# IV. PRELIMINARY EXAMINATION OF PREHISTORIC HUMAN COPROLITES FROM FOUR WESTERN NEVADA CAVES

Norman Linnaeus Roust

## Preface

Robert F. Heizer

It is often true that if one is patient, a hope will come to realization. What follows is an illustration of this axiom drawn from personal experience.

In July 1936, Alex Krieger and I—not yet admitted to graduate study in Anthropology since we had just received our B.A. degrees and had not yet satisfied the admission requirement of demonstrating a reading knowledge (the performance level of which was determined by Professors Kroeber and Lowie) in French and German—excavated Humboldt Cave in Nevada. The necessary funds were provided by Mrs. B. Blackmer (now Mrs. Jon Wiig), and that summer's research may be said to have marked the beginning of what has become, over the past thirty years, the archaeological research program in California and the Great Basin of the University of California Department of Anthropology at Berkeley. We had both had some practical training in field archaeology by Waldo Wedel, who, on the same day we received our B.A. diplomas, was awarded his Ph.D. (incidentally, his was the first doctoral dissertation on archaeology written at Berkeley), but neither of us had ever had a formal course of any kind in archaeology. Probably Chicago was the only University that offered a formal field course—at least this was what West Coast undergraduates thought in 1936. If we were to be archaeologists, it was clear that we were going to have to learn the business by ourselves, and that was what we were trying to do when we dug Humboldt Cave. We tried, as we excavated, to observe and record as much as we could, to collect as much of the cave contents as we thought would be significant, and to fathom the way in which the people whose trash and treasures we were digging up had once lived. Among the items—none of them too unimportant for us to consider as a potential source of information—which we encountered and saved were some numbers of human coprolites. We believed that from these, experts in plant identification could tell us what kinds of seeds the Humboldt Cave people had eaten. Professor E. W. Gifford kindly dispatched several batches of these coprolites to persons in the State Department of Agriculture in Sacramento, and to certain members of the

faculty at the Medical School and the College of Agriculture, with the request that they examine them and identify seeds contained in them. So far as we know, no response was ever received, nor were the coprolites returned. I record this attempt as one which anticipated too far in advance the much vaunted "interdisciplinary approach" to knowledge, but realize at the same time that the extended hand of cooperation may have been filled with the wrong substance.

In the summer of 1950 I was again in the Lovelock area with a large group of students enrolled in a field work class.* We excavated Leonard Rock Shelter (Heizer 1951), Granite Point Cave (Roust 1966), and site NV-Pe-8 (Baumhoff 1958), and carried out extensive site survey in the lower Humboldt Valley. Several visits to Lovelock Cave by the group made me aware once more of the great numbers of human coprolites at that site, and we collected several bags of these at random from the spoil heaps in the cave interior and the dry outer shelter area. It is these samples, together with some collected by Loud in 1912, which N. L. Roust, at my suggestion, analyzed between 1950 and 1956, using methods devised by himself in a project which is referred to in the report on the archaeology of Humboldt Cave (Heizer and Krieger 1956:33).

Roust and G. L. Grosscup excavated Hidden Cave, which lies on the south margin of Carson Sink, in the following summer (1951), and were by that time fully conscious of the importance of coprolites. The collection from this cave became part of the material for Roust's study published here.

The Korean War and activities in Berlin were instrumental in Roust's recall to active military service, and his coprolite research project lapsed.

Finally, after nearly fifteen years, Roust and I got together once more, and through this renewed contact it happened that Roust's coprolite research report, long since completed, was deposited in the files of the Archaeological Research Facility. When it was turned over to us, we had already completed the analysis and identification of the fifty Lovelock

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* For historical purposes only, I note that the first summer archaeological field course offered by the University of California at Berkeley was in 1948. Twelve students were enrolled, and the course was given under my direction. In the summers of 1948-54, I was in charge of the summer session field class. The course offering was then dropped until 1958 when it was taught by A. D. Krieger, and since that time it has not been offered on the Berkeley campus.

Cave coprolites reported on elsewhere in this volume by myself, R. Cowan, R. Ambro, and W. I. Follett. What is presented here in Roust's report is a summary of his data. The detailed data on the 149 coprolites examined by Roust are not published here because of limitations of space, but are accessible in the files of the Archaeological Research Facility.

Roust's report is of interest because his analysis is carried out by non-destructive methods developed by him alone, and which are quite different from the partially destructive wet analysis which we, in 1965-66, adapted from that devised earlier by E. O. Callen.

Roust uses the terms "digested" and "undigested" for the two main components of coprolites. By digested he means the finer residues which are so small in size that identification is difficult. It conforms, generally, with our "fine residues" which are less than 1.0 mm in diameter. By undigested, Roust means approximately the same thing that we do by the term "coarse residues" held in the 1.0 mm mesh screen.

Roust's coprolite series from Lovelock Cave was a grab sample and no record was made of where they were collected in the cave. In all probability, his 51 analyzed coprolites from Lovelock Cave include representatives of both our fairly ancient interior group and the much younger entrance group.

A recent search of the Lowie Museum of Anthropology collections for the Hidden Cave, Lovelock Cave, Granite Point Cave, and NV-Pe-8 cave coprolites analyzed by Roust produced only the Lovelock Cave specimens. The balance probably remains tucked away in some unlabeled tray in one of the half dozen dead storage areas which have been reluctantly assigned to the Museum. In re-examining the crushed Lovelock Cave coprolites, we observed that Roust had failed to identify, perhaps because they were simply assigned to the "digested" category, certain dietary elements which we had become familiar with. We have taken the liberty of adding to his Table 3 a plus (+), denoting presence of these elements. Whatever the weight of these items marked by a plus in Roust's Lovelock Cave doprolites may be, this would be subtracted from his digested category. We have not quantified these, and cannot say, therefore, to what extent they would alter his figures.

Since Roust employed dry analysis, there is no "weight loss" which occurs in our analytical results summarized in the table appended to Cowan's report (Paper II).

This is enough of the history of coprolite research at Berkeley; I have thought it of possible interest to set it out briefly since we

rarely have information on the persons, events, and situations which lie behind research publications.

December, 1966

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This report is concerned with the identification of undigested materials recovered from prehistoric human coprolites found in archaeologic sites in west central Nevada. Specimens here discussed are in collections of the University of California Lowie Museum of Anthropology at Berkeley.

## Gross Lot

One hundred and eighty-six specimens, weighing 3690.5 gm, were available to the author and included: (1) 73 specimens weighing 1284.7 gm from undetermined locations and depths in Lovelock Cave, Churchill County, Nevada (site NV-Ch-18);[1] (2) 12 specimens weighing 107.0 gm from a dry rock shelter (site NV-Pe-8) in Pershing County, Nevada;[2] (3) one specimen weighing 15.0 gm from Humboldt Cave, Churchill County, Nevada (site NV-Ch-35);[3] (4) one burned specimen weighing 11.2 gm from Granite Point Cave, Pershing County, Nevada (site NV-Pe-12);[4] (5) 11 specimens weighing 585.8 gm from rat nests and surface deposits in Hidden Cave, Churchill County, Nevada (site NV-Ch-16);[5] and (6) 88 specimens weighing 1706.85 gm from the "32 inch midden" deposits in Hidden Cave.

## Selected Specimens

From this gross lot 149 specimens weighing 2908.75 gm were examined including:

A. 64 specimens weighing 900.1 gm from Humboldt Valley, Nevada, specifically:

   1. 51 specimens weighing 781.9 gm from Lovelock Cave
   2. 12 specimens weighing 107.0 gm from site NV-Pe-8
   3. One specimen weighing 11.2 gm from Granite Point Cave

B. 85 specimens weighing 2008.65 gm from the Carson Sink Basin, Nevada, specifically:

   1. 11 specimens weighing 565.8 gm from rat nests in Hidden Cave

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[1] See p. 80 for end notes.

2. 74 specimens weighing 1442.85 gm from the 32 inch midden in Hidden cave

Specimens rejected included those of doubtful human origin and those retained for museum or other purposes. On the basis of composition, shape, size, over-all appearance, and location, there can be little doubt that examined specimens are of human origin.

## Methodology

My analysis can be characterized as a preliminary physical analysis only, and the procedure consisted of: (1) initial sorting and selection of specimens to be examined; (2) weighing and physical description of individual specimens; (3) partial reduction by crushing and removal of large undigested items; (4) physical description of interiors; (5) further crushing; (6) final reduction and/or pulverization; (7) gross volume determination; (8) separation of undigested material from digested/decomposed matter; (9) division of undigested material into components; (10) individual weight determination of undigested components; (11) individual volume determinations of undigested components; (12) identification of undigested materials; (13) weight determination of digested/decomposed matter; (14) volume determination of digested/decomposed matter; (15) compilation of individual statistics; (16) mathematical synthesis; and (17) summary of results.

Considering their probable antiquity,[6] the majority of specimens were in an excellent state of preservation, undoubtedly the result of the environment in which they were found. All were dry, and evident decomposition was noted in relatively few, primarily in those specimens from site NV-Pe-8 and some from the 32 inch midden in Hidden Cave.[7] In general, specimens from Lovelock Cave and rat nests in Hidden Cave proved to be the most difficult to fractionate because the hard crust of their exteriors required the use of a heavy scalpel and/or steel probe for initial penetration and fracture. Attempts to separate undigested material by filtration, flotation, and centrifuging proved unsatisfactory. Procedures adopted involved the patient and time consuming use of hand lens, tweezers, and microscope.

In some undigested components, the quantities involved unfortunately necessitated the submission of sample lots only to respective authorities for identification purposes. While this method is not entirely desirable, the careful initial procedures taken to determine that all undigested items were properly sorted into their respective components (primarily through microscopic techniques) makes it probable that over-all accuracy of identification has not been appreciably diminished.

The most difficult problem connected with the examination proved to be the proper sorting and identification of fibers. With the aid of the staff of the University of California Herbarium at Berkeley, and also with known samples suppled by the Herbarium, most fiber types were identified without too much difficulty. But the presence of partially decomposed, desiccated, discolored, or in other ways altered fiber left proper quantity ratios difficult, it not impossible, to determine. It was noted, however, that with but a few exceptions (in the form of Scirpus fibers) all identified fiber from Panicum (witch grass) and Linum (wild flax) occurred in coprolites in which seeds from these respective plants were also present. A few of these specimens also contained partially decomposed fiber or fiber of doubtful identity. In cases where this dubious material resembled identified fiber occuring in the same specimen, the author has labeled the former "probable Scirpus", "probable Panicum," etc. In no case has unidentifiable fiber from the other specimens been labeled other than "unidentified." The estimates are thus probably close to the actual situation, but stated quantities in these instances should be taken as approximations. In any event, the accuracy of weights and estimated volumes of the total fiber occurring in any particular seed-identified fiber coprolite has not been affected.

Weights and volumes in the following analysis are those of dry material only, and, with the exception of volume estimates for certain undigested material, are believed to be accurate within one per cent. Gross volume measures are of pulverized specimens only, and although tamping was employed prior to measure, it is very likely that such volumes are slightly larger than those of the intact specimen. Given volumes of undigested materials are estimates only; it is felt that volume determinations are reasonably accurate for such items as seed, shell, bone, charcoal, and wood, and probably less accurate for feathers, fiber, fur, and hair.

## Lovelock Cave Coprolites

### General Data

Number of specimens examined: 51
Total weight of examined specimens: 781.90 gm
Total volume of examined specimens: 2219.09 cc
Weight of undigested material: 346.89 gm (44.34% of total)
Weight of digested matter: 435.01 gm (55.65% of total)
Average specimen weight: 15.33 gm
Specimen weight range: 1.80 - 60.90 gm
Estimated volume of undigested material: 1250.61 cc (56.33% of total)
Volume of digested matter: 968.48 cc (43.66% of total)
Range estimate of specimen volumes: 5.70 - 183.33 cc
Average estimated volume: 43.57 cc
Average weight to volume ratio: 1:2.84

Specimens ranged in color from yellow to black with examples of yellow, yellow-brown, gray-yellow, tan, mixed, mixed brown, brown, gray-brown, light gray, gray, gray-black, brown-black, and black all being noted. Most frequently encountered colors were brown and black.

Specimen shapes ranged from disc to irregular to mound with examples of disc, round, cylindrical, ovoid, irregular, irregular-ovoid, and mound all noted. Ovoid shaped specimens were the most frequently noted.

Specimen textures ranged from fibrous to powdery with fibrous, feathery, mixed, carbonized-mixed, seedy, carbonized-seedy, brittle, powdery-mixed, carbonized-powdery, and powdery (with notable decomposition) examples evident. Mixed specimens occurred the most frequently.

Maximum noted specimen diameter was 3.36 cm (1.32 in.) and maximum noted specimen circumference was 9.95 cm (3.92 in.).

### The Return

The undigested return from the Lovelock Cave coprolites examined was notable for its preponderance of seed (58.58% by weight, 47.49% by volume; found in 68.63% of examined specimens); small fish bone, all of which is identified as *Siphateles* sp. (11.44% by weight, 14.09% by volume; found in at least 41% of examined specimens); and miscellaneous fibers (17.24% by weight, 24.68% by volume; found in 39% of examined specimens). About 80% of the recovered seed by weight, and an equal amount by volume, is identified as *Scirpus* sp. (46.93% by weight and 38.05% by volume of undigested return; found in 57% of examined specimens). Most fiber is identified as *Scirpus* or probable *Scirpus* (71% of recovered fiber by weight; 78.4% of

recovered fiber by estimated volume or 12.15% by weight, 19.34% by estimated volume of all undigested weight return). Scirpus remains and Siphateles thus account for 70.5% by weight; and 71.48% by estimated volume of all undigested material returned from Lovelock Cave coprolites examined by the author. In addition, Scirpus or Siphateles was found in 78.4% of all specimens.

Other floral remains include fibers identified as Elymus sp., found by themselves in a single specimen unassociated with any other undigested material; fibers from Panicum and probable Panicum, found in five specimens; fibers tentatively identified as Linum sp.[8] found in two specimens; and fiber from Phragmites sp. found in a single specimen. Seeds from these plants are also present in the specimens, with Panicum especially noted and occurring in six (11.76%) of the specimens. Also returned from one specimen was seed tentatively identified as Oryzopsis sp.[9] Elymus seed is definitely identified as Elymus triticoides and occurs in a single specimen.

Faunal remains, other than Siphateles, include mussel shell fragments found in a single specimen; a small portion of an unidentified snake skin; unidentified bird remains (bone, feathers, shell and skin) found in 18 (35%) of the specimens (3.97% by weight, 6.54% by volume of all undigested return); unidentified bone; fur and hair; a single bone, possibly Sylvilagus;[10] another bone, possibly Citellus sp.;[11] and still another bone believed to be Neotoma sp.[12] Also recovered was an example of Gammarus,[13] and Prionus[14] sp. was found in two specimens. Cybister sp. was also found here and is definitely identified from four specimens. Of interest again is the fact that no heads of any of these latter were present.

Miscellaneous materials recovered from the specimens include wood fragments found in two specimens: charcoal bits found in four specimens, always associated with Scirpus seeds; and a twine ring (Apocynum?) found intact in a single specimen.

The majority of Scirpus seeds in these specimens appear blackened or carmelized, implying roasting prior to ingestion. While the diet appears more diversified than in Hidden Cave specimens, it is to be noted that the preponderance of elements parallels the latter with Scirpus seed and fiber, Siphateles, with avian remains accounting for the bulk of undigested materials remaining.

TABLE 1

Lovelock Cave Coprolites: Total Composition by Weight
(Weights in grams)

| | Weight | % of Examined | % of Undigested |
|---|---|---|---|
| Fiber | | | |
| *Scirpus* & prob. *Scirpus* | 42.16 | 5.39 | 12.15 |
| *Linum* (?) | 1.14 | 0.14 | 0.33 |
| *Phragmites* | 0.21 | 0.03 | 0.06 |
| *Elymus* & prob. *Elymus* | 2.40 | 0.30 | 0.69 |
| *Panicum* & prob. *Panicum* | 10.10 | 1.29 | 2.91 |
| Unidentified | 3.80 | 0.48 | 1.10 |
| Total | 59.81 | 7.63 | 17.24 |
| Seed | | | |
| *Scirpus* | 162.79 | 20.82 | 46.93 |
| *Panicum capillare* var. *occidentale* | 6.10 | 0.78 | 1.76 |
| *Oryzopsis hymenoides* | 3.80 | 0.49 | 1.10 |
| *Atriplex* | 6.10 | 0.78 | 1.76 |
| *Typha* | 4.30 | 0.55 | 1.24 |
| *Linum* | 0.25 | 0.03 | 0.07 |
| *Elymus triticoides* | 0.40 | 0.05 | 0.12 |
| Unidentified | 19.40 | 2.48 | 5.60 |
| Total | 203.14 | 25.98 | 58.58 |
| Faunal | | | |
| *Siphateles* | 39.68 | 5.07 | 11.44 |
| Shell (*Anodonta*?) | 4.20 | 0.57 | 1.21 |
| *Gammarus* | 0.40* | 0.05 | 0.12 |
| Snake | 0.40 | 0.05 | 0.12 |
| *Sylvilagus* (?) | 1.40 | 0.17 | 0.40 |
| *Neotoma* | 2.20 | 0.28 | 0.63 |
| *Citellus* (?) | 1.40 | 0.17 | 0.40 |
| Fur and hair | 1.31 | 0.16 | 0.38 |
| Unidentified animal bone | 1.80 | 0.23 | 0.51 |
| Bird bone | 2.00 | 0.25 | 0.57 |

*Approximation only

TABLE 1 [cont'd.]

| | Weight | % of Examined | % of Undigested |
|---|---|---|---|
| Faunal [cont'd.] | | | |
| Feathers | 8.64 | 1.11 | 2.49 |
| Egg shell | 0.40 | 0.05 | 0.12 |
| Bird skin | 2.74 | 0.35 | 0.79 |
| Cybister (explanatus?) | 5.30* | 0.68 | 1.52 |
| Prionus | 1.32* | 0.17 | 0.38 |
| Total | 73.19 | 9.36 | 21.08 |
| Miscellaneous | | | |
| Charcoal | 3.85 | 0.49 | 1.10 |
| Wood fragments | 6.00 | 0.76 | 1.72 |
| Twine (Apocynum?) | 0.90 | 0.12 | 0.26 |
| Total | 10.75 | 1.37 | 3.08 |
| Undigested Total | 346.89 | 44.34 | 99.98 |

*Approximation only

TABLE 2

Lovelock Cave Coprolites: Total Composition by Volume
(Volume in cc)

| | Volume Estimate | % of Examined | % of Undigested |
|---|---|---|---|
| Fiber | | | |
| Scirpus & prob. Scirpus | 241.85 | 10.90 | 19.34 |
| Linum (?) | 7.59 | 0.34 | 0.60 |
| Phragmites | 1.40 | 0.06 | 0.11 |
| Elymus & prob. Elymus | 7.50 | 0.34 | 0.60 |
| Panicum & prob. Panicum | 30.76 | 1.38 | 2.47 |
| Unidentified | 19.50 | 0.87 | 1.56 |
| Total | 308.60 | 13.90 | 24.68 |
| Seed | | | |
| Scirpus | 475.82 | 21.44 | 38.05 |
| Panicum capillare var. occidentale | 19.11 | 0.86 | 1.53 |
| Oryzopsis hymenoides | 11.14 | 0.50 | 0.89 |
| Atriplex | 17.73 | 0.80 | 1.42 |
| Typha | 12.50 | 0.56 | 1.00 |
| Linum | 0.72 | 0.03 | 0.06 |
| Elymus triticoides | 0.40 | 0.02 | 0.03 |
| Unidentified | 56.40 | 2.54 | 4.51 |
| Total | 593.82 | 26.75 | 47.49 |
| Faunal | | | |
| Siphateles | 176.20 | 7.94 | 14.09 |
| Shell (Anodonta?) | 4.00 | 0.18 | 0.32 |
| Gammarus | 0.66 | 0.03 | 0.05 |
| Snake | 2.00 | 0.09 | 0.16 |
| Sylvilagus (?) | 9.30 | 0.42 | 0.74 |
| Neotoma | 0.73 | 0.03 | 0.06 |
| Citellus (?) | 3.50 | 0.16 | 0.27 |
| Fur and hair | 8.39 | 0.38 | 0.67 |
| Unidentified animal bone | 6.30 | 0.28 | 0.50 |
| Bird bone | 5.07 | 0.23 | 0.40 |

TABLE 2 [cont'd.]

| | Volume Estimate | % of Examined | % of Undigested |
|---|---|---|---|
| Faunal [cont'd.] | | | |
| Feathers | 72.79 | 3.28 | 5.82 |
| Egg shell | 2.00 | 0.09 | 0.16 |
| Bird skin | 2.07 | 0.09 | 0.16 |
| Cybister (explanatus?) | 26.50 | 1.20 | 2.12 |
| Prionus | 6.60 | 0.29 | 0.53 |
| Total | 326.11 | 14.69 | 26.05 |
| Miscellaneous | | | |
| Charcoal | 9.98 | 0.45 | 0.79 |
| Wood fragments | 9.20 | 0.41 | 0.73 |
| Twine (Apocynum?) | 2.90 | 0.13 | 0.23 |
| Total | 22.08 | 0.99 | 1.75 |
| Undigested Total | 1250.61 | 56.33 | 99.97 |

**TABLE 3**

Weight in Grams of Identified Components in Lovelock Cave Coprolites
(Plus [+] denotes presence; no quantitative determinations
Omitted numbers in series are those of coprolites not analyzed)

| Spec. No. | Orig. Wt. | Wt. of Identified Components | Wt. of Unidentified Components | *Scirpus* Seed | *Typha* Seed | Fiber | Charcoal | Fish Bone | Feathers | Other Components* |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 46.40 | 31.35 | 15.05 | | | 2.20 | 0.45 | 8.50 | 0.80 | 19.40 (7) |
| 3 | 37.00 | 2.40 | 34.60 | | + | 2.40 | | | | |
| 4 | 37.00 | 31.00 | 6.00 | 30.20 | | | | | 0.80 | |
| 6 | 17.00 | 2.00 | 15.00 | | | | | | | 2.00 (5) |
| 7 | 25.60 | 10.60 | 15.00 | 6.40 | | 4.20 | | | | |
| 8 | 21.60 | 16.80 | 4.80 | 14.80 | | 0.90 | | | | 1.10 (8) |
| 9 | 12.40 | 9.25 | 3.15 | | | 5.25 | | | | 0.40 (2)<br>1.80 (9)<br>1.80 (5) |
| 10 | 7.80 | 3.60 | 4.20 | 2.40 | | | | 0.80 | | 0.40 (13) |
| 11 | 4.20 | 2.35 | 1.85 | 1.80 | | | 0.20 | 0.35 | | |
| 13 | 5.60 | 3.60 | 2.00 | | 1.60 | 2.00 | | | | |
| 14 | 6.00 | 2.90 | 3.10 | | 0.90 | 1.10 | | | | 0.90 (9) |
| 15 | 2.70 | 1.10 | 1.60 | 1.00 | | | | | 0.10 | |
| 17 | 3.60 | 1.54 | 2.06 | 1.30 | | 0.04 | | 0.15 | | 0.05 (10) |
| 18 | 7.50 | 3.90 | 3.60 | 1.50 | | | | 2.40 | | |
| 20 | 6.60 | 2.80 | 3.80 | 2.00 | | | | 0.80 | | |

TABLE 3 [cont'd.]

| Spec. No. | Orig. Wt. | Wt. of Identified Components | Wt. of Unidentified Components | *Scirpus* Seed | *Typha* Seed | Fiber | Charcoal | Fish Bone | Feathers | Other Components* |
|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 7.00 | 4.50 | 2.50 | | | | + | 4.50 | + | |
| 22 | 2.90 | 1.90 | 1.00 | | 0.40 | | | | 0.20 | 0.40 (9)<br>0.90 (14) |
| 23 | 4.40 | 1.47 | 2.93 | 1.20 | | | | 0.20 | | 0.07 (4) |
| 24 | 47.00 | 13.40 | 33.60 | 11.40 | | | | 2.00 | | |
| 25 | 41.20 | 8.40 | 32.80 | | | 1.00 | | 3.20 | | + (9)<br>4.20 (11) |
| 28 | 26.80 | 8.05 | 18.75 | 0.55 | + | | | 2.10 | 1.40 | 4.00 (12)<br>+ (14) |
| 29 | 12.40 | 4.70 | 7.70 | + | | | | | | 0.50 (13)<br>0.40 (14)<br>3.80 (15) |
| 30 | 8.70 | 5.02 | 3.68 | 3.40 | + | | | 1.40 | 0.22 | |
| 31 | 11.60 | 5.44 | 6.16 | 1.60 | | 0.40 | 2.40 | 1.04 | | |
| 33 | 11.20 | 3.20 | 8.00 | | | | + | 3.20 | | |
| 34 | 11.00 | 4.90 | 6.10 | 4.10 | + | | 0.80 | | | |
| 35 | 16.60 | 9.70 | 6.90 | 8.00 | | | | 1.70 | | |
| 37 | 14.00 | 1.14 | 12.86 | | + | | | | 0.34 | 0.80 (4)<br>+ (9) |
| 39 | 12.90 | 0.61 | 12.29 | | | | | + | 0.21 | 0.40 (3) |
| 40 | 7.30 | 3.20 | 4.10 | 3.20 | | | | + | | + (9) |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 41 | 10.20 | 6.94 | 3.26 | | | 4.00 | | | | 1.40 (3)<br>0.44 (4)<br>0.20 (10)<br>0.90 (16) |
| 42 | 8.20 | 2.90 | 5.30 | | | | | | | 2.20 (3)<br>0.70 (5) |
| 43 | 7.50 | 5.75 | 1.75 | | | 1.40 | | | | 3.80 (13) |
| 44 | 7.50 | 0.54 | 6.96 | + | | | | | 0.54 | + (13) |
| 45 | 1.80 | 0.24 | 1.56 | | + | | | 0.24 | | |
| 46 | 32.30 | 9.74 | 22.56 | | | 8.00 | | | | 1.40 (3)<br>0.34 (13) |
| 47 | 3.50 | 2.90 | 0.60 | 2.90 | | | | | | |
| 48 | 6.50 | 3.44 | 3.06 | 2.90 | + | 0.10 | | | 0.44 | |
| 51 | 8.50 | 4.60 | 3.90 | | 2.20 | | | | 0.20 | 2.20 (9) |
| 53 | 6.90 | 2.55 | 4.35 | | | 0.21 | | 2.10 | 0.24 | + (9) |
| 54 | 5.80 | 4.19 | 1.61 | 2.60 | | 1.09 | + | 0.50 | | |
| 55 | 2.40 | 1.26 | 1.14 | 0.24 | | | | | | 0.80 (5)<br>0.22 (8) |
| 56 | 3.80 | 3.60 | 0.20 | 1.40 | | | | 0.20 | | + (7)<br>2.00 (12) |
| 59 | 60.90 | 3.50 | 57.40 | | + | 0.90 | | | 0.80 | 1.80 (9) |
| 60 | 30.10 | 19.22 | 10.88 | 12.10 | + | 3.02 | | 2.10 | 0.60 | 1.40 (3)<br>+ (4) |
| 62 | 36.90 | 31.50 | 5.40 | 31.50 | | | | | | + (4) |
| 64 | 23.50 | 19.60 | 3.90 | | | 19.60 | | + | | + (7) |
| 66 | 15.50 | 8.60 | 6.90 | 7.10 | | 0.80 | | | 0.70 | |

TABLE 3 [cont'd.]

| Spec. No. | Orig. Wt. | Wt. of Identified Components | Wt. of Unidentified Components | *Scirpus* Seed | *Typha* Seed | Fiber | Charcoal | Fish Bone | Feathers | Other Components* |
|---|---|---|---|---|---|---|---|---|---|---|
| 69 | 11.50 | 8.80 | 2.70 | 7.20 | + | 1.20 | | | | + (11)<br>0.40 (14) |
| 70 | 10.90 | 2.85 | 8.05 | | | | | 2.20 | 0.65 | |
| 73 | 11.70 | 3.90 | 7.80 | | + | | | + | 0.40 | 2.40 (13)<br>1.10 (14) |

*Parentheses in this column refer to the following list:

(1) gravel
(2) egg shell
(3) mammal bone
(4) hair
(5) insect
(6) snail shell
(7) unidentified seed
(8) brine shrimp (*Prionus*)
(9) *Atriplex* seed
(10) *Linum* seed
(11) mussel shell
(12) wood fragments
(13) bird skin
(14) bird bone
*Panicum* seed
*Elymus* seed
*Oryzopsis* seed
Twine
*Gamarus*

## Hidden Cave 32 Inch Midden Coprolites

### General Data

Number of specimens examined: 74
Total weight of examined specimens: 1442.85 gm
Total volume of examined specimens: 3746.40 cc
Weight of undigested material: 484.49 gm (33.58% of total)
Weight of digested matter: 958.36 gm (66.42% of total)
Average specimen weight: 19.50 gm
Specimen weight range: 2.90 - 115.62 gm
Estimated volume of undigested material: 1643.19 cc (43.86% of total)
Volume of digested matter: 2103.21 cc (56.14% of total)
Average estimated volume: 50.63 cc
Range estimate of specimen volumes: 9.00 - 298.00 cc
Average weight to volume ratio: 1:2.6

Specimens ranged in color from light brown to dark gray, with examples of tans, browns, mixed-browns, dark browns, gray-browns, light grays, grays, and dark grays all being noted. Most frequently encountered color was a mixed dark brown.

Specimen shapes ranged from disc-like to mound-irregular, with examples of disc, hemispheric, conical, ovoid, cylindrical, mound, and mound-irregular all noted. Ovoid specimens were the most frequently encountered.

Specimen textures ranged from fibrous to powdery, with fibrous, seedy, granular, clayey, mixed fibrous-seedy, mixed seedy-clayey, and powdery examples apparent. Seedy specimens occurred most frequently.

Maximum noted specimen diameter was 10.50 cm (4.13 in.) and maximum noted specimen circumference was 25.00 cm (9.84 in.).

### The Return

The undigested return from Hidden Cave 32 inch midden coprolites is notable for its preponderance of seed (66.15% by weight, 57.61% by volume; found in 53% of examined specimens) and small fish bone (18.47% by weight, 27.61% by volume; found in 64% of examined specimens). Almost all of the seed is identified as Scirpus sp. (63.81% by weight, 55.74% by volume; found in 46% of specimens); and almost all fish bone is Siphateles sp. (18.42% by weight, 27.54% by volume; found in 62% of examined specimens). The most prevalent fiber found throughout the examined lot is Scirpus (2.74%

by weight, 4.74% by volume; found in 24% of specimens). Scirpus[15] remains and Siphateles[16] thus account for 84.97% of all undigested weight, 88.02% of all undigested volume, and are found in at least 87% of all examined specimens.

Other recovered floral remains include fiber from Elymus triticoides[17] found in one specimen in combination with Scirpus seed and fiber, bird remains, and Siphateles; a portion of a shell from a single nut of Pinus monophylla[18] found in a specimen also containing Scirpus seed and unidentified seed and fish bone; and a quantity in one specimen only of the tiny seeds and fiber of Panicum capillare.[19] Unidentified seed and fiber occur in 19% of the specimens, and account for 3.18% by weight and 3.26% by volume of the undigested total.

Faunal remains, other than Siphateles, include unidentified fish bone found in two specimens; mussel shell, tentatively identified as Anodonta sp.[20] found in small fragments in five specimens and always associated with Siphateles bone; an unidentified rodent tooth found in one specimen; miscellaneous fur and hair, some of which is possibly rabbit, occurring in eight specimens; unidentifiable small bird bone fragments found in three specimens; a single, small bird skin fragment, unidentifiable; miscellaneous small feather sections found in five specimens; bird egg shell fragments found in two specimens; a small portion of an unidentified insect; and the almost totally undigested remains of the predaceous water beetle Cybister explanatus[21] found in seven (9.46%) of the specimens. Of interest is the fact that no heads of any of these beetles were found, indicating that they were either bitten or torn off prior to ingestion, without chewing, of the whole beetle.

Miscellaneous materials recovered from the specimens include wood fragments, found in six specimens; an Apocynum twine loop[22] found in a single coprolite; a small rock, found in one specimen; and miscellaneous charcoal fragments found in fifteen specimens (20.27%). It is interesting to note that the charcoal is associated with faunal remains in twelve of the fifteen specimens in which it is found, primarily Siphateles bone, fur/hair, and bird bone and feathers. Scirpus remains occur in five of these specimens, and in only one specimen does Scirpus occur with charcoal without faunal remains also being present. Since the majority of Scirpus seeds recovered from the specimens appears unroasted or carmelized, it appears likely that the Hidden Cave 32 inch midden occupants parched their major faunal items prior to eating (including Siphateles) and devoured Scirpus items primarily without benefit of roasting procedures.

TABLE 4

Hidden Cave 32 Inch Midden Coprolites: Total Composition by Weight
(Weights in grams)

| | Weight | % of Examined | % of Undigested |
|---|---|---|---|
| Fiber | | | |
| *Scirpus* & prob. *Scirpus* | 13.252 | 0.9186 | 2.7353 |
| *Panicum* | 0.240 | 0.0166 | 0.0495 |
| *Elymus* | 0.333 | 0.0231 | 0.0687 |
| Unidentified | 4.829 | 0.3347 | 0.9967 |
| Total | 18.654 | 1.2930 | 3.8502 |
| Seed | | | |
| *Scirpus* | 309.167 | 21.4275 | 63.8130 |
| *Panicum* | 0.776 | 0.0538 | 0.1602 |
| *Pinus* sp. | 0.010 | 0.0007 | 0.0021 |
| Unidentified | 10.521 | 0.7292 | 2.1716 |
| Total | 320.474 | 22.2112 | 66.1469 |
| Faunal | | | |
| *Siphateles* | 89.223 | 6.1838 | 18.4159 |
| Unidentified fish | 0.264 | 0.0183 | 0.0545 |
| Shell (*Anodonta*?) | 10.360 | 0.7180 | 2.1383 |
| Rodent tooth | 2.320 | 0.1608 | 0.4788 |
| Fur and hair | 2.789 | 0.1933 | 0.5757 |
| Bird bone | 2.390 | 0.1656 | 0.4933 |
| Bird skin | 1.420 | 0.0984 | 0.2931 |
| Feathers | 2.844 | 0.1971 | 0.5870 |
| Egg shell | 0.266 | 0.0184 | 0.0549 |
| *Cybister explanatus* | 11.410 | 0.7908 | 2.3551 |
| Unidentified insect | 0.200 | 0.0139 | 0.4130 |
| Total | 123.486 | 8.5584 | 25.4879 |
| Miscellaneous | | | |
| Charcoal | 7.732 | 0.5369 | 1.5960 |
| Wood fragments | 5.238 | 0.3630 | 1.0811 |
| Twine | 0.105 | 0.0073 | 0.0217 |
| Rock | 8.800 | 0.6099 | 1.8163 |
| Total | 21.875 | 1.5171 | 4.5151 |
| Undigested Total | 484.489 | 33.5797 | 100.0001 |

TABLE 5

Hidden Cave 32 Inch Midden Coprolites: Total Composition by Volume
(Volume in cc)

| | Volume Estimate | % of Examined | % of Undigested |
|---|---|---|---|
| Fiber | | | |
| Scirpus & prob. Scirpus | 77.850 | 2.0779 | 4.7377 |
| Panicum | 1.200 | 0.0320 | 0.0730 |
| Elymus | 2.220 | 0.0593 | 0.1351 |
| Unidentified | 25.620 | 0.6839 | 1.5592 |
| Total | 106.890 | 2.8531 | 6.5050 |
| Seed | | | |
| Scirpus | 915.950 | 24.4488 | 55.7422 |
| Panicum | 2.000 | 0.0534 | 0.1217 |
| Pinus sp. | 0.750 | 0.0200 | 0.0456 |
| Unidentified | 27.910 | 0.7450 | 1.6985 |
| Total | 946.610 | 25.2672 | 57.6080 |
| Faunal | | | |
| Siphateles | 452.520 | 12.0787 | 27.5391 |
| Unidentified fish bone | 1.200 | 0.0320 | 0.0730 |
| Shell | 11.050 | 0.2949 | 0.6725 |
| Rodent tooth | 1.200 | 0.0320 | 0.0730 |
| Fur and hair | 30.930 | 0.8256 | 1.8823 |
| Bird bone | 7.400 | 0.1975 | 0.4503 |
| Bird skin | 4.000 | 0.1068 | 0.2434 |
| Feathers | 12.290 | 0.3280 | 0.7479 |
| Egg shell | 1.370 | 0.0366 | 0.0834 |
| Cybister explanatus | 31.350 | 0.8368 | 1.9079 |
| Unidentified insect | 1.500 | 0.0400 | 0.0913 |
| Total | 554.810 | 14.8089 | 33.7641 |
| Miscellaneous | | | |
| Charcoal | 25.656 | 0.6848 | 1.5614 |
| Wood fragments | 7.020 | 0.1874 | 0.4272 |
| Twine | 0.700 | 0.0187 | 0.0426 |
| Rock | 1.500 | 0.0400 | 0.0913 |
| Total | 34.876 | 0.9309 | 2.1225 |
| Undigested Total | 1643.186 | 43.8601 | 99.9996 |

TABLE 6

Hidden Cave 32 Inch Midden Coprolites: Number of Occurrences in 74 Specimens

| Item | Total No. Occurrences | Specific Occurrences | % of Total Number |
|---|---|---|---|
| Fiber | 27 | | 36.5* |
| *Scirpus* fiber | | 18 | 24.3 |
| *Panicum* | | 1 | 1.4 |
| *Elymus* | | 1 | 1.4 |
| Unidentified | | 8 | 10.8 |
| Seed | 39 | | 52.7 |
| *Scirpus* | | 34 | 46.0 |
| *Panicum* | | 1 | 1.4 |
| *Pinus* | | 1 | 1.4 |
| Unidentified | | 6 | 8.1 |
| Fish | 48 | | 65.8 |
| *Siphateles* | | 46 | 63.2 |
| Unidentified | | 2 | 2.7 |
| Mussel shell | 5 | | 6.8 |
| Rodent tooth | 1 | | 1.4 |
| Animal fur and hair | 8 | | 10.8 |
| Bird | 10 | | 13.5 |
| Bone | | 4 | 5.4 |
| Skin | | 1 | 1.4 |
| Feathers | | 5 | 6.8 |
| Egg shell | | 2 | 2.7 |
| Insect | 8 | | 10.8 |
| *Cybister* | | 7 | 9.5 |
| Unidentified | | 1 | 1.4 |
| Charcoal | 15 | | 20.3 |
| Wood | 6 | | 8.1 |
| Twine | 1 | | 1.4 |
| Rock | 1 | | 1.4 |

*Approximation only

## Hidden Cave Rat Nest Coprolites

### General Data

Number of specimens examined: 11
Total weight of examined specimens: 565.80 gm
Total volume of examined specimens: 1812.20 cc
Weight of undigested material: 237.85 gm (42.04% of total)
Weight of digested matter: 327.95 gm (57.96% of total)
Average specimen weight: 51.44 gm
Specimen weight range: 15.00 - 100.50 gm
Estimated volume of undigested material: 820.81 cc (45.29% of total)
Volume of digested matter: 991.39 cc (54.706% of total)
Average estimated volume: 164.75 cc
Range estimate of specimen volumes: 25.20 - 360.00 cc
Average weight to volume ratio: 1:3.20

Specimens ranged in color from light brown to gray brown, with examples of tans, browns, mixed-browns, dark browns, gray-browns, and mottled gray all being noted. Most frequently encountered color was brown.

Specimen shapes ranged from disc-like to irregular, with examples of irregular disc, hemispheric, ovoid, cylindrical, mound, irregular cylindrical, and irregular ovoid all noted. Irregular disc-shaped specimens occurred the most frequently.

Specimen textures ranged from powdery to granular to granular-fibrous, with powdery, mixed-powdery, seedy-powdery, mixed, granular, mixed-granular, and granular-fibrous examples evident. Specimens of powdery-seedy texture occurred the most frequently.

Maximum noted specimen diameter was 8 cm (3.15 in.) and maximum noted specimen circumference was 22 cm (8.66 in.).

### The Return

The undigested return from Hidden Cave Rat Nest coprolites is notable for its preponderance of seed (76.754% by weight, 74.121% by volume; found in ten out of eleven examined specimens, or 91%) plus a notable amount of bird bone and other avian remains (11.865% by weight, 13.195% by volume; found in 54.545%, or 6 out of 11 examined specimens). Fish bone is also present in these specimens, but in lesser amounts (6.542% by weight, 6.774% by volume; found in 6 out of 11 or 54.55% of examined specimens). Like the Hidden Cave 32 inch midden coprolites, almost all of the seed is identified as Scirpus sp. (75.492% by weight, 72.90% by volume; found in 81.82% or 9

out of 11 examined specimens); and almost all fish bone is Siphateles sp. (6.534% by weight, 6.762% by volume; found in 45.455% of examined specimens). Bird remains appear diversified in type, but this impression cannot be supported with species identifications. Scirpus fiber also occurred in these specimens, but in somewhat reduced quantity (1.085% by weight, 2.193% by volume; found in 4 specimens only, or 36.36% of the 11 examined specimens). Scirpus remains, avian remains, and Siphateles thus account for 94.976% by undigested weight and 95.050% by volume, and are found, together or separately, in all eleven or 100% of the examined specimens.

Other identified floral remains include a small section of Phragmites cane[23] and seeds from Panicum capillare (1.26% of undigested weight, 1.219% by undigested volume; found in only one specimen).

Faunal remains other than Siphateles include a duck ulna; a femur from a Falco mexicanus[24] and a considerable amount of unidentified bird bone, skin, and feathers; an unidentified mammal bone; and unidentified insect remains found in two specimens.

Miscellaneous materials recovered include wood fragments found in one specimen; charcoal found in one specimen; and a section of twine (Apocynum?) found in a single specimen.

It should be noted that in only one specimen do Scirpus seeds appear to be "carmelized" and/or roasted prior to ingestion.

In general, Hidden Cave Rat Nest coprolites closely parallel the undigested dietary pattern established in in situ Hidden Cave 32 inch midden coprolites, but with a somewhat more marked avian ingestion and a somewhat decreased Siphateles ingestion than in the former. The rat nest is, of course, a non-human induced deposit and cannot be associated with the stratigraphic cultural materials. If not wholly prehistoric in age, the human feces from the rat nest are at least wholly aboriginal in character as judged from their contents.

From the dietary evidence thus presented, it would appear that the producers of both Hidden Cave 32 inch midden coprolites and Hidden Cave Rat Nest coprolites were shore-dwelling people who concentrated their primary food gathering efforts on the flora and fauna of shallow-water, marshy environments close to, if not immediately adjacent to, their cave home. With the notable exceptions of the eating of Panicum, Elymus, and Cybister, together with the fact that Scirpus seeds appear primarily unroasted, it would appear that the dietary habits of these people closely paralleled known patterns previously indicated for Lovelock Type and/or affiliated cultures in the Humboldt/Carson Sink area.

TABLE 7

Hidden Cave Rat Nest Coprolites: Total Composition by Weight
(Weights in grams)

| | Weight | % of Examined | % of Undigested |
|---|---|---|---|
| Fiber | | | |
| *Scirpus* & prob. *Scirpus* | 2.58 | 0.4600 | 1.085 |
| *Phragmites* cane | 0.84 | 0.1484 | 0.353 |
| Unidentified | 1.13 | 0.1997 | 0.475 |
| Total | 4.55 | 0.8081 | 1.913 |
| Seed | | | |
| *Scirpus* & prob. *Scirpus* | 179.56 | 31.7355 | 75.492 |
| *Panicum capillare* var. *occidentale* | 3.00 | 0.5302 | 1.261 |
| Total | 182.56 | 32.2657 | 76.753 |
| Faunal | | | |
| *Siphateles* bone | 15.54 | 2.7465 | 6.534 |
| Unidentified fish bone | 0.02 | 0.0035 | 0.008 |
| Probable mammal bone | 4.34 | 0.7670 | 1.825 |
| Duck ulna | 3.61 | 0.6380 | 1.518 |
| *Falco mexicanus* femur | 2.90 | 0.5125 | 1.219 |
| Other bird bone | 14.50 | 2.5627 | 6.096 |
| Feathers and down | 7.10 | 1.2549 | 2.985 |
| Bird skin | 0.11 | 0.0194 | 0.046 |
| Unidentified insect | 1.10 | 0.1944 | 0.462 |
| Total | 49.22 | 8.6989 | 20.693 |
| Miscellaneous | | | |
| Charcoal | 0.80 | 0.1414 | 0.336 |
| Twig | 0.02 | 0.0035 | 0.008 |
| Twine (*Apocynum*?) | 0.70 | 0.1237 | 0.294 |
| Total | 1.52 | 0.2686 | 0.638 |
| Undigested Total | 237.85 | 42.0413 | 99.997 |

TABLE 8

Hidden Cave Rat Nest Coprolites: Total Composition by Volume
(Volume in cc)

| | Volume Estimate | % of Examined | % of Undigested |
|---|---|---|---|
| Fiber | | | |
| *Scirpus* & prob. *Scirpus* | 18.00 | 0.9933 | 2.193 |
| *Pragmites* cane | 1.90 | 0.1048 | 0.231 |
| Unidentified fiber | 8.80 | 0.4856 | 1.072 |
| Total | 28.70 | 1.5837 | 3.496 |
| Seed | | | |
| *Scirpus* & prob. *Scirpus* | 598.40 | 33.0206 | 72.903 |
| *Panicum capillare* var. *occidentale* | 10.00 | 0.5518 | 1.218 |
| Total | 608.40 | 33.5724 | 74.121 |
| Faunal | | | |
| *Siphateles* bone | 55.50 | 3.0626 | 6.762 |
| Unidentified fish bone | 0.10 | 0.0055 | 0.012 |
| Probable mammal bone | 3.10 | 0.1711 | 0.378 |
| Duck ulna | 5.80 | 0.3201 | 0.707 |
| *Falco mexicanus* femur | 4.00 | 0.2207 | 0.487 |
| Other bird bone | 26.00 | 1.4347 | 3.168 |
| Feathers and down | 72.02 | 3.9742 | 8.774 |
| Bird skin | 0.49 | 0.0270 | 0.060 |
| Unidentified insect | 12.40 | 0.6843 | 1.511 |
| Total | 179.41 | 9.9002 | 21.859 |
| Miscellaneous | | | |
| Charcoal | 2.00 | 0.1104 | 0.244 |
| Twig | 0.30 | 0.0166 | 0.037 |
| Twine (*Apocynum*?) | 2.00 | 0.1104 | 0.244 |
| Total | 4.30 | 0.2374 | 0.525 |
| Undigested Totals | 820.81 | 45.2937 | 100.001 |

## Granite Point Cave Coprolite

### General Data

Number of specimens examined: 1
Weight of specimen: 11.20 gm
Estimated specimen volume: 27.60 cc
Weight of undigested material: 3.50 gm (31.25%)
Weight of digested matter: 7.70 gm (68.75%)
Estimated volume of undigested material: 18.20 cc
Weight to volume ratio: 1:2.46

Color: gray
Texture: clay-like; partially carbonized
Shape: ovoid
Length: 5.20 cm

### The Return

This single specimen contains three item types: Scirpus seed (71.42% of undigested weight, 43.96% of estimated undigested volume); fur and hair (17.10% by weight, 32.97% by volume); and miscellaneous feathers (11.43% by weight, 23.07% by estimated volume).

Seeds are partially roasted or carmelized and the author recovered coiled roasting trays from this small site in association with the specimen (Roust 1966). It can thus be safely assumed that cave inhabitants roasted Scirpus seeds prior to eating them. Twenty-five miscellaneous bone fragments were recovered by the author in the excavation of the cave, including those of coyote (Canis latrans), mule deer (Odocoileus hemionus), jackrabbit (Lepus californicus), marmot (Marmota flaviventris), and miscellaneous rodent bones. Also included in this total was a raven skull (Corvus corax) and bones from a cinnamon teal (Anas cyanoptera). While the coprolite fur and hair and feathers are not identified, it is possible that they represent remnants of the above.

TABLE 9

Granite Point Cave Coprolite: Total Composition by Weight
(Weights in grams)

| | Weight | % of Examined | % of Undigested |
|---|---|---|---|
| Seed | | | |
| Scirpus | 2.5 | 22.321 | 71.420 |
| Faunal | | | |
| Feathers | 0.4 | 3.571 | 11.429 |
| Fur and hair | 0.6 | 5.350 | 17.142 |
| Total | 3.5 | 31.242 | 99.991 |

TABLE 10

Granite Point Cave Coprolite: Total Composition by Volume
(Volume in cc)

| | Volume | % of Examined | % of Undigested |
|---|---|---|---|
| Seed | | | |
| Scirpus | 8.0 | 28.980 | 43.956 |
| Faunal | | | |
| Feathers | 4.2 | 15.217 | 23.076 |
| Fur and hair | 6.0 | 21.739 | 32.967 |
| Total | 18.2 | 65.936 | 99.999 |

## Site NV-Pe-8 Coprolites

### General Data

Number of specimens examined: 12
Total weight of examined specimens: 107.00 gm
Estimated volume of examined specimens: 232.20 cc
Weight of undigested material: 36.90 gm (34.49% of total)
Weight of digested matter: 70.10 gm (65.51% of total)
Average specimen weight: 8.916 gm
Specimen weight range: 1.50 - 22.80 gm
Estimated volume of undigested material: 62.60 cc (26.95% of total)
Estimated volume of digested or decomposed matter: 169.60 cc (73.04% of total)
Range of estimated volumes: 7.80 - 35.00 cc
Average estimated volume: 19.88 cc
Average weight to volume ratio: 1:2.23

Specimen colors ranged from tan or light brown to brown.

Specimen shapes ranged from irregular to cylindrical, with examples of irregular, round, ovoid, and cylindrical all being noted. Ovoid shaped specimens were most frequently encountered.

Specimen textures ranged from fibrous to powdery with examples of fibrous, seedy, mixed, and powdery all being noted. All specimens evidenced notable decomposition, and in consequence powdery textured specimens occurred most frequently.

Maximum noted specimen diameter was 4.6 cm (1.81 in.) and maximum noted specimen circumference was 13.5 cm (5.31 in.).

### The Return

The undigested materials in the NV-Pe-8 coprolites have been markedly affected by decomposition. Much return is, in consequence, unidentifiable, and the remaining proportions of this material cannot be held to be truly representative of the original undigested totals.

Crude woody fiber (78.32% of undigested weight, 62.14% of estimated undigested volume) is notably predominant. None of this fiber has been identified, but it is obviously not typical of fibers which occur in coprolites from other sites as examined by this author. A small amount of unidentified seed in a state of advanced decomposition also occurs, and it is possible that some of this may be Scirpus, but it should be noted that

the author identified no clear-cut example of Scirpus per se, and it thus appears probable that none was originally present. Siphateles bone was recognized in small amounts in two specimens only. Panicum seed is identified from a single specimen. Small amounts of fur and hair, feathers and bird skin(?), round out the scattered return.

At first glance, and on the basis of the existing return, it would appear that these specimens are atypical when compared to the return from coprolites of other sites in immediately adjacent or nearby areas. But such a conclusion is invalid. With the notable decomposition of the specimens and resultant warped undigested return percentages, no positive statements (other than the above) should be made concerning ratios of primary diet items of these particular cave people.

TABLE 11

Site NV-Pe-8 Coprolites: Total Composition by Weight
(Weights in grams)

| | Weight | % of Examined | % of Undigested |
|---|---|---|---|
| Fiber | | | |
| Unidentified | 28.9 | 27.010 | 78.32 |
| Seed | | | |
| Panicum | 1.4 | 1.308 | 3.79 |
| Unidentified | 4.1 | 3.831 | 11.11 |
| Faunal | | | |
| Siphateles | 0.8 | 0.747 | 2.16 |
| Fur and hair | 0.5 | 0.467 | 1.35 |
| Feathers | 0.7 | 0.654 | 1.89 |
| Bird skin | 0.5 | 0.467 | 1.35 |
| Total | 36.9 | 34.484 | 99.97 |

TABLE 12

Site NV-Pe-8 Coprolites: Total Composition by Volume
(Volume in cc)

| | Volume | % of Examined | % of Undigested |
|---|---|---|---|
| Fiber | | | |
| Unidentified | 38.9 | 17.183 | 62.14 |
| Seed | | | |
| Panicum | 4.0 | 1.722 | 6.38 |
| Unidentified | 7.4 | 3.186 | 11.82 |
| Faunal | | | |
| Siphateles | 2.8 | 1.205 | 4.47 |
| Fur and hair | 4.0 | 1.722 | 6.38 |
| Feathers | 4.0 | 1.722 | 6.38 |
| Bird skin(?) | 1.5 | 0.645 | 2.39 |
| Total | 62.6 | 27.385 | 99.96 |

TABLE 13

Site NV-Pe-8 Coprolites: Individual Specimen Breakdown*

| | Specimens | | | | | | | | | Totals |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 12 | (gm) |
| Panicum seed | | | | | | | 1.40 | | | 1.40 |
| Unidentified seed | 2.20 | | | | | | | 1.20 | 0.70 | 4.10 |
| Unidentified fiber | 2.00 | 14.00 | 1.00 | 6.90 | 5.00 | | | | | 28.90 |
| Siphateles bone | | | | | | 0.40 | 0.40 | | | 0.80 |
| Fur and hair | 0.50 | | | | | | | | | 0.50 |
| Feathers | | | | 0.70 | | | | | | 0.70 |
| Bird skin(?) | | | 0.50 | | | | | | | 0.50 |
| Totals | 4.70 | 14.00 | 1.50 | 7.60 | 5.00 | 0.40 | 1.80 | 1.20 | 0.70 | 36.90 |

*Specimens 1, 10, and 11 too decomposed for analysis

## Notes

1. See Loud and Harrington, Lovelock Cave. Univ. Calif. Publs. Amer. Archaeol. and Ethnol. 25, 1929. Where the old state reference symbol for site designations was a number (e.g. 26 for Nevada), we are proceeding to use the new U.S. Post Office Department letter abbreviations for states and dependencies (cf. Heizer and Graham 1967). For the state of Nevada this is NV; for California, CA.

2. One of a series of small rock shelters located near and slightly higher in elevation than NV-Pe-14, Leonard Rockshelter (see Heizer, Preliminary Report on the Leonard Rockshelter Site, Pershing County, Nevada. American Antiquity 17:89-98, 1951). Artifacts from NV-Pe-8 are largely "Lovelock" in type. See Baumhoff, Excavation of a Cache Cave in Pershing County, Nevada. Univ. Calif. Archaeol. Survey, Report 44:II:14-25, 1958.

3. See Heizer and Krieger, Humboldt Cave. Univ. Calif. Publs. Amer. Archaeol. and Ethnol. 47, 1956.

4. Roust, The Archaeology of Granite Point Cave, Pershing County, Nevada. Univ. Calif. Archaeol. Survey, Report 66:37-71, 1966.

5. See N. L. Roust and G. L. Grosscup, Archaeological investigations in the southern Carson Sink. MS on file in the University of California Archaeological Research Facility office, Berkeley.

6. Since the entrance and interior coprolites may differ a thousand or more years in age, and the locations at which the coprolites reported here were not recorded in 1912 or 1950, we must ignore this problem at this time. However, because many of the specimens still exist, they could be radiocarbon dated if necessary.

7. These specimens were notably soft and talc-like in texture, light in weight, and uniformly tan in color. A rough correlation was noted between specimen hardness, weight, and probable decomposition.

8. Linum sp. (probably lewisii), wild flax, blue flax, wild blue flax. Dicotyledonous. Common to North America from Wisconsin to Texas and west to Alaska and California at elevations of 4000-9000 feet above sea level. A perennial, one to three feet tall, it is characterized by narrow leaves and clusters of bright blue flowers. Stems are several from a woody root; the crown is erect and thickly clothed with leaves; herbage is glabrous; and the fruit is a dry capsule containing about ten glossy brown mucilaginous seeds. Gilmore reports the use of the seeds in Missouri

Valley cookery. The plant is also known to both Paiute and Shoshone as a remedy for a variety of ills.

9. Oryzopsis sp. (probably hymenoides), sand grass, wild millet, Indian millet. One of several plants known to local Indians as "wai." (See Stewart 1941:428. Other plants so-called include Elymus condensatus, Distichlis stricta, Wyethia mollis, and W. scabra. See Kelly 1932; Loud and Harrington 1929:158; and others.) Also known as spurious rice, wild rice, Indian rice, and ricegrass. (Incorrect designations; the true wild rice is Zizania aquatica, the striking plant found on mud flats all over the country, but most common to the eastern United States and Canada. This latter is the rice harvested by the Indians for commercial purposes.) Monocotyledonous. Common to prairies, deserts, and dry hillsides of western North America from Iowa and Texas west to Washington and Lower California and into Canada. The plant is about 30-60 cm in height, with densely tufted culms and slender involute blades. The panicle is rather simple and loose; the calyx is two-halved and one-flowered; the husks are membranous, hard, and a little longer than the corolla. Seeds of Oryzopsis hymenoides are well known as a source of Indian food (see, among others, Stewart 1941:375; Medsger 1939:128).

10. Sylvilagus sp., cottontails and allies. Lagomorpha (Leporidae). Species known to the Carson area include S. nuttallii grangeri (Nuttall cottontail) and S. idahoensis (pigmy rabbit; see Hall 1946). The forms are too well known to require description here, and are renowned as a staple of areal aboriginal diet.

11. Citellus sp., ground squirrels and allies. Rodentia (Sciuridae). Presently known to the area are the Townsend ground squirrel (C. townsendii mollis, the antelope ground squirrel (C. leucurus leucurus), and the beechy ground squirrel (C. beecheyi fisheri). The recovered femur fragment is likely one of these. (For description and distribution of these species see R. E. Hall, Mammals of Nevada. Univ. Calif. Press, 1946.) Ground squirrels are a known and apparently common item of aboriginal Indian diet in this area. (See Stewart 1941:371; Kelly 1932:87-88; Loud and Harrington 1929:153-154.)

12. Neotoma sp., wood rat, pack rat. Rodentia (Muridae). Common throughout western North America and mountainous regions of eastern North America. Wood rats are about the size of the house rat, but are lighter in color and with haired tails. A clean animal, their curiosity makes them easily adaptable or trapable, and they are a common item of aboriginal diet. Species known to the present area are the desert wood rat (N. lepida lepida) and the bushy-tailed wood rat (N. cinerea acraia). Living specimens were noted by the author in both Hidden and Lovelock Caves, with nests

recognized in the former site. It is to be noted that the wood rat hosts the "Kissing Bug" (western blood-sucking cone-nose, Triatoma protracta), bearer of the protozoan Trypanosoma cruzi, carrier of Chaga's disease.

13. Gammarus sp., freshwater amphipod. Crustacea (Amphipoda). A common amphipod about one inch in length, with elongated abdomen bearing three pairs of posteriorly directed springing feet and three pairs of anterior swimming feet, and without a carapace. Amphipods are found in ponds and streams throughout the year and are a common source of food to fishes, birds, and aquatic insects. They mate and lay eggs from April to November, and produce about twenty-two eggs every eleven days. It has been estimated that a single pair of G. fasciatus might have 24,221 progeny in one year. It appears probable that our single specimen was introduced into the human coprolite coincidentally with Siphateles or Cybister.

14. Prionus sp. (probably californicus), long-horned wood borer. Coleoptera (Cerambycidae). Common along the Pacific Coast from central California to Alaska. Also reported from Arizona, New Mexico, Colorado, and Nevada. The family is noted for its very long antennae. The adults are 40-60 mm in length, shining, uniform dark reddish brown, with three sharp teeth usual on each lateral margin of the prothorax. They are nocturnal and, flying from midsummer to fall, make a loud humming noise on the wing. The larvae are very large white grubs attaining a length of 60-75 mm. They breed normally in dead and decaying roots and stumps of live and deciduous oaks, but readily attack living and dead roots of other trees (in this area notably the cottonwoods and larger sagebrushes), frequently killing them in the process. Believed to be previously unreported as an item of aboriginal American diet.

15. Scirpus sp., club rush, bulrush, common tule, tule. Monocotyledonous. The most common specie known to the area include acutus, americanus, lacustris, nevadensis, and validus, of which acutus and nevadensis appear most frequently. S. acutus is the traditional source of native seed and construction material in this area and is probably the species of our coprolite seeds. Stems in the plant are some 3 to 9 feet in height, arise from a stout creeping rootstock, and are leafless or with a short terete leaf occurring from the upper basal sheath. Spikelets are numerous, congested, and either capitate or occur in an irregular umbel with unequal rays, and with bristles six in number, slender and barbellate. S. nevadensis differs from acutus in that spikelets occur in clusters; the perennial stems are tall and leafy at the base, with stems clustered from a creeping rootstock 9 to 18 inches in height, and with leaves one-half to two-thirds the height of the stems. Both S. nevadensis and S. acutus are water plants, growing commonly in the salt and freshwater marshes and borders of lakes and streams of the western and northern United States and southern Canada.

16. Siphateles sp., roach, chub, tui, Lahontan chub (of Pisces—Cyprinidae). Of the many species of this minnow known to lakes and streams of California, Oregon, and Nevada, perhaps the most common in the Humboldt-Carson Sink area are S. obesus (Girard), previously known archaeologically and possibly the species of our specimens; S. pectinifer (Snyder), also called Leucidius pectinifer, the most common minnow of Pyramid Lake; and the Pyramid Lake roach, S. olivaceus (Cope). S. pectinifer occur in tremendous schools and are characterized by long, slender, and crowded gill-rakers resembling a fine-toothed comb. The minnow is about 8 inches in length, olive colored above, lighter on the sides, and white below, with lower fins tinged with red and with scales characterized by their silvery sheen. S. olivaceus is the largest of the areal specie, with specimens 12 inches in length not uncommon.

17. Elymus triticoides, squaw grass, wild wheat. Monocotyledonous. Commonly 6 to 8 feet tall, this is an erect perennial with erect spike and crowded spikelets. The plant occurs in large masses with extensively creeping rhizomes. Blades are involute, hirsute, pubescent; with culms glaucous, and the spike 10 to 18 cm in height and sometimes branched. The plant is known to the United States from Minnesota west; it is prominent from Colorado to California and north to Washington, and has been especially noted in the low, wet meadows of eastern Oregon and adjacent regions. It is an excellent forage crop and is frequently cut for hay. Scattered reports indicate Indian use of the grain for grinding into cake or porridge meal.

18. Pinus sp. (probably monophylla, var. cembroides). Single-leafed piñon, one-leafed nut pine, piñon. Dicotyledonous. The piñon is a flat-crowned tree 8 to 25 feet in height (rare specimens to 45 feet), common to dry mountain regions of Utah, Nevada, Arizona, and California. Its black-barked trunk, branched crown, and solitary needles (one in a place) distinguish it from all other pines. Cones containing the seeds or nuts are sub-glucose, chocolate-brown or yellow in color, 2½ to 3½ inches in diameter, with thick scales raised at the apex into high broadbased pyramids with slightly flattened summits bearing a minute deciduous prickle. The nuts themselves are dark brown, oblong in outline, about three-quarters of an inch in length, slightly flattened, and without wings. Our specimen appears identical. Pine nuts are well known as a staple of Indian diet in this region and are eaten raw, roasted, or ground into meal. It is notable that abundant crops do not occur every year. Pack rats are known storers of the seeds and as much as a quart or more of nuts can be frequently obtained from this source. The closest known historic source area to the Carson and Humbold Sink Basins is in the Stillwater Mountains east of the Carson Sink.

19. Panicum capillare var. occidentale, witch grass, old witch grass, tickle grass. Monocotyledonous. An erect, nutritious annual, 2 to 6 decimeters in height, with foliage conspicuously papillose. The spike, or more correctly panicle, is more than one-half the length of the entire plant and notably diffuse. Spikelets are elliptic and abruptly pointed. The panicle is included at the base until maturity, when the entire panicle breaks from the plant and rolls before the wind. It appears likely that our individual swallowed such an entire panicle. Blades are 10 to 25 cm in length, 6 to 10 mm in width. Seeds are elliptic with a hard crust cover. Although common as a forage crop for animals, the author knows of no prior reference on the use of this plant as human food.

20. Anodonta sp., paper shell mussel. Mollusca (Pelecypoda). Known regional species include nuttalliana, californiensis, oregonensis, and mutabilis. A. nuttalliana is perhaps the most common, with californiensis and oregonensis sometimes considered varieties of nuttalliana. A. mutabilis is the familiar ovoid shape with other species more triangular. Shells in the latter are thin, generally smooth and shining, and with the outer surface greenish or brown and often marked by light and dark concentric bands indicating rest periods in growth. The lining is dull white or pinkish. Length of the adult is about 4 inches. Anodons characteristically inhabit fresh water in quiet lakes and ponds, and their utility as an item of Indian diet is well known. (See, among others, Powers 1877:430; Greengo 1952:80-81.)

21. Cybister sp. (probably explanatus), diving beetle, water tiger. Coleoptera (Dystiscidae). A large, aquatic, predaceous beetle common in the area; ovoid of shape with short, broad, greenish wings with yellowing borders. Hind tibia are almost as broad as long, with outer apical spur basally strongly expanded. Male adhesion discs are transversely oval with three to four transverse rows of petiolate adhesive plates, behind which is a fringe of bristles (summary from La Rivers 1951:392-406). The full grown larvae are some 3 inches in length and live in fresh water. They will attack tadpoles, other water beetles, and small fish, hence the name "water tiger." The head of the larva bears a pair of large, sickle-shaped jaws. Cybister is a reported item of human diet in rural southern China and aboriginal Australia, but to the author's knowledge is previously unreported for the Americas.

22. Apocynum sp., dogbane, Indian hemp. Dicotyledonous. Found near water. Species known to the Humboldt and Carson valleys include A. androsaemifilium, medium var. floribundum, and cannabinum, of which cannabinum appears to be most common and is the usual Indian hemp. It is distinguished from the spreading dogbane (A. androsaemifilium) by its erect

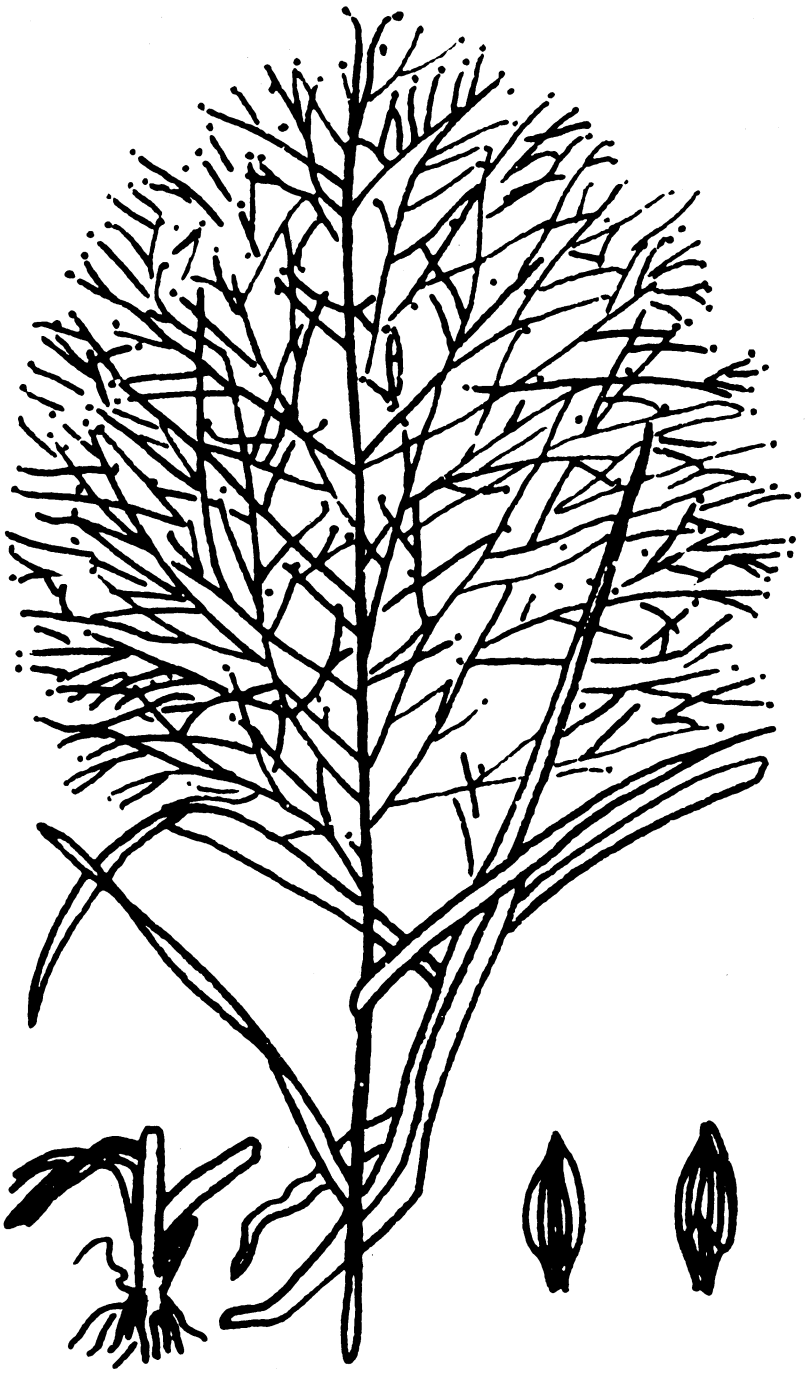

Fig. 1 Panicum capillare

nature and greenish flowers. Leaves are opposite, and the clustered bell-shaped flowers are followed by pairs of long, slender pods. A perennial with milky juice, it is the traditional source of Indian cordage fiber in the area.

23. Phragmites sp. (probably communis), common reed, wild broomcorn. Monocotyledonous. Found in swamps and wet places over almost the entire United States, southern Canada, and northern Mexico. Also known to Europe and Asia. The culms or stalks are stout, usually about an inch in thickness, and 5 to 12 feet high. The leaves are about an inch wide and generally less than a foot long. The panicle is crowded and plumey, 6 to 12 inches long. The plant rarely produces seed but spreads by long horizontal rootstocks (sometimes on the surface, forming leafy stolons as much as 9 meters in length). Cookery-wise, the reed is best known as a source of sugar, and the Carson Basin is historically famous as the center for the gathering of this substance by the Indians (see Stewart 1941:375, and others). In the fall of the year the leaves and stems of the plant are profusely encrusted with a pasty, grayish exudate. This is the "sugar" collected by the Indians; it is compressed into balls and eaten at pleasure. The exact origin of the exudate is not clear, but apparently it is only dried plant sap which oozes out through the punctures made by aphids. One author states that the Indians of the Mohave Desert collect the plants, dry the stalks, grind them, and then sift out the flour. This contains so much sugar that when placed near a fire it swells, turns brown, and is then eaten like taffy. Other reports state that the sugar is dissolved in water to form a sweet, nourishing drink (see Coville 1913, and others). Historically, Paiute pneumonia patients were given the sugar with the idea that it loosened phlegm or soothed the pain in the lungs (see Train et al. 1941:116).

24. Falco mexicanus, prairie falcon, American lanner (female) or American lanneret (male). Aves (Falconiformes). The prairie falcon is known from the eastern border of the Great Plains and from southern British Columbia and southeastern Saskatchewan to southern Lower California and southern Mexico, occurring casually east to Minnesota and Illinois. It is a known present permanent resident of the Carson Basin area. Similar to the better known duck hawk (F. peregrinus), the prairie falcon is a predator of the open, resorting to perpendicular sides of canyons or buttes to rear its young. The male adult is about 18 inches in length, the female about 20 inches. Both are brownish-ash colored above, spotted or mottled white below. The head and nape of neck are streaked with dark brown, the iris is brown, and the throat has spots of dark brown. The tail is brownish-gray with barring of white. Legs are yellow, and the bill is primarily dark bluish horn (yellow at the base and below). The young differ from adults in their lighter colors and heavier spots. The bird has a keen

vision and ranges over many square miles of territory, from which it takes its toll of birds and small rodents, especially ground squirrels. True falcons have sharply hooked, toothed, and notched bills; projecting bony eye shields; strong, sharp, curved talons; long, strong, and pointed wings; and a generally short tail. The prairie falcon, like other falcons indigenous to the area, is a known, but rare, item of aboriginal diet.

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