). It should be pointed out that remains of the short-faced bear, *Arctotherium*, were both abundant and distributed throughout the bone deposit at Potter Creek (Merriam and Stock 1925:9). This immensely large bear, even larger

than the present-day Kodiak, has been described as the "most powerful carnivorous mammal which has lived on our continent" (Cope 1891:998) and "to have been more fleet of foot, as well as more rapacious, than living types of bear" (Kurten 1969:23-24). It is difficult to imagine anyone sharing the cave with such a creature!

To reiterate, the controversy surrounding the question of early man at Potter Creek Cave has gone on for over seventy years without satisfactory resolution. In an effort to provide fresh data the cavern has been reinvestigated. Excavation disclosed two distinct depositions, an ossiferous cave fill and a superficial archaeological stratum. A six millenium hiatus can be demonstrated between these two strata through the application of  $^{14}\text{C}$  and obsidian hydration dating. While man may well have been in the region 8000 years ago, there is no convincing evidence that he occupied the cave at this time or hunted animals such as the shrub ox or ground sloth. We believe at this point it can be asserted that the earlier indications for contemporaneity of man and extinct fauna were most likely fortuitous; the association was only apparent, not real, thus it is analogous to the situation at Gypsum Cave where application of  $^{14}\text{C}$  dating has disclosed a similar situation (Heizer and Berger 1970). This is not to say, however, that further investigations on this or other sites in the area will not some day unearth such evidence.

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