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## LOVELOCK CAVE FORMERLY KNOWN AS SUNSET GUANO CAVE (NV-CH-18):

### Introduction

The archaeological materials from NV-Ch-18 (Lovelock Cave) were acquired by the PAHMA over a 65-year period in 21 accessions. The first archaeological collection was donated by S. A. Barrett in 1907 (Accession 291). In 1912, three more accessions including materials from this site were acquired (Accessions 419, 426, and 443). Accession 419 includes materials bought by the Museum from a private collector, I. P. Richardson; Accession 426 includes specimens collected by Claude Jones of the Nevada State University and donated to the Museum in February 1912; and Accession 443 includes archaeological materials collected by L. L. Loud during his excavations at Lovelock Cave from April to August 1912. In 1923, five more specimens from this site collected by I. P. Richardson were accessioned into the Museum (Accession 100EB), and plant fiber and a piece of string collected by the Botany Department were accessioned in 1932 (Accession 500AJ). R. F. Heizer and A. D. Krieger collected a small number of artifacts in 1936, which were accessioned later that year (Accession 704). In 1941, L. L. Loud donated a model of an atlatl to the Museum, the original of which was found at this site (Accession 1941R). Accession 829 includes archaeological specimens collected by R. F. Heizer in 1944 and was received by the Museum the same year. Materials collected from the site by R. F. Heizer and J. E. Mills in September 1949 were accessioned by the Museum in 1950 (Accession 991). Accession 1009 includes archaeological specimens, primarily coprolites, collected by R. F. Heizer and a University of California field party from Lovelock Cave in July 1950, and in December 1950, Heizer donated several archaeological specimens from the site (Accession 1950AK). Accession 1934 includes materials collected from packrat nests at this site by Richard Brooks and donated to the Museum by R. F. Heizer in 1964. Heizer and a field party returned to the site in the summer of 1965, collecting archaeological specimens that were acquired through University Appropriation in August of that year (within Accession 2040). Accession 2235 includes archaeological materials collected by Sam Payen of the University of California-Davis in the 1960s and donated to the Museum in 1967. Accessions 2467 and 2805 include archaeological specimens collected from the site in the spring of 1968 by R. F. Heizer and others under a permit granted to the University of California-Berkeley by the U. S. Department of Interior, with work conducted in cooperation with of the Bureau of Land Management. These specimens were accessioned by the Museum in February 1969. Heizer returned with a field party in 1969 under an extension of the permit mentioned above, collecting more archaeological materials that were accessioned into the Museum that same year (Accession 2534). Finally, Accession 2851 includes archaeological

specimens donated to the Museum by Clarence Stauts. These archaeological materials were collected by Mr. Stauts' father, who worked as a guano digger at the cave before Harrington's excavation (not part of the PAHMA collections) in 1924. Sixty-six catalogue records pertain to human remains, although 10 of these records have subsequently been deaccessioned from the Museum, five represent Catalogue-2 records apparently containing human remains based on document description, and one represents a Catalogue-2 record found to contain human remains through physical inspection for the purposes of NAGPRA inventory.

Copies of four permits for excavation at Lovelock Cave issued by the United States Department of the Interior to the University of California-Berkeley under the Antiquities Act are on file at the Museum. Permit 68-NV-112 was issued on August 16, 1968 for excavations conducted from that date through August 16, 1969. Specimens collected by Heizer and Napton under this permit were accessioned into the Museum in Accessions 2050, 2534, and 2805, while human remains collected under this permit are catalogued as 12-10741 and 12-11105 through 12-11118. Permit number 70-NV-007 was issued on March 2, 1970 for the calendar years 1970 to 1972. None of the materials collected under this permit were accessioned into the Museum. Another permit (71-NV-009) was issued by the United States Department of the Interior on March 29, 1971 for 1971 through 1972. Likewise, none of the specimens collected under this permit were accessioned by the Museum. Finally, permit 75-NV-089 issued on August 21, 1975 to R. F. Heizer, C. L. Busby, and K. M. Nissen makes reference to Lovelock Cave, as well as other sites, but there is no Museum record of any materials from this site being collected at this time.

## History of Research

According to the UCAS site record and various publications, NV-Ch-18 is a large rockshelter and cave located adjacent to an ancient Pleistocene lake. Previous designations of this site are Lovelock Cave, Loud Site 18, Sunset Guano Cave, and Horseshoe Cave (UCAS Site Record; Heizer 1970:3). The cave, located in a limestone outcrop, is approximately 150 feet long and 35 feet wide, and faces north onto the Humboldt Sink. Leonard Rockshelter (NV-Pe-14) is eight miles to the northeast, while Humboldt Cave (NV-Ch-35) and Ocala Cave (NV-Ch-24) are 10 miles to the southeast. The site has been extensively pothunted and many materials remain in private collections. Lovelock Cave, despite years of destruction, is one of the most important sites in the history of North American archaeology.

Reviewing the history of excavation at NV-Ch-18, Heizer and Napton (1970:1) state:

Lovelock Cave was the first major Great Basin archaeological site to be excavated. Unfortunately, from the point of view of procedure, the initial explorations in the cave were antithesis of even the relatively unsophisticated archaeological methods practiced at the beginning of the present century. The first digging in the cave was the wholesale removal, by

pick and shovel, of some 250 tons of bat guano, which was dug from the upper cave deposits, screened on the hillside outside the cave, and shipped to a fertilizer company in San Francisco. The extent of the damage to the archaeological strata and artifacts will never be known, but some idea of its magnitude may be gained from the fact that after cessation of guano mining operations, L. L. Loud (1929:29) salvaged from the guano dump in front of the cave "several thousand specimens," consisting mainly of human skeletal material and artifacts made of vegetal material. In 1965 and 1969 we screened portions of the same dump and recovered flaked implements of stone as well as objects of ground stone, bone and shell, numbering in all about 200 specimens. It is probably fair to say that guano mining activities in 1911 nearly destroyed Lovelock Cave as an archaeological site.

James Hart and David Pugh of Lovelock, Nevada, filed a mineral claim on Lovelock Cave (then known as Horseshoe Cave or Sunset Guano Cave) and mined guano deposits from the fall of 1911 to the spring of 1912 (Loud and Harrington 1929:168). They stripped a layer of guano approximately 3 to 6 feet deep off the floor and, in the process, discovered numerous archaeological materials. Loud and Harrington (1929:2) note:

Naturally only objects of a spectacular nature were saved as curios. The smaller inconspicuous things were overlooked and lost. . . .The guano digging stopped when the miners reached a level in the cave where the tule rushes, broken baskets, and refuse left by the ancient inhabitants formed such a large portion of the deposit that the fertilizer could no longer be profitably screened from it.

A letter to the University of California from James Hart dated September 28, 1911 provided some of the first information about the site:

Am engaged in cleaning out an old cave near Lovelock, this state, that is full of guano and the other day sunk a shaft about sixteen feet to get an idea of the depth of guano and was surprised to find quiet [sic] a lot of old indian relics in a very good state of preservation [cited in Heizer and Napton 1970:134].

Loud's 1912 investigation and collection at the site comprises the majority of the Museum's collection from NV-Ch-18. Heizer and Napton (1970:4-6) summarize his investigation:

L. L. Loud, employed by the Museum of Anthropology, University of California, was sent by A. L. Kroeber to Lovelock in the spring of 1912 in order to salvage whatever materials might be secured following cessation of commercial exploitation of the guano deposit. . . .Unassisted, Loud conducted excavations in the cave from April to August, 1912, and

collected approximately 10,000 archaeological specimens, most of which came from three locations: the refuse dump left outside the gape by the guano miners; the remnants of the lower level deposits in the northwest end of the cave; and the scattered pockets of undisturbed refuse remaining in situ along the peripheral edges of the cave. It is impossible to provide detailed information concerning Loud's excavations, since he devotes less than a paragraph to this topic in his published report (Loud 1929: 29). Loud did not establish a grid system of the type presently used in recording the depth and provenience of the specimens. Instead he designated each of his digging locations as "lots," of which there were 41. It has been stated (Loud and Harrington 1929:vii) "that one of the joint claimants of the cave prohibited work in his end of the cave;" however, the map prepared by Loud and Harrington (1929, pl. 2) shows that Loud dug in a number of locations in both ends of the cave. Lots 1, 2, 4, 5, 7, 15, 20, 21, and 24 are not marked on the map referred to, nor do these locations appear on Loud's field map, copies of which are in the files of the Lowie Museum, and none of the artifacts described in the report of his excavations are attributed to these lots. However, a partial list of the contents of these lots is given on the original museum accession sheet prepared by Loud.

They continue:

It is a matter of historical interest that Loud's report of his work at the cave was not published until 1929, 17 years after his first visit to the cave. His description of the artifacts found in the cave is quite detailed (Loud 1929:31-109), but in only a few instances were the specimens located by "lot" -- information that would have provided at least the approximate horizontal provenience of the specimens. Many of the specimens illustrated in the report are located as to "lot" in the explanatory notes accompanying the plates. . . .Using this information and the sketchy notes in the museum catalog cards, we have attempted to determine the quantity and type of artifacts found in each of the lots designated by Loud -- bearing in mind, of course that the vertical or stratigraphic provenience of the materials is unknown. We hoped that in deficiencies in Loud's methods of recording data, it might be possible to discern a few details of the prehistoric occupational uses or "activity-facies" that might have been manifested in the cave, based on the number and distribution of various types of artifacts. Unfortunately, because some of the lots (e.g., lot 9) cover as much as 20 feet horizontally, the attempt was unsuccessful. It is evident, however, that lots 19, 33, 34, 37, and 44 are the deepest in the cave, and, with the exception of the deep cache pits (which Loud failed to find or did not recognize) probably contained some of the oldest cultural material found in the cave. This possibility is all the more likely in view of the fact that the upper stratigraphic layers, which may have been as much as six feet thick, were

removed by the guano miners, and the deeper deposits were worked by Loud [Heizer and Napton 1970:4-6].

Loud returned to the site with M. R. Harrington for the summer in 1924 to further investigate the cave. To secure access to the site, a mining claim for Lovelock Cave was made out to Kroeber by M. R. Harrington in July 1924 and amended September 1924 (Fowler 1986:19). Heizer and Napton (1970:6) state:

In July 1924, Harrington, Loud and several Northern Paiute Indian assistants began a season of excavation in Lovelock Cave for the Museum of the American Indian, Heye Foundation, New York. During the three-month field season, Harrington's party dug to the base of the deposit in the west end of the cave, and also excavated in the center and east end of the cave a few remnants of the original deposit that had been overlooked by relic collectors.

The archaeological specimens from this investigation were not accessioned by the UC Anthropology Museum. Rather, these collections were housed at the Museum of the American Indian, Heye Foundation. Similarly, Nels Nelson conducted some surface collection at the site in 1936, sponsored by the American Museum of Natural History; however, none of the materials from his investigation were accessioned into the PAHMA.

Heizer and Krieger visited Lovelock Cave in 1936 and collected a small number of specimens "found in crevices and under rockfalls" that were accessioned by the Museum (Accession 704). Heizer returned to the site in 1949 to obtain organic materials for radiocarbon dating, and in 1950 and 1965, Heizer returned again with a field party to collect coprolites from the surface and also screen dirt that the guano diggers dug from inside the cave and deposited on the slope in front of the cave ("guano miner's dump"). The 1965 investigations also yielded artifacts screened from the "guano miner's dump."

Excavations undertaken by Heizer and Napton in 1968 and 1969 were conducted under permit 68-NV-112, issued by the Department of the Interior. Human remains were found in disturbed debris throughout the cave and in the guano miner's tailings outside the cave; however, the remains were fragmentary and highly disturbed and no complete burial was recovered.

Catalogue record 1-64407 is a model of an atlatl (after one found in Lovelock Cave, Nevada) that was donated to the Museum by L. L. Loud in 1941, and is not an archaeological specimen from this site.

Heizer and Napton (1970) note the difficulty in reconstructing artifact placement within the cave given the information available from the ledgers and Loud's writings on the site. Associations for artifacts from this project for the purposes of NAGPRA inventory were made based on the little provenience information in the ledgers and from Loud's 1924 report on the site.

Temporal analysis of NV-Ch-18 was undertaken by Loud and Harrington (1924), Grosscup (1960), Heizer and Napton (1970), and Bennyhoff and Hughes (1987). Heizer

and Napton (1970:44) discuss radiocarbon dates from materials recovered from their excavations in addition to temporally specific artifacts found at the site:

The excavations led to the recovery of materials that have provided the oldest radiocarbon date of culturally associated vegetal material -- 2740 B. C.  $\pm$  110 (I-3962) -- and the earliest absolute cultural dates: 1450 B. C.  $\pm$  80 (UCLA-1459-C) and 1420 B. C.  $\pm$  100 (I-4758), based on radiocarbon determinations of human remains. A series of internally consistent radiocarbon determinations was produced by analysis of samples taken from one of the last existing remnants of the original cave midden. Recent occupation of the site is evidenced by additional finds of Desert Side-notched and Rose Spring Corner-notched points. Possible post-contact occupation is indicated by gun parts found in the hitherto unexcavated west alcove of the outer rockshelter. Thus, the known occupational history of the cave has been extended to include the time from circa 2500 B. C. to circa A. D. 1835.

Table 1 the indicates the full suite of radiocarbon dates from NV-Ch-18.

Table 1. NV-Ch-18 uncalibrated radiocarbon dates (after Heizer and Napton 1970:39).

<b>Material</b>	<b>B.C./A.D. date</b>
Human Coprolite	A. D. 1850
Scirpus seed	A. D. 1430
Human Coprolite	A. D. 756
Human Coprolite	A. D. 480
Vegetal Material	A. D. 440
Human Coprolite	A. D. 350
Human Coprolite	A. D. 300
Basketry	A. D. 268
Human Coprolites	A. D. 120
Vegetal Material	A. D. 50
Vegetal Material	531 B. C.
Vegetal Material	660 B. C.
Basketry	1218 B. C.
Human Muscle Tissue	1420 B. C.
Human Femur	1450 B. C.
Vegetal Material	2030 B. C.
Bat Guano	2320 B. C.
Bat Guano	2480 B. C.
Bat Guano (B)	2498 B. C.
Bat Guano	2570 B. C.
Bat Guano (B)	2630 B. C.
Bat Guano, veg.	2740 B. C.
Bat Guano	4054 B. C.

A chronology for NV-Ch-18 is also summarized by Bard et al. (1981:128-129):

A major accomplishment of the 1968/1969 Lovelock project, aside from the final exposition of the lacustrine subsistence/settlement pattern in the study region, was a final reconstruction of the Lovelock Cave culture history and the dating of the Lovelock Culture. Heizer and Napton state that Lovelock Cave was occupied by bats at a date coinciding with the estimated end of the Altithermal perhaps as a direct result of the rejuvenation of Humboldt Lake. The initial buildup of the older bat guano layer may have begun ca. 5000 B. C. The earliest, although intermittent evidence of human occupation is in the Older Guano layer at ca. 2700 B. C. Bats and other creatures continued to inhabit the cave until about 2500 B. C. when human occupation began ca. 1500 B. C. Heizer and Napton (1970) note that an inhumation at the Humboldt Lakebed site has been dated at

733 B. C.  $\pm$  250 indicating contemporaneous use of Lovelock Cave and the nearby open sites. Human occupation of the cave and lakeside sites probably coincided with the oscillations of Humboldt Lake. Intensive occupation of the cave began ca. 1500 B. C. and continued until about A. D. 500. Due to a massive rockfall (ca. A. D. 440  $\pm$  90) access to the interior of the cave was greatly impeded, but it continued to be utilized as a repository for the dead and for cache purposes. According to Heizer and Napton (1970: 41), human occupation of the interior of the cave was drastically curtailed, and this, together with the reduced illumination and air circulation made it attractive to bats. Thus, between A. D. 700 and A. D. 1911, a thick deposit of bat guano accumulated over the cultural deposits. Human occupation of the outer shelter and use of the inner cave probably continued until 1829. The 1833 slaughter of Humboldt Lake area Indians by Walker's expedition. . . probably ended use of the Humboldt Valley as travelers reported the presence of few or no Indians for a number of years.

Most recently, Bennyhoff and Hughes (1987) have summarized the chronology for NV-Ch-18 within their Scheme B1 of the Central California cultural sequence, based primarily on the presence of exotic shell beads and ornaments in the site assemblage. They preface this discussion, however, by noting that:

given the uncontrolled method of excavation. . . , disturbance, and multiplicity of poorly integrated reports. . . it may seem foolhardy to attempt definition of components. . . . [however, we] feel that this rich Great Basin cave was occupied or used (the interior and/or exterior portions) more or less continuously for more than 4000 years [Bennyhoff and Hughes 1987:168].

They identify 17 components, as follows: (1) Component A (Historic Period; ca. AD 1816-1880) indicated by the presence of a gun cache dating to 1850; (2) Component B (late Protohistoric Period or late Dune Springs; ca. AD 1700-1816) indicated by the presence of two *Olivella* A1c and one *Olivella* whole shell beads, as well as Desert Side-notched Sierra subtype projectile points; (3) Component C (early Protohistoric Period or early Dune Springs; ca. AD 1500-1700) indicated by the presence of one *Olivella* thin lipped E1a, two *Olivella* A1c, and one *Olivella* whole shell beads, as well as Desert Side-notched General subtype projectile points; (4) Component D (Late Period, late Phase 1; ca. AD 1300-1500) indicated by the presence of one *Olivella* A1cil, 15 *Dentalium*, two pine nut type II, 121 *Olivella* A1a, one *Olivella* A1b, 220 *Olivella* B2a, three *Olivella* B2b, and eight *Olivella* B3a beads, as well as a radiocarbon date of AD 1430; (5) Component E (Late Period, middle Phase 1; ca. AD 1100-1300) indicated by the presence of one *Olivella* A1a, 24 *Olivella* B2b, and one *Olivella* B2c beads, as well as Rosegate series projectile points; (6 and 7) Components F (Late Period, early Phase 1; ca. AD

900-1100) and G (Middle/Late Period Transition; ca. AD 700-900) indicated by the presence of two *Olivella* split punched D1, one *Olivella* oval punched D3, and one *Olivella* A1c beads, as well as Rosegate series projectile points for at least Component F; (8) Component H (terminal Middle Period; ca. AD 500-700) deriving at least in part from Loud's Lot 6 and indicated by the presence of one *Olivella* scoop C5, five *Olivella* split drilled C2/3b1, 20 *Olivella* oval C3/3b1, one *Olivella* double perforated C6/3b1, and six *Margaritifera* 4b beads, as well as one *Haliotis* CA2j ornament; (9 and 10) Components I (late Middle Period; ca. AD 300-500) and J (intermediate Middle Period; ca. AD 100-300) deriving at least in part from Lot 15, Level III, and Level IV, and indicated by the presence of eight *Olivella* oval C3/3b1, 11 *Olivella* A1b, and one *Haliotis* 4d beads, as well as one SA3j *Haliotis* ornament; and (11) Component K (early Middle Period; ca. 200 BC - AD 100) indicated by the presence of one *Haliotis* H3a bead, three *Haliotis* H3c beads, 226 *Olivella* ground saucer G4, 16 *Olivella* grooved rectangle N, six *Olivella* A1b, and eight *Olivella* A1c beads as well as one *Haliotis* FA3j and one *Haliotis* OJ3j ornaments; (12) Component L (Early/Middle Period Transition or Windmill E; ca. 600-200 BC) indicated by the presence of 229 beads from Grave 18 (female) radiocarbon dated to 531 BC, including two *Margaritifera* (cf. Bennyhoff and Hughes 1987:165, 168 "Macoma") disk, 185 *Haliotis* square, 20 *Olivella* L2b/2b, one *Olivella* oval C3/3b1, and 21 *Olivella* spire-lopped 1a beads; (13) Component M (terminal Early Period or Windmill D3; ca. 1100-600 BC) indicated by the presence of two *Olivella* applique section beads, one *Margaritifera* CA2n/c(1)a ornament, one *Haliotis* CA2n/c(1)a ornament, and one *Haliotis* CA4j/C(2) ornament, with an associated radiocarbon date of 660 BC and an inlaid pipe; (14) Component N (late Early Period or Windmill C3; ca. 1250-1100 BC) indicated by the presence of 287 beads from Loud's Lot 26 (child) radiocarbon dated to 1222 BC, including 53 *Olivella* end-ground B2b/1a, 20 *Olivella* A1b/1a 11 *Olivella* A1a/1a, and 203 *Olivella* end-ground B2a/1a beads, as well as 24 other specimens in the midden, including one *Haliotis* square 1a bead, one *Olivella* A1a/1a bead, four *Olivella* spire-lopped 1a beads, one *Olivella* end-ground B2a/1a bead, 11 *Olivella* small cap B4a/G1b beads, one *Olivella* large cap B4c/G1b bead, two *Haliotis* CA6j ornaments, two *Haliotis* CA6n ornaments, and one unclassifiable *Haliotis* ornament; (15) Component O (middle Early Period or Windmill C1; ca. 1500-1250 BC) indicated by the presence of one bead from Heizer and Napton's (1970) disturbed burial Feature 5 and 96 beads from Harrington's Graves A and B, including one *Olivella* A1a/1a bead, 96 *Olivella* spire-lopped 1a bead, one *Olivella* oblique A2a bead, and one CA20j *Haliotis* ornament, with associated radiocarbon dates of 1420 and 1450 BC [Feature 5] for this component; (16) Component P (early Early Period or Windmill B; ca. 2000-1500 BC) indicated by a radiocarbon date of 2030 BC; and (17) Component Q (Windmill A; ca. 7000-4000 BC) indicated by "Older Guano" (Bennyhoff and Hughes 1987:168). In addition, there are 49 *Olivella* spire-lopped 1a beads and one unclassifiable *Haliotis* ornament from this site, which cannot be ascribed to a particular phase. As noted by Bennyhoff and Hughes (1987:94), four of these components are indicated at least in part by burial associations, including Component D (348 beads from Grave D

[child]), Component L (229 beads from Harrington's Grave 18 [female]), Component N (287 beads from Loud's Lot 26 [child]), and Component O (one bead from Heizer and Napton's disturbed burial Feature 5 [Bennyhoff and Hughes 1987:167], 96 beads from Harrington's Graves A and B).

Many of the artifacts contributing to this site chronology derive from Harrington's collection from NV-Ch-18, which are part of the Museum of the American Indian, Heye Foundation collections. With respect to specific artifacts in the PAHMA collections, however, Bennyhoff and Hughes (1987:164) note that a beaded child's moccasin (1-21640) purchased by Loud was apparently found "in a deep grave at the south end of the cave," but conclude that such moccasins are a "Late Lovelock trait and would correlate best with the Little Ice Age. . .[while] the type B2 frequency suggests that most beads were obtained from a late Phase 1 central California source" (Bennyhoff and Hughes 1987:165). Likewise catalogue records 1-19343 and 1-19344 are recognized as Late Lovelock (Component E), while 1-19347 and other items in Lot 6 are assigned to the Middle period (Component H). One other *Haliotis* ornament (1-19346) "lacks provenience, but is typologically Early Lovelock" (Bennyhoff and Hughes 1987:165), and therefore, is linked to Component N.

## **Document Consulted**

### Museum Records

Catalogue-12 ledgers and Paradox working database  
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