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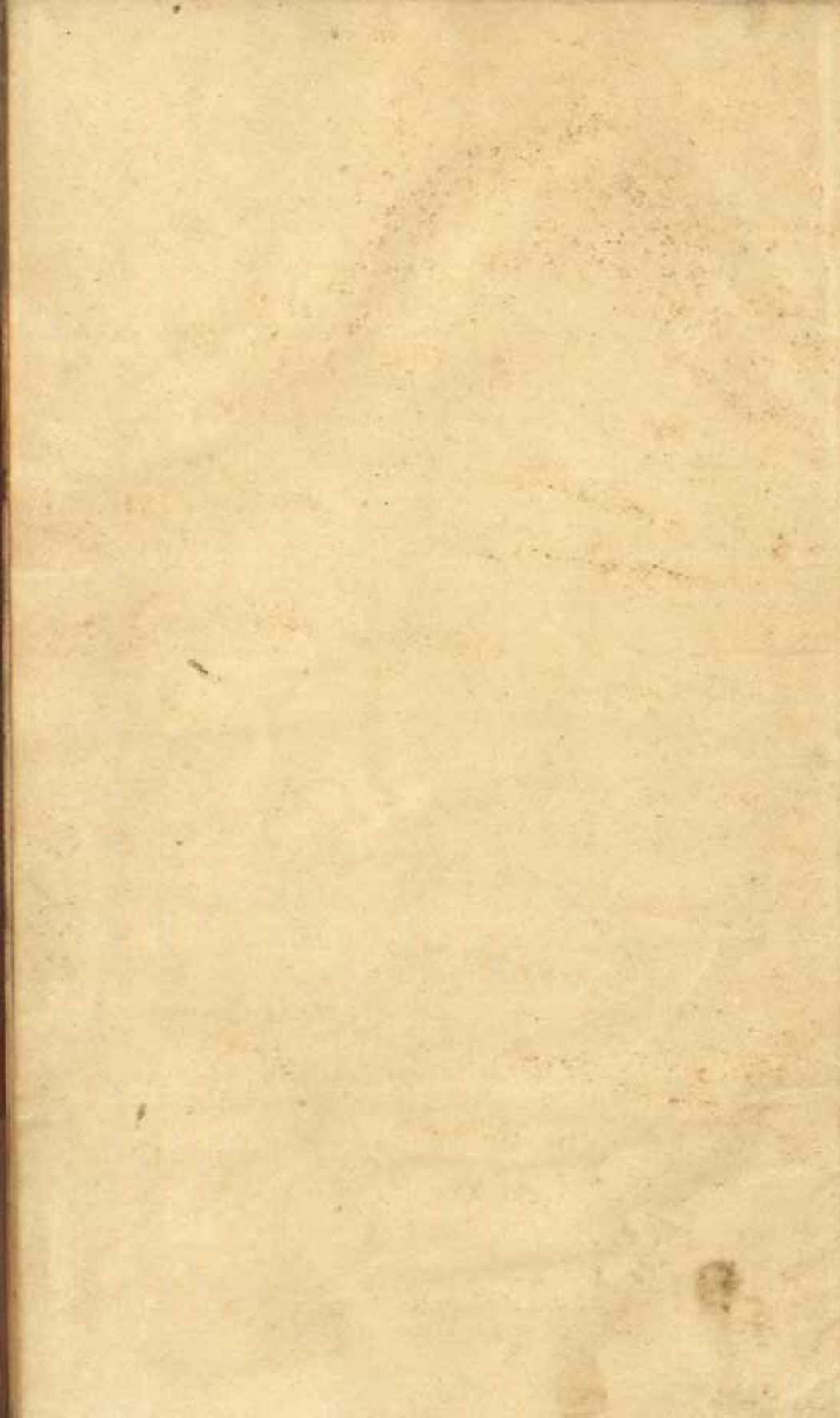
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Mosaic incruated flint blade, Poncho House

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AND ETHNOLOGY, HARVARD UNIVERSITY

VOL. XII—No. 1

EXPLORATIONS IN
NORTHEASTERN ARIZONA

REPORT ON THE ARCHAEOLOGICAL
FIELDWORK OF 1920-1923

12944

BY

SAMUEL JAMES GUERNSEY

SIXTY-SIX PLATES AND
THIRTY-ONE ILLUSTRATIONS IN THE TEXT

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INTRODUCTION

THE present paper records the results of the Museum's archaeological expedition to northeastern Arizona in the years 1920 to 1923 inclusive. The investigation of this area was inaugurated in 1914 and, except during the War, has continued to the present time. Reports on the work of 1914 to 1917 have already been published,¹ and the expedition of 1925 has been treated in a separate paper by Noel Morss,² who was in charge during that year. The explorations and excavations of the period here considered were carried on by the author, with the exception of the last two weeks of the 1923 season, when the work was taken over by Mr. and Mrs. William H. Claffin, Jr., and Dr. A. V. Kidder. In each year the Museum has worked under the authority of permits granted by the Secretary of the Interior.

Most grateful acknowledgment is made to the following persons, whose generous contributions, supplementing the Museum appropriation, have proved an indispensable help: Charles L. Bernheimer, Bronson M. Cutting, Mr. and Mrs. William H. Claffin, Jr., Carl P. Dennett, W. N. Duane, Walter Fitch, Sr., Lawrence Grinnell, F. E. Guernsey, Clarence L. Hay, Augustus Hemenway, Henry Hornblower, T. Mitchell Prudden, Dudley L. Pickman, Samuel D. Stevens, John E. Thayer, Mrs. Thornton K. Lothrop, Abby L. Whiting, Mrs. Harold K. Estabrook, and J. M. Longyear.

Fortunate choice of assistants contributed greatly to the success of these explorations. Indebtedness is here acknowledged to Monroe Amsden, who accompanied all the expeditions, and Oliver Ricketson, Jr., George Vaillant, and Oliver LaFarge, who acted as assistants during various years. The author cannot adequately acknowledge his obligation to Dr. A. V. Kidder, not only for his aid in the preparation of this report but for his inspiring interest in the work, without which the explorations would not have been carried on. The Museum is also indebted to the Trustees of Phillips Academy, Andover, for permission to incorporate data recovered from certain excavations made under their auspices in the area.

¹ Kidder and Guernsey, 1919; Guernsey and Kidder, 1921.

² 1927.

The first Museum expedition, that of 1914, resulted in the discovery of the former presence in northeastern Arizona of the Basket-maker II people, whose remains had previously been described only from southeastern Utah. The investigations of that year and of 1915 indicated the probability that the Basket-maker II people were the earliest agricultural inhabitants of the Southwest. The fieldwork of 1916 and 1917 served, by stratigraphic evidence, definitely to prove this priority; the work also provided large collections of specimens which added greatly to our knowledge of the culture. The report on the two latter years, therefore, deals almost exclusively with the Basket-maker II material.¹

The chronological position of the Basket-maker II people having been established, and the outlines of their culture determined, the efforts of the field parties, when work was resumed in 1920, were devoted almost wholly to an attempt to trace the later development of the Basket-maker II people, and to determine what, if any, relation they bore to the Pueblo I and later Pueblo peoples who occupied the region in subsequent but still prehistoric times. These researches resulted in the finding of a second phase of the early civilization, named the Post-Basket-maker (Basket-maker III). The present report concerns itself largely with this culture; but as the fieldwork was devoted primarily to the search for the excavation of stratified sites, which alone could supply sure evidence of chronological relations, a number of caves and ruins occupied by other peoples were examined and data were recovered as to the Basket-maker II, the Pueblo I, and the later Pueblo cultures. These data are not as plentiful as might be desired, nor have they been analyzed as fully as the author could wish. They are presented, however, for what they may be worth.

The explorations were confined to the country within a radius of fifty miles of Kayenta, Arizona (see map at end of this paper), the district in which, through our earlier work, we had become familiar with the Basket-maker II culture. The final results seem to have justified the wisdom of this course, which was adhered to in spite of many temptations to enter new and promising fields. At the start we were handicapped by lack of definite information. We wished to find late Basket-maker II remains, but being ignorant, as indeed we still are, of the exact nature of true Basket-maker II

¹ Guernsey and Kidder, 1921.

village sites (practically all our knowledge of the Basket-maker II people being derived from burial caves), we were much hampered in our attempt to identify the dwellings of their successors. Fortunately, however, a cave explored in 1920¹ yielded data as to both the graves and the houses of the Basket-maker III period; data which enabled us to locate subsequently other sites in caves and in the open.

CAMBRIDGE, MASSACHUSETTS
November, 1930.

¹ Cave 1, Segi Canyon. See pp. 2-11.

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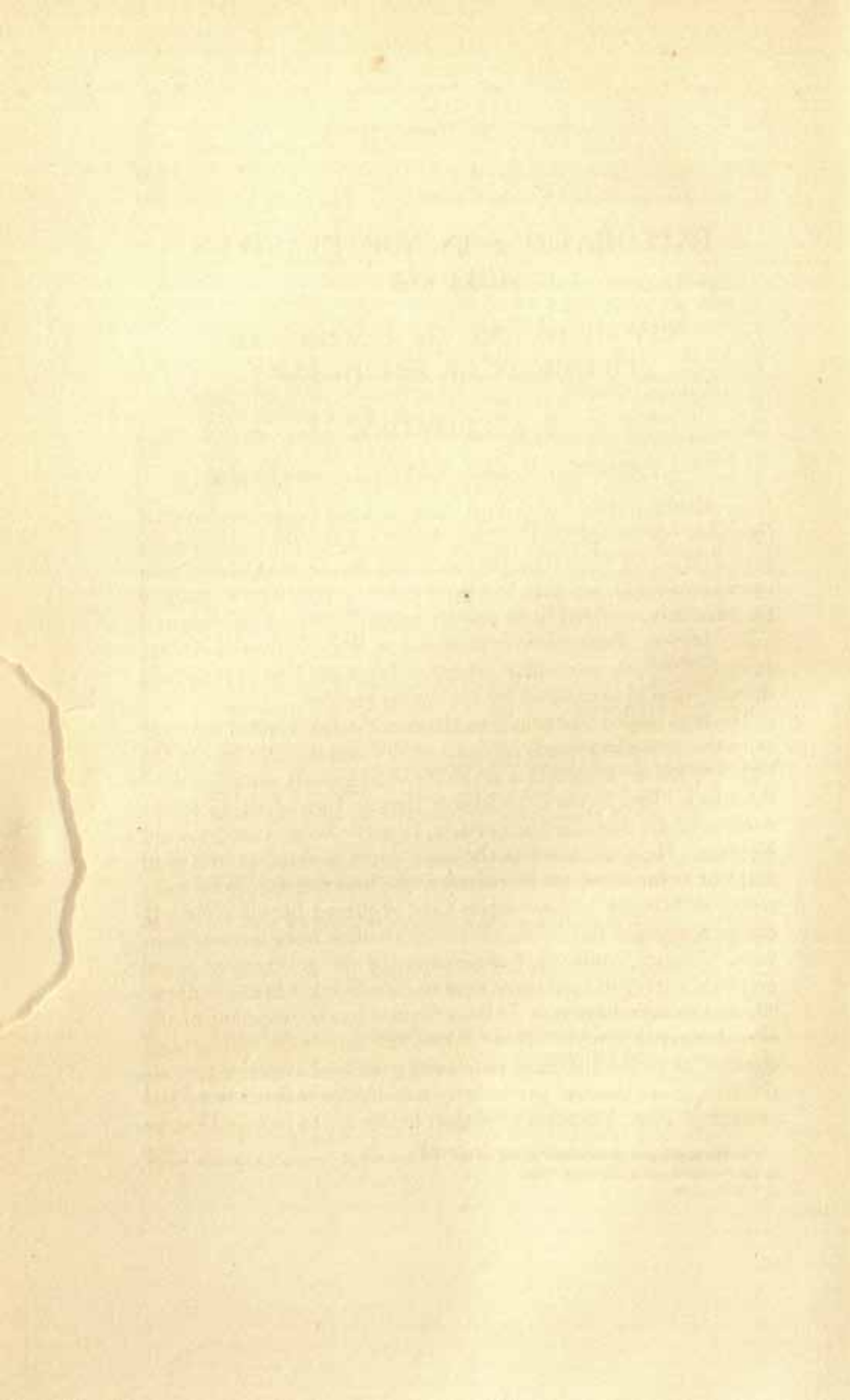
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EXPLORATIONS IN NORTHEASTERN ARIZONA

REPORT ON THE ARCHAEOLOGICAL FIELDWORK OF 1920 TO 1923

I. FIELDWORK

SEASON OF 1920, KAYENTA DISTRICT

LEAVING the railroad at Gallup, New Mexico, the party travelled by motor via Chinle¹ to Kayenta, Arizona, where the friendly services of Mr. and Mrs. John Wetherill and Mr. Clyde Colville, who have always done so much to help scientific expeditions working in their country, enabled us to procure an outfit of pack animals and riding horses. Exploration was begun in Segi Canyon (see map, at end of paper), particular attention being paid to caves which showed signs of occupancy by the earlier peoples.

The Segi (called "Laguna" on Gregory's map) is one of the most extensive and picturesque canyons of this region. Heading in the high Segi mesas, it runs in a generally southeasterly direction until the Black Mesa forces it at Marsh Pass to turn abruptly to the northeast. Its drainage then passes along the South Comb toward Kayenta. Here and there in the main upper canyon, as well as in many of its branches, are places where the towering sandstone walls recede sufficiently to leave open flats, sheltered by the cliffs. It carries a constant flow of water, fed by rivulets from the side canyons. Gregory² states that at the time of the government topographical survey in 1883 there were numerous lakes in the canyon. These, however, have now all been drained by the trenching of the ever-deepening arroyo. These lakes, the numerous springs and streams, as well as the many patches of good land available for cultivation, made the Segi particularly suitable for occupancy by the ancient peoples. The remains of their homes are to be found every-

¹ In the spelling of place names we follow the orthography of Gregory's admirable report on the Navajo country (Gregory, 1916).

² 1916, p. 48.

where in the open bottoms, while almost every cave in the entire system contains ruins of one sort or another. Some of these, such as Keet Seel (Plates 2 and 3), Betatakin (Plate 4), and Bat-Woman House, are among the largest and best preserved cliff-dwellings in the entire Southwest.

Cave 1, Segi. This cave is about fourteen miles from the mouth of Segi near the head of the first branch canyon entering from the

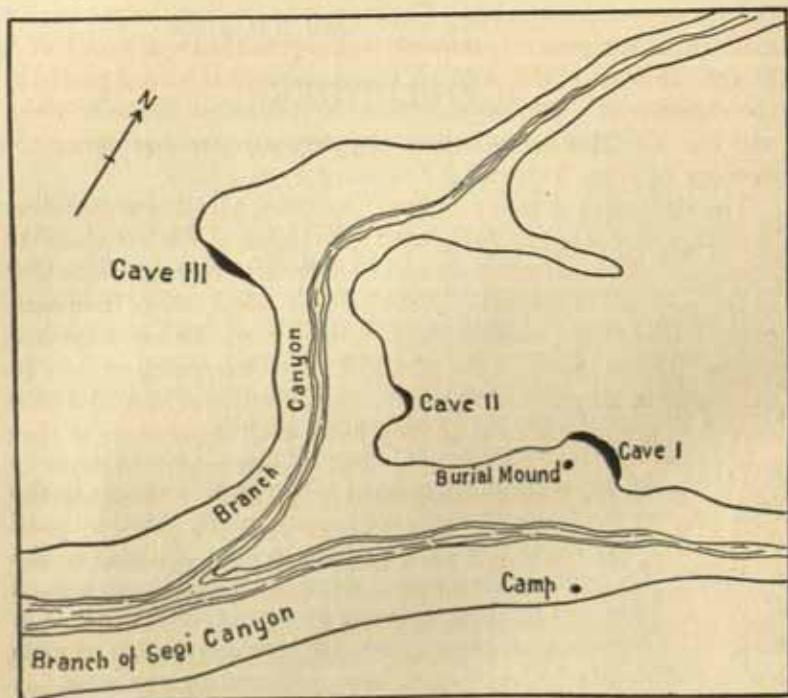


FIGURE 1
Sketch-map of vicinity of Cave 1, Segi

west above Betatakin Canyon.¹ It is located in the north wall and consists of a huge semilunar shelter with a southerly exposure. The high arched roof reaches nearly to the top of the cliff. The length of the cave across the front is approximately 600 feet; 400 feet of this is usable floor space with an average width of 25 feet. The line of shelter at the point of greatest overhang is about 50 feet from the

¹ Distances given in this report are approximations. No accurate map of the region exists.

rear. In times of rain the water from the top of the mesa concentrates just over the cave to fall in a cataract to the base of the cliff. This drainage has cut in the slope below the cave two arroyos, which merge to form one wash just at the edge of the canyon bottom.

The photograph reproduced in Plate 5, upper, gives a clear idea of the general appearance of the site. The small cave seen at the right contained no remains. The growth at the front of the cave is made up of vigorous cottonwoods and aspens thirty or more feet in height. In front of the cave is a broad open space caused partly by the entrance of a side canyon from the northwest (Plate 5, lower, and Fig. 1). This flat is now cut by deep arroyos, but during the memory of John Wetherill it contained a small lake.¹

The structures in the main cave (see plan, Fig. 2) consist of detached groups of rooms distributed for a length of 300 feet along the back wall, the most compact and best preserved group being that at the east end of the cave. Navajos have taken stones from some of the walls of these rooms to build a small corral for use in lambing season. This is shown on the plan at *h*. Axe-sharpening grooves are numerous in all parts of the cave; certain of them may also have served as grinding places, as they have small depressions at their lower ends, possibly for catching meal of corn or ground seeds. A large rock on the floor has excavated in it a mortar 10 inches deep and 10 inches in diameter. On the same rock is a group of pictographs. On the back wall are a number of drawings done in red, white, and yellow paint, and groups of hand prints, one of which may be seen above the room in Plate 6.

Potsherds were plentiful among the rooms and lay scattered well outside the cave down the slope to the southeast. West of the rooms, the surface was singularly free from sherds. Possibly at the time the rooms were occupied this part of the cave was considered unsafe, the floor below it being littered with small stones scaled from the cave roof. At the top of the declivity leading into the east end of the

¹ "Your note in regard to flat and lake is correct. The lake was below Kit Zeal, and a fine spring in the flat by the ruin.

"My first trip to the Teagie was made in January '93, though I did not know of Kit Zeal at that time. The arroyo head then was about a mile above the Marsh Pass. There was a small arroyo through the pass. There were a number of lakes in the main Teagie and lakes up all the different forks. Carson gave the cañon the name of Laguna for that reason. We have taken the Navaho name Teagie meaning 'rocky' since there are no more lakes there." — Letter of July 28, 1928.

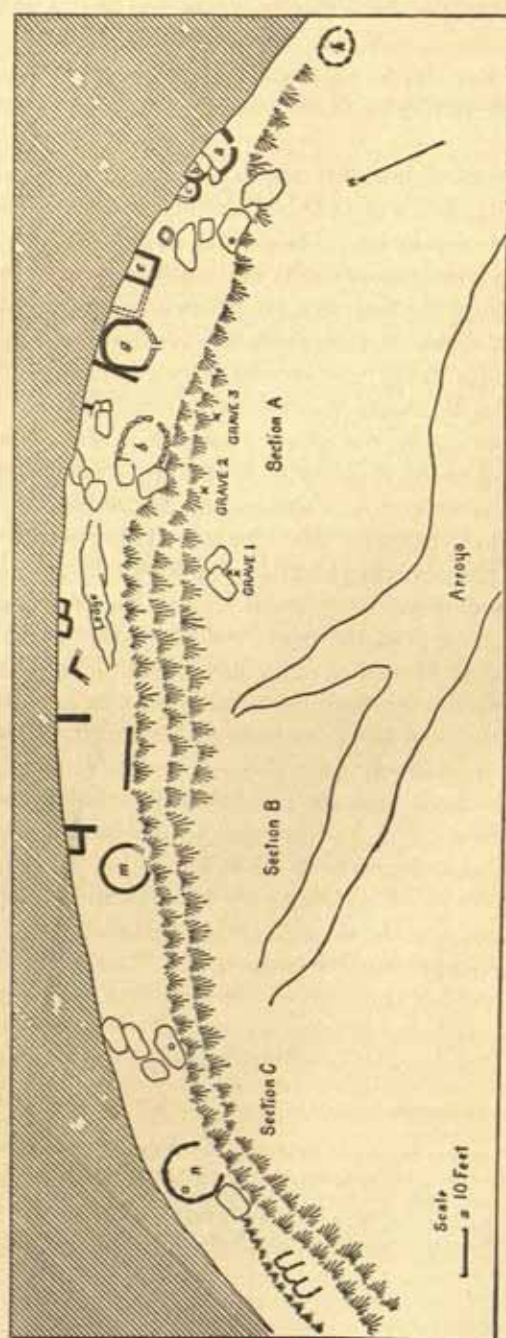
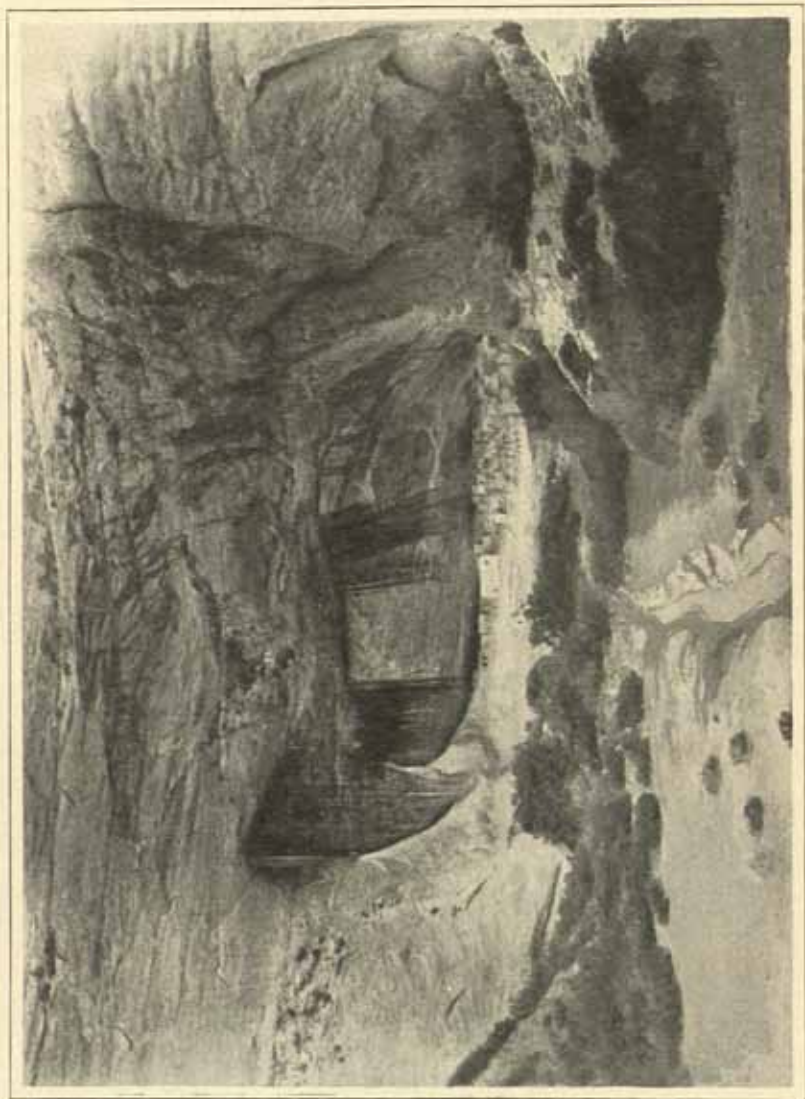
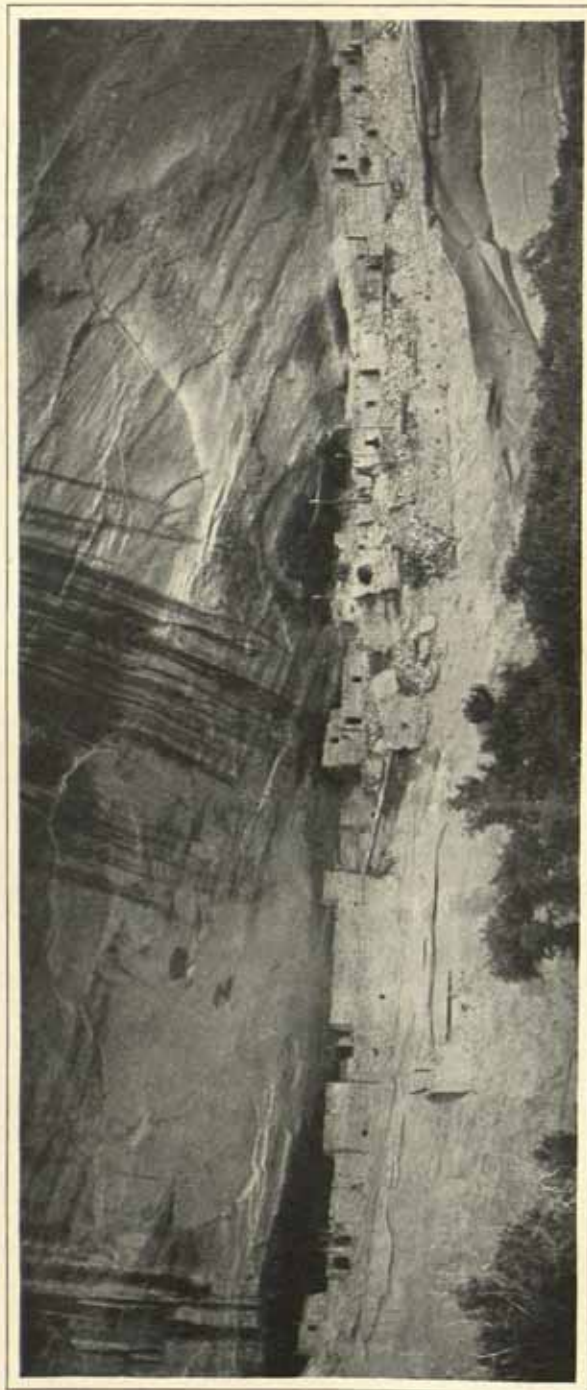


FIGURE 2
Plan of Cave 1, Segi



Distant view of Keet Seel



Kert Seel

cave are a number of circular slab structures (Fig. 2, *k*), the tops of the slabs projecting so slightly above the surface that at first we did not notice them. Another similar structure occurs some distance below the cave near the mouth of the branch canyon (see Plate 23, *c*). Three hundred yards in front of the cave is a low mound of charcoal-blackened sand which later turned out to be a burial place.

Excavations were made at Cave 1 both in 1920 and in 1921; for convenience the results of both years are recorded together.

The group of rooms at the east end dates from the Pueblo period. It offers nothing of special interest. Rooms *a*, *b* and *c* (Fig. 2) are irregular in shape, due to the fact that they were built to take advantage, for parts of the room walls, of several large rocks that occur at this place. The masonry is of small stones set in adobe mortar and heavily chinked with spalls. Excavation revealed about 2 feet of dry refuse and ashes, containing the usual cliff-house material: sandals, potsherds, bits of feather-string, rush matting, etc.

Room *e* (Plate 6, lower), the best preserved of any in the ruin, appears to have been burned, as short charred ends of roof timbers are still in place in the wall. This room had at some time been remodelled by closing up a large door in the front; there were also two sealed loopholes. The sherds from in and about these rooms are of Pueblo III types. Outside the rooms and in the talus below they are mixed with Pueblo I sherds. Farther down the talus there appeared a predominance of the latter type. These Pueblo I sherds and two Pueblo I burials found in the talus indicate a fairly extensive occupancy of the cave in Pueblo I times. The house structures of that period were, however, not identified.

Kiva *g*, shown on the plan (Fig. 2), was excavated by the University of Arizona expedition under Professor Cummings. Between it and Kiva *m*, which marks the west end of the Pueblo III section, there are traces of a number of room foundations. About 55 feet west of Kiva *m*, in an area the surface of which was free from sherds and rubbish, we uncovered the foundations of a roughly circular room, 15 feet in diameter (Room *n*, Fig. 2). The enclosing wall of this room was made of upright slabs of sandstone, inclined slightly outward. On the tops of the slabs there remained two or three courses laid up with loaf-shaped adobe bricks interspersed with small stones. The last course finished off into a rounded rim. A

section of the wall is shown in the upper picture in Plate 8. The structure was closely similar to ones which we previously had associated with Pueblo I pottery, and during the early part of our work upon it we were quite certain that we were excavating a Pueblo I house contemporary with the Pueblo I pottery observed in the east end of the cave. As we got deeper, however, we began to come upon material of a sort that we had never seen before. Conditions in the room were as follows:

The surface consisted of 6 to 8 inches of sand mixed with bits of stone sealed from the roof of the cave. Below this was a layer of coarsely shredded juniper bark, beneath which were quantities of reeds that had been made into rough, mat-like assemblages by laying bunches of them parallel to each other and tying them together with rows of twined-woven yucca leaves. Below the reeds was one foot or so of dry rubbish, resting on a badly broken adobe floor. The specimens in the rubbish were scallop-toed sandals (Plate 9), several elaborately decorated carrying straps or tump-lines (Plate 10), fragments of coarse twined-woven bags, containers made of yucca plants (Plate 11), and many fragments of pottery. The pottery, to our great surprise, was not of the easily recognized Pueblo I types, i. e., well decorated black-on-white and neck-coiled cooking wares, but was of a granular-paste gray ware, entirely without painted decoration or any trace of coiling. There were also a few bits of plain red pottery.

It was, of course, realized at once that we were in the presence of a culture hitherto undescribed, and the other specimens, particularly the coarse twined-woven bags, suggested strongly some connection with the Basket-maker II culture. We accordingly continued our excavations with greatly stimulated interest.

The room itself was so ruinous that it provided little architectural information; considerable parts of the slab wall were gone and the floor was hopelessly broken. In the latter were traces of a fireplace, and also, toward the back, a round pit, 2 feet in diameter by 2½ feet deep, lined with small stones. Although the wall-slabs were heavily smoked, it was obvious that the room had not been destroyed by fire, for the masses of reed matting and juniper bark had doubtless formed part of the roof, and none of these showed any trace of burning. The main roof beams had disappeared, presumably removed either by the inhabitants themselves or by later comers, and only a

few small roof poles were found. We received the impression, from the lay of the material, that the roof had been conical, but we discovered no evidence as to the former total height of the walls or as to the method of entrance.

Just west of the room, near the top of the talus slope, was uncovered a series of small bin-like slab structures which were also covered with fallen roofing material and contained the same type of potsherds found in the room. It is probable that the bins were for storage, although they might possibly have served as individual sleeping places. Similar bins found in a Basket-maker II cave in 1915 gave some evidence of having been so used.¹

Not being able to find any further structures, a careful examination was made of the surface of the cave, of the talus, and of the arroyos in front. In the cave, pottery of the Pueblo III period was confined almost exclusively to the eastern end, no sherds of this type occurring in the section occupied by the slab structure. It seems very strange that fragments should not have become scattered farther west, but the bad condition of the cave roof, mentioned above, may have begun to manifest itself in Pueblo III times with the result that the people avoided that section. At the east end also was found a considerable number of Pueblo I sherds, which became more common just west of the late rooms, and were fairly abundant on the eastern talus. The west end of the cave and the western talus showed practically nothing but the plain gray wares of the slab room. Conditions in the arroyo proved that the same distribution of remains had obtained during the time of its cutting. The arroyo forks in front of the center of the cave, one branch terminating below the Pueblo III end, and the other in front of the western section. In this arroyo were quantities of sherds washed down by floods, collections of which were made, starting at the point where the wash enters the flat. Up to the junction of the two forks, sherds of Pueblo I, Pueblo III, and the plain gray types were found mixed together. In the right-hand or eastern fork were only Pueblo I and Pueblo III sherds; and in the left fork, no sherds but those of plain gray.

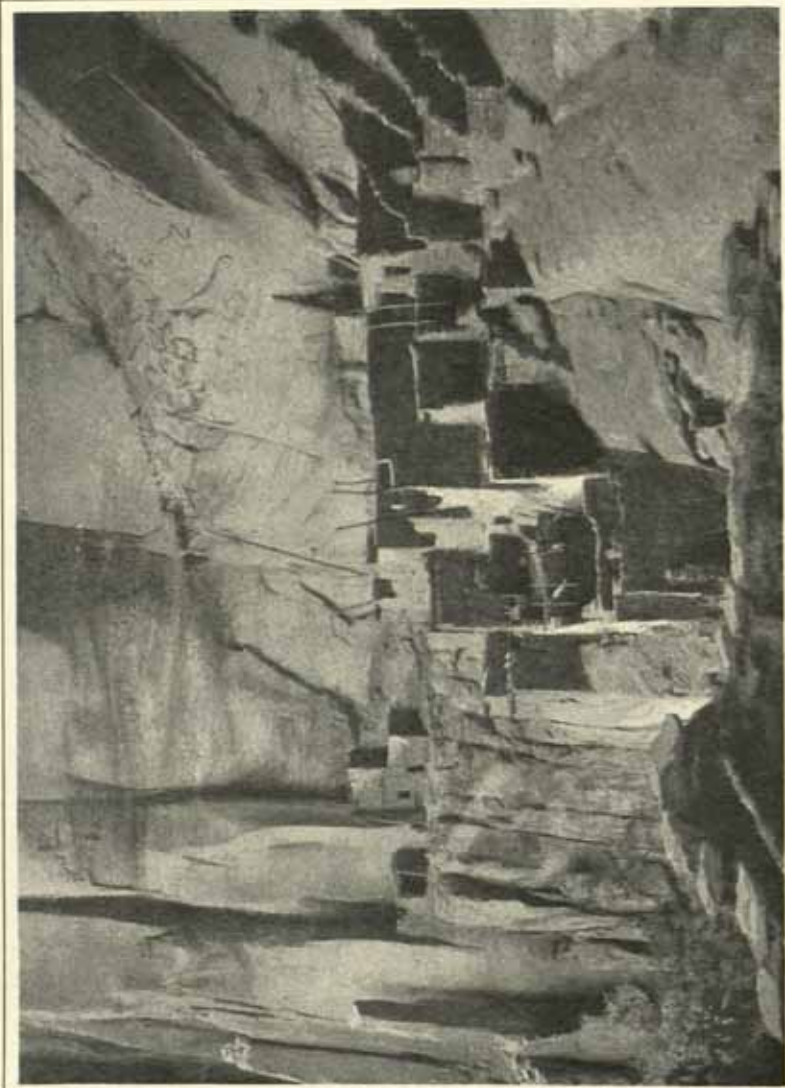
Next, trenches were cut in such parts of the talus as gave promise of holding deep deposits of rubbish. Places were selected near the junction of the Pueblo III zone, and of what we then called the

¹ Kidder and Guernsey, 1919, p. 206.

"plain gray" zone, in the hope of finding the two types of remains in stratigraphic order. In one trench the material appeared to have been badly mixed; but in a second one we were rewarded by the discovery of a top layer containing Pueblo III pottery, toward the bottom of which was a sprinkling of Pueblo I pottery. Under this came a heavy bed of juniper bark, and below it was rubbish with nothing but the plain gray wares. The base stratum also held an odd pipe-like object of clay (Fig. 26, c) and several bits of crude, unbaked clay vessels tempered with cedar bark. A bit of a similar vessel had already been found in the slab room. The greater antiquity of the plain gray ware relative to the two other types (Pueblo I and Pueblo III) was thus certainly established, but we were still anxious to find skeletons which would enable us to get some idea as to the physical type of the makers of the plain gray pottery. Our search resulted in the uncovering of two interments, one of which was of the Pueblo I period, the other probably Pueblo III.

Grave 1, located in the talus (Fig. 2), contained two burials. The first, that of an adult and a young child, had been disturbed; only parts of the skeletons of each remained in the grave. These lay close beneath the surface, the missing parts evidently having long ago disappeared down the steep bank. There were no mortuary offerings found *in situ* with this burial, but a Pueblo III food bowl lay broken just below the grave and in such a position that it had, without doubt, come from there.

The burial just described lay partly under a large rock. In clearing it, a second and undisturbed burial was encountered farther under the rock which clearly antedated the first one. This grave was roofed over with poles covered by reeds and bark, as shown in the lower picture (Plate 7), and contained the remains of a female about eighteen years of age. The skeleton was perfectly preserved, many of the bones being still held together by the tough ligaments of the body. A good portion of the hair, dressed as in life (Plate 12), still adhered to the skull which was markedly flattened. The body had been wrapped in a fur-string robe, held in place by a small woven strap. Most of the fur had disappeared, of course, but the warp and woof of the robe is still in good condition and is described farther on. In addition to the robe there remained portions of a cotton shroud; this was badly decayed. On the bottom and against the back of the grave were rush mats fairly well preserved. On



Betatakin



Upper, Cave 1, Segi; Lower, View down Segi from Cave 1



Upper, Masonry and hand prints on cave wall, Room a, Cave 1, Segi; Lower, Sealed-up door, Room a, Cave 1, Segi



Upper, Walled-up burial, Poncho House, Pueblo III; *Lower*, Burial 2, Grave 1, Cave 1, Segi, Pueblo I

these the body had been placed in a reclining position, facing south. Inverted over the body was a large coiled carrying basket (shown at the right in Plate 13). Other mortuary offerings were as follows: a small black-on-white decorated bowl (Plate 14, *j*), which lay at the right side of the body near the knees; a second bowl, inverted, at the left shoulder, under which was a seed jar (Plate 15, *a*); a bottle-shaped red ware pottery vessel (Plate 15, *d*); and a small plain gray ware pot with a handle (Plate 14, *b*). In addition to the pottery and the carrying basket, the grave contained pieces of dressed skin, wads of yucca-fibre, fragments of a sandal, a woven strap (Plate 10, *h*), a sleeve-like object of cotton, a ring basket (Plate 16), part of a fire drill, a broken bow, part of another bow, and also a quantity of corn cobs with traces of other food offerings.

This grave, the first Pueblo I interment containing perishable material that the writer has found, and the only one that, as far as he knows, has been described, furnishes much interesting new information. It provides an example of hairdressing; it surely identifies a Pueblo I type of red pottery (see p. 100) that had previously been of doubtful status; and it proves that the Pueblo I people possessed the bow and used loom-woven cotton cloth.

Grave 2. The location of this grave is shown on the plan (Fig. 2). It contained a few bones from the skeleton of an adult; the missing portions had been carried away by slides, the talus at this point being very steep. The only offerings found in the grave were a black-on-white bowl (Plate 14, *i*) and a miniature jug (Plate 14, *e*).

Grave 3 (see plan) contained the remains of a child. The body was wrapped in three small robes, one of feather-cloth and two of fur-cloth. These are described farther on. The offerings in the grave consisted of a black-on-white bowl, a red ware seed jar, and a small coiled basket, shown below the ring basket in Plate 16.

With the excavation of the graves our work in the cave itself was brought to a close, but perhaps the most important find was still to be made.

Mound in Front of Cave 1. About 300 yards distant from the front of the cave and a little to the west of it is a low mound of charcoal-blackened earth. Its greatest diameter is less than 50 feet, its height not over 2 feet. Near the top of the mound there protruded the rim of a small slab structure. This was cleared and found to be of oval shape, $2\frac{1}{2}$ feet one way and 2 feet the other. It was built

of small, irregular slabs set edgewise, and the earth which filled it contained a large amount of charcoal. This structure was like many of the slab cists found in Basket-maker II caves.

On further examination of the mound, the top of a skull was observed just showing through the surface. It proved to belong to the skeleton of an adult buried in a half-sitting position, the knees well drawn up, the head, which faced south, bent low on the chest, the right arm resting in the lap, and the left flexed across the chest (Plate 17). Near the feet were a small globular pot and the bowl shown in Plate 19, *f* and *c*. These were of exactly the same type as the gray sherds found in the cave. Burial 2 lay 10 feet east of the grave just described. It had been disturbed, presumably by prairie dogs. As nearly as could be determined, the position of the body had been the same as that in Grave 1. There were no pots or other objects. Grave 3 was in order and contained the skeleton of an adult buried in the same position as the first, except that both hands rested between the thighs. The head faced southwest. The right humerus showed a knitted fracture, and the upper jaw an abnormal tooth eruption. At the right side of the skeleton were the fragments of a small red ware bowl (Plate 19, *g*). At the feet on the same side were a large sherd from a plain gray pot, and pieces of a large bottle-necked olla (Plate 19, *e*), the latter broken by a rock that had apparently been thrown into the grave when it was filled. Near the elbow was a large plain gray sherd containing a number of pieces of copper ore; below the sherd was a broken metate. Burial 4 was found 10 feet northwest of Burial 3. This somewhat disturbed skeleton lay just beneath the surface with the head pointing south. Nothing was in this grave except some large sherds of gray ware which may or may not have been mortuary offerings. Burial 5 was encountered while clearing Burial 4. It was that of an adult and contained no pottery. The grave was partly filled with large fire-blackened rocks which evidently had been thrown into the grave at the time the interment was made.

All the above burials lay close below the surface and, with the exception of Skeleton 3, faced southwest. The skulls are all undeformed and as far as can be determined by visual inspection are identical with the Basket-maker II skulls. The earth composing the mound contained a large amount of charcoal and ash running from 8 inches to 2 feet in depth. It appeared, therefore, that the

mound must have been a house or camp site; no foundations were found, however, although the soil contained many burned stones. If the mound had been used only for burials, there seems no practical use to assign to the small slab cist on the crest. It is possible that the cist was used for the kindling of ceremonial fires, thus accounting for the large amount of charcoal in the earth. However, in view of the fact that we have no other evidence of such practises, and that mounds built primarily for sepulchral purposes are unknown in the Southwest, it seems most probable that this mound was merely a camp site. If houses were built upon it, they may have been of the unsubstantial type postulated in the description of the Segi Sand Hill (see p. 25).

We were now in possession of the much desired data from the graves as to the physical type of the plain gray pottery makers of the cave, and were able to take stock, so to speak, of what we knew of them. They antedated the Pueblo I people. They built round houses with slab foundations, the wall being carried above the slab tops by means of courses of small stones set in large amounts of adobe, with roofs made of reeds and juniper bark. They used scallop-toed sandals and woven carrying straps, both finely woven and elaborately ornamented. Their twined-woven bags were coarse. The pottery was mostly plain gray, with a few crudely decorated pieces of black-on-white, and a few of plain red. Their skulls were apparently identical with those of the Basket-maker II people. The stratigraphic position of the remains and the crudity of the pottery indicated that this people was an early one; the resemblance of the twined-woven bags to those of the Basket-maker II people, the head form, the absence of cranial deformation, all pointed to close relation to the Basket-maker II people. The fairly advanced house type and the presence of pottery seemed to argue for a developed stage of the Basket-maker II, hence the newly discovered culture was tentatively called "Post-Basket-maker" (Basket-maker III). Subsequent work has served to strengthen our belief in the chronological and cultural relationships implied by the above name. Our knowledge of the Basket-maker III people, however, was still very limited, and search was accordingly made for other sites which might yield further information.

Cave 2, Segi is near the mouth of the branch canyon west of Cave 1 (see sketch-map, Fig. 1). In its east end are a number of

Pueblo III rooms grouped about a small kiva. These rooms are built on the bedrock floor of the cave. Room *a* (Fig. 3), the best preserved of the Pueblo III structures, stands 6 feet in height. The kiva, also shown in the figure, has no unusual features except that its builders found it necessary to cut through a projection of the ledge to make way for the ventilator shaft; as the plan shows, the kiva is slightly oval in shape.

The small rooms (*d*, *e*, *f*) are the most interesting features of the ruin. These are typical Basket-maker III structures that were

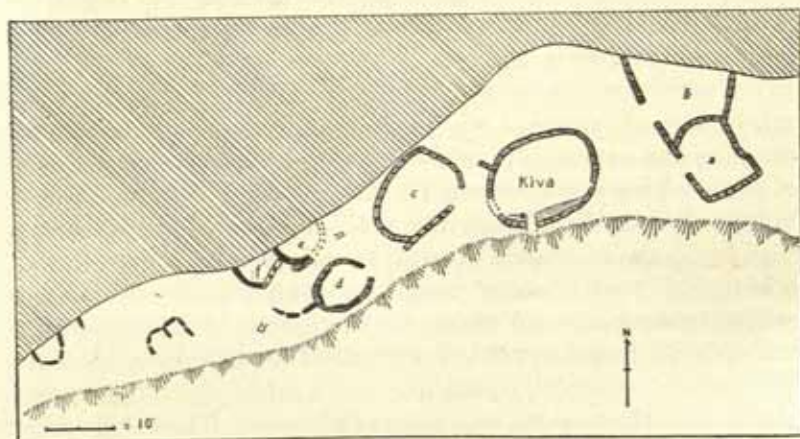
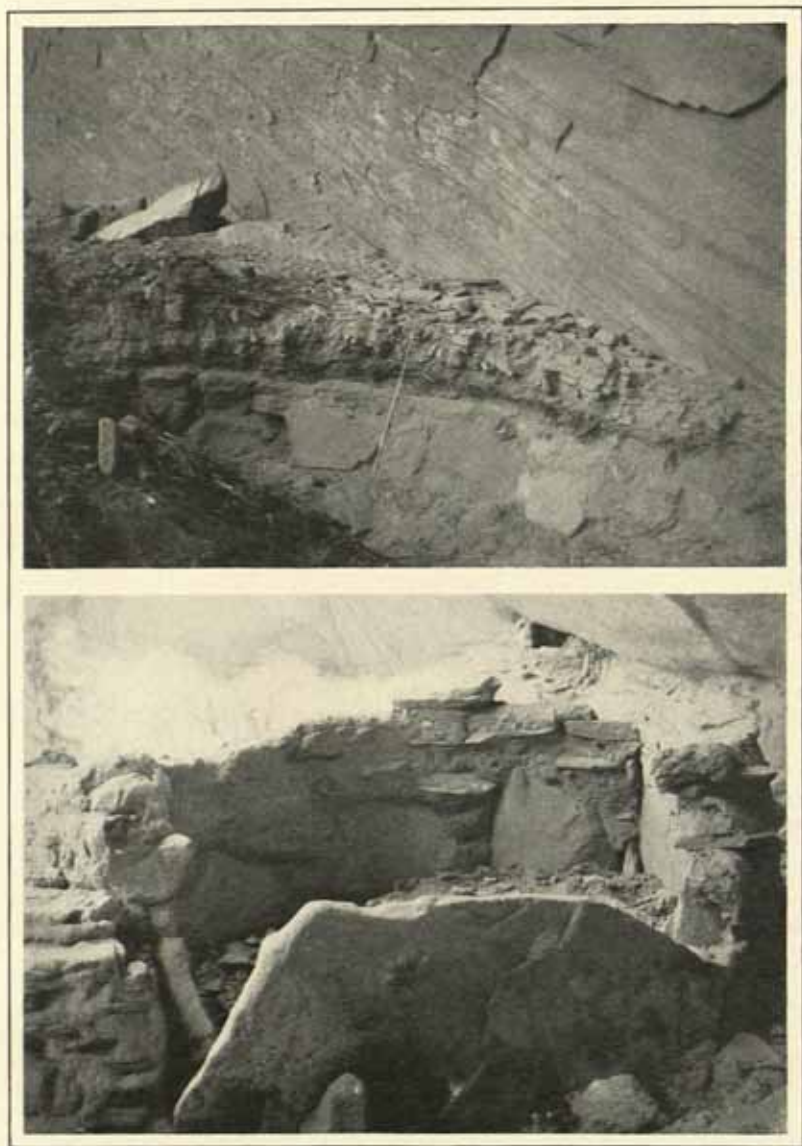


FIGURE 3

Plan of Cave 2, branch of Segi

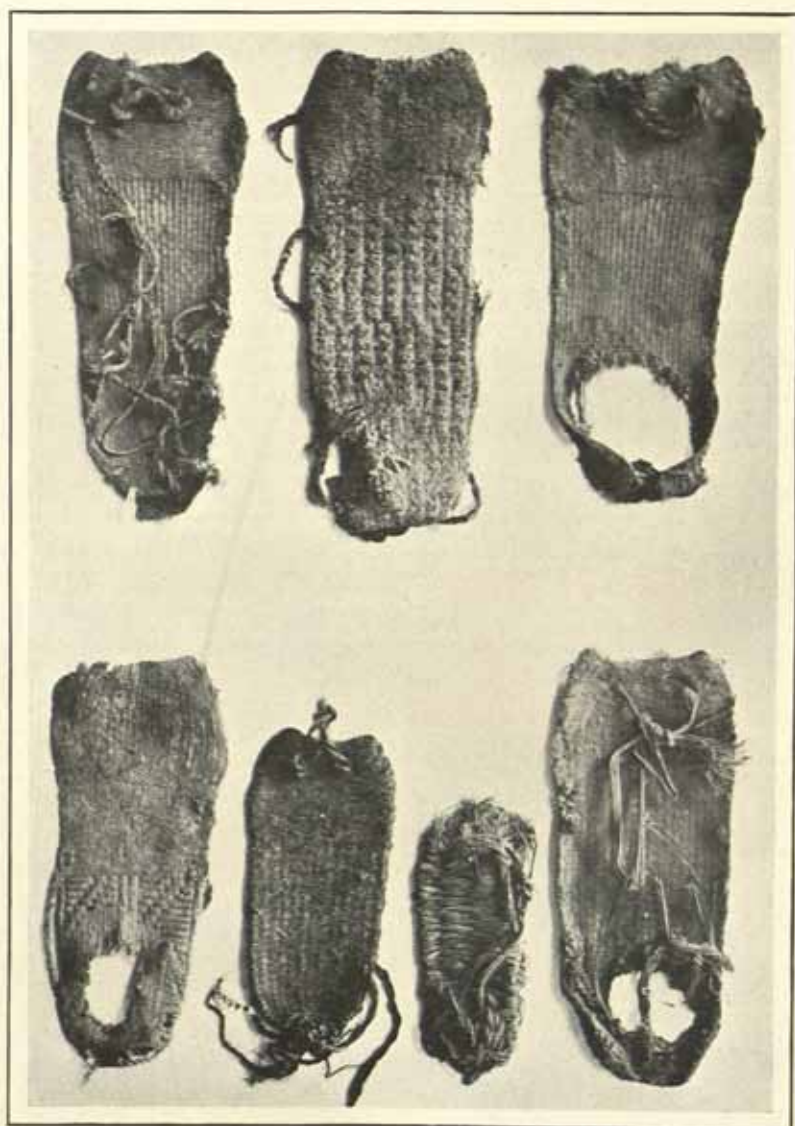
utilized by the later occupants of the cave. The present condition of these rooms makes it possible to show by photographs the differences in construction and masonry of the two periods. Plate 8, lower, shows Room *d*, a Basket-maker III structure. This room has a foundation of large stone slabs on which are laid hand-molded, loaf-shaped masses of adobe interspersed with stone. The adobe is heavily tempered with bark, husks, and coarse charcoal. The finished structure is plastered outside and inside with adobe mortar.

Plate 20, lower, photographed from the point indicated in the plan (Fig. 3), shows above the laid-up Pueblo III wall in the foreground the plastered outside wall of Room *e*, another Basket-maker III structure. The upper picture in Plate 20, Room *e*, shows a buttress wall of Pueblo III construction built against the old structure to strengthen it.



BASKET-MAKER III STRUCTURES

Upper, Section of wall, Room n, Cave 1, Segi; Lower, Room d, Cave 2, branch of Segi



Basket-maker III sandals, Room n, Cave 1, Segi

In Water Fall Ruin and others, we have found instances where Basket-maker III structures have been incorporated into the rooms of later periods.

Excavations in Cave 2 yielded little of importance. There was no depth of rubbish and sherds were not plentiful, types common to the late ruins of the region predominating.

Cave 3, Segi. About a mile from Cave 1, in a bend of the west wall of the branch leading out of the main canyon to the northeast, is a shelter of considerable size which faces nearly west (Fig. 1). At the north end there is a small niche walled up by the Pueblo III people as a storehouse. From here the narrow floor space slopes steeply upward to the south end, most of the surface being uneven and littered with rocks. The cave had been dug over to a considerable extent previous to our visit, but there remained a small area which seemed less disturbed than the rest. Excavating here, we uncovered a Basket-maker II grave that had originally contained the remains of two individuals. The head and some other portions of the upper of the two bodies were missing. Beneath these fragmentary remains was the partly mummified body of an eighteen-year-old male, wrapped in a badly decayed fur-string robe. It had been placed in the grave in a sitting position with the knees drawn closely up against the trunk. The arms were at the sides. Along the right arm was an atlatl in contact with which were two atlatl stones; the wrappings which once bound them to the shaft had entirely disappeared through decay.

In the pelvis was an oval object that looked like a white stone, but which later was identified as a *vesical calculus* (bladder stone). Dr. H. W. Starkweather, to whom it was submitted, very kindly furnished the following analysis:

The stone (Fig. 4) is symmetrically oval and weighs approximately 1 ounce troy. It has a somewhat chalky look and, like chalk, it leaves a white mark when rubbed on a hard surface. The surface is not smooth but has a shallow reticular pitting of a brownish hue which shows through the chalky white. The stone is soft and easily drilled. Spectroscopic examination showed the presence of calcium. Dilute acetic acid gave a slight evolution of gas, indicating the presence of some carbonate. An acid solution gave a slight white precipitate with magnesium and ammonium chloride, indicating the presence of a phosphate. More than half of the material did not dissolve in dilute acetic acid. A small amount of the residue, heated on platinum, burned without flame, showing the presence of organic matter. Another portion subjected to the murexide test was positive for uric acid.

About the neck of the mummy was a string of cylindrical bone beads, and in the decayed fur-string robe wrapped about the body a feather head ornament (Plate 49, *d*).

In another part of the cave we found close under the surface the remains of an infant, buried under a twined-woven cradle or baby-carrier of grass.

As we were unable at this time to find further evidence of Basket-maker III remains in Segi, and as we were desirous of learning

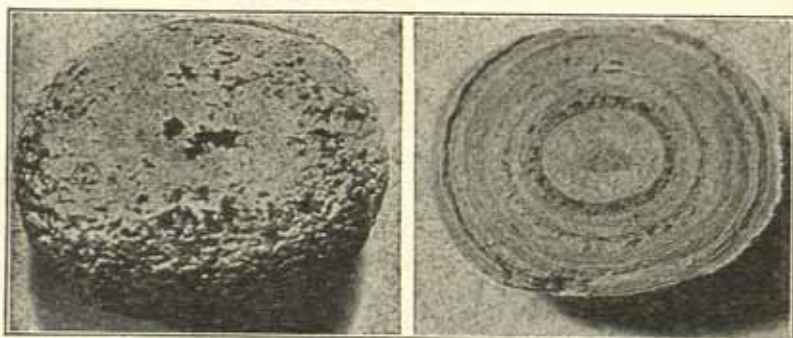


FIGURE 4

Bladder stone (*Vesical calculus*) found in pelvis of skeleton, Cave 3

whether the culture had more than a local distribution, we moved camp to Segihatsosi (see map at end of paper).¹

Caves in Segihatsosi. In Segihatsosi and the side canyons leading out of it are a number of caves (see sketch-map, Fig. 5), all of which have been worked to greater or less extent by other excavators. Some of these caves contain Pueblo III structures, the most extensive being a picturesque and well preserved cliff-dwelling in Cave 10. In Cave 4, our party uncovered a number of typical Basket-maker II slab cists but obtained no specimens. On the wall of the cave was an interesting group of pictographs in red and white paint (Plate 21, *a*, and Plate 22, *e*). The curious human figures seem to be carrying baskets on their heads. The long object may perhaps represent an atlatl, although arrows are sometimes similarly drawn on the pottery of the Mimbres region. If the depiction in this case is intended for an arrow, the pictographs must be of later date than the slab cists; for the latter are almost surely

¹ For descriptions of this canyon and for accounts of previous work in it, see Cummings, 1910, pp. 9-18; Guernesey and Kidder, 1921, pp. 33-40.

Basket-maker II, and, as far as we know, the Basket-maker II people never used the bow and arrow.

Plate 23, *a*, is a view taken looking out of the canyon from Cave 5, and showing Cave 4 at the right. Cave 5 is a huge grotto 75 to 100 feet deep, the floor sloping upward toward the back. Our predecessors had cleared a number of well-like rooms along

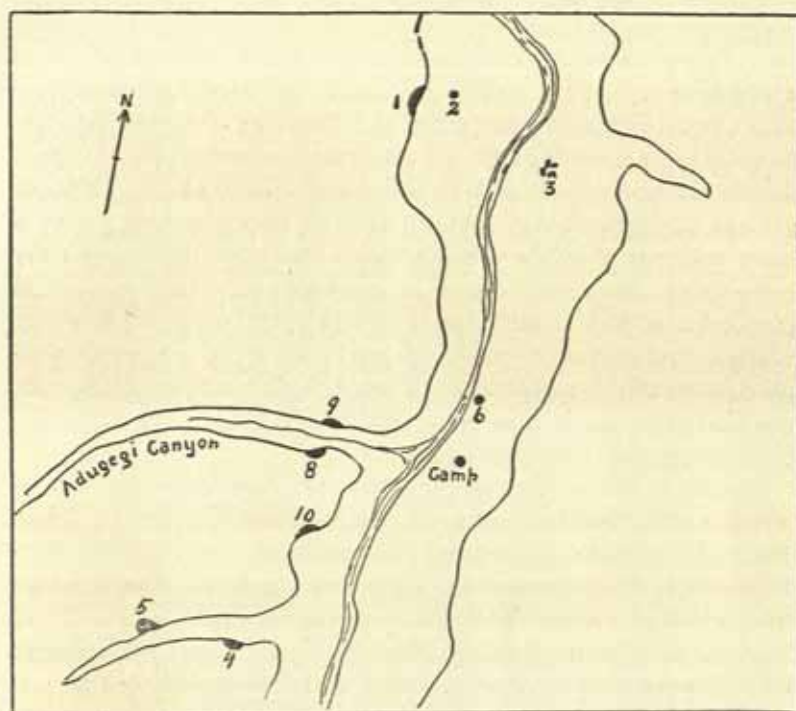


FIGURE 5
Sketch-map of Segihatsosi Canyon and side canyons

one side, all lying beneath the present surface. The cave floor is covered with two or more feet of *débris* from the roof.

In a small patch of undug refuse under a flat rock, we found the remarkable string of *olivella* shell beads illustrated in Plate 24, *a*, and described on page 78. No surely identifiable Basket-maker III remains were observed during this visit to Segihatsosi.

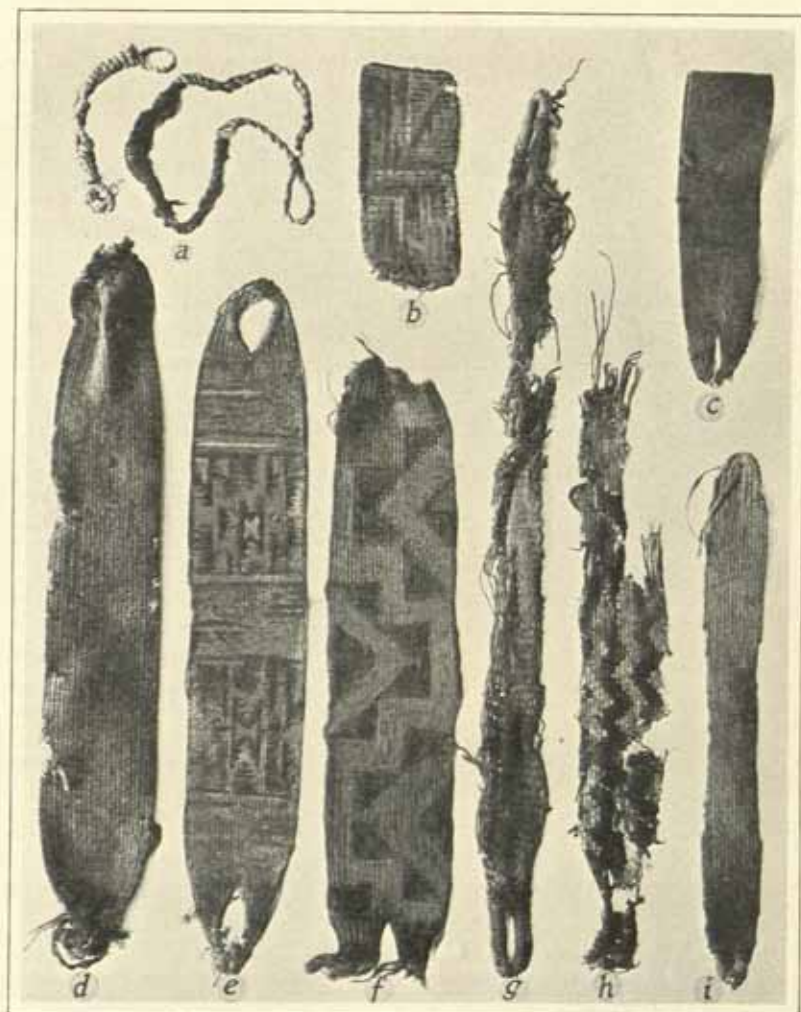
Hagoé Canyon. From Segihatsosi we moved camp to Hagoé, a short canyon breaking into Monument Valley from the south.

Although Hagoé is scenically most magnificent, one suffers there from an extreme shortage of water. Our camp was made at a deserted Navajo *hogan* near the mouth of the canyon. Water was obtained from a hole dug in the dry bed of a near-by wash.¹ At the time of our visit there was sufficient water of fair quality for ourselves and our horses. We could probably also have obtained some water from tanks in the tops of high rock hummocks in the canyon wall, as we saw at a number of such places series of toe holes leading to the top of the rocks that had been cut by the ancient people to give access to natural potholes or tanks that accumulate and hold water from melting winter snow and the rains of the wet season. Some of these toe holes were almost weathered away. We have on a number of occasions had to depend on similar pockets. That the ancient inhabitants were obliged to seek water in such places is some evidence that there has been no real climatic change since early times. We were for some time puzzled as to how the ancient people knew they would find water in these inaccessible places without first cutting steps, which we found to be a most arduous process even with metal tools. Their probable method of locating the tanks was made clear when we noticed that doves and other birds resorted to them for water.

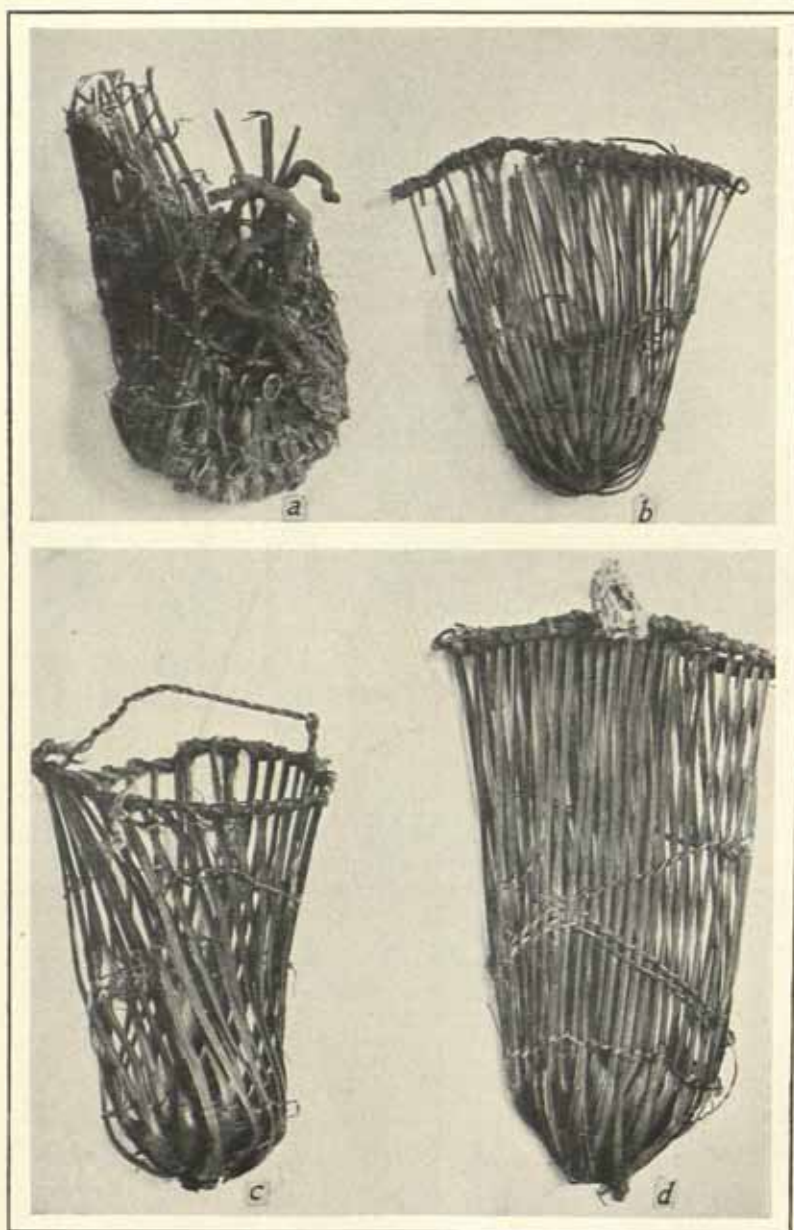
In spite of the dryness of the valley it shows signs of at least intermittent occupancy during the Basket-maker II, Pueblo I, and Pueblo III periods, and certain finds made here may possibly date from times even more remote. These finds consisted of several sites from which all surface sand had been scoured by the wind, leaving bare the hard adobe subsoil. Upon this were small areas strewn with chipped points, rejects, flakes, and fire-cracked stones. At none of them was to be found any trace of buildings, or any sign of pottery. They may possibly be camp sites of the non-agricultural people who, theoretically at least, must have lived in the region before the development of the Basket-maker II culture. They may, on the other hand, be of early Paiute origin. We do not think they are Basket-maker II.

That the Basket-maker II people did occupy Hagoé is proved by the presence in caves of typical painted pictographs of large square-shouldered human figures, and of slab cists of Basket-maker II type. Pueblo I remains were found in 1914, in fact our first knowl-

¹ Called Haspidibito (Dove Springs) by the Navajo, a very common name on the reservation.

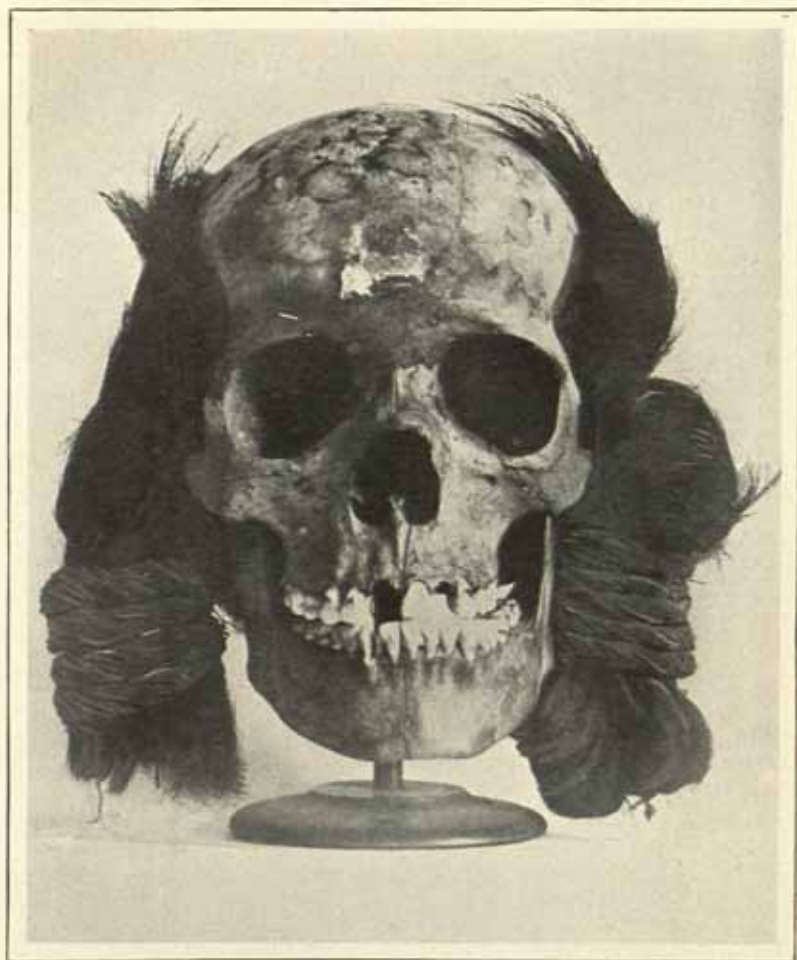


BASKET-MAKER III AND PUEBLO I ARTICLES FROM CAVE 1, SEGI, AND WATER FALL RUIN
a, Handle-like cord loop, Water Fall Ruin, Pueblo I, and handle-like loop of fibre rope and hair-string, Cave 1, Segi, Basket-maker III; *b*, Fragment of apron, Room *n*, Cave 1, Segi, Basket-maker III; *c*, Carrying band, Water Fall Ruin, probably Pueblo I; *d*, *e*, Carrying bands, Room *n*, Cave 1, Segi, Basket-maker III; *f*, Carrying band, Water Fall Ruin, Pueblo I; *g*, Carrying band, Room *n*, Cave 1, Segi, Basket-maker III; *h*, *i*, Carrying bands, Grave 1, Burial 2, Cave 1, Segi, Pueblo I

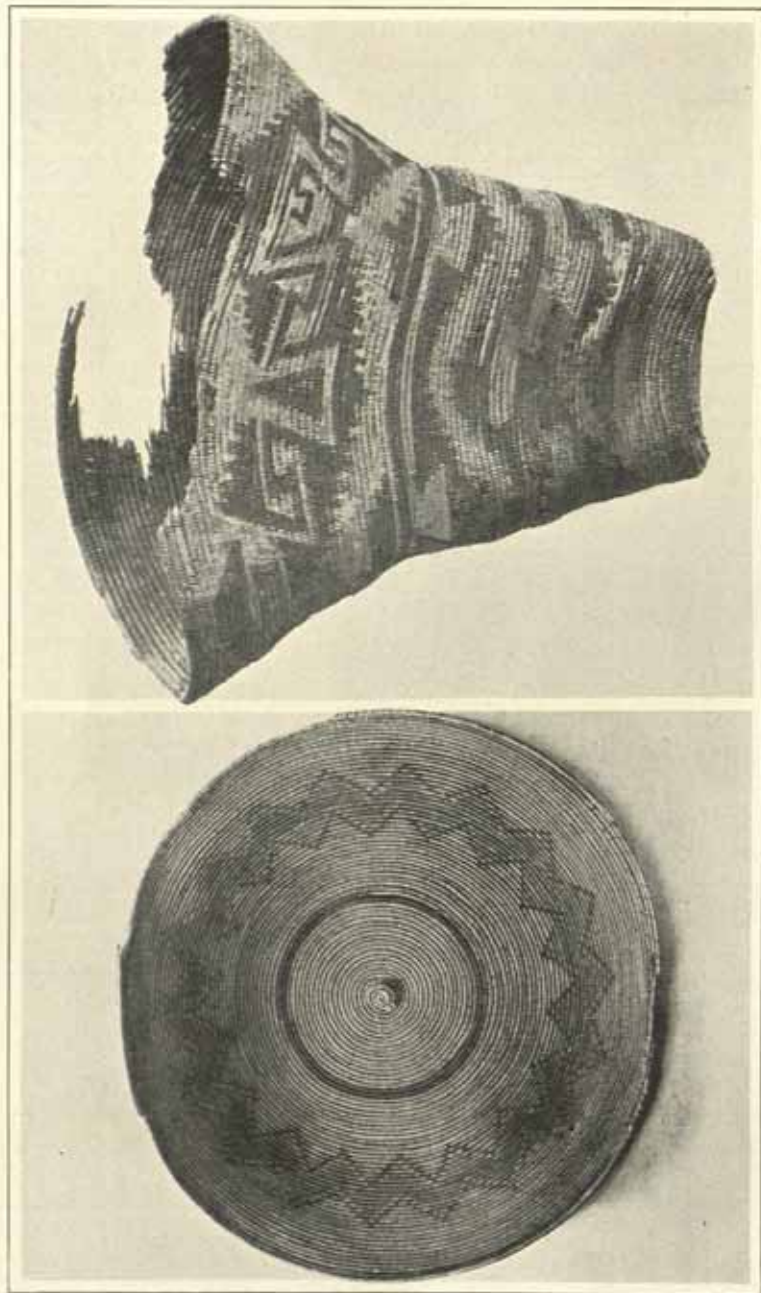


CONTAINERS MADE FROM YUCCA PLANTS

a, Filled with roots, from Cist 1, Broken Roof Cave, Basket-maker II; b, c, d, From Room n, Cave 1, Segi, Basket-maker III



Skull showing feminine style of hairdressing, Burial 2, Grave 1, Cave 1, Segi, Pueblo I



Left, Tray basket, killed, from Cist 1, Broken Roof Cave, Basket-maker II; *Right*, Carrying basket from Burial 2, Grave 1, Cave 1, Segi, Pueblo I

edge of that culture was derived from objects taken from a cave in Hagoé.¹ During the present visit we observed some exceptionally well preserved structures that we believe to be of Pueblo I origin. They are in a cave in a branch of the main canyon nearly opposite that which shelters Ruin 5 (1914). It is a shelter 200 feet long by about 35 feet wide. The general appearance of the houses is shown in Plate 25, upper left; their arrangement is made clear by the sketch-plan, Figure 6. They are built upon foundations of upright

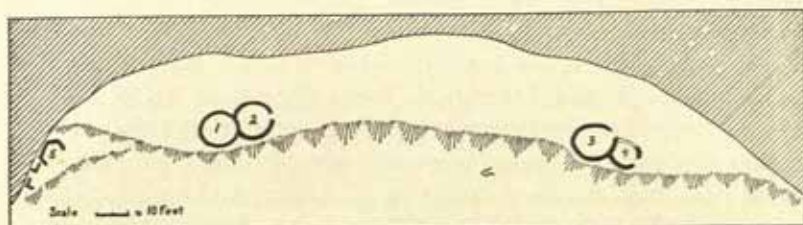


FIGURE 6

Sketch-plan showing arrangement of structures in cave, Hagoé Canyon

slabs set on the sloping rock floor of the cave. The upper parts of the walls were made in regularly laid courses of loaf-shaped "gobs" of adobe, tempered with grass and charcoal and reinforced with spalls.

The walls of Rooms 1 and 2 stand to a height of $5\frac{1}{2}$ feet. The tops are finished off smoothly but give no hint of how the roof was laid. In the east side of each room is a door. The doors average 20 inches high by 17 inches wide, the jambs being nicely rounded off with adobe. The lintel of one door was supported on one side by two sticks built into the wall. The front of Room 2 shows restoration, the new masonry being different in appearance from the rest. In one end of the cave are the foundations of two or three rooms which we think are of Pueblo III origin. On the surface in front of the cave were many potsherds of late Pueblo III type. This, however, does not alter our belief that the circular rooms are Pueblo I.

In a short branch canyon near the head of Hagoé is a small cave, the floor of which has been completely washed away by a newly formed arroyo, which here makes its way along the base of the cliff. On the back wall of this cave, $7\frac{1}{2}$ feet above the bottom of

¹ Ruin 5, 1914, Kidder and Guernsey, 1919, pp. 41-45.

the arroyo, are paintings representing two tau-shaped doors (Plate 25, upper right). Cliff-house rooms had evidently once occupied this cave, the cliff supplying their back wall. The arroyo has completely cut away the houses. The rooms may have had doors of the same shape in the walls that formerly stood opposite the above-mentioned paintings.

We were unable to discover any Basket-maker III remains in Hagoé, and it was not until six years later, during the preparation of the present report, that we determined that people of this culture had actually lived in the canyon. While checking up the data on Basket-maker III house types, it occurred to Dr. Kidder and the author that a semi-subterranean room, excavated by us in 1914 at Cave 5, Hagoé, had many of the characteristics of the Basket-maker III houses.¹ We at once got out the collection of sherds made from that chamber twelve years before and found them to be of undoubted Basket-maker III type. At the time of our original excavation we had not been able to distinguish them from undecorated bits of Pueblo I cooking vessels, and so had assigned both sherds and room to the latter period.

With the exploration of Hagoé Canyon our fieldwork for 1920 was brought to a close. We returned to Kayenta, packed the collections, and travelled by motor to the railroad at Flagstaff.

That the Basket-maker II people did occupy Hagoé is proved by the occurrence in caves of painted pictographs of square-shouldered human figures which were identified by the expedition of 1914 as belonging to this period,² the identification being based mainly on the presence in Cave 2, Kinboko, which, with the exception of a relatively recent Hopi cache (pot and ladle), contained only Basket-maker II remains. To this evidence may be added the square-shouldered figures in Broken Roof Cave where there was no trace of occupancy other than Basket-maker II, also the fact that in nearly every instance where these figures were found on the walls of caves, digging would reveal further evidence that such caves had been used by these early people.

¹ For description and drawing of this room, see Kidder and Guernsey, 1919, pp. 43, 44.

² Bulletin 65, Kidder, Guernsey.

SEASON OF 1921, KAYENTA DISTRICT

THIS season we entered the field from Flagstaff, Arizona, proceeding to Kayenta by motor. The distance by this route is somewhat longer than that from Gallup, New Mexico, but the road is much better. At Kayenta we outfitted with horses.

Explorations were carried on in Segi and Segihatsosi canyons, and at surface sites near Kayenta. Owing to the unusual dryness of the season, there having been scarcely any rain during the preceding year, we were unable to reach certain sections we had hoped to visit. Notwithstanding the drought, we experienced more than usual difficulty in getting from place to place because of the quicksands found in many of the almost dry creek beds. We lost one horse from this cause, and on several other occasions were only just able to rescue animals from quicksands.

During the winter of 1920-21 we had had an opportunity of studying the finds from Cave 1, Segi, and had become quite certain that their field identification as belonging to a period between the Basket-maker II and the Pueblo I was correct. A short paper defining the new culture and naming it Post-Basket-maker was published in the *Proceedings of the National Academy of Sciences*.¹ The work of the summer of 1921 was planned with an eye to the discovery of further material of Basket-maker III (Post-Basket-maker) date. We also hoped to find some Pueblo I sites, in order to learn what, if any, relation they might bear to the older remains. Cave 1, Segi, was revisited and some days were devoted to digging in the talus. The trenches which revealed the stratigraphic material mentioned on page 7 above were opened at this time. On the way to Cave 1, two other sites were examined.

High Caves, Lower Segi. About two miles up from the mouth of Segi Canyon there can be seen from the trail two caves just under the rim rock of the south wall (see sketch-map, Fig. 7), and nearly 700 feet above the canyon floor. We had noticed these caves in 1920, but did not have time to visit them. As the cliff below is almost perpendicular, it was found necessary to start at the mouth of the canyon and work our way up from one bench to another until the level of the caves was reached—a hard three hours' climb. From a point higher up the canyon it was later found pos-

¹ Kidder and Guernsey, 1921, pp. 69-71.

sible to reach these caves in about one third of this time, but the shorter route required the negotiation of some bad ledges.

The caves lie close together at the base of an overhanging section of the cliff. One of them proved to be a shallow recess containing a few slab cists, above which lay fragments of bark-tempered adobe that had once formed part of their upper walls. In one cist sunk in

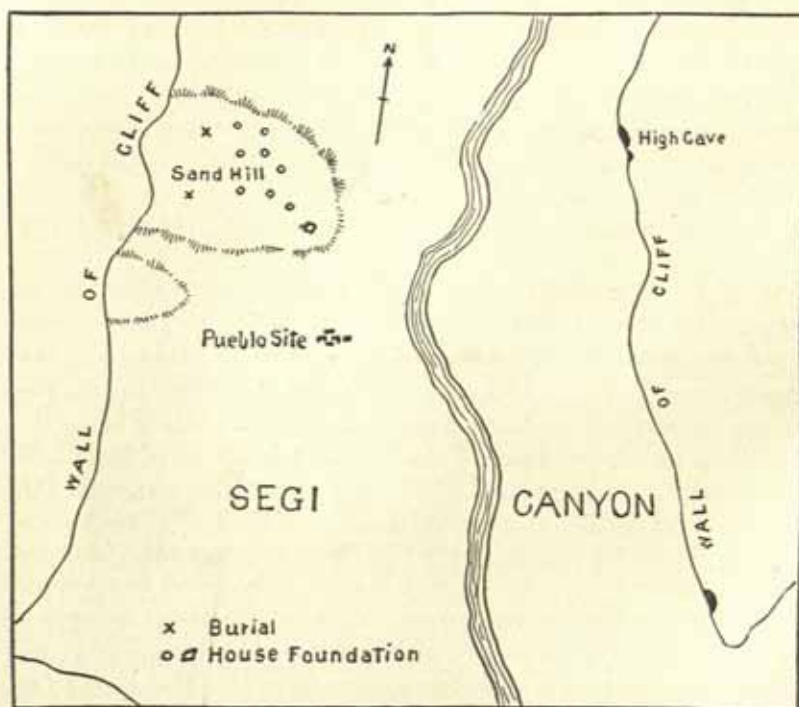
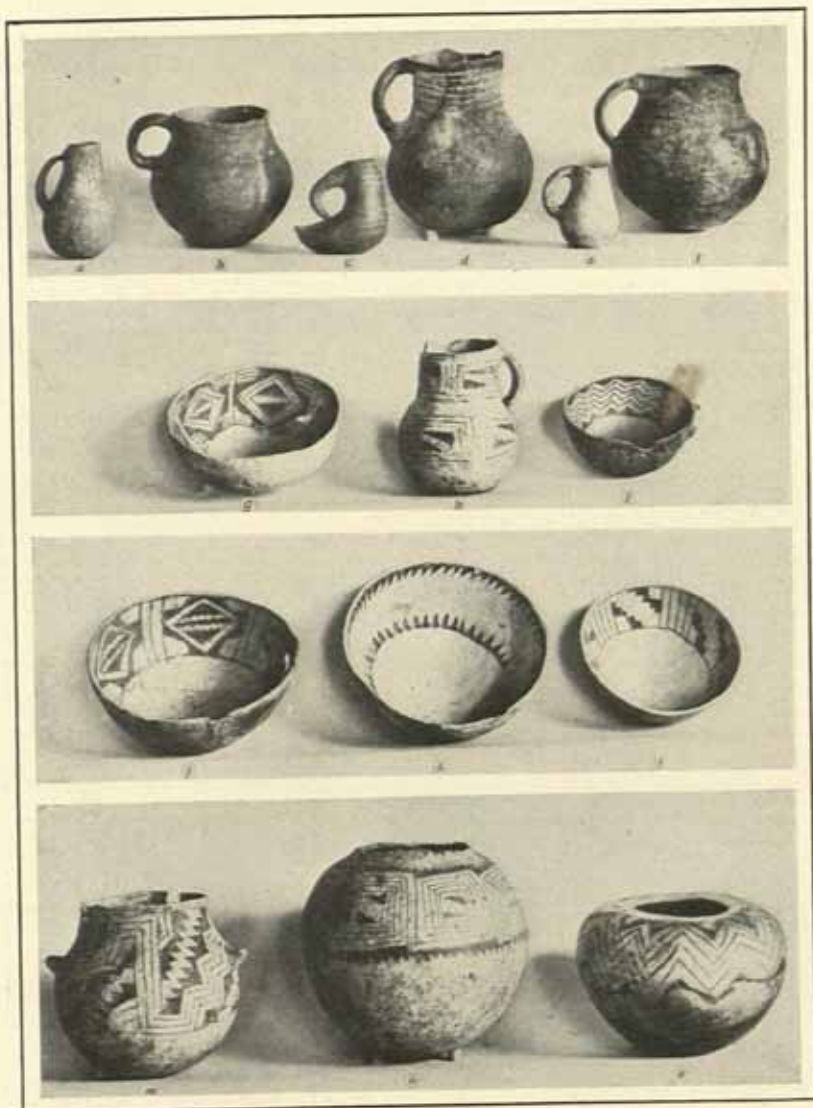


FIGURE 7
Sketch-map of Lower Segi

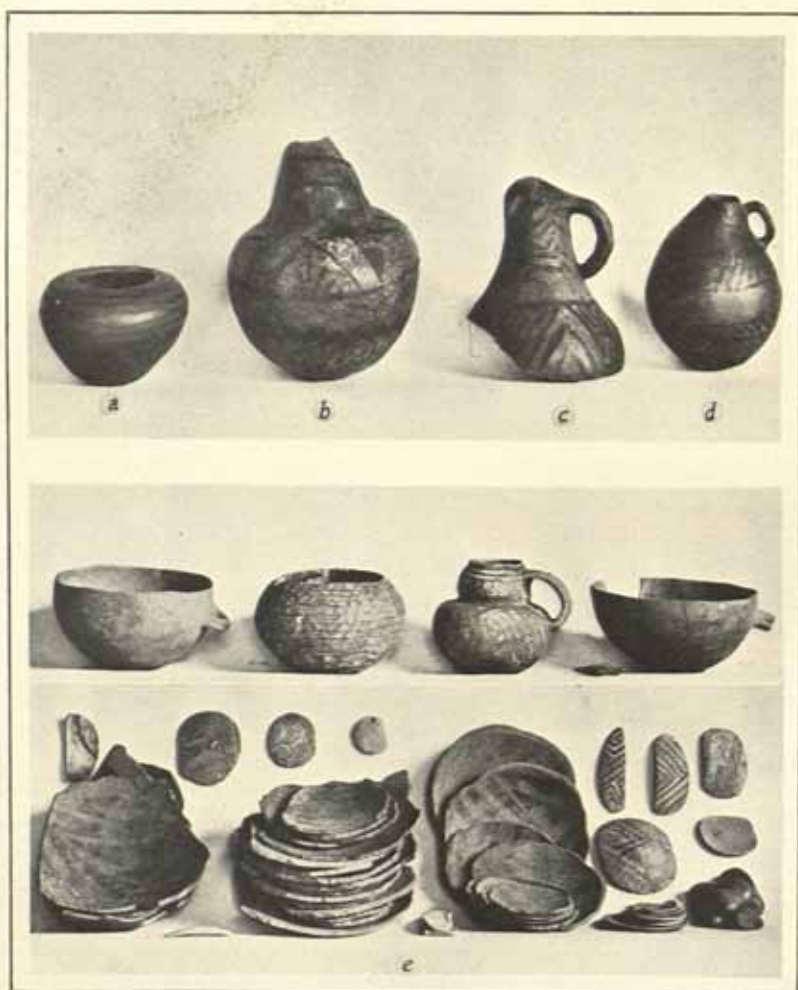
the hardpan were found parts of the skeleton of a child, fragments of a coiled basket, and one scallop-toed sandal. Aside from these specimens the first cave proved barren.

The larger cave, about 60 feet farther along the cliff, has a depth of 36 feet, is 32 feet across the front, and 15 feet high. On the back wall are a number of interesting pictographs done in red, yellow, white, and green paint. Some of these are reproduced in Plate 22, *a*, *b*, *c*. There are also a number of hand prints.



PUERLO I POTTERY

a, Miniature jug, vicinity of Kayenta; *b, j, k, o*, Plain gray pot and black-on-white decorated ware, Burial 2, Grave 1, Cave 1, Segi; *c*, Miniature red ware jug, Water Fall Ruin; *d, g, n*, Plain gray ware pot and black-on-white decorated ware, burial, Site 6, Segihatsosi; *e, i*, Miniature jug and black-on-white bowl, Grave 2, Cave 1, Segi; *h, m*, Black-on-white jug and pot, Grave 1, Say-a-Kin; *l*, Black-on-white bowl, Keam Collection, Keam's Canyon.



PUEBLO I RED WARE AND POTTER'S OUTFIT

a, d, Burial 2, Grave 1, Cave 1, Segi; b, Grave 11, Say-a-Kin; c, Water Fall Ruin, 1914;
e, Potter's outfit, grave at Kayenta, Pueblo III

The plan (Fig. 8) shows the location of what appears to have been a roofed structure. Of the fallen roof there remain three beams, over which are quantities of sticks, brush, and juniper bark. Nothing was recovered from the digging at this point. In front of the room, charcoal and ashes were found to a depth of more than one foot. Through the deposit were scattered many corn cobs.

In the rear of the cave back of the room are a number of typical Basket-maker II cists dug in the hardpan. These contained nothing but bark, grass, and plant stalks. From the general digging were recovered two coarsely woven sandals, a number of turkey bones,

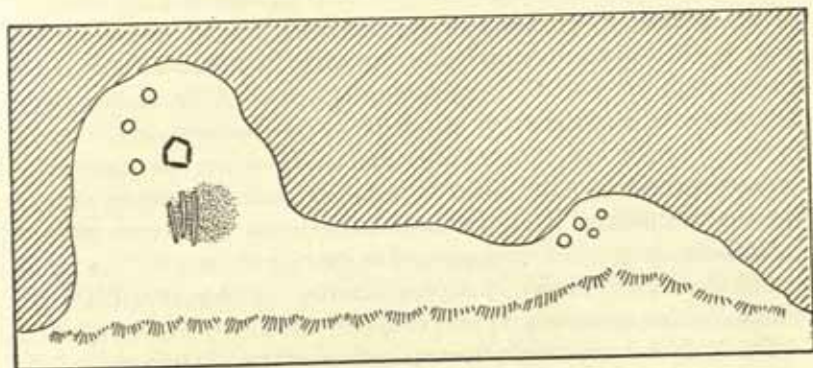


FIGURE 8
Plan of High Cave, Segi

specimens of several varieties of corn, a single bean, and a small string of cylindrical beads. None of these were in definite association with the structures.

No very important conclusions can be drawn from the work here. It is evident that the cave was used for storage by the Basket-maker II people, for the cists in the hardpan are quite surely of that period. The roofed structures may be Basket-maker II or perhaps Basket-maker III. The pictographs, particularly the square-shouldered figure, the zigzag snakes, and what appear to be representations of atlatls (Plate 22, *b*, *e*), are probably Basket-maker II, although they are not quite typical.

The bean and some of the varieties of corn have never yet been found by us in undisturbed Basket-maker II deposits, so that it seems likely that the cave was used as a shelter in later times. It

should be noted that we observed a number of small Pueblo III structures along the trail on the way to the cave.

At the conclusion of the work in Cave 1, camp was moved down the canyon to a site which had been noticed on the trip in from Kayenta.

Segi Sand Hill. About one and a half miles above the mouth of Segi Canyon, banked up against the base of the southwest wall, which here rises sheer to a height of several hundred feet, is an enormous drift or hill of blown sand. On the east and north it slopes gently to the canyon floor; its west side falls abruptly to the bottom of a narrow gorge. At and near the summit are areas of charcoal-blackened sand, which contrast so sharply with the light color of the hill that, seen from the trail, they first attracted our attention to the site. Closer examination showed the surface to be dotted with the foundations of rude structures placed singly and in groups (Fig. 7). All of them are roughly circular. The tops of the upright slabs, of which these foundations consist, barely appear above the surface. The structures vary in size from cists $2\frac{1}{2}$ feet in diameter to circular enclosures 8 or more feet across. On a number of them grow ancient junipers like the one shown in Plate 25, middle, which measures $3\frac{1}{2}$ feet in diameter.

The surface is plentifully strewn with sherds, and our excavations revealed large areas in which charcoal mixed with sand ran to a depth of somewhat over one foot. On the very crest of the slope was a blown-out burial. There remained only a few crumbled and sun-bleached fragments of bone, with a number of beads of stone and shell, fragments of a large chipped knife blade, a broken chipped atlatl foreshaft point, and some broken ornaments. All these articles are unlike Pueblo III products and very like those of the Basket-maker III people. The potsherds scattered over the surface were identical with the sherds and pottery from the excavations in the Basket-maker III end of Cave 1. A large number of the sherds bore the almost indestructible, compact, perforated side lugs (Plate 26) which we have come to look upon as highly typical of Basket-maker III pottery. On the entire site, which covers a considerable area, there was found barely a handful of sherds of the late pottery of this region, notwithstanding the fact that at the base of the ridge less than 300 yards distant there is a small Pueblo ruin.

The location of this site, overlooking the entrance to the canyon, and its sandy soil, always dry, would recommend it to primitive people, though its complete exposure to the sun, except late in the day when shadows of the cliff furnish some relief, make it exceedingly uncomfortable for excavation. Owing to the extent of the site only a small part was excavated, though the whole area was tested for burials.

The foundation wall shown in the plan (Fig. 9) encloses an area 7 feet in width and probably somewhat more in length. There were no slabs for a short space on the south side, where possibly there had been an entrance; this dimension could not, therefore, be exactly determined. The foundation is of upright slabs of stone averaging 2 feet high by about 2 feet wide. Between the slabs at two points in the west wall are upright stakes; a third stake is set a little inside the wall on the east side. The east wall extends in a direct line, 4 feet beyond the back or north wall, with a stake at the end of the last slab. This may perhaps be part of the wall of an adjoining room, or the north wall may have been only a partition. Details were difficult to trace, as the earth in and about the room was so compact that it had to be loosened with a pick. Owing to this condition, a bench-like structure of adobe rising about one foot above the floor level in the northeast corner of the room was partly destroyed before it was found not to be a part of the fill. It may have been a raised fireplace, as many lumps of smoke-blackened adobe were found here. In the digging outside the main foundation wall were found the ends of a number of roof timbers averaging 4 inches in diameter. These were set in the earth at an angle of about 45 degrees, and if projected to a point over the center of the room would have given a roof height of about 5 feet. There was also found in this area a quantity of charred reed matting, undoubtedly roof covering, of the same sort found in Cave 1. Discarded metates had been used as slabs at two points in the wall. One of these shows in Plate 25, the bottom picture; it is the only metate of this period we are able to illustrate, as, on account of their weight, none were collected.

Built against the west wall is part of a small bin-like enclosure, only two slabs of which remained in place. Inside the room in the northeast corner were recovered a number of curious clay figures, two funnel-like pottery objects, a bunch of charred human

hair, and a small hairbrush which crumbled on exposure to the air. The hairbrush was identical to those found in the Kinboko Cave in 1915.¹ Here were also found sherds of a bowl of plain gray ware.

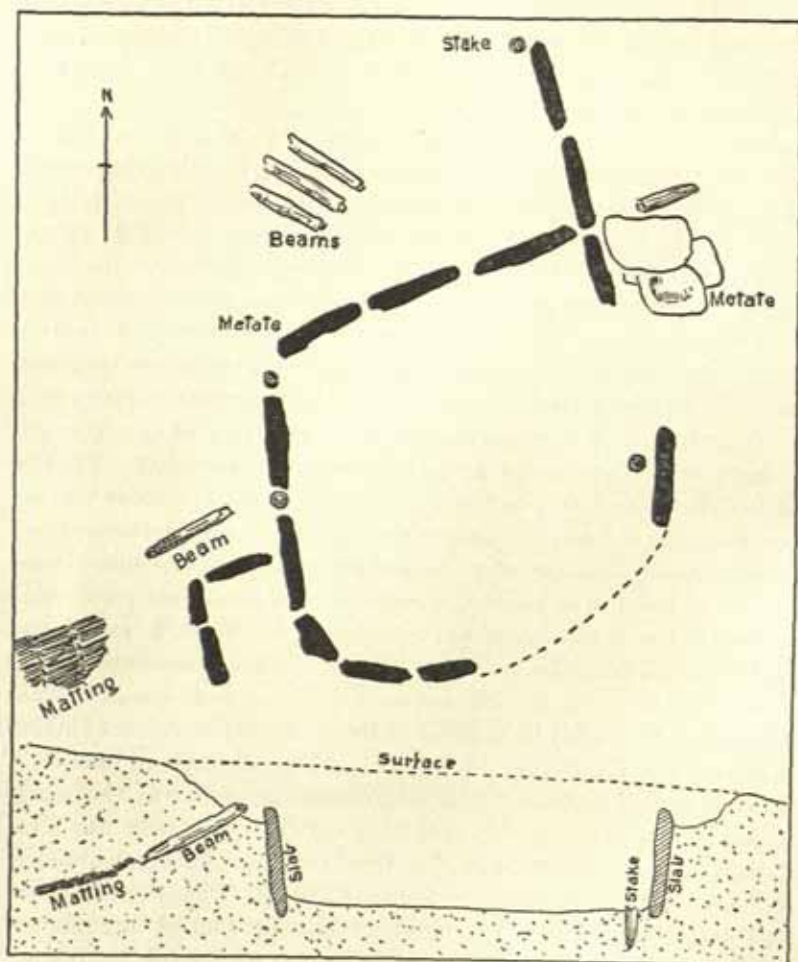


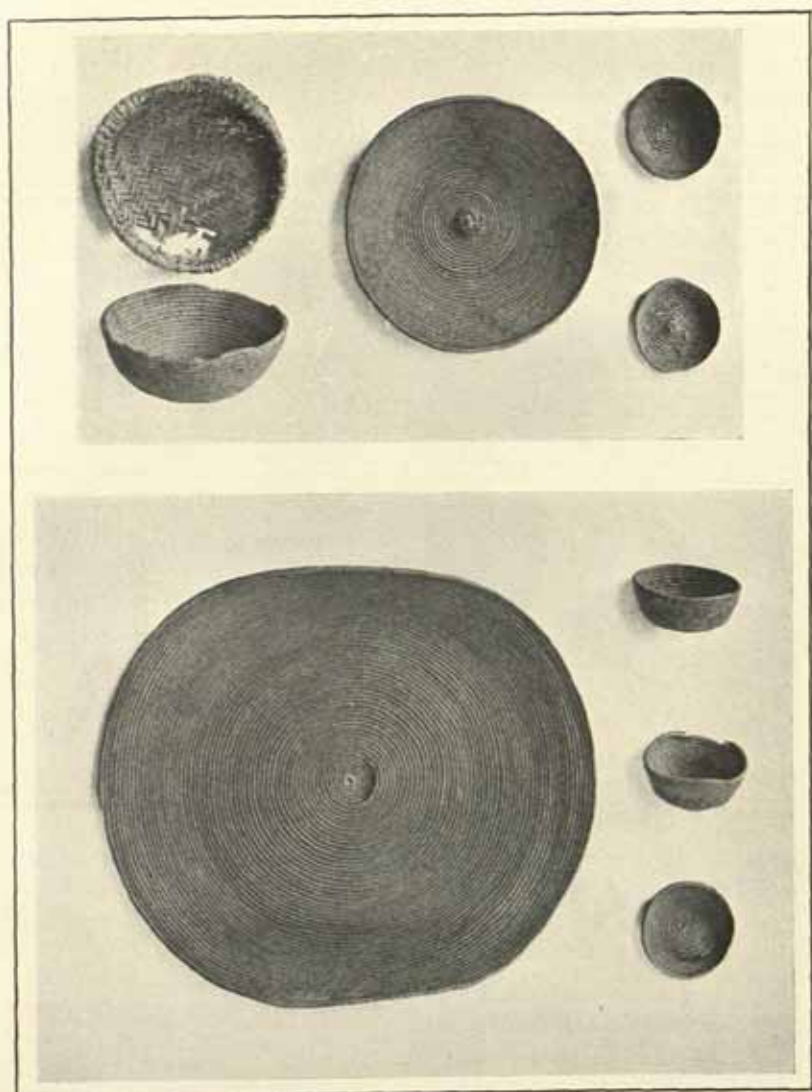
FIGURE 9

Plan and cross section of Basket-maker III house foundation, Segi Sand Hill

In all the digging in and about this room, no sherds of late pottery were discovered.

Although the data obtained from this house foundation are far

¹ Kidder and Guernsey, 1919, Plate 74.

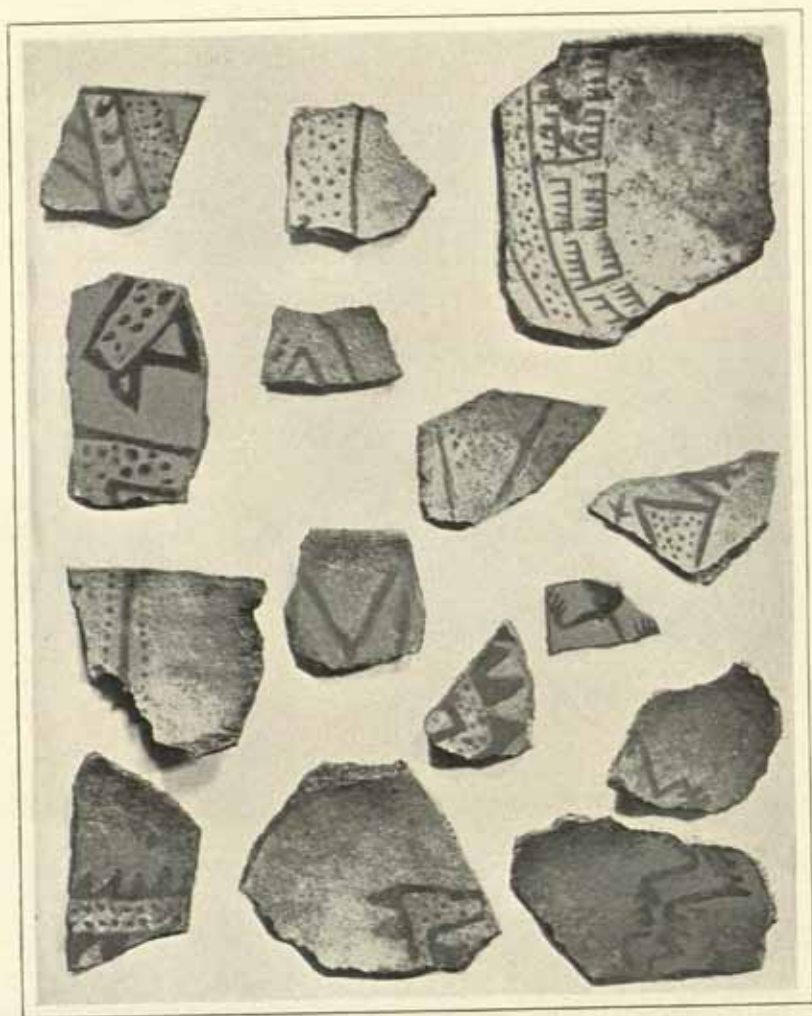


BASKET-MAKER II AND PUEBLO I BASKETS

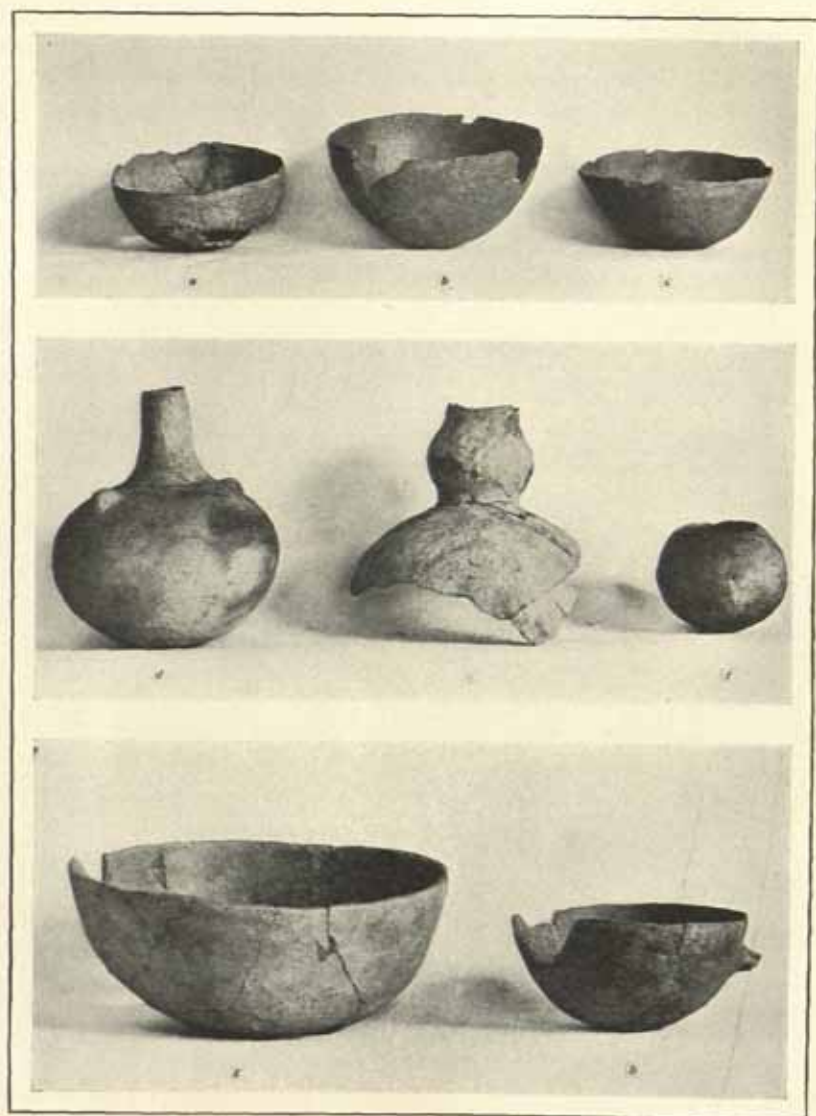
Ring basket from Grave 1, Cave 1, Segi, Pueblo I (upper left); Small coiled basket from Grave 3, Cave 1, Segi, Pueblo I (below ring basket); Coiled tray baskets, killed, from Cists 1 and 2, Broken Roof Cave, Basket-maker II; Small bowl-shaped baskets from Cists 1 and 2, Broken Roof Cave, Basket-maker II.



Burial (Grave 1), mound in front of Cave 1, Segi, Basket-maker III



Typical black-on-white sherds, Basket-maker III



BASKET-MAKER III POTTERY

a, Gray ware bowl, Segi Sand Hill Site; b, Black-on-white (overfired) bowl, Segi Sand Hill Site; c, Gray ware bowl, Grave 1, burial mound, front of Cave 1, Segi; d, Gray ware bottle, perforated lugs, Keam Collection, Keam's Canyon (?); e, Pieces of olla, Grave 3, burial mound; f, Small gray ware pot, Grave 1, burial mound; g, Red ware bowl, Grave 3, burial mound; h, Red ware ladle, burial, Segi Sand Hill Site

from satisfactory, it seems fairly certain that the general plan of its construction was as follows: an excavation in the surface 2 feet or more in depth was lined with stone slabs, supported and strengthened at intervals with upright stakes. Over this was built a conical roof of timbers covered with rush matting and brush or bark, the whole held down with earth or stones; the door apparently opened to the south. These details correspond to those of the houses in Cave 1, except that there was no evidence that the top of the slab foundation had been finished with loaf-shaped adobe bricks. The structure had from all evidence been destroyed by fire.

Here and there on the site were small cist-like slab enclosures 2 to 3 feet in diameter. Scattered about them were a great many rocks approximately the size of cobblestones. Inside the cists we found quantities of charcoal and ashes, and earth, hard-baked, as if by long exposure to fire. These structures may perhaps have been fireplaces inside flimsy brush huts, the covering of which was held in place by the above-mentioned stones.

In spite of diligent search, only two burials were found. One was the blown-out skeleton already described. The second lay in clean sand near the base of the slope, 100 feet east of the first. The grave contained the skeleton of an adult, lying on the left side, with knees drawn up, hands resting on the thighs, head north, face south. At the chest was a small red ware ladle (Plate 19, *h*), covered with a large sherd from a plain gray ware pot. No beads or ornaments were found in the grave. The skull was long and undeformed.

From the Segi Sand Hill we returned to Segihatsosi. During the winter we had had an opportunity of consulting Professor Cummings's report on the San Juan and had noted that in Segihatsosi he had found remains of houses older than those of the Pueblo III people and that he had taken from them sandals and carrying bands identical with those recovered by us in Cave 1, Segi.¹ We wished to examine these house structures and, if possible, find other similar sites to excavate. We visited the cave and were able to do a small amount of digging in areas not previously explored.

The High Cave, Segihatsosi (No. 1, sketch-map, Fig. 5), as we called it because of the long, steep climb necessary to reach it, contains a number of most interesting structures. These had been cleared by Professor Cummings and will doubtless be described

¹ Cummings, 1910, p. 10.

by him. In the refuse deposit which we dug there were found many scallop-toed sandals, fragments of unbaked mud dishes with heavy lugs, and many sherds of typical Basket-maker III pottery. Along the ledges below the cave are signs of the former presence of extensive settlements in the open, but the houses have for the most part been washed away, only a few slabs and potsherds remaining.

About three quarters of a mile from the mouth of Segihatsosi and directly below High Cave (No. 2, sketch-map, Fig. 5), on a

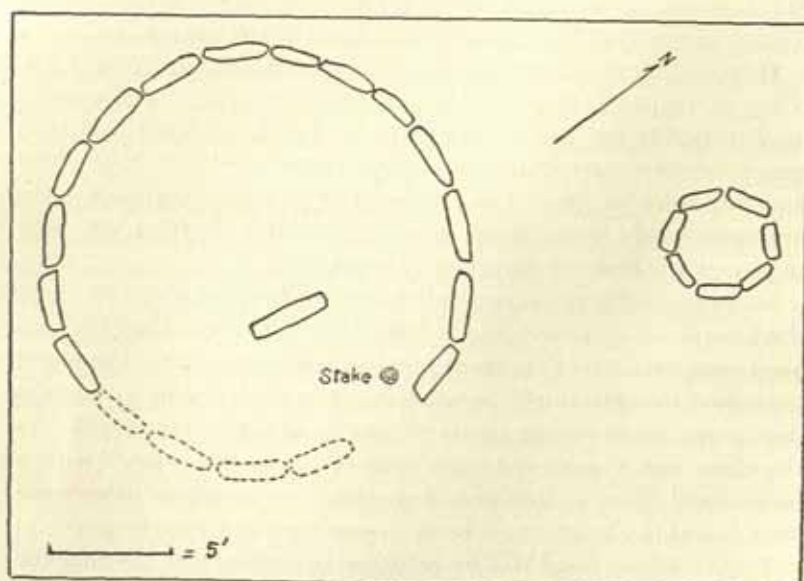


FIGURE 10

Plan of Basket-maker III slab foundation, Segihatsosi

knoll above the wash, a small circular stone enclosure was observed. This was cleared and found to be made of slabs of various sizes and shapes, set on edge to form a circle 17 feet in diameter. A hard adobe floor could be traced in some parts of the enclosure; in other places soft spots were encountered, which when dug into showed charcoal-blackened earth. As indicated in the plan (Fig. 10), an upright slab 16 inches wide by 1 foot high was set in the floor. Its relation to the edge of the enclosure would be about that of the fire screen of a kiva, though digging in the somewhat disintegrated floor back of it disclosed no fireplace. In front of the slab

the wall stones were missing, but the end of an upright stake was found just within the line of the circle. This may have been one side of a doorway opening. Above the floor were found many lumps of baked adobe bearing imprints of reeds and grass. These were most plentiful along the inner edge of the slab circle; none were found outside. This somewhat fragmentary evidence seems to indicate a pole roof, thatched with reeds and grass, and bearing an outer covering of adobe. That the roof was conical seems likely from the fact that the burned adobe fragments lay thickest toward the enclosing wall of slabs.

At a distance of 10 feet from the north side of the circle was a slab cist $2\frac{1}{2}$ feet in diameter, with part of a second one just beyond it. A number of crude *manos* were found in the digging; these were of the same type as *g*, Plate 27. There were also found a few sherds of plain gray and black wares.

As this site lies directly in front of High Cave, a large Basket-maker III site, and as what little pottery we found is of Basket-maker III type, we believe the slab circle to be the remains of a Basket-maker III house.

No stone axes were found on this site, but a number of heavy grooved mauls were collected from the surface, examples of which are figured in Plate 28. These were probably used in driving stakes such as were uncovered in the house site.

About a mile from the mouth of the canyon, on a rise of ground on the east side, is a low mound plentifully strewn with potsherds of both Pueblo I and Pueblo III types, the latter predominating. Here we spent some time trenching unsuccessfully for burials. The site is marked 3 on sketch-map, Figure 5.

Pueblo I Site, Segihatsosi. This site (No. 6 on sketch-map, Fig. 5) occupies an area roughly 100 feet long by 70 feet wide, on the crest of a little ridge that extends out from the east wall of the canyon just below and on the opposite side from the mouth of Adugegi Canyon. Our attention was attracted to it by Pueblo I sherds scattered over the surface. Closer examination revealed the protruding walls of a circular structure and the tops of upright slabs. This mound provides an excellent illustration of how closely potsherds cling to the site to which they belong. Upon it were no fragments of Pueblo III types, not even of the abundant corrugated ware, although close by were two other mounds of

Pueblo III period, covered with sherds among which were no pieces of Pueblo I make.

As little time was available for exploration, a trench was opened in what appeared a likely spot for burials. One was found at a depth of 3 feet below the surface. The grave contained the badly preserved remains of an adult in a sitting position facing southeast, the knees drawn up and inclined to the left, the arms at the sides. The skull, which showed artificial deformation, had fallen, as is often the case with skeletons in this position, and lay face down on the right side of the pelvis. There were three pieces of typical Pueblo I pottery (Plate 14, *d*, *g*, *n*), a potter's tool made from a sherd, and a large sherd used as a cover.

Basket-maker III Cave. Near the head of Adugegi Canyon is a large cave containing a number of extremely interesting Basket-maker III structures. These were cleared by Professor Cummings and party in 1917, and it is earnestly hoped that they will be described by him, as it is doubtful if anywhere in this region there will be found another site so typical of this period.¹ Our own investigations of the site were confined to examination of the house foundations, and a little digging in an undisturbed area near them and in the talus leading up to the cave. From the former we obtained a number of fine scallop-toed sandals and a few minor objects, all of which were appropriate to the period to which the structure belongs.

Beneath a large rock in the talus we uncovered a Basket-maker II cache, consisting of two pairs of square-toed sandals (Plate 29, *a*, *b*), a child's sandal of skin, a twined bag (Plate 30, *c*), a lump of uranium ore, and forty-eight snares, one of which is shown in the drawing (Plate 31, *d*). These articles were in a coarse cedar-bark container.

From Segihatsosi we moved camp to the mouth of Say-a-Kin, a short canyon breaking through the Comb below Kayenta (see map at end of paper). In 1914 a short time had been spent in examining a Pueblo I village at that point and some trenching had been done in a fruitless search for burials.²

Pueblo I Site, Say-a-Kin. The site, which occupies the crest of a sandy knoll, is about 200 yards in length and a little less in width.

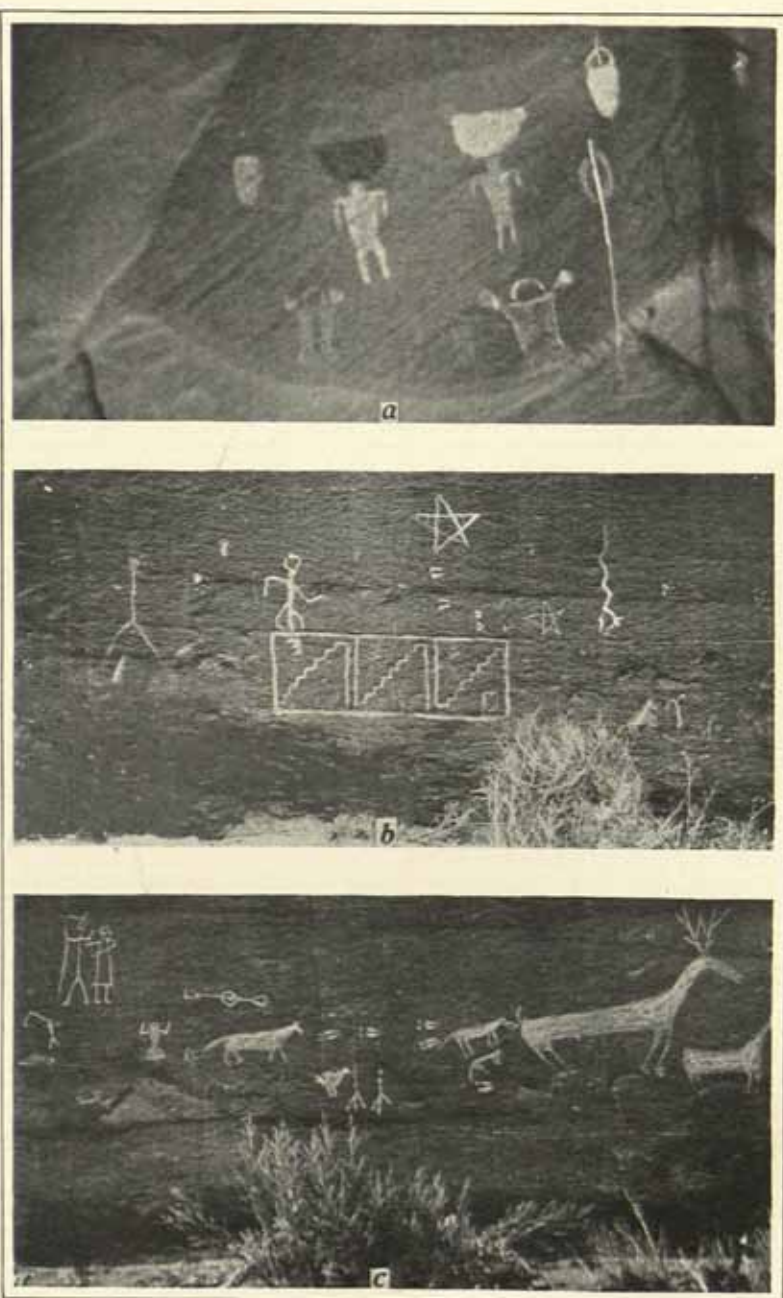
¹ A structure very similar to some of the ones in this cave is figured by Judd (1926) in his plan of Cave 5, Cottonwood Canyon.

² Kidder and Guernsey, 1919, p. 54.



BASKET-MAKER III AND PUEBLO III MASONRY

Upper, Buttress wall of Pueblo III masonry built against Basket-maker III structure, Room *e*, Cave 1, Seg; *Lower*, Room *e*, other side



PICTOGRAPHS

a, Human figures with carrying baskets (7) on their heads, Cave 4, Segihatsosi. Long object at right may possibly represent atlatl; *b*, *c*, Wall near Ford House

Over a considerable portion of it can be traced outlines of roughly circular structures built of stone slabs of varying sizes. They very much resemble the structures at the smaller site at Church Rock (see p. 30). They are most noticeable on the southeast slope. The sketch-plan (Fig. 11) shows a small part of a group at the base of this slope. Below the group of room foundations we noticed a few scattered human bones in the side of a trail worn in the bank by horses and cattle on their way to and from a near-by spring.

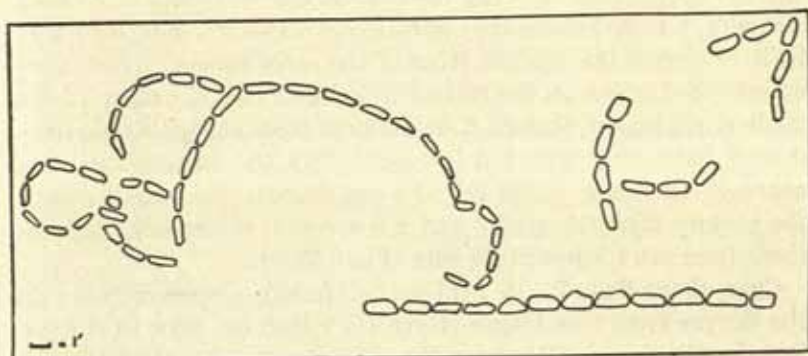


FIGURE 11

Plan of Pueblo I surface site at Say-a-Kin

Trenching along the trail, we uncovered two undisturbed skeletons, each accompanied by mortuary pottery.

Burial 1 contained the remains of an adult, the skull showing marked deformation. The skeleton lay with the head pointing south. With it was part of a large gray pot with a handle, a small food bowl with polished black interior, and two small black-on-white jars. The bones were in a bad state of preservation and the skull collapsed soon after it was taken out.

Burial 2 (a young adult) lay only 5 feet away; the bones were also in an advanced state of decomposition. The skeleton lay in the same position as that in Grave 1. With it was a small gourd-shaped bottle of red ware with a design in faintly lustrous black, one of the few complete specimens of this ware that we have found.

The pottery from these burials is figured elsewhere; it is typical Pueblo I. As these were only the second Pueblo I burials in the open to be found by the Museum expeditions, special efforts were made to locate others, but without success. The surface of the

site was gone over a number of times and a careful examination made of the sherds. These were also all of Pueblo I make, with the exception of less than a handful of Kayenta-type Pueblo III fragments. The latter, however, are probably to be accounted for by the presence, on the crest of the hill, of the remains of a small Pueblo III structure.

In the sketch-plan of part of the slab-enclosure group (Fig. 11), there is shown a section of what appears to be a straight wall. This has the appearance of being the foundation for a wall of coursed masonry, but we believe that in reality it was a retaining structure built to terrace the bank in front of the early houses. There were no scattered stones on the surface to indicate that it had ever been made much higher, though it is of course possible that stones from it may have been removed for use during the construction of a near-by cliff-house (Ruin 7).¹ No specimens were found except the pottery from the graves and a few *manos* of the same type as those from the Church Rock Site (Plate 27, c).

Cave above Ruin 7. In 1914 we had found, a short distance up the canyon from Olla House (Ruin 7),² which lies close to the site just described, a small cave with a line of toe holes pecked in the precipitous cliff leading up to it. These were so worn by rain and sand erosion as to be no longer safe; because of this we were unable to gain an entrance in 1914. We were able, however, to look into the cave from the top of the canyon wall on the opposite side, and, as it seemed to have a good floor space of clean sand, there was likelihood that something worth while might be found in it. In 1921, therefore, when we were camped on the surface site below Ruin 7, two of our men were set to work re-pecking the ancient steps with geological hammers (Plate 32, upper). This was a tedious process, which proved fruitless, as when we finally got into the cave it was found to be completely barren. Whether the ancient people had made the set of steps with a view to the eventual building of a house, or prepared them in order to use the cave as a retreat in times of danger, there was no way of telling.

Pueblo I Ruin opposite Church Rock. Seven or eight miles east of Kayenta in the flat opposite an outcrop known locally as Church Rock, is a small Pueblo I surface site. In times of heavy

¹ Described in Kidder and Guernsey, 1919, p. 45.

² Kidder and Guernsey, 1919, p. 47.

rain this flat is flooded, so that a crust of sun-baked mud has formed over the ruin and to some extent protected it from decay. When we first saw it, the outlines of walls could be traced through the crust by occasional projecting slabs of stone, and by thin lines

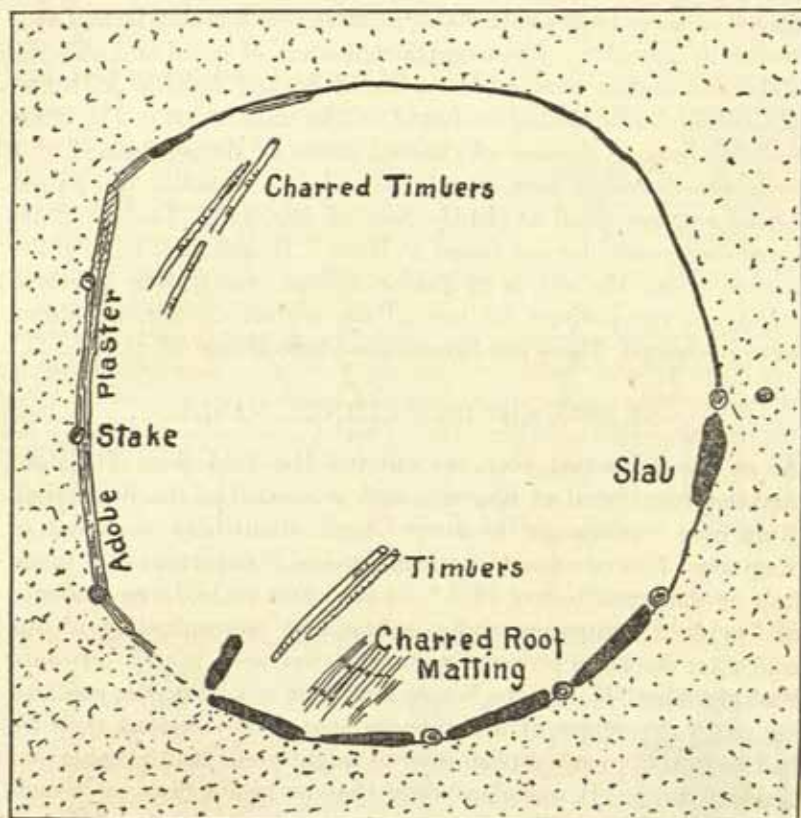


FIGURE 12

Plan of largest room of Pueblo I site near Church Rock

of adobe that proved later to be plaster of room walls. A general view of the site is shown in the upper photograph in Plate 33.

The whole ruin, or as much of it as can be made out, consists of a loosely related group of circular structures varying in size from 4 feet to as much as $17\frac{1}{2}$ feet in diameter. The largest room shown in the plan (Fig. 12), we only partially cleared, as our work

here was interrupted by a sudden rise of Tyende Creek, which threatened to cut us off from our camp on the opposite side. The room is $17\frac{1}{2}$ feet in diameter north and south by 16 feet east and west. It was made by digging a round pit of the above dimensions and $2\frac{1}{2}$ to 3 feet deep. The sides of the excavation were reinforced at some places with slabs, at others with stakes from 1 to 2 inches in diameter. The unsupported areas of earth and also the slabs and stakes were coated with adobe and finished with fine plaster similar to that often found on the walls of kivas. In clearing this room a number of charred pieces of timber from 4 to 7 inches in diameter were found, as well as a quantity of charred brush and grass, all evidently part of the roof. The structure somewhat resembles one found at Ruin 5, Hagoé, in 1914.¹ All the pottery from the site is of Pueblo I type (see p. 100). Several *manos*, or hand-stones for use on the metate or grinding-stone, were recovered. These are figured elsewhere (Plate 27, c).

SEASON OF 1922, CHINLE VALLEY

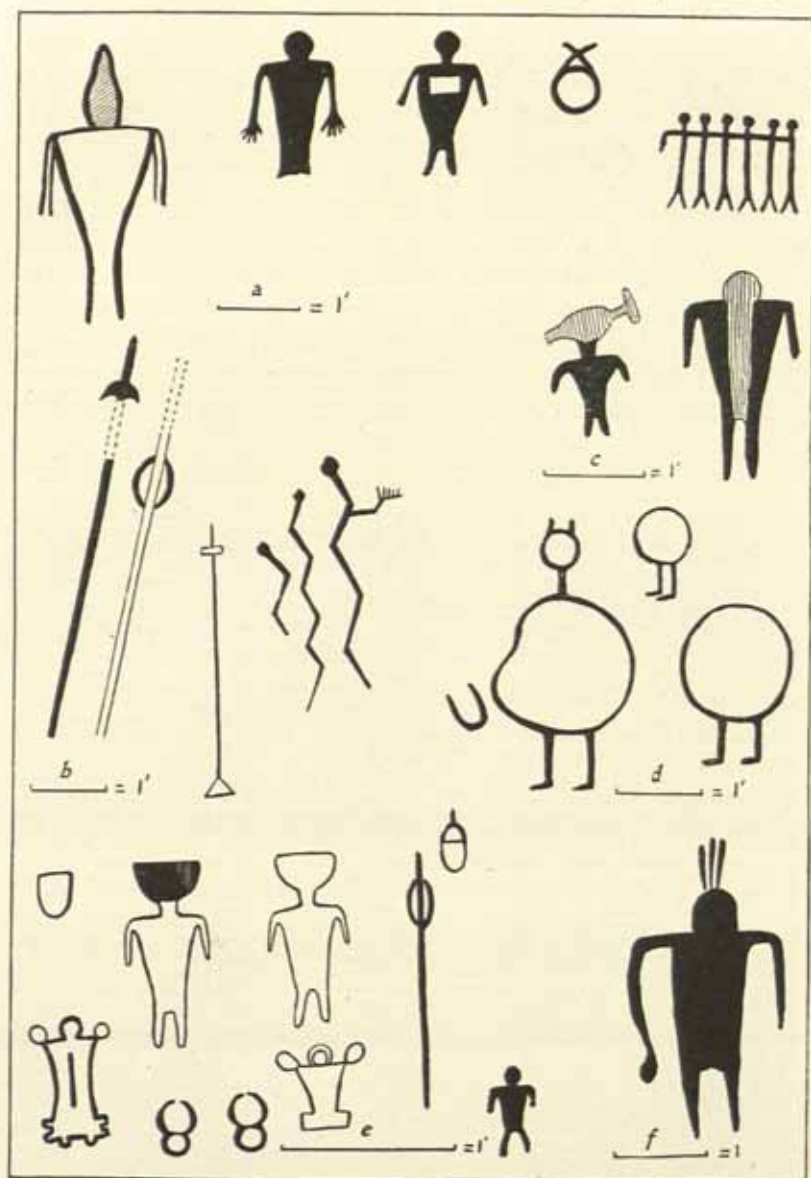
As in the preceding year, we entered the field from Flagstaff, Arizona, reoutfitted at Kayenta, and proceeded to the Water Fall Ruin near Nakaito on the lower Chinle, about fifty miles east of Kayenta. This site was visited and limited excavations were made in it by the expedition of 1914.² At that time we had seen evidence of Pueblo I occupancy and a subsequent reëxamination of our collection disclosed pottery fragments that were pretty certainly Basket-maker III. As the Water Fall Ruin is a large one, containing much dry refuse, it was thought that deeper digging than we had been able to accomplish in 1914 might yield stratigraphic evidence of value. It was also hoped that we might discover transitional material to fill the gap between Basket-maker III and Pueblo I.

Water Fall Ruin (Ruin 9, 1914). The following description of the cliff-house is from our first report.

The ruins are in a shallow cave set well above the valley bottom, but easily reached from it up a sandy incline. Conditions have not been favorable for the preservation of this ruin from decay, as the overhang of the cliffs is so high that a southerly wind could drive rain or snow clear to the back of the cave;

¹ Kidder and Guernsey, 1919, p. 43.

² *Ibid.*, 1919, pp. 70-74.

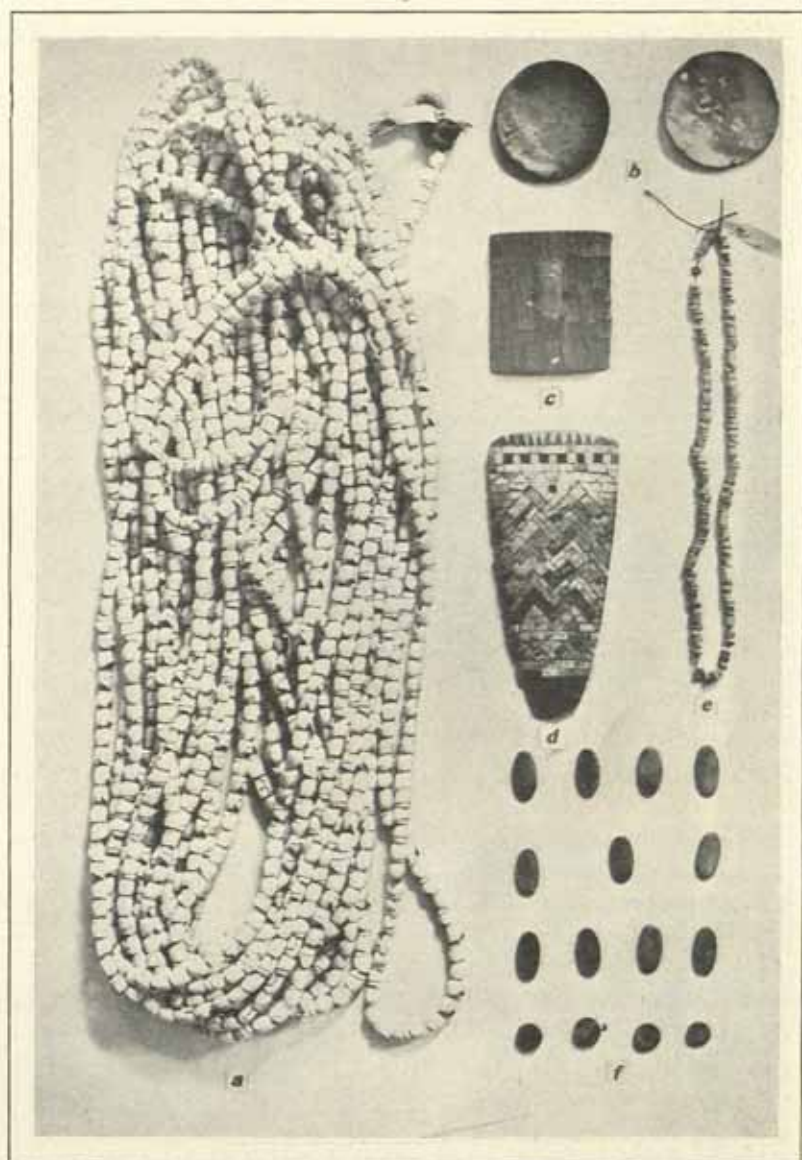


PICTOGRAPHS

a, b, c, From High Cave, Segi; d, From small cave above Poncho House; e, From Cave 4, branch of Segihatsosi; f, From Cave 1, Segi.

*a**b**c*

a, Looking down side canyon of Segihatsosi from Cave 5, showing Cave 4 at right; *b*, Circular foundation, Room *k*, Cave 1, Segihatsosi; *c*, Foundation, surface site near Cave 1, Segi.



a, Olivella shell necklace from Cave 5, Segihatsoei, Basket-maker III; b, Shell ear ornaments, cache, Poncho House, Pueblo III; c, Lignite button or mirror, cache, Poncho House, Pueblo III; d, Mosaic incrustated flint blade, cache, Poncho House, Pueblo III; e, Turquoise beads found with d, cache, Poncho House, Pueblo III; f, bone dice, cache, Poncho House, Pueblo III



Upper left, Structures in cave, Hagoé Canyon; Upper right, Painting of tau-shaped doors on wall, Hagoé; Middle, Ancient tree growing over Basket-maker III foundation, Segi Sand Hill Lower, Room foundation, Segi Sand Hill, Basket-maker III

besides this there is a seepage of water from a horizontal vault along the whole length of the house bench, which concentrates in fine bubbling springs at either end of the ruin. The elements and this spring water have together brought about a very complete state of collapse. Few walls stand clear of the rubbish, and the rooms at the front of the cave are almost entirely buried under debris. In spite of these conditions it is obvious that Waterfall Ruin was once a very extensive structure, and one which, moreover, was inhabited for a long time. This is indicated by the enormous beds of debris of occupancy which encumber the slope below the houses and choke up all those spaces in the rear of the cave not actually covered by rooms.

Unfortunately the pothunters of the nineties did extensive digging at this site. They completely trenched over a zone of burials that once extended all

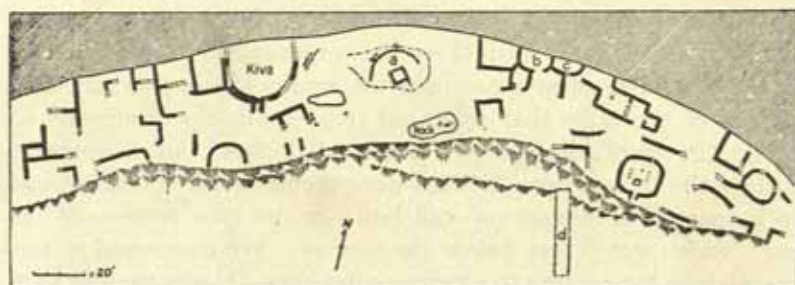


FIGURE 13
Plan of Water Fall Ruin

along the front of the cave on the lower slopes. They also did some pitting and room clearing in the rear, but this apparently was not carried to any great depth; the work, however, was done so long ago that the holes had to some extent filled up and reexcavation would be necessary to determine where disturbance has taken place. In spite of the moisture in parts of the site and in spite of vandalism, the Waterfall Ruin would splendidly repay careful excavation, for there is still left a great deal of untouched dry rubbish (what little we cleared was extraordinarily rich in textiles and wooden implements); and, moreover, we believe, though without any definite evidence beyond bits of fallen wall and a few potsherds, that under the cliff-house there will be found the remains of a large settlement of early type.¹

With more time at our disposal and with our increased knowledge, we were able to identify standing walls of rooms of two early occupancies, Basket-maker III and Pueblo I. The Basket-maker III structures are indicated on the plan (Fig. 13, a, b, c). Some examples of the former remain, with their masonry and the characteristic blackened areas of the cave wall back of them which

¹ *Ibid.*, pp. 71-72.

mark the outlines of the roofs clearly indicating their origin. These early structures were utilized by the later tenants of the cave in the same manner as was done in Cave 2, Segi (see p. 12). Another Basket-maker III structure (*a* on plan) was uncovered in the course of the excavations (see figure 14). A pictograph of a square-shouldered human figure shows faintly on the back wall of the cave at one point, indicating Basket-maker II occupation at a still earlier period. The Pueblo I occupancy seems to have continued for the longest time and most of the structures in the cave probably date from it. This was borne out by the results of systematic trenching in the talus and sherds collected at various depths from surface to undisturbed subsoil.

In our search for stratified remains excavations were carried on in the plaza-like open space near the center of the ruin and in a section of the talus that appeared to be made up principally of refuse. In the plaza at a depth of 2 feet 10 inches below the present surface the tops of upright slabs were encountered. These proved to be part of a foundation wall built on the rock bottom of the cave, which was 5 feet below the surface. We uncovered it, not completely, but enough to determine its shape. It was circular with an estimated diameter of 15 feet. The stone slabs used in the wall averaged $2\frac{1}{2}$ feet in length by 2 feet wide; they were set on edge and coped with adobe. This structure was exactly like those found in Cave 1, Segi, as a comparison of Plates 8 and 32 will show. The fill in and above this room furnishes the most clear-cut stratification we have yet obtained, due to the nature of the fill and the fact that it was laid down in a way that made its history perfectly apparent. The room had been abandoned while the roof of the structure was still intact, but sufficiently open to allow wind to enter, sweeping a quantity of coarse charcoal mixed with sand into a loose heap in the angle between the back wall and the floor (Fig. 14, *d*). Over this a wind-blown deposit of finer sand and small particles of charcoal (*c*) had been deposited.

During the Pueblo I period the roof was destroyed either accidentally or, more likely, by beam-robbing. This resulted in the laying down of a stratum of coarse material composed of lumps of adobe, sticks, corn-husks, etc., which covered the room to a depth of more than 2 feet (Fig. 14, *b*). After the final abandonment of the site, a top layer of surface sand (*a*) was blown in.

It is seen that without leaving some definite trace of disturbance there was little likelihood of sherds from the upper strata finding their way to the lower level, so that it is not surprising that the

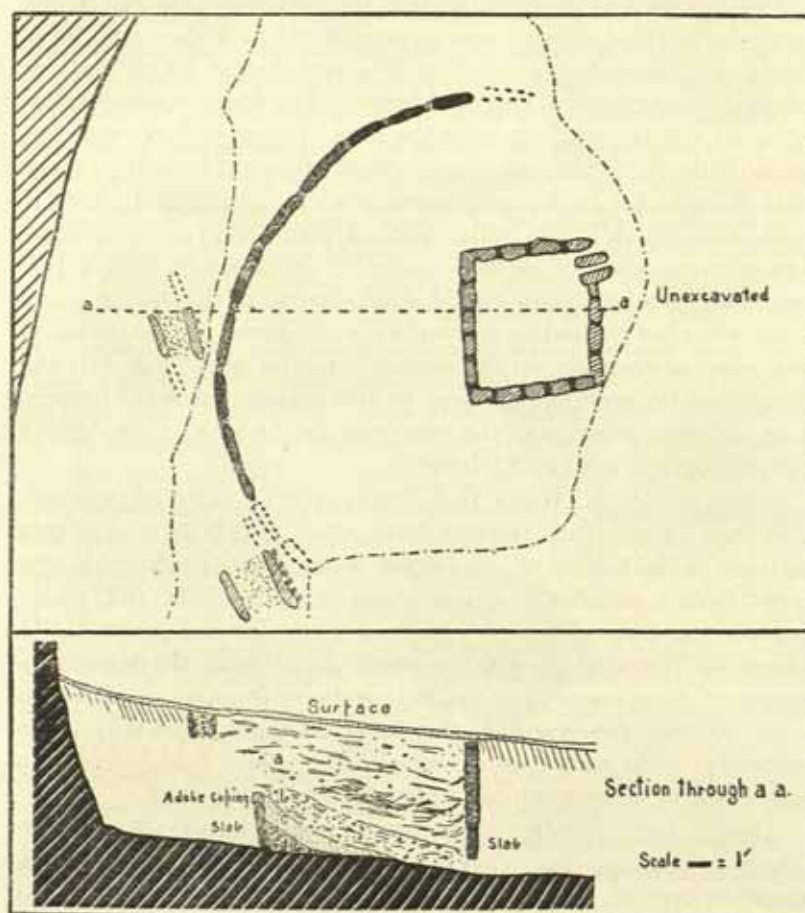


FIGURE 14

Plan and cross section of Basket-maker III slab foundation, showing relation to rectangular Pueblo III structure, Water Fall Ruin

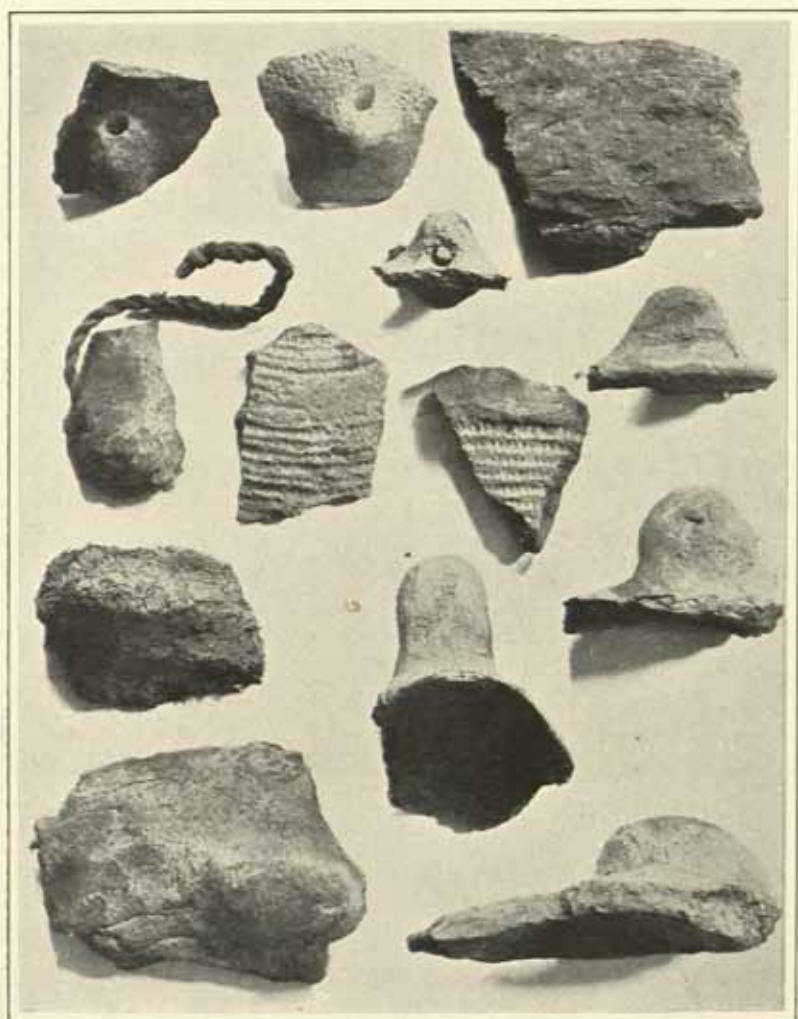
fragments collected by careful trowelling in the deposit along the floor are all easily identifiable Basket-maker III types, appropriate to the structure itself. Those collected above the deposit *c* are, however, all Pueblo I or very early Pueblo II. On or near the

surface, sherds of red ware decorated in black predominated. As yet we are not familiar enough with this style of ware to be sure of its exact place, but we think it is Pueblo I.

In excavating in the circular room foundation we ran our trench toward the front of the cave in search of the front wall; in so doing, we encountered remains of a rectangular room built of coursed masonry on a slab foundation. The foundation was not, however, on the rock bottom of the cave. This structure caused us some doubt for a time, as there seemed nothing about it to show that it might not be contemporaneous with the Basket-maker III room with which it was built. Such a room would have upset all our previous ideas of Basket-maker III architecture. As a last resort we examined minutely the adobe mortar of the structure and were rewarded by finding embedded in it a sherd of the decorated red ware so common on the surface. In the plan (Fig. 14), the relation of the rectangular room to the Basket-maker III foundation is shown; a corner of the room can also be seen at the right of the photograph in Plate 32, lower.

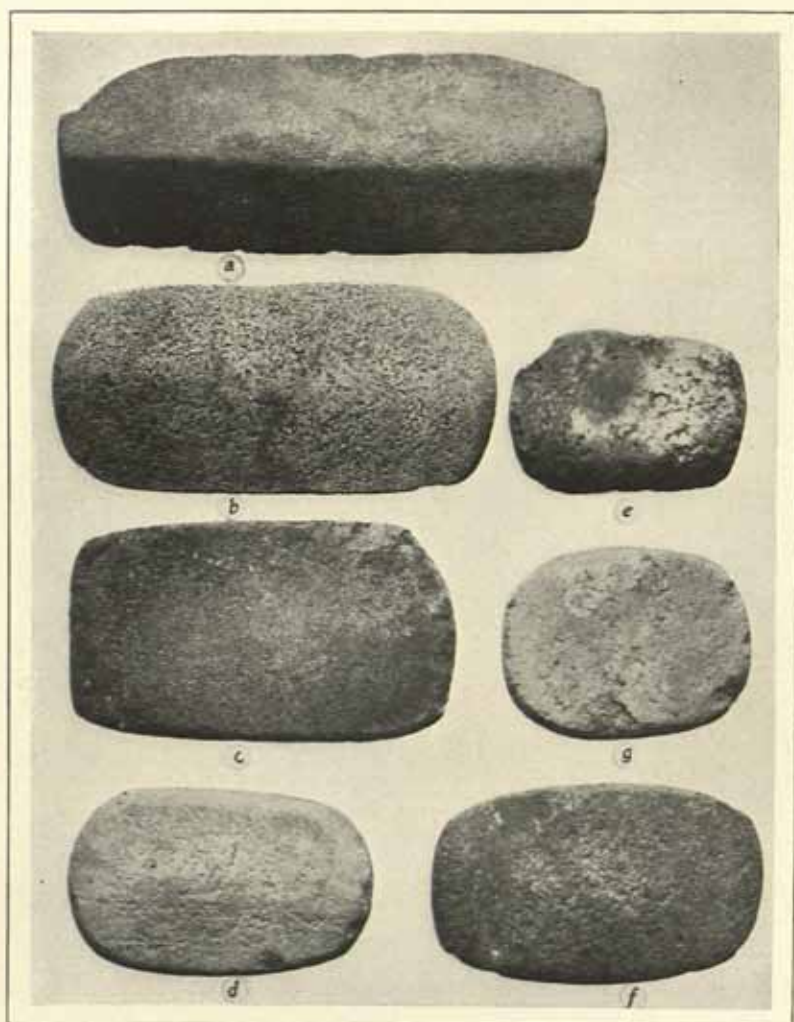
Irrigation Ditch. Water Fall Ruin overlooks a flat of considerable size, where the Navajos have small cornfields and melon patches in the shelter of the canyon wall. These gardens are irrigated from a number of springs along the base of the cliff, which furnish a not too abundant supply of water for this purpose. At times the Navajos are able to divert water from the stream by means of dams above the falls, but, owing to frequent floods which come without any warning, the dams are maintained with great difficulty. One such dam on which the Indians had expended a great deal of labor went out while we were at the ruin.

The ancient inhabitants no doubt irrigated from the stream. There is evidence that they also obtained water from a source easier to control, for along the cliff, a little up from its base, at a point indicated on the sketch-map (Fig. 15) are traces of a ditch marked mainly by large stone slabs, set on edge, that extend for some distance back from the flat in the direction of a spring. Probably in early times this source was developed by means of a dam, as water from the surrounding cliffs would drain at this point. No trace of such a dam remains today, however. The ditch opens on the flat high enough above it to permit distribution of water over a large portion of it.



BASKET-MAKER III SHARDS

Perforated side lugs from bottle-shaped vessels; basket-marked sherds, and sherds of fibre-tempered unfired pottery. From various sites



"MANOS"

a, With bevelled grinding face, Turkey Cave, Pueblo III; b, Turkey Cave, Pueblo II; c, Church Rock Site, Pueblo I; d, Poncho House, Pueblo I; e, f, Room n, Cave 1, Segi, Basket-maker III; g, Segi Sand Hill, Basket-maker III

Site above Water-Fall Ruin. A mile and a quarter above the falls on the west bank of the stream (see sketch-map, Fig. 15) is a small Basket-maker III site marked by a number of roughly circular structures which average 7 feet in diameter. The whole site has been much worn away by erosion. Its identification as Basket-maker III was made certain by the finding of sherds from

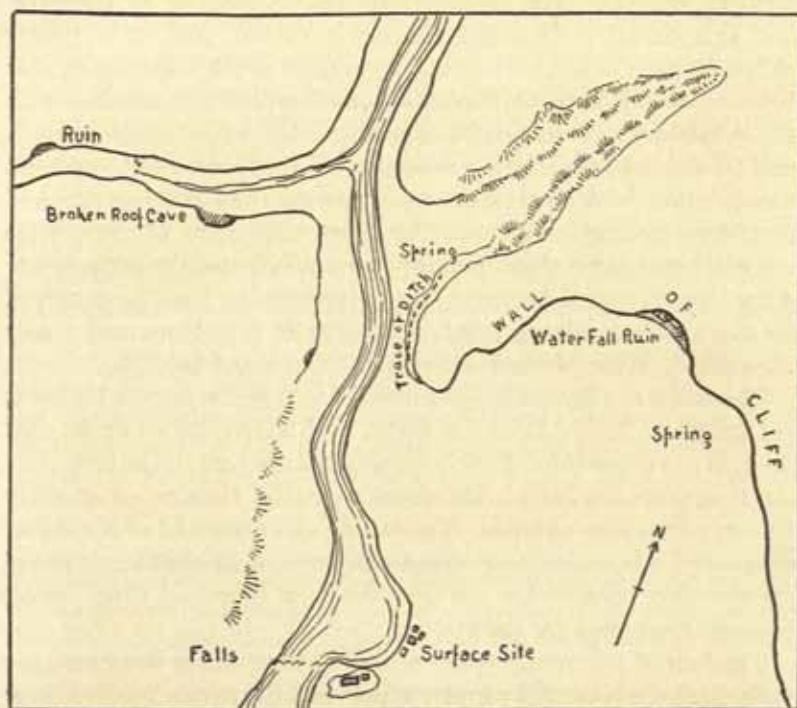


FIGURE 15
Sketch-map, vicinity of Water Fall Ruin and Broken Roof Cave

typical Basket-maker III globular pots and heavy perforated side lugs, as well as a few sherds showing characteristic decorations. These were all on the surface. Trenching through the site was unproductive.

Broken Roof Cave. In the south wall of a canyon entering the Chinle from the west, a little below Water Fall Ruin (see sketch-map, Fig. 15), there is a large cave that shows no visible trace of occupancy, either early or late, other than some Basket-maker II

pictographs on the back wall. These represent square-shouldered human figures and hand prints done in white and yellow paint.

The cave has a floor space about 150 feet long, is 75 feet to top of arch, and has an overhang of about 75 feet. The floor is cluttered with large and small rocks fallen from the roof. After digging at several points along the back wall and finding no rubbish, we tested a likely looking spot near the center of the cave, and at a depth of 18 inches there was encountered the top of a slab cist, built of large irregular stone slabs set on edge, the spaces between the slabs being filled with small stones and chinked with shredded bark. It measured approximately 4 feet across the top and 20 inches in depth; in it were the remains of an adult male and four infants. Various articles accompanying these remains required forty-five catalogue entries. The more important of them were an atlatl and three stone pointed foreshafts in nearly perfect condition, seven coiled baskets, two twined-woven bags, a pouch of dressed skin containing paint, a number of skin bags, and a pair of sandals. Some of these articles are shown in Plate 34.

The body of the adult, aged about forty years, lay on its back, head slightly higher than the body, with knees drawn up so that they were encountered first in excavating the cist. The feet were tight against the body. On them were the remains of coarsely woven yucca-fibre sandals. The wrappings consisted of a number of dressed mountain-sheep skins that were in an excellent state of preservation, except for the fact that the hair had been almost entirely destroyed by insects.

The hair of the mummy was cropped short, which is unusual for male Basket-maker III people, whose hair as a rule was left long and was elaborately dressed. That of the females was cut short, supplying no doubt the large amount of hair used in the manufacture of string, tump-lines, etc., as we suggested in the previous report.

The babies, ranging in age from six months to a year and a half, were arranged in a very orderly manner, two on each side of the adult as shown in Plate 35, middle. The wrappings were fur-string robes and dressed mountain-sheep skins. The youngest child lay on a shredded bark pad. The oldest was wrapped in the remains of a fur-string blanket having an ornamental edge of bird feathers. Similar blankets, though not so well preserved, were recovered

in Cave 1, Kinboko, and White Dog Cave. The technique is described in a previous report.¹ To the feet, which were completely encased in shredded bark, were attached square-toed sandals of fine weave with loops of yucca-fibre stitched along the edge. A soft tie-string held the sandals and bark in place.

About the thighs of three of the infants were wrapped thick, soft cords of dogskin. The objects found with the burial are described elsewhere.

A great fall of rock, described below, cut short our work in the cave. It was, however, revisited in 1923 by Monroe Amsden, who was a member of the 1922 party. He was at that time engaged in a reconnaissance for the Department of Archaeology of Phillips Academy, Andover. Finding that no more stone had fallen, he carried on further excavations and found, close to Cist 1, a second burial place. The following description is from Amsden's notes:

The cist lay under about 18 inches of sand mixed with juniper bark and oak leaves. It was roughly rectangular, measuring at the top 5 feet 9 inches north and south by 4 feet 6 inches east and west. It was walled with twelve rough stone slabs from 18 inches to 2 feet high. Its depth from slab-tops to bottom was 2 feet. It had been covered with a roof of oak and cottonwood poles, 3 to 9 feet in length and 3 to 6 inches in diameter. One of the cottonwood poles was decorated with a double zigzag design in red beginning 2 feet from the butt and extending 16 inches up the pole, the design being about an inch wide, each line the width of a finger-mark. Over the roof had been a layer of juniper bark. The latter covering had been partly torn away and the roof poles pushed aside and disarranged by animals which had broken into the cist, pulled the body out and generally disarranged the contents. I am sure it was not the work of man. There were bones of a single adult and two young children; no skulls were found and many of the bones were much gnawed. The adult had been buried reclining on the back, with the knees up and the feet flat on the bottom of the cist. His sandals with parts of the skin of the soles of the feet still adhering to them were found in their original position, stuck fast to the adobe floor. Aside from the sandals nothing was *in situ*, the mortuary offerings being scattered about in the cist or lying in the juniper bark that had been pulled from its roof. There were: fragments of a cradle and of a fur-string blanket, a rope of yucca leaves, seven coiled baskets, eight sandals, a breech-cloth (?) of human hair, four digging sticks, two foreshafts with chipped points, one broken atlatl dart shaft, five snare-twigs, one stone knife in wooden haft, two chipped points, one buckskin wallet, one lump of red paint, two flaking punches of horn, one stone pipe, one broken clay pipe, one bundle of feathers tied at the butts, one fragment of netting, one feather ornament with beads, several loose beads.

¹ Kidder and Guernsey, 1919, p. 174.

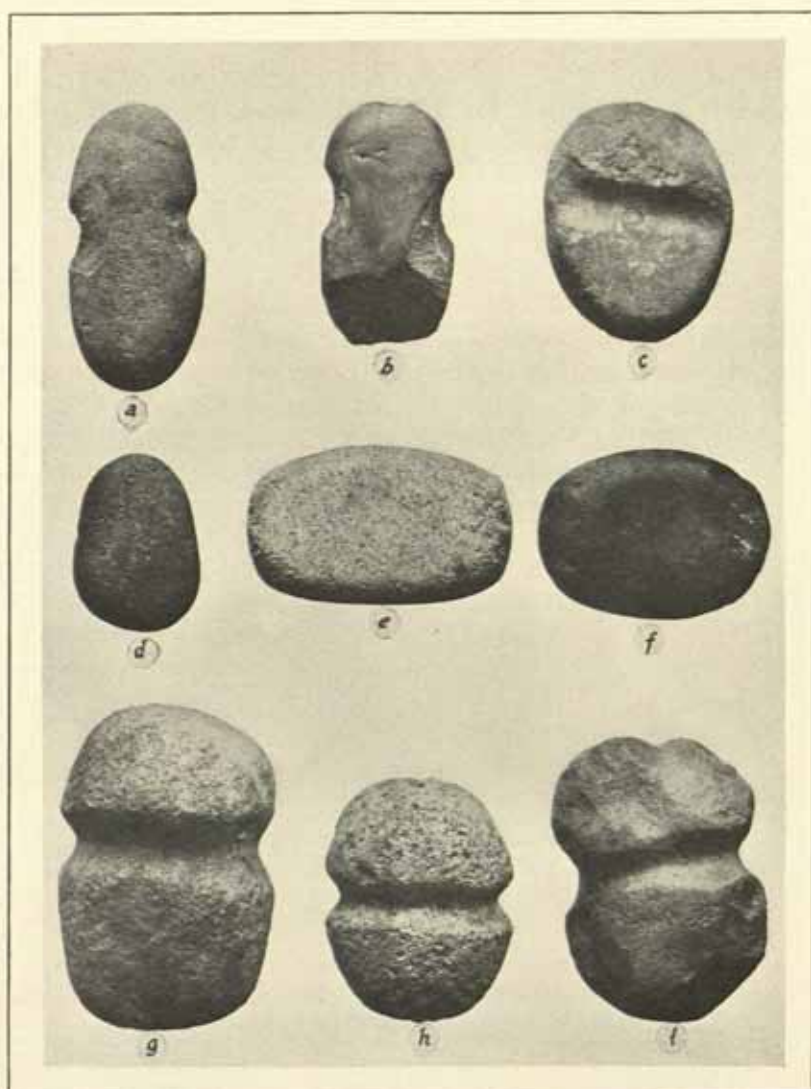
Amsden did considerable digging in other parts of the cave, but found no further cists or specimens.

While we were at work in 1922 clearing the first cist in order to photograph it the next day, small pieces of rock kept falling from the roof at the east end of the cave. At the time this gave us little concern, but on our return the following morning we were amazed, as we came in sight of the cave, to find that an enormous mass of rock had fallen since our visit. This had crashed down upon the cave floor, and avalanched down the talus, which for a space of 75 feet it completely denuded of the thick growth of scrub oak through which we had forced our way while getting in and out of the cave the day before. Some of these trees were not less than a foot in diameter. The freshly fallen rocks appear in the photograph (Plate 35, lower), which was taken at a distance of about 175 feet out from the cave. Fortunately none of the rocks fell directly on the burial; so we were able to photograph and remove it. According to an Indian living near-by, the fall of rocks had taken place shortly after we had left the cave. This incident, the second of the kind to happen to us,¹ is noted here to call the attention of future workers to danger from this source. According to mining men, the coming down of small particles almost always precedes heavier falls.

As we did not consider it safe to continue work in Broken Roof Cave, we returned to Kayenta. Before describing the brief trip out from that place, which ended the season's work, we will insert some notes, taken in 1916, on a cliff-house on the Chinle about 15 miles upstream from Water Fall Ruin.

Ford House (1916) and Near-by Sites. This ruin is so named on account of its location, which is directly opposite the point where the trail to Kayenta crosses the Chinle; one of the few places for a long distance where it is possible to ford when there is any water flowing. The shelter in which the ruin lies is at the back of a deep cove in the cliffs that line the west side of the valley at this point (see Plate 36). It is near the top under the rim rock, but can be gained by an easy ascent over not too steep ledges which form the base of the cliffs. Directly in front of the cave is a deep gully choked with trees and rocks, so that entrance to the ruin is made most conveniently from either the left or right side. The natural

¹ Kidder and Guernsey, 1919, p. 74.



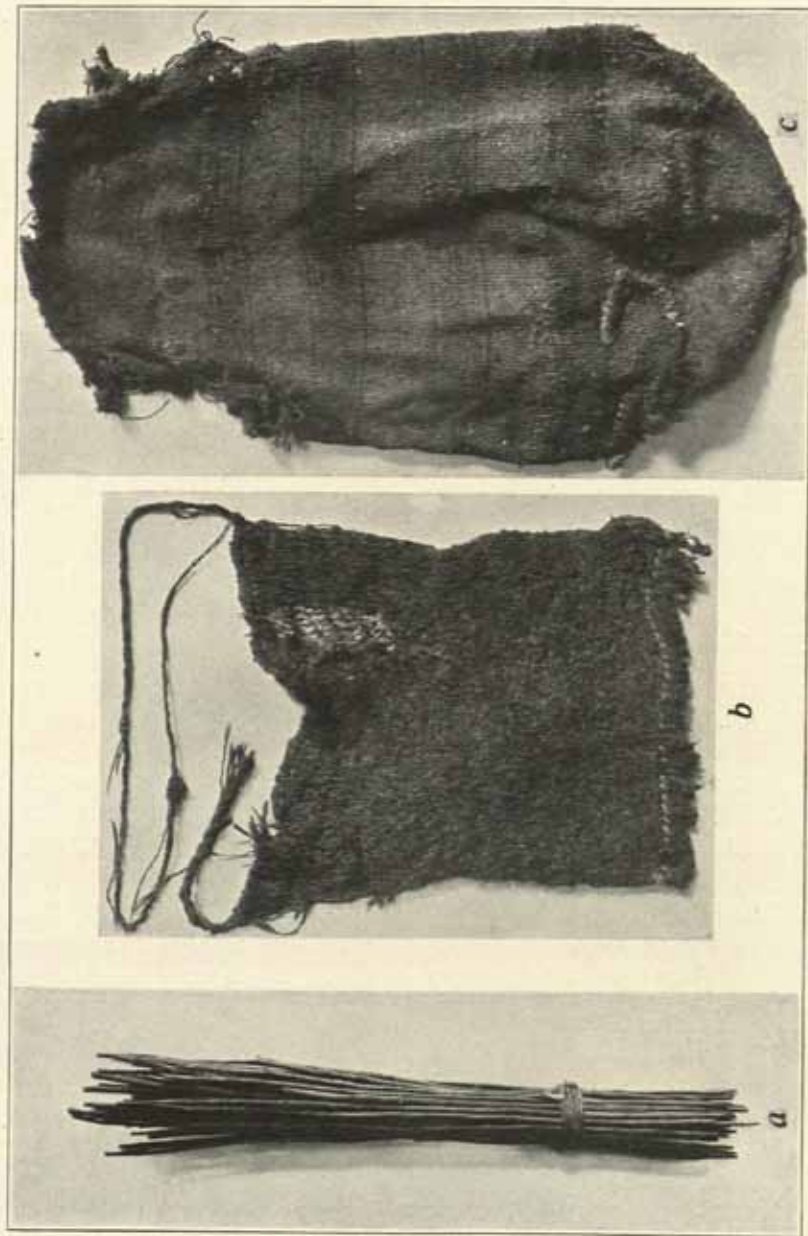
STONE IMPLEMENTS

a, Unfinished axe, Poncho House, Pueblo III (7); *b*, Notched adze, Poncho House, Pueblo III; *c*, *Mano* With secondary groove, Water Fall Ruin, probably Pueblo I; *d*, Arrow flaking stone, Poncho House, Pueblo III; *e*, *f*, *Manos*, Water Fall Ruin, Pueblo I; *g*, Maul, Turkey Cave, Segi, probably Basket-maker III; *h*, *i*, Mauls, Segi Sand Hill, Basket-maker III

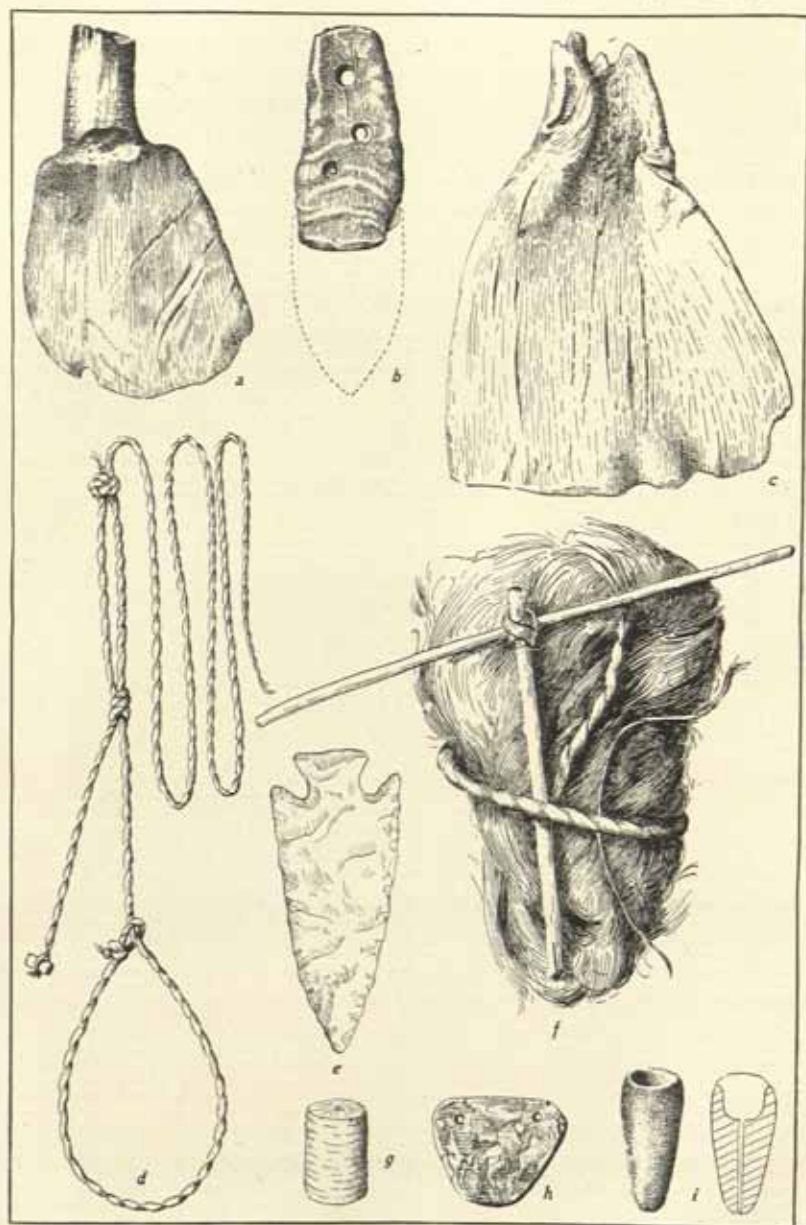


TYPICAL SQUARE-TOED SANDALS, BASKET-MAKER II

a, b, d, From cache, talus of cave at head of Adugegi Canyon; c, Child's rawhide sandal from cache, talus of cave at head of Adugegi Canyon; e, Sole of sandal, Broken Roof Cave



a, Snare sticks, cave at head of Aduogi Canyon, Basket-maker II; *b*, Apron woven of human hair, Cist 2, Broken Roof Cave, Basket-maker II; *c*, Twined-woven bag, made at Aduogi Canyon, Basket-maker II



a, Digging stick of mountain-sheep horn, Room n, Cave 1, Segi, Basket-maker III; b, Knife handle of antelope horn, Room n, Cave 1, Segi, Basket-maker III; c, Digging stick blade of mountain-sheep horn, Poncho House, probably Pueblo III; d, Snare for small animals, cache in talus of cave at head of Adugegi Canyon, Basket-maker II; e, Jasper knife blade, Cist 1, Broken Roof Cave, Basket-maker II; f, Bundle of human hair, human hair-string in process of making, shown as found, cave at head of Adugegi Canyon, Basket-maker III; g, Crinoid, Cist 1, Broken Roof Cave, Basket-maker II; h, Abalone shell pendant, Cist 1, Broken Roof Cave, Basket-maker II; i, Pottery pipe, small cave above Poncho House, Pueblo I

path leads to the south end of the cave and crosses a level area a little lower than the cave proper, which is partly sheltered by the overhanging walls of the cliff. Here there is a fine spring, seemingly with an unfailing supply of clear cold water; the damp ledge back of it is covered with green moss and clinging vines, the latter at the time of our visit bearing brilliant scarlet blossoms.

This sheltered spot about the spring must have recommended the site to the Pueblo III people, as it is at all times delightfully cool,

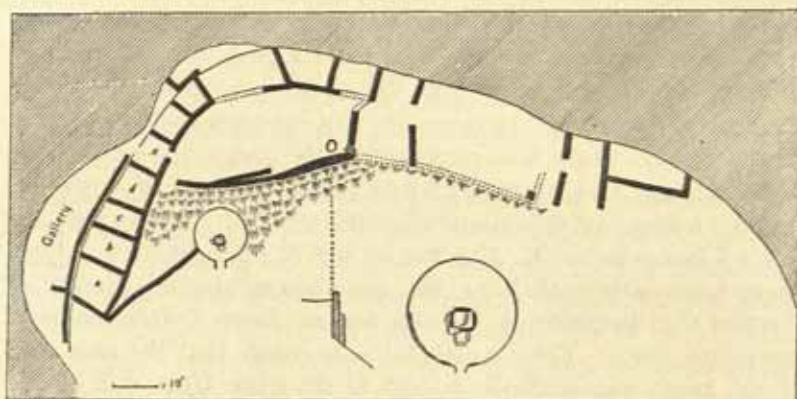


FIGURE 16
Plan of Ford House

while the cave facing the east, except for a portion at the north end, is exposed to the full rays of the morning sun.

Reference to the photograph reproduced in Plate 36 and to the ground plan (Fig. 16) will show that the salient feature of the ruin is the high, rampart-like wall along the front. This wall and one built at right angles to it at the north end enclose a plaza-like space in the center of the shelter. The wall is over 40 feet in length; at the highest point measured outside it stands 13 feet; inside, the top of the wall is 5 feet 4 inches above the present floor level. In thickness the top of the wall averages 15 inches. As indicated in the plan, the wall is not straight, but has a slight double curve. From a point about midway, extending to the south corner, the base of the wall is reinforced by a buttress-like wall for a distance of $7\frac{1}{2}$ feet. This retaining wall has a thickness at the top of 1 foot 6 inches. Measured at the south corner

of its base, it was found to be much thicker. At various points, and on three levels, the wall is pierced by loopholes set at angles which command every approach from the front. In the side of one of these holes are grooves made perhaps by sharpening wooden arrow points. We judge that the prime purpose of this wall was defense. Another wall built partly at least for the same reason extends along the front of the natural gallery at the south end of the cave; at its highest point it stands 4 feet. About midway in it is a small window or loophole 9 inches square, by means of which the whole front of the cliff-dwelling might be under observation. A few rude steps cut in the ledge at the edge of the gallery back of Room *a* show that access from the plaza to the gallery was over the roof of this room. Rooms *a*, *b*, *c*, *d* are on a level below the plaza. Room *c* is the best preserved of the group, the wall at one point standing to a height of 8 feet. The front wall of this room has in it a doorway, dimensions of which are 2 feet 2 inches high, by 1 foot 6 inches in width. This can be seen in Plate 36, lower. That these rooms were built later than the main structure is shown by the fact that loopholes in the east wall of Room *e* were rendered useless by them. These portholes may mean that the east wall of this room was originally a part of the main front wall of the plaza; it is the same height and thickness. Now, however, there is a passage 4 feet 4 inches wide between the end of the front wall and Room *e*, evidently the principal entrance to the plaza. From the outer corner of Room *a* an aimless wall, only the foundation stones of which remain, extends to the kiva as shown in the plan (Fig. 16). Its purpose may have been to level up a space at this point. A similar wall joining a group of rooms with a kiva was found in Ruin 7, 1914 expedition. Room *e*, when cleared, was found to have a hard-packed adobe floor on which lay lumps of adobe bearing imprints of sticks, all that remained of the roof. Located as shown in the plan was a fireplace 20 inches square, built of thin flat rocks; the doorway, which is also indicated, measured 1 foot 7 inches in width. We found a considerable number of shattered arrow shafts in the débris that filled this room and in the entrance to the plaza. At the time the work was in progress we pictured quite graphically in our minds the Pueblo III people driven by some enemy to a last stand in the gallery. This may possibly have been the case, as arrows aimed at this point would certainly, after striking the cliff or walls, have fallen where we found them.

Excavations in the plaza revealed an old wall 3 feet below the present surface. This wall is located as shown in the plan. It seems to have no place in the present structure. Its masonry is inferior to that of the front wall, which, as may be judged by Plate 36, lower, shows good workmanship. It is possible that this wall was built to level off the original floor of the cave.

The front walls of several rooms to the north of the plaza have fallen outward and down the steep bank in this part of the cave. The top of the bank has also broken away, exposing the foundation of the side wall of Room 11, showing it to have been built on a close-packed rubbish layer, one foot deep. This rubbish layer rested on a hard-trodden adobe floor, below which was more rubbish. In the room, two floor levels show, the upper covered with charcoal, ashes, and fragments of the adobe and stick roof of the room.

Although no evidence of a kiva appeared on the surface of the steep bank in front of the ruin, one was readily located by clearing away the building stones and other débris, at a point which seemed the most probable site of such a room. The kiva, when cleared, was found to be circular in shape, approximately 12 feet in diameter, partly excavated in the hard earth of the bank and partly built up of stone. The rear of the room, in conformity to the slope of the bank, has, at one point, earth walls to a height of 4 feet, topped by 1 foot 6 inches of stone wall, a total height of 5 feet 6 inches. At the front, the stone work begins at the floor level, though only a few courses are left. There remains in this section of the wall the lower part of the ventilator shaft opening. This has in place a flat stone sill. The angles of the sill and the sides of the opening are rounded and faced with adobe mortar. The width of the opening is 1 foot 2 inches.

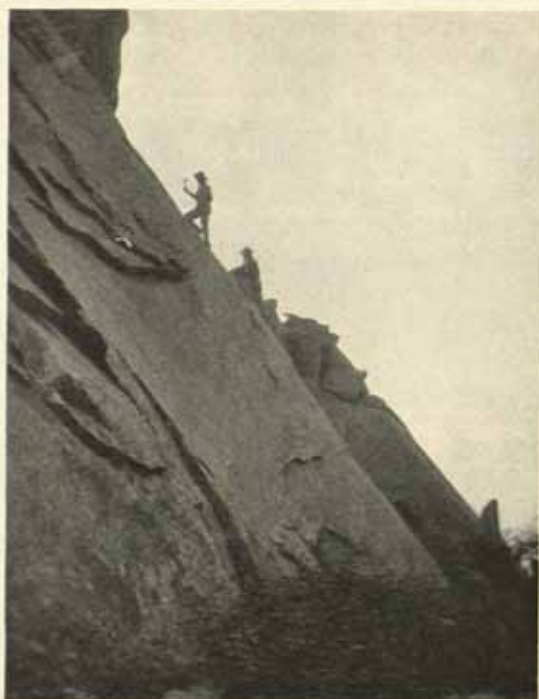
The fill in the lower part of the room was damp, so that no well defined floor level could be traced. The side walls had also suffered to some extent from moisture. At the back of the room, where the least damage from this cause occurred, there remained several coats of adobe plaster put on one over the other, each thin layer being much blackened by smoke.

In the northeastern side of the room at a point 1 foot 7 inches above what was assumed to be the floor level was a niche 11 inches wide and 9 inches high. Fire had destroyed the roof, leaving no hint as to its construction.

The most interesting feature of the room was the evidence found in it, showing that during the latter part of the occupancy of the cliff-dwelling its use as a ceremonial chamber had been discontinued and given over to more commonplace purposes. This conclusion was based upon the finding of a rectangular two-compartment mealing bin set up in the center of the room. The identification of the structure was made certain by a *mano* which was found in one of the compartments. This mealing bin had been built directly over the original stone slab fire box of the kiva period, in which were the usual clean white wood ashes. The position of these two structures and their relation to each other are shown in the plan and cross section, Figure 16. It is possible that there may be other kivas in the bank along the front.

Our excavations in the ruin were poorly rewarded by specimens, notwithstanding the fact that the cave had been occupied for a long period of time, as was shown by the depth of rubbish, successive floor levels, and the old wall back of the plaza wall. Clayton Wetherill thought that the ruin might have been explored by McLoyd and Graham in the eighties, which would account for the dearth of specimens; but as the plaza had been used for a long time by the Navajos as a sheep corral, all trace of earlier digging had been completely effaced, except possibly two holes in the lower part of the front wall, such as were sometimes made by pot hunters to expedite the removal of rubbish.

While work was in progress at Ford House, as much of the valley near it as possible was explored. Several shallow caves were found diagonally opposite the ruin. They were empty save one which contained a Navajo burial, marked by a pile of heaped-up stones and fragments of a cradle board. About two miles above the ruin there are two small caves, one inaccessible except by poles or a ladder, neither of which we had time to secure. In this cave are several rooms which appeared to be in a fair state of preservation, seeming to have the roof still in place. The second cave has a smoked ceiling but no structures. Near these caves is a surface site marked by the tops of slab structures; the potsherds that we found here are mostly Pueblo I. About one-half mile below the caves just mentioned is a smooth-faced vertical cliff whose surface seems to have been quite irresistible to artists, both Indians and whites, from very early times down to the present; on it are



Upper, Recutting ancient toe holes to enter cave above Ruin 8; *Lower*, Basket-maker III circular slab foundation and corner of Pueblo I rectangular room of later date, Water Fall Ruin



Upper, Surface site opposite Church Rock; Middle, Falls at Water Fall Ruin; Lower, Grave excavated in bedrock, Kayenta

drawings by Pueblo I and III people, Ute and Navajo, as well as the inscription reading, "Navajo Expedition, October 21, 1860," and another as recent as 1915 (Plate 37).

On our return to Kayenta from Broken Roof Cave, we repositioned and struck across the high mesa that lies between Kayenta and the eastern branches of Segi, dropping into the latter canyon by the branch which contains the picturesque ruin named "Bat-Woman House" by Professor Cummings, its discoverer. We had planned to reconnoitre this district, but the season was cut short by the fact that the leader of the expedition was bitten on the leg by a centipede. The bite became badly inflamed, and as it refused to yield to the field remedies, it became necessary for him to proceed to Flagstaff for medical treatment.

SEASON OF 1923, CHINLE VALLEY AND SEGI CANYON

THE original plans for this season provided for the exploration of new territory in Nokai Canyon, north of the Segi system,¹ but on arrival at Kayenta it was found that the services of Wetherill, who was to act as guide, would not be available for a matter of two weeks. To fill in this interim we decided to visit a ruin on the Chinle, twelve to fifteen miles below Water Fall Ruin, which had been reported to us by the Navajo in 1921, and visited by Amsden of the party's staff late in the same year. Two weeks were spent in excavating this ruin, a surface site near it, and in making a preliminary reconnaissance in the neighborhood.

Poncho House, so named from a peculiar poncho-like garment recovered from a burial found in it, was discovered in 1875 by W. H. Jackson of the Hayden Survey. It was described and figured by him in 1878,² and was thus one of the first cliff-dwellings of the Southwest to be brought to notice in an official report. Between the time of Jackson's visit, over fifty years ago, and ours in 1923, the ruin seems to have escaped attention, except by pot hunters, who have broken a number of holes through the bases of walls for the easier disposal of rubbish. Seven large ollas that Jackson speaks of having found and left in the site had, of course, disappeared.

¹ See Gregory, 1916, map, Plate 1.

² Jackson, 1878, pp. 420-423.

Poncho House is in southern Utah, on the east bank of the Chinle, eight or ten miles above its confluence with the San Juan. At the ruin the canyon wall has a deep bend or cove in its east side (Fig. 17). The Chinle arroyo winds into the mouth of this cove, passes around a low butte and very nearly doubles upon itself as it emerges to continue its way along the base of the cliff to the San

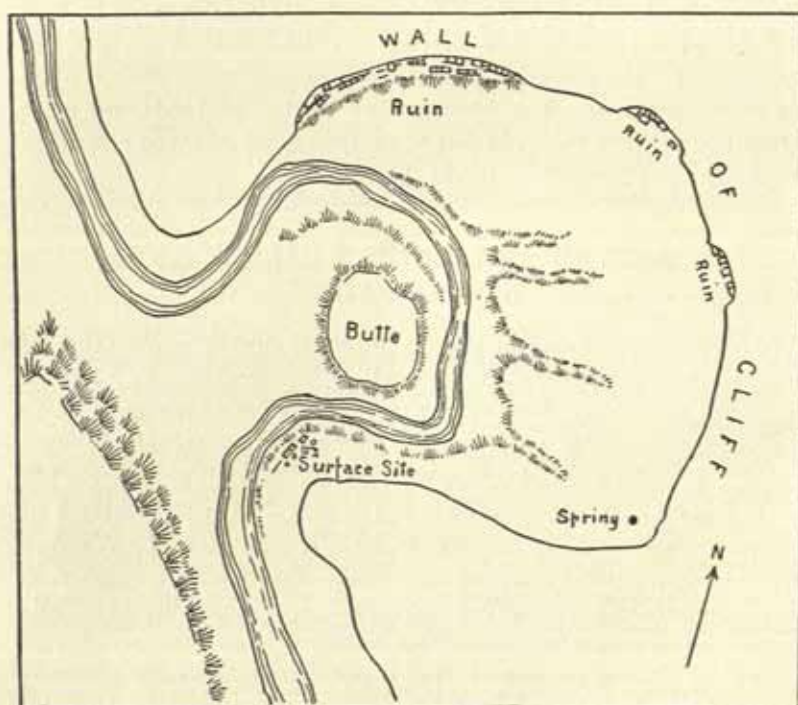


FIGURE 17
Sketch-map, vicinity of Poncho House

Juan. On the opposite side of the canyon, the wall breaks down into an opening to the west where the wide valley of a broad tributary wash enters the Chinle.

Our camp at Poncho House was located in the deepest part of the cove where there is a splendid spring of clear cold water of ample flow to have supplied the needs of the people who occupied the ruin. It is apparent that water could also be developed at a number of other points along the cliff. At this point the Chinle

usually carries a flow of fairly good water. At the present time no great extent of land suitable for cultivation lies in the cove, but before the arroyos began cutting, there was doubtless somewhat more. It is probable, however, that the fields of the ancient people were in the main valley below the ruin.

The ruin lies in the north side of the cove on a narrow bench 500 feet long and 75 feet above the base of the cliff (Fig. 17). To the west the bench terminates in a shallow recess; at this end the rock below the bench is bare, being too steep to allow the accumulation of *débris*. At the opposite end, a steep, rough talus filled with large rocks leads up to the bench. Nowhere has the bench a useful floor space much more than 40 feet in width.

The best preserved rooms are in the sheltered west end of the ruin. Those in the east end, when viewed from the front, seem to be wholly exposed to the elements; in reality, however, the apparently perpendicular cliff overhangs the ruin and a part of the talus as well. Nevertheless, during a shower that occurred while we were working here, wind-blown rain reached the back wall, probably a rare circumstance, as the structures show no sign of damage from this cause.

While we did not attempt to gather data for a detailed description of the ruin, being occupied chiefly in exploring sections unoccupied by cliff-houses in the hope that we might find stratigraphic evidence of earlier cultures, we did spare as much time as possible for mapping and recording its salient features. The plan (Fig. 18) shows the seventy structures we were able to trace, although undoubtedly more would be disclosed by excavation. This number corresponds fairly closely to Jackson's estimate of seventy-five rooms.

As shown in the plan, the principal buildings are grouped at the two ends of the bench, those in the sheltered west end being the best preserved and most orderly in arrangement (Plate 38). They are in two rows, one along the cliff and one placed as far in the front as possible. In order to provide foundations for these front rooms, walls were built extending down the cliff, often below the floor level of the chambers. The ancient masons were thus able to secure firm and permanent foundations on ledges that slope at a most precarious angle. Several of the western rooms extend clear up to the ceiling of the cave; one of them is three stories high, its

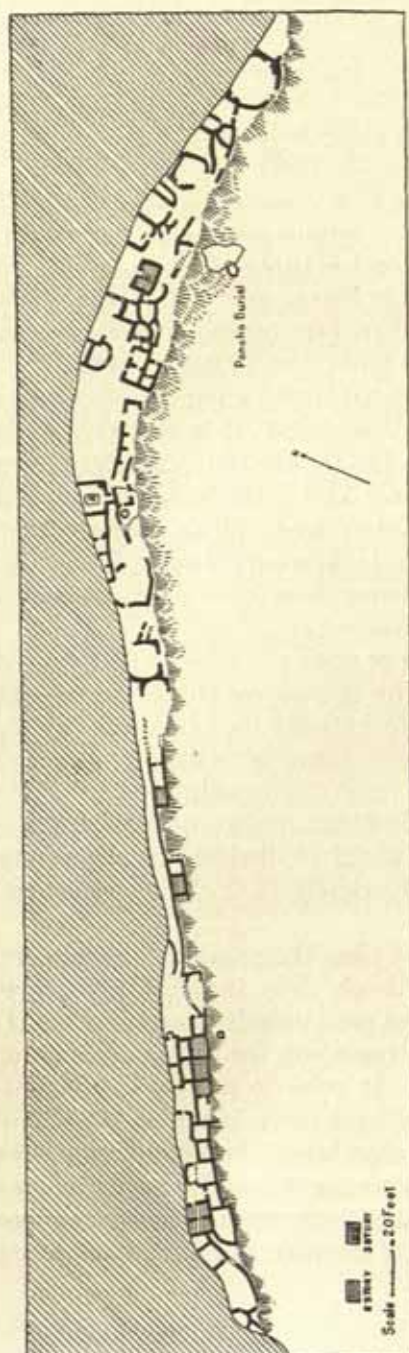
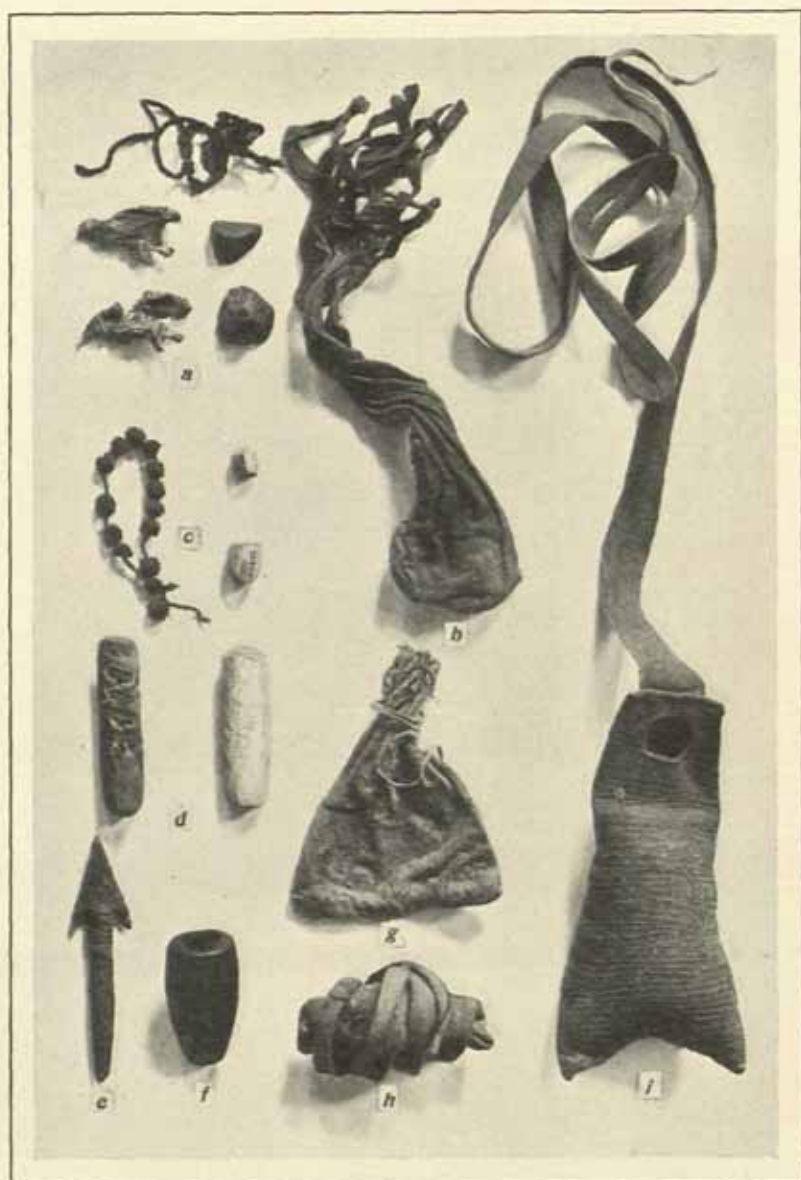


FIGURE 18
Plan of Poncho House



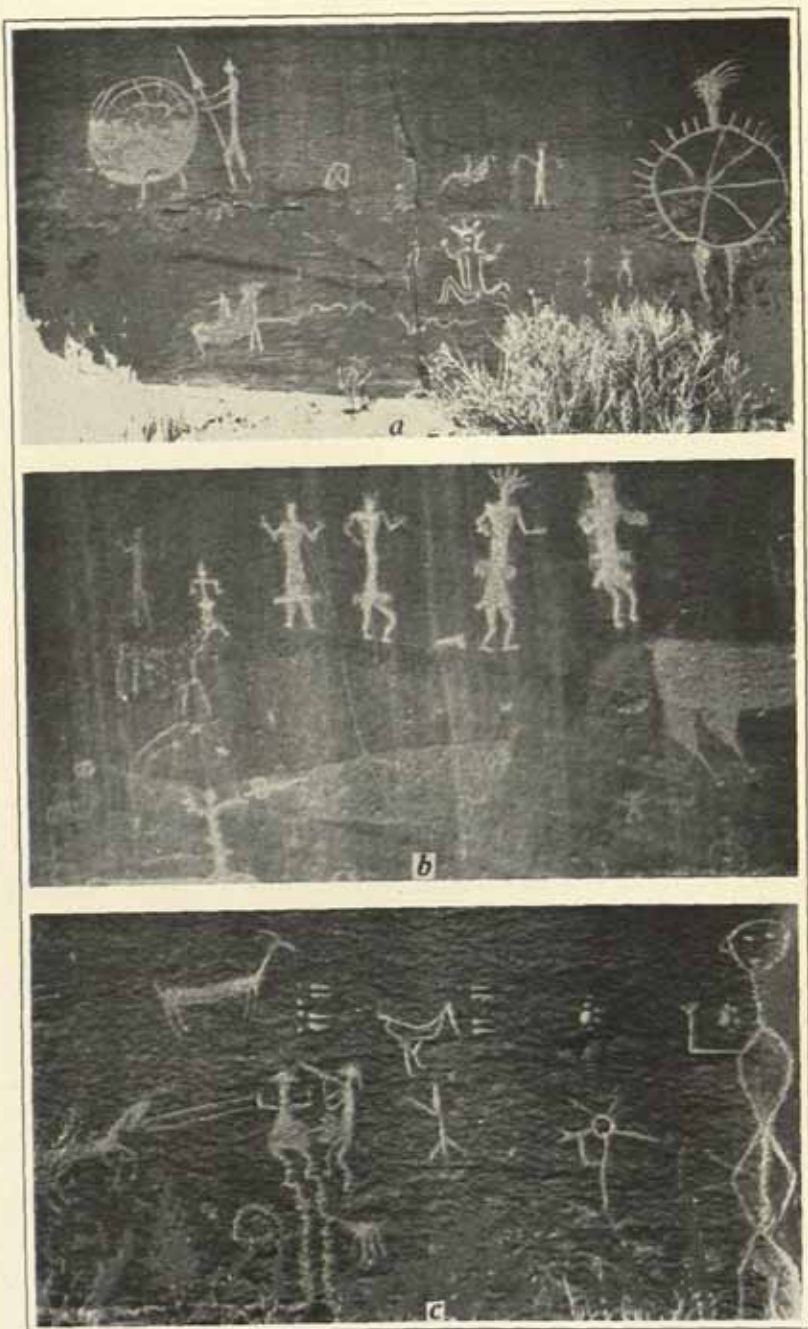
BASKET-MAKER II ARTICLES FROM CISTS 1 AND 2, BROKEN ROOF CAVE
a, Rodent's jaw, knotted string, yellow ochre and paint stone; *b*, Pouch of dressed skin which contained above articles; *c*, String of seed beads and two bone beads; *d*, Horn flakers; *e*, Fore-shaft; *f*, Pipe; *g*, Skin pouch; *h*, Skin pouch, wrapped as found; *i*, Skin pouch, containing pollen(?)



Upper, Partly cleared burial, Broken Roof Cave, Basket-maker II; *Middle*, Burial with baskets and wrappings removed; *Lower*, Fall of rocks, Broken Roof Cave



Upper, Ford House from valley; Lower, Ford House



Pictographs on wall near Ford House

front wall measuring 23 feet from base to top. Access from one end of the western group to the other was had by a passageway between the front and back rows of rooms, through some rooms and over the roofs of others. At the extreme west end of the group there is an open area fronted by a low parapet. The rooms of the back row are provided with windows and doors opening outward. In the front row, except in the upper story of the highest structure, there are no windows in the outer wall, though there are a number of loopholes at various angles and levels. Most of these details appear either on the photographs (Plates 38, 39, 40), or on the plan (Fig. 18). The rooms in the east section vary greatly in size and shape, and are built in most cases on no more secure foundation than the talus or large rocks in it. One structure, indeed, is built on an old rubbish heap (Plate 40). In spite of the insecurity of their foundations, there are many walls in good preservation, one room built on the sloping top of a large rock still standing at a height of 10 feet. Many of the eastern chambers, especially those along the cliff, were apparently intended only for storage places. One of the few rectangular rooms in this section (Fig. 18, b) has walls $1\frac{1}{2}$ feet thick, which is exceptional, as 8 inches is the average thickness. There are four and possibly five kivas here. These are described below.

Between the east and west ends of the cave the bench is very narrow, but where possible to do so rooms were built. Back of these runs a narrow passageway connecting the two ends. When no rooms protected the front of this passage, there was a low parapet wall.

The masonry of the ruin is rather poor; it is composed of roughly shaped thin stones laid in an abundance of mortar, the mortar in most cases equaling the thickness of the stone. The walls are faced outside and inside with adobe mortar, the inner plastering being the smoother. Occasionally what seems intended as an ornamental feature is introduced by inserting small stone flakes or spalls in the wall in narrow bands. The doorways in Poncho House show a variety of forms, as can be seen in the drawing (Fig. 19). The arched door (Fig. 19, a) is unusual.

One of the most interesting results of our visit to this ruin is the comparison which we are able to make between its condition at the time of Jackson's visit and at the present. Two photographs

are reproduced in Plate 40, one made in 1875, the other in 1923. Through a most fortunate coincidence these two pictures were taken from almost exactly the same spot. The views are of the eastern or least sheltered part of the cave, and during the fifty-year period there appears to have been no perceptible change. Loose rocks at the tops of the walls and in fallen walls lie in the same positions in both photographs. It seems then that the

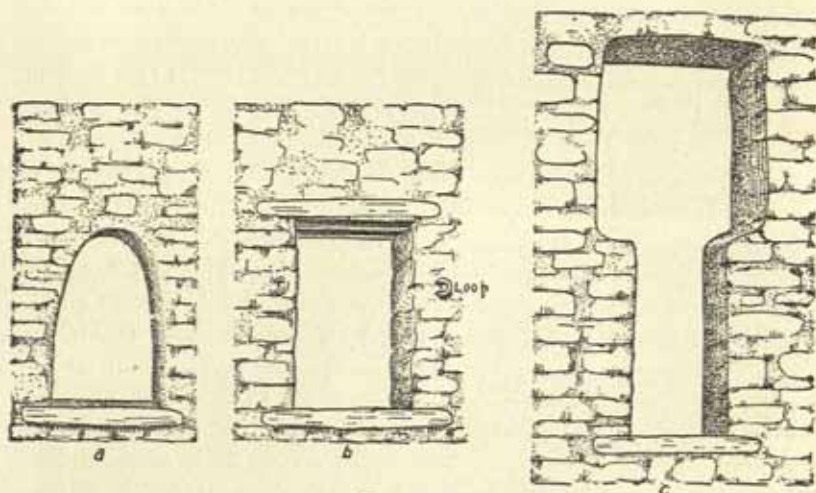


FIGURE 19
Various shaped doorways of Poncho House

natural decay of time is an almost negligible factor in the destruction of ruins situated as is this one, for certainly half a century should be long enough to bring about changes from this cause.

It appears that, at some time since the cliff-dwellings were built, there has been a slight shifting of the fill of the east end of the ruin, the floor of which is composed of a jumble of huge rocks as noted before. In a number of instances, walls of rooms which were originally built against the cliff are now two or three inches out from it.

Our excavations in Poncho House were mostly confined to the plaza-like open area in the east half of the ruin. Here it seemed possible that we might find conditions analagous to those in Water Fall Ruin. No stratified deposits, however, were encountered, though we dug in bedrock $8\frac{1}{2}$ feet below the surface of the deep-

est point. We were, nevertheless, well rewarded for the work by several fine pieces of pottery (Plate 65), and by the little cache-pot shown in Plate 41, upper right, which contained among other things the remarkable mosaic incrustated flaked knife blade figured in Plate 24, *d*, and frontispiece.

The fill of this area was a mixture of ashes, sand, charcoal, and the usual straw, sticks, husks, etc. Near the bottom there was less rubbish and the sand was slightly damp. At the very bottom of the cut we found a section of wall of coursed masonry like that of the upper houses. We could distinguish little difference in type between potsherds collected at various levels, but fancied that red ware became more abundant toward the bottom.

In the extreme east end of the ruin there was a small unencumbered space in which we uncovered an upright post, 1 foot in diameter, and a row of upright stakes that seemed to mark the outer wall of the house for which the large post may have been a roof support. The rubbish here was very deep and contained little sand. It is regretted that we did not have time to clear completely this section.

In exploring the talus at the east end of the ruin, a section of wall and some poles and reeds which seemed to be part of a roof covering were exposed; these lay partly under a rock 15 feet long, 9 feet wide, and 5 or more feet thick, which rested so insecurely on the steep talus that while we were clearing the wall it slid down several feet. This forced us to abandon the idea of extensive excavation thereabouts, as there was danger that the large rock and others above it might slide and completely block our diggings. After exposing as much of the wall as possible and working down in front of it as far as it was safe to go, we made a hole in the masonry, revealing a chamber $4\frac{1}{2}$ feet long by 3 feet wide, partly filled with very fine sand (Plate 7, upper). Scooping away a little of the sand, we encountered a large squash of which nothing remained but the rind. Further clearing uncovered the desiccated remains of an adult male whose body had been prepared for burial by making it into as compact a bundle as possible by compressing the limbs tightly against the trunk. The body was done up in a fur- and feather-string blanket, while wrapped tightly about the head was the poncho-like garment from which the ruin derives its name. The body lay on its back, the head west, resting on a wooden

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billet or pillow, with a bow and one arrow lying along the right side. The bow was broken off at each end to accommodate it to the limited space. In addition to the articles already named there were four pieces of pottery and three baskets arranged as shown in Figure 20, *b*. Great difficulty was experienced in clearing this sepulcher of the very fine dust-like deposit in it, which could only

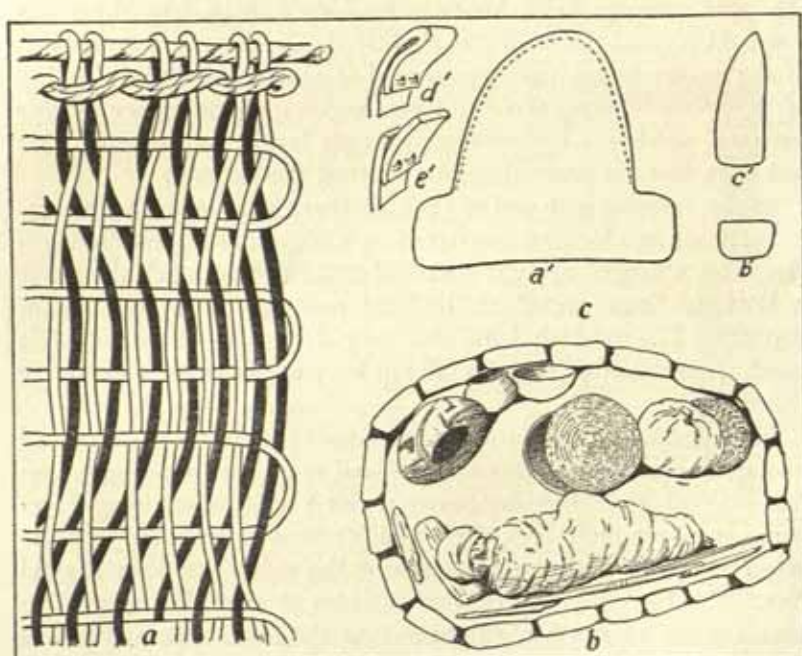


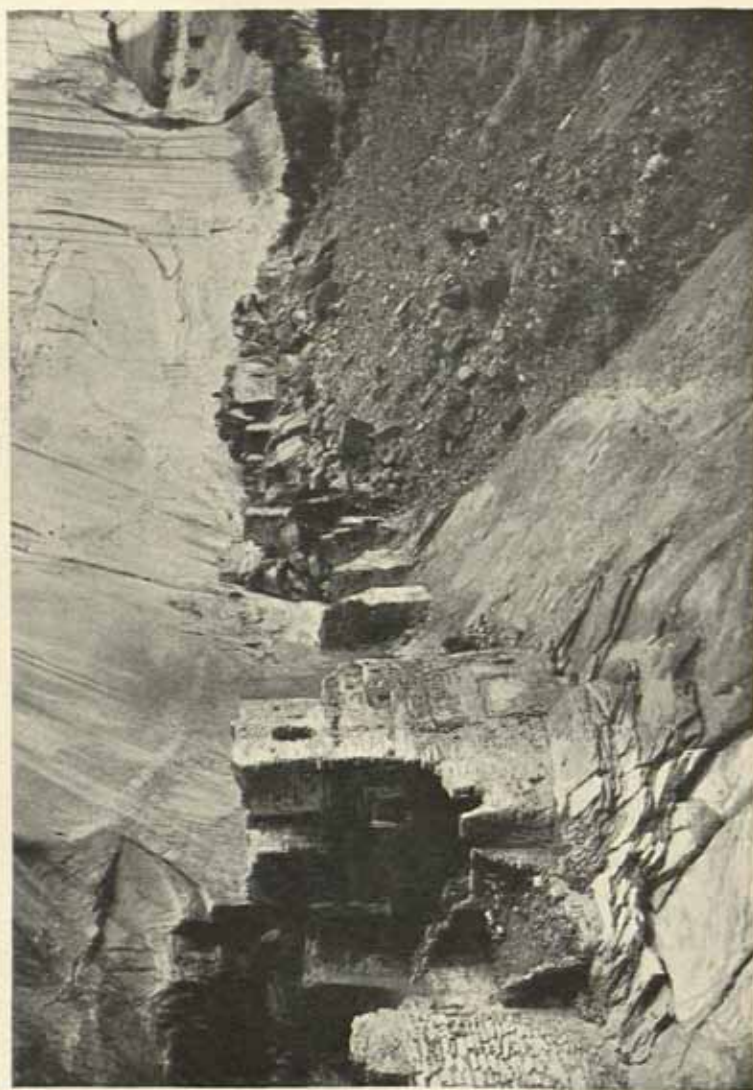
FIGURE 20

a, Weave used in hair apron, Burial 2, Broken Roof Cave (cf. Plate 24, *b*); *b*, Grave in small room, Poncho House, showing pottery, baskets, broken bow, and squash; *c*, Plan showing pattern of moccasin from Grand Gulch (cf. Plate 27, *f*)

be removed a cupful at a time through a hole just large enough to admit the head and shoulders of the person thus engaged. The wall of this little chamber, as shown in the plan, was oval in outline; its masonry was the same as that of the houses. The roof was constructed of small poles covered with coarse reed matting and grass. The structure was carefully made and apparently was built for a mortuary chamber. No burials made in this way have, so far as we know, been recorded from this region.



Poncho House, west end



Poncho House, east end

Two disturbed burials and one undisturbed but badly decayed skeleton were found in the digging. The skulls were strongly deformed. The burials contained no pottery or other objects.

Out from the foot of the talus in front of the ruin we found one circular slab structure, 10 feet in diameter. Excavations in the enclosure showed charred roof timbers, but no specimens or identifiable potsherds were recovered.

We cleared one kiva. It was built against the back wall of the cave and was of later construction than the rooms about it, the side wall of one room serving as the west wall of the kiva, while the vertical portion of the ventilator shaft was built against the back wall of a room in front. In size it measured 15 feet 6 inches from side wall to side wall at the back, 12 feet 6 inches at the front, and 11 feet 2 inches from front to back wall. The walls were of coursed stone, plastered on the inside with adobe. The fireplace was built of stone slabs set on edge and was approximately 1 foot 6 inches square. The fire screen was missing but the base on which it rested remained. This was slightly higher than the surrounding floor. Back of the fireplace and in line with the west wall was a series of four loom loops set in the floor. A small recess had been picked out in the cave wall at the back. It showed traces of having at some time been sealed up with adobe. Its position in the wall was in line with the fireplace and ventilator.

Sites near Poncho House. The flat area enclosed in the cove is deeply cut by arroyos that lead into the wash of the Chinle, some of which appear to be quite recent. There has been some change in the stream bed itself, as Jackson's photographs show it some distance out from the cliff at the west end of the ruin, whereas now it is cut clear to the base of the cliff. Scattered over the flat area in the cove are a number of slab structures marking small sites. The most extensive one is just at the mouth of the bay on its upper side (see Fig. 17). Here there are traces of rectangular walls of laid-up stones as well as circular enclosures built of thin slabs. The latter vary in size from mere cists to circles large enough to be called house foundations. The Chinle skirts the front of the site and has carried away a good portion of it. The surface is hard-packed earth, and was thickly strewn with sherds of an earlier type of pottery than that found in Poncho House. This pottery belongs to the period when corrugated pottery was just coming

into vogue and the novelty of the technique led to its use in a great variety of ways, though only applied to the upper body of pots. Examples of the ware are shown in Plates 42, 43, and 66.

We excavated several of the slab enclosures but found nothing in them. From a trench near the center of the site at a depth of 18 inches from the surface was taken the pot shown in Plate 43; it had apparently been cached here for storage purposes.

About one hundred yards west from Poncho House and higher up in the cliff is a group of several very well preserved houses

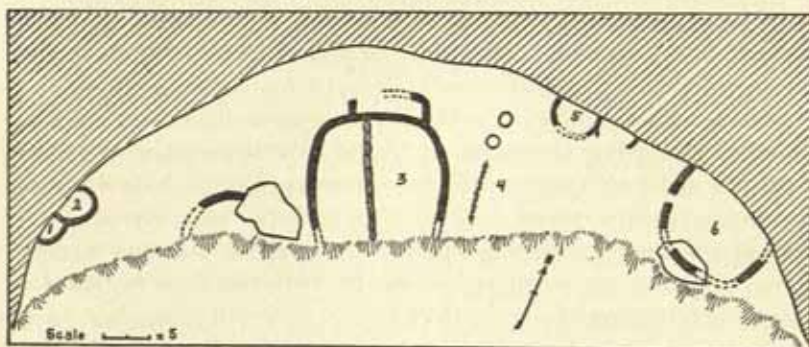


FIGURE 21

Plan of cave above Poncho House

with roofs still intact. The ascent to the ruin is difficult but not impossible. The relation of this ruin to the larger one is shown in Plate 44, lower. A nearer view is given in the upper photograph, close examination of which will show, in the lower left-hand side of the picture, our stock feeding, from which the height and relative size of the ruin is made clear. The rich vegetation here is due to a large amount of seepage.

About one and a half miles above Poncho House on the same side of the stream there is a surface site of some extent. Its surface was plentifully strewn with potsherds of the same kind as those found in Poncho House, but there were also a few Pueblo I sherds. Near the site just mentioned, and on the same side of the Chinle, is a semicircular shelter high up in the cliff overlooking the waterfall. In it are several badly dilapidated structures arranged as shown in the plan (Fig. 21). The useful floor space is

about 75 feet across the front and 25 feet deep at the center. Rooms 1 and 2 are storage places or granaries. The walls of Room 2 stand to a height of 4 feet; a door at the front has been sealed up. Room 3 is the largest in the cave. Its front wall has fallen out; the remaining three walls stand to a height of $3\frac{1}{2}$ feet, measured on the inside. They are plastered with adobe. Dividing the room into two compartments is a wall of coursed masonry laid without mortar and unplastered, apparently a much later structure than the room itself, and perhaps of Paiute or Navajo origin. The wall of Room 6 is so thickly coated with adobe mud as to hide the building stones completely. Room 4 probably had wattled walls, of which nothing remains but a row of close-set upright sticks broken off close to the surface.

On the talus outside the cave lay a number of bleached human bones. The rubbish within contained quantities of corn husks. The few potsherds were of the kind found in Poncho House mixed with a small proportion of Pueblo I types. Basket-maker II and Basket-maker III sandals and bits of feather-string were recovered from the talus. A pottery pipe and an arrow shaft were found in the general digging.

This cave provides one more example of a type of site very common in this region. Apparently these sites were resorted to from time to time during practically the entire period of man's occupancy of the country, but were never lived in by people of any one culture.

Expected supplies not having arrived, the party returned to Kayenta to reprovision. Shortly after arrival, the Field Director and two of the men came down with a violent sickness, resembling pneumonia, that in the case of the former resulted in a prolonged disability. The trouble was doubtless due to a particularly pernicious dust encountered during the excavations at Poncho House. The great rubbish heaps at that site, the accumulations of centuries, are composed largely of ashes and pulverized turkey droppings. Every stroke of the pick caused the dust to rise in choking clouds. Only such members of the party as were most exposed suffered from the subsequent long irritation, and those who were engaged in mapping and photographing escaped. In most cases of dust sickness the symptoms manifest themselves within a few hours; the delayed effect in the present instance is so unusual as to suggest

that there may have been something especially toxic in the dust of Poncho House.

At the time that the author was taken sick, Dr. A. V. Kidder and Mr. and Mrs. W. H. Claffin, Jr., were on their way to join him at Kayenta. We all met at Gallup, and as it was impossible for the author to do further fieldwork, he returned East and the rest of the party undertook a two weeks' reconnaissance of the Keet Seel branch of Segi Canyon. A report of this part of the season's work by Dr. A. V. Kidder follows.

Keet Seel. We motored to Kayenta via Chinle, procured horses, and proceeded to Keet Seel, camping about four hundred yards above that ruin, at the edge of a grove of scrub-oaks which were fast dying as the result of the lowering of the water table.

Keet Seel Canyon illustrates very well the harmful effect of the arroyo cutting which, since the introduction of live stock, has gone forward to such an alarming extent in the Southwest.¹ Fifty years ago this canyon had a level floor of rich adobe soil stretching from cliff to cliff, the wider parts covered with grass and sagebrush, the coves densely thicketed with box-elder and scrub-oak. In times of rain, the flood-water was held back by this vegetation and soaked into the ground, or, when heavy, spread out more or less evenly over the flats, enriching them with a thin deposit of silt washed down from the mesas above. It is doubtful if there was any considerable permanent above-ground flow, but the water table was certainly close below the surface, and seeps must have occurred at many places.

Overstocking with consequent overgrazing by Navajo horses, sheep, and goats brought about the disappearance of a large part of the grass and weeds over the whole country, with the result that the run-off of the rains, no longer retarded by vegetation, was greatly quickened; the drainage from the mesas and the upper reaches of the canyon arrived at its lower end in the form of heavy floods, where it began the cutting of a gully or arroyo. Each year the arroyo ate deeper into the adobe floor and each year its head pushed higher and higher up the canyon, while after every rain its bed was widened by the undercutting and caving in of great sections of its banks. When the first Peabody Museum expedition to the Segi visited Keet Seel Canyon in 1912, the arroyo, though already

¹ In this connection, see Bryan, 1925, pp. 338-344.

deep, had not reached the cliffs on either side, and enough flat land was left to permit easy travel. Now, only eleven years later, the cutting was found to have extended in many places to the rock walls, so that the party had to cross and recross the arroyo, often with considerable difficulty, in order to keep on level ground. At some narrow places practically the entire fill had disappeared, and we rode in the bed of the arroyo until abrupt transverse ledges, over which the stream fell in little waterfalls, forced us to climb to the upper benches of alluvium.

We have described present conditions in Keet Seel Canyon because they are so typical of what has been happening within the last fifty to one hundred years in many parts of the Southwest. Countless acres of tillable soil have been washed away, and much of that which remains has not only been deprived of its flood irrigation, but has been dried out by the lowering of the water table to the level of the arroyo bottoms. Hence the entire country has become less favorable for unirrigated agriculture than it was in the very recent past, without, as far as we know, any falling off in actual precipitation. This is naturally of great importance for the study of prehistoric conditions.

Turkey Cave. Our camp, as was said above, was made about four hundred yards up-canyon from Keet Seel, just below a site on the same (north) side of the canyon. Turkey Cave, so called because of the enormous amounts of turkey droppings in the refuse, is a large, shallow cave with a southerly exposure, reached by a steep but easy climb of forty or fifty feet from the flat land below. At the rear are some cliff-house rooms and a kiva; the latter had been cleared by some previous excavator.

Our digging consisted in the cutting of a longitudinal (east to west) trench across the lower part of the rubbish accumulation at the front of the cave in the hope of finding stratified deposits, a hope raised by the occurrence on the talus of sherds of Basket-maker III, Pueblo I, and Pueblo III types. Although there were good reasons for supposing the Basket-maker III to have been earlier than the Pueblo I, no case of the direct superposition of the latter on the former had so far been found.

Our trench revealed a thick and excessively dusty deposit of dry Pueblo III refuse, made up of corn husks and cobs; shreds of juniper bark; grass; sage, oak, and greasewood twigs and leaves;

reed and cat-tail rushes; turkey and human excrement; masons' chips; lumps of adobe; bits of string; worn-out sandals and matting; potsherds and broken implements. As is usual in such dry débris, there were relatively few animal bones. Below the mass, at a depth from the surface of about 6 feet, were the remains of a burned roof of poles and brush, crushed down upon the slab walls of an early structure, the southern part of which was cleared to the floor. It proved to be a circular room some 11 feet in diameter,

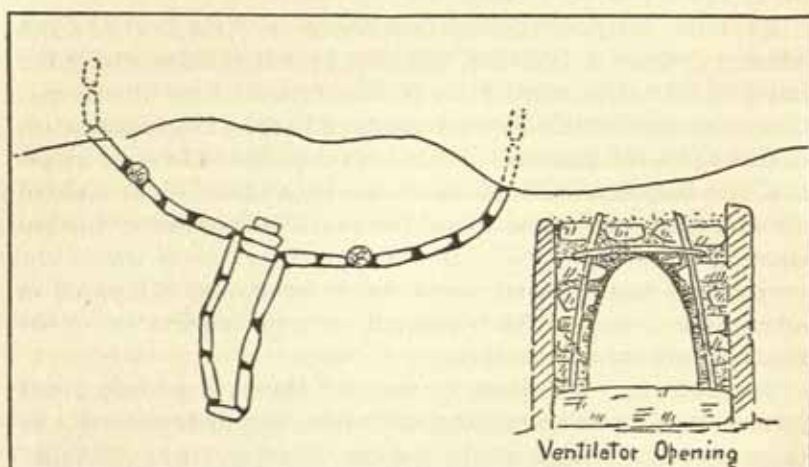


FIGURE 22

Plan of slab foundation and detail of ventilator opening, Turkey Cave

outlined with slabs set edgewise in the sandy hardpan of the cave floor. Although we were not able to get back far enough to make certain, it is probable that the rear portion of the room was dug into the shelving hardpan in order to provide a level floor. Our trench was narrow, for the débris above kept sliding into the excavation, and to have cleared the whole room we would have had to pull down and shovel out the material from far back up the slope.

The floor of the room was of tramped adobe which curved up to meet the wall-slabs. These were 20 to 22 inches high, the interstices chinked with adobe and small stones, and reinforced at two places (see Fig. 22) with short vertical posts, one of them heavily charred. If the wall had formerly been carried higher than to the tops of the slabs, no trace of such a superstructure remained. At the

south side, 5 inches above the floor, was the entrance to a narrow, ventilator-like passage. A stone slab sill protruded 4 inches into the room. The entrance, 10 inches wide at the base, 16 inches high to the arched top, was edged and topped with wooden rods set in adobe (Fig. 22). The wall-slab just west of the entrance had pecked in it an 8-inch semicircle, in the center of which was a cup-shaped hole 1 inch in diameter. A loose slab found lying on the floor bore exactly the same marking. The passage was 22 inches high, was edged with slabs, and terminated at 3 feet from the room wall. The floor was of adobe except 18 inches at the south which was slabbed. Its roof, if it had one, had disappeared, but a single charred stick slumped into it may perhaps have formed part of a covering. Conditions were confused here by a prehistoric excavation, made apparently at the period of the cliff-house, which had been dug down to the passage and, at one place, to the floor of the slab chamber. It had been filled with the dry refuse described above.

Just west of the chamber the deposit shallowed to a depth of about 5 feet. Although it was much more rotted than the *débris* in and above the chamber, it had evidently not been disturbed in any way, and as it contained many potsherds, a column 2 feet square was isolated for a stratigraphic test. The mass proved to be made up of earth full of masons' *débris*, ashes, and charcoal, intercalated with many thin, horizontal layers of decayed organic matter (evidently decomposed refuse). The upper 2 feet contained pottery of the earlier or Proto-Kayenta phase of the Pueblo III period; the next 2 feet, typical Pueblo I ware; the bottom foot, plain gray Basket-maker III sherds.

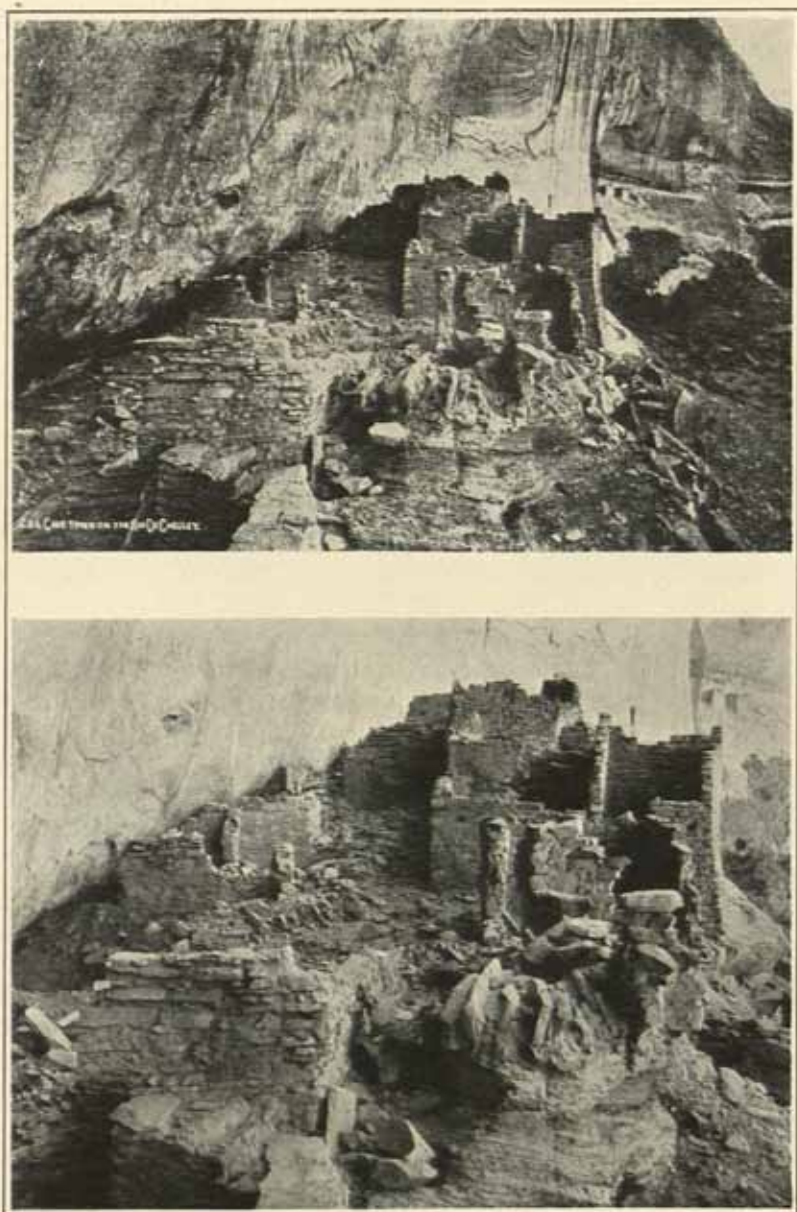
This test concluded our work in Turkey Cave. The results were pleasing in that they provided additional stratigraphic proof of the priority of Basket-maker III as compared to Pueblo I. To which of these two early cultural horizons the slab structure should be assigned is not certain, because the prehistoric excavation mentioned above caused confusion in the material filling it. Both Basket-maker III and Pueblo I sherds were found on the floor and in the passage, but we are inclined to believe it was built during the former period. Be that as it may, the Pueblo I occupancy of the cave was either longer or by a greater number of people, as Pueblo I sherds are much more abundant and fill a larger

amount of refuse than do those of Basket-maker III. The Pueblo I houses perhaps lie farther back in the cave below the heavy mass of Pueblo III rubbish. The Pueblo III occupancy, to judge from the pottery (we did no digging in the rooms), dates from the early Kayenta period. The wares are: Post-Kayenta black-on-white; black-on-red (with a very limited amount of polychrome); and fine corrugated. A single typical Mesa Verde bowl-sherd was found.

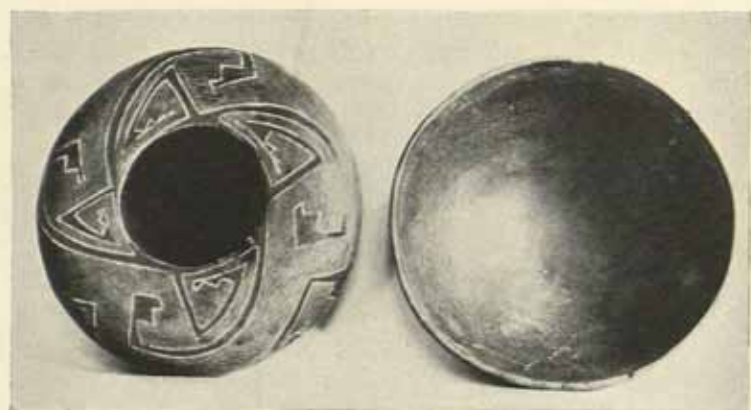
Cave 2. Opposite Turkey Cave, and a hundred yards or so higher up the canyon, is a second large shallow cave. It is about 250 feet long by 60 feet deep from the rear wall at the center to the line of shelter, and 100 to 150 feet high at the front. Like Turkey Cave it is set some 50 feet above the valley floor. The exposure is to the northwest. Along the rear are visible the wall tops of half a dozen cliff-house rooms. None of them are roofed and all are filled to the general level of the cave with debris and blown sand. A layer of sheep and goat dung covers the surface of most parts of the cave, and may well conceal other structures. A single kiva appears against the cliff near the center.

Our work consisted of sinking a few test-holes at the back, the clearing of the kiva, and the excavation of a little knot of burials in the talus. The test-holes disclosed dry rubbish of Pueblo III date to a depth of from 2 feet 6 inches to 5 feet along the cliff with no sign of earlier material. In one of the holes, at 18 inches below the surface, was a large corrugated jar covered with a thin slab of sandstone; it was empty.

Burial 1. Mixed with the pack-rat litter in a cleft between two large rocks at the western end of the cave were found human bones and potsherds. The place was cleared out and proved to contain the badly disturbed remains of two skeletons: an infant of about eighteen months and an adult male. The child appeared to have been buried first, accompanied by a red ware bowl, a Mesa Verde mug (Plate 45, center, right), and a small black cooking pot. This interment was subsequently broken into by the burial of the adult, the digging of whose grave resulted in the breaking and scattering of the pottery (pieces of the bowl and the mug were found outside and below the cleft). Other pieces of these vessels and bones of the child were left in the bottom and at the sides of the new sepulcher. The adult was then buried in the flexed posi-



Two views of middle section of Poncho House showing practically no change in fifty years;
Upper, by Jackson, 1875. *Lower*, by author, 1923



PUEBLO III POTTERY, PONCHO HOUSE

Upper right. Seed jar which contained mosaic blade and other objects; *Remainder.* Pottery from walled-up burial. Two views of large seed jar and bowl

tion, with a black cooking jar and a large coiled carrying basket. The latter was so badly rotted that only small bits of it could be saved. The adult skeleton had in its turn been pulled to pieces, apparently by rats, for some of the bones were much gnawed. The skull and several of the long bones were not found.

A group of six skeletons was discovered at the top of the rough, bush-grown talus at the front of the cave. They lay in small shallow pockets of dark, rubbishy earth between the rocks. Having been exposed to water falling from the cliff, they were all in very bad condition.

Burial 2 (depth 1 foot) was an elderly male with very marked flattening of the skull in the occipital region, closely flexed on the left side with head northwest. At the feet lay a red bowl, and in front of the knees a black-on-white pitcher.

Burial 3 (8 feet north of No. 1, depth 16 inches). An infant, with skull strongly flattened. The body had apparently been flexed on the face. With it were a small red flask and a red bowl.

Burial 4 (6 feet north of No. 3). An elderly adult, skull deformed. The body had been placed in a sitting position in a deep, narrow pocket between two rocks. The top of the head was originally about 1 foot below the surface, but the skull had fallen into the lap. The knees were drawn up to the former position of the chin, the right forearm was across the lap; the left arm flexed with the hand beside the left knee. A small corrugated jar containing a bone awl was placed in front of the feet. Beside it was a black-on-white bowl.

Burials 5 and 6 (9 feet northeast and a little downhill from No. 4) were the remains of two very young infants, partly washed from their shallow graves. With No. 5 were two small jars, one corrugated and one plain gray; with No. 6 was a small bowl and a little pitcher, both of black-on-white ware.

Burial 7 (near top of talus above Nos. 5 and 6). This unusually rich grave held the skeleton of an adult female about fifty years of age. The skull was strongly flattened posteriorly. The bones lay a scant foot below the surface. The body had been flexed on the right side with the head northeast. Behind the hips was a red bowl half full of fine white clay; on edge beside it were two *manos*. Against the lower part of the back was a rough grooved maul. At the feet was a black cooking jar with a single handle. In front of

the shins stood a large corrugated jar containing a polychrome ladle, two small seed jars (one red, one black-on-white), a red bowl, a black-on-white colander with several flint chips in it, a black-on-white jar, two bone awls, and a bone scraper. At the knees was a small black pot nearly full of flint chips; below it a handsome black-on-white vessel with two handles. In front of the arms were a fragment of a red pot of odd shape, a small black-on-white jar, a red pitcher, two small brownish-gray undecorated pieces, a ladle, and a pitcher.

Kiva. While the graves were being investigated, digging was going on in the kiva, a round chamber built directly against the cliff at about the middle of the cave. The wall tops, before excavation, were flush with the surface of the ground, and it is probable that they never extended much higher. The fill consisted of a hard crust, 6 to 8 inches thick, of tramped horse and sheep manure. Below this were 3 feet of clean drifted sand and bits of rock sloughed from the roof of the cave. Then came a zone of sand 1 foot to 18 inches thick in which were many building stones, presumably fallen from the upper part of the kiva wall as each one was heavily smoked on one side. On the floor lay 1 foot of dry refuse, mostly corn husks and stalks, containing a single yucca sandal, part of a worn-out feather-robe, a broken maul of sandstone, and a few pieces of string.

When the fill had been removed, we found that the chamber had been built within an earlier, larger kiva (see plan, Fig. 23). Nearly half of the wall of the original kiva had been utilized, and the new, less commodious room was made by building an inner wall on the northwest, west, and southwest sides. The resulting disused space had been filled with rubbish and rubble; it was not excavated. The old wall was of thin, flat stones, well coursed and copiously spalled with lines of chips introduced into the adobe mortar between the courses. The newer wall was of much larger and more irregularly shaped stones, vaguely coursed, laid with greater quantities of adobe, and sparsely spalled.

In the back (old) wall were two half-sockets in the masonry, which originally had held vertical beams 6 to 8 inches in diameter. Both were removed at the time of remodelling, and the southern socket was sealed with masonry. Where the new wall joined the old, there was, at floor level in the former, a cubby-hole 8 inches

square by 6 inches deep. With the exception of the ventilator openings, which will be described below, the remainder of the wall was plain; its lower part still retained about 1 inch of plaster in fifteen layers, each coat blackened by smoke.

The floor of the kiva proved to consist of the native rock cut to a uniform level and worked smooth; certain interstices and an area at the southwest, where the ledge evidently sloped steeply down-

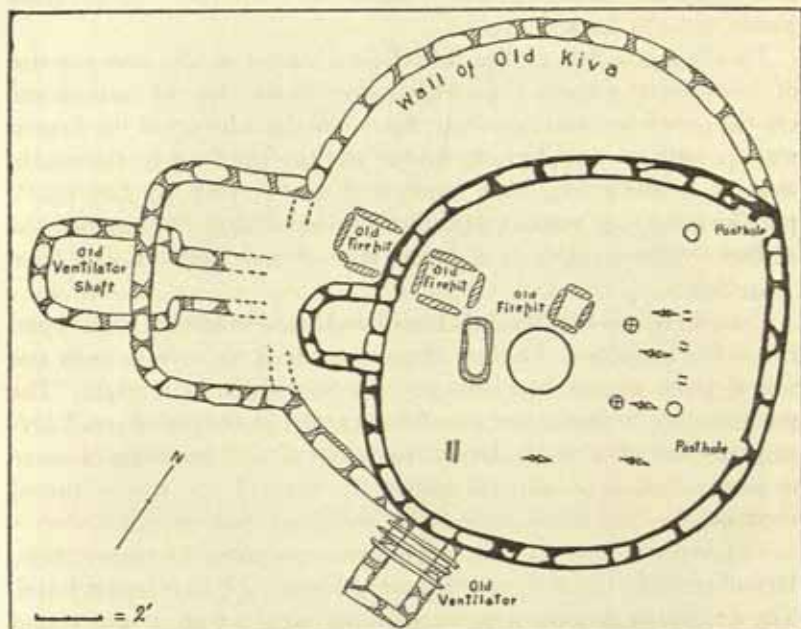


FIGURE 23

Plan of old and new kivas, Cave 2, opposite Turkey Cave

ward, were brought to the general level with puddled adobe, surfaced with gray plaster. The round firepit, 21 inches in diameter, was sunk slightly into the rock and was rimmed with an adobe-and-spall coping 3 inches high. It was full of pure white wood ash. Just southwest of the firepit was a rectangular platform of adobe, 1 inch high, 22 inches long, and 11 inches wide, with a flat sandstone slab (neither very regular in shape, nor showing much wear) set flat on top of it and adobed in place. This occupied the proper position for a deflector, and may have served as the base for one,

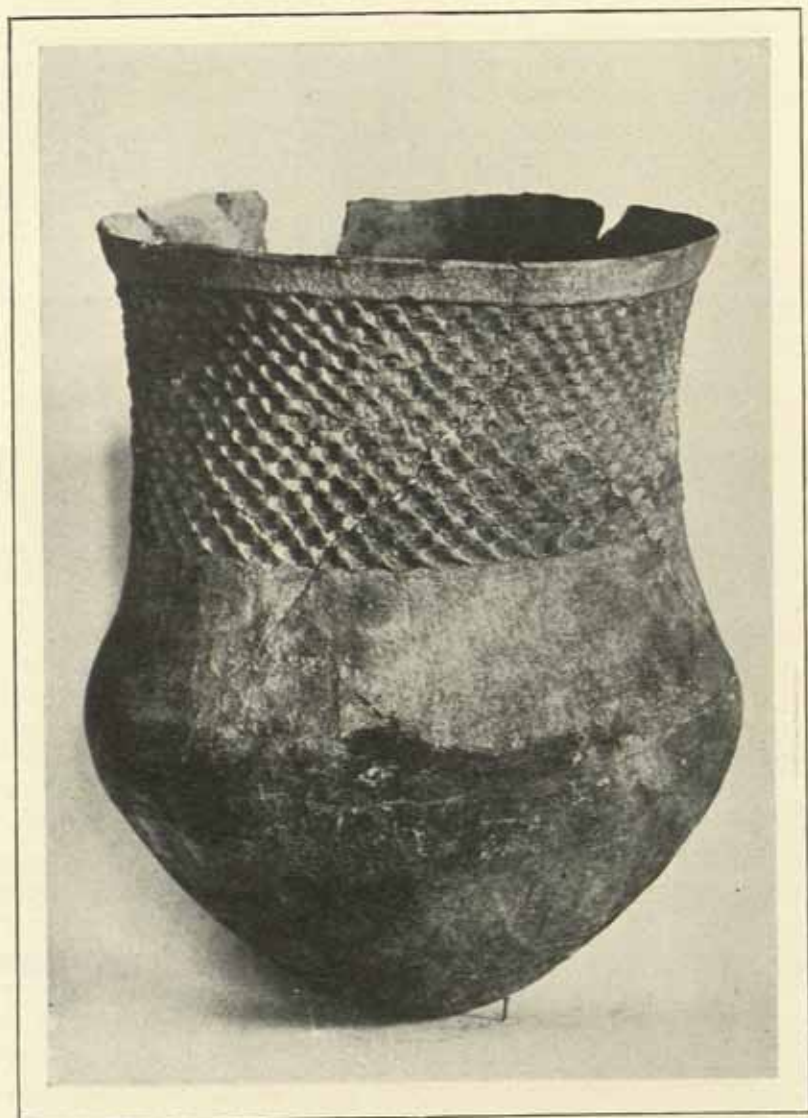
but there was no evidence that any permanent structure had ever been built upon it. Near the rear wall were two holes 8 inches deep by $2\frac{1}{2}$ inches in diameter, neatly cut in the ledge-rock floor (indicated by small circles on plan, Fig. 23). The southern one had been slightly reduced in size by an inner lining of adobe. Back of the firepit were two similar holes (indicated by crossed circles) filled with clean sand and carefully sealed over with adobe and plaster. These holes strongly suggest the "sipapu" of the Mesa Verde type of kiva.¹

To the northeast of the firepit (see plan, Fig. 23) was a series of four loom attachments very cleverly cut in the sandstone. On the southeast side, at about the same distance from the firepit, was a single one; and in the adobe part of the floor to the southwest of it was a twig loop (indicated on the plan by two short, parallel marks) so sunk in a shallow pit that its top just reached the surface. Three other twig loops were found between the open "sipapus."

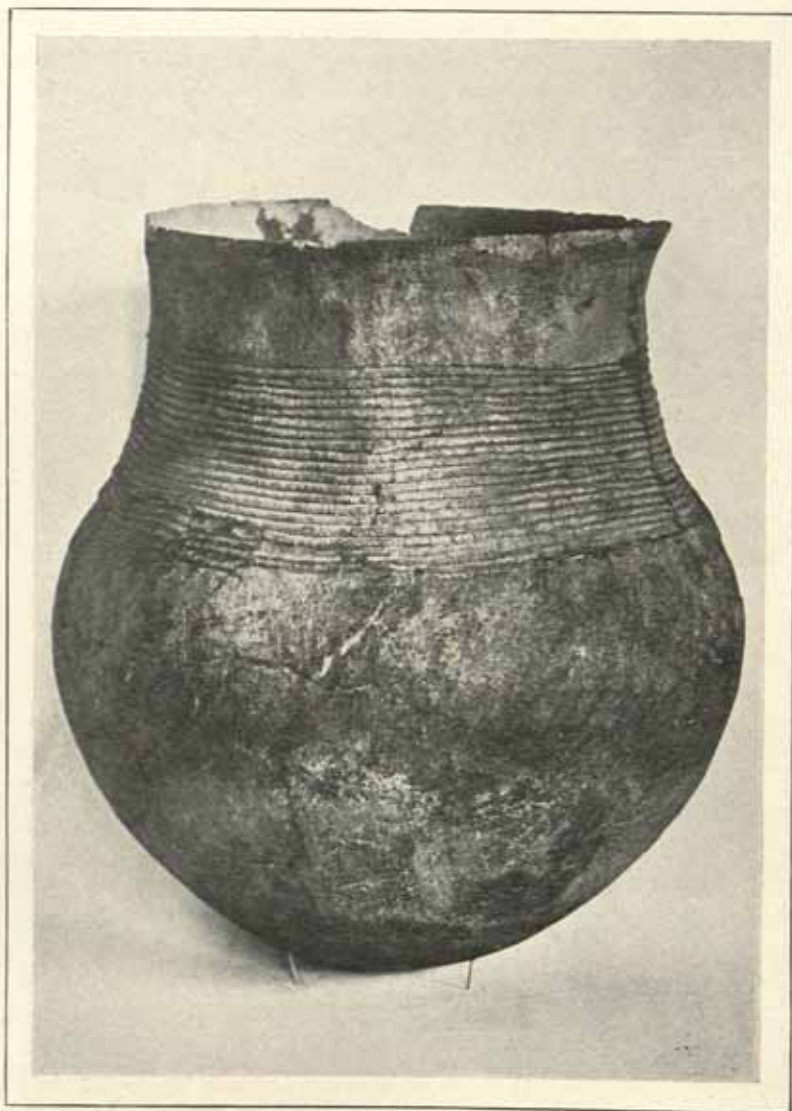
Remains of no less than three old rectangular firepits were found below the late floor. Each of them was edged with slabs, each was full of ashes, and all had been covered and sealed with adobe. The one that lay between the late firepit and the northwest wall presumably belonged to the larger, earlier kiva; the one contiguous to it surely did, as it ran off under the wall of the reconstructed chamber.

The ventilator of the late kiva had an opening 16 inches wide, 16 inches high; the wall above it was supported by a wooden lintel. The ascending passage rose directly behind the wall; it was round and slightly over 1 foot in diameter. In the south wall was a sealed ventilator, 2 feet high, 1 foot wide, and 8 inches above the floor; it opened into a horizontal passage roofed with sticks of oak 2 inches in diameter. This ventilator had been carefully blocked up with masonry. Traces of the ventilating apparatus of the early kiva are indicated on the plan (Fig. 23). Conditions here were very obscure, due to partial destruction and stone-robbing during the remodelling, but there seemed to be traces of a deep recess from the early southwest wall under which ran the horizontal air-passage. From the rubbish in the recess were taken fragments making up about half of a very handsome black-on-white water jar.

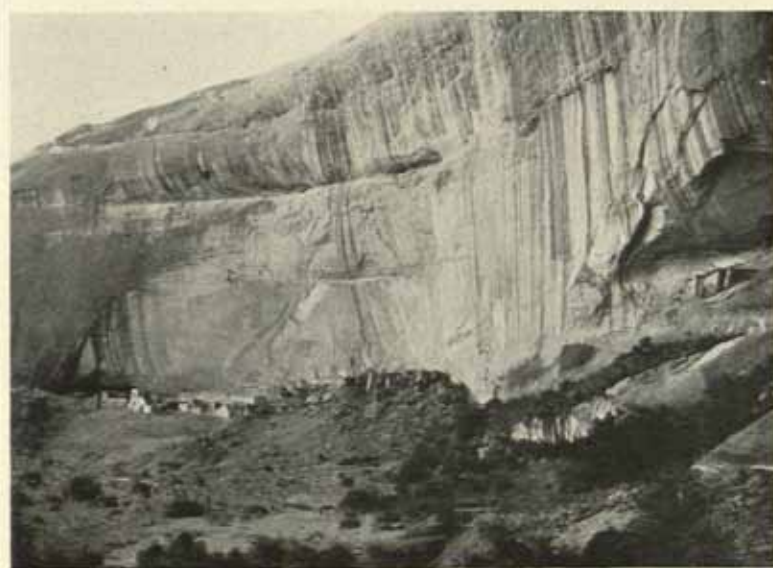
¹ See Fewkes, 1909, p. 18.



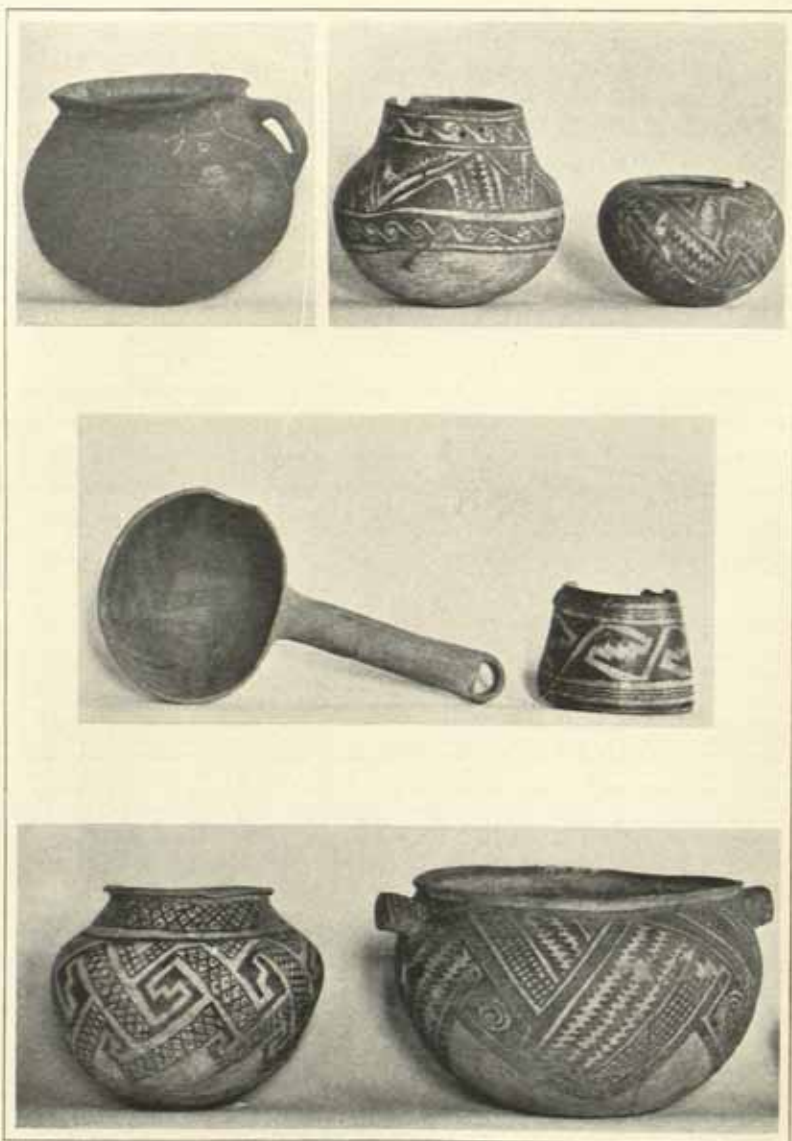
Cooking pot from surface site near Poncho House, Early Pueblo II



Cooking pot from surface site near Poncho House, Early Pueblo II



Upper, Small ruin east of Poncho House; Lower, Distant view of Poncho House showing small ruin at right



Pottery from burials in small cave opposite Turkey Cave, Segi. Mug, middle right, from Burial 1, Pueblo III (?). Other pieces from Burial 7. Early Pueblo III (?) or according to more recent classification, Proto-Kayenta. Upper right is a colander.

II. MATERIAL CULTURE¹

BASKET-MAKER II CULTURE

ALMOST all the Basket-maker II specimens recovered during the period covered by this report came from the two burial cists in Broken Roof Cave (see pp. 37-38). Until the discovery of this site, our knowledge of the Basket-maker II culture had been derived from material collected in three areas: the country of south-eastern Utah,² the Kayenta region,³ and the vicinity of Kanab, Utah.⁴ The former presence of the Basket-maker II people in the Chinle had been suspected for some time, but no representative collection had been made. The Broken Roof Cave specimens are not numerous, but they are in almost all respects identical with those from the other regions.

Dress and Personal Ornaments. *Fur-string Blankets.* With the burials in Broken Roof Cave were remains of the usual fur-string blankets,⁵ which apparently served the Basket-maker II people during life as blankets, and which were almost invariably used as wrappings for the dead. In Cist 1 were also a large number of pieces of dressed hide.

Human Hair Skirt. The only item of body clothing not formerly noted from this culture is a human hair skirt or small apron from Cist 2 (Plate 30, *b*). It measures 10½ inches in length by 9½ inches in width. It is made of two-ply human hair string, doubled over a heavy waist cord of the same material, and held by a double twining element of human hair string. The very firm, tight weave illustrated diagrammatically in Figure 20, *a*, has produced a stiff heavy fabric ¼ inch thick. At the bottom of the skirt is a twining element of fibre string, not shown in the drawing but visible in the photograph (Plate 30, *b*). It is estimated that 200 feet of string were required to weave this skirt.

¹ The writer keenly regrets that pressure of other duties has prevented his making the detailed examinations and the comparative studies which would be necessary for the preparation of an adequate report upon the specimens recovered during the expeditions. As there is no immediate likelihood of his being able to do so, it has been thought best to publish certain notes without further delay, even in more or less undigested form, in the hope that they may be of use to other investigators.

² Pepper, 1902; 1905, pp. 107-130.

³ Kidder and Guernsey, 1919; Guernsey and Kidder, 1921.

⁴ Nussbaum, Kidder and Guernsey, 1922.

⁵ Guernsey and Kidder, 1921.

Waist Cord. The Basket-maker II people used human hair extensively for making waist cords, tump-lines, small string, and sandal ties, occasionally weaving it into sandals as an ornamental element. Fragments of textile made of human hair have also been found but none so large or complete as the specimen just described.

Plate 46, *b*, shows a knotted piece of waist cord taken from the wrappings of the adult in Cist 1, Broken Roof Cave. It has a diameter of $\frac{3}{8}$ inch and is made by braiding fine fibre string around a core of coarser string.

Tie-Cord. Another cord found with the same mummy is 56 inches in length, of six apocynum fibre strings made up in three loops ending in small tie-cords. This was originally wrapped about with thin strips of rabbit hide, with the fur on, making a soft round cord. A perfect specimen of this kind was obtained by Nusbaum from a Basket-maker II cave in Kane County, Utah.¹

Sandals. On Plate 29 are grouped a series of typical square-toed, fringed Basket-maker II sandals from the Kayenta district. The pair illustrated in Plate 47, *d*, was found in Broken Roof Cave on the Chinle. Like most specimens from this cave, they have fibre instead of buckskin toe-fringes, and their sole reinforcements are seemingly more simply made than are those of Grand Gulch and Kayenta sandals. The weaves of Basket-maker II sandals appear to be extremely interesting; they would well repay careful study.

In the drawing of sandal ties (Fig. 24) are shown two Basket-maker II specimens from Broken Roof Cave. Example *a* is a coarse weave sandal with padded sole; it has the characteristic Basket-maker II multiple heel-loop. Example *b* is a finely woven sandal with single cord heel- and instep-loops. The tie-cord from the toe-loop is probably incomplete.

Moccasins. The pair of moccasins shown in Plate 47, *f*, were found on the feet of a Basket-maker II mummy collected in Grand Gulch, southern Utah, by one of the early Wetherill expeditions. The mummy, called by the Wetherills "Old Cut-in-two" because of its having been cut in two near the waistline and sewn together again (probably at the time of burial), is now in the American Museum of Natural History, New York.

These moccasins are particularly interesting, as they are the

¹ Nusbaum, Kidder and Guernsey, 1922, p. 89, Plate XLIII.

only ones of the kind that have so far been found directly associated with Basket-maker II remains. They seem to show the technique of a long established industry, and it is strange that others of the type have not turned up in this region.

The lower part, or shoe proper, is made of three pieces of leather. The first, an inner shoe of soft dressed skin, forms both the

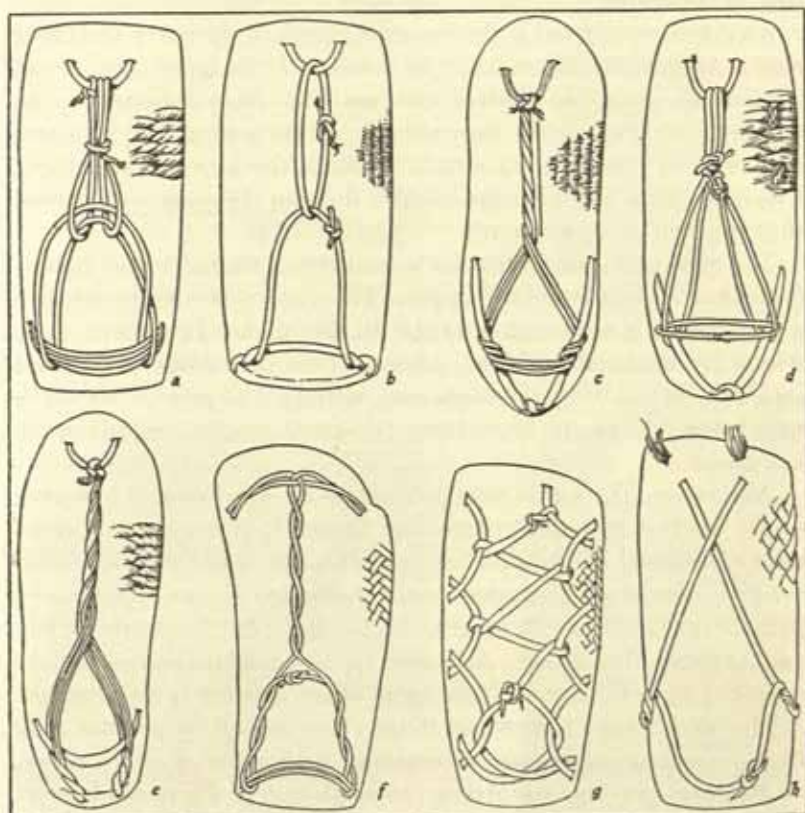


FIGURE 24

SANDAL TIES

a, b, Basket-maker II; c, d, Basket-maker III; e, Probably Pueblo I; f, g, h, Pueblo III

bottom and the ankle flaps; a template is shown in Figure 20, c, a'. The second part at the bottom, also of dressed skin, is cut somewhat smaller than the first, and the ankle flaps are omitted. This is sewn in the inner shoe, the seam coming about $\frac{3}{4}$ inch below the margin of the latter. The third part is the inserted heel piece

(b'), which is sewn to the inner shoe only. The sole consists of two pieces of thick rawhide joined to each other just under the instep and sewn on.

The upper (c') is sewn to the point where the ankle flaps begin, the loose rear part forming a tongue. The ankle flaps are drawn together with a thong which is knotted through holes from one side to the other.

An interesting detail is the marginal finish of the outer and inner shoe. Apparently, in making the bottom of the inner shoe, it was turned up along the dotted line (see Fig. 20, a'), folded down, and sewn in the manner shown in d'. After sewing, the hem was cut, as in e', thus forming a welt to which the upper was stitched. The outer shoe has a marginal finish done in the same way except that the hem is cut off evenly.

The sewing is done with sinew and the marginal seams laid in folds that radiate from the upper. The uppers are decorated with a zigzag line, a very characteristic Basket-maker II pattern. The seams are outlined with red ochre. These moccasins do not fall into any of Hatt's¹ classifications, although a pair of Klamath moccasins figured by Hatt have two-piece rawhide soles exactly like these.

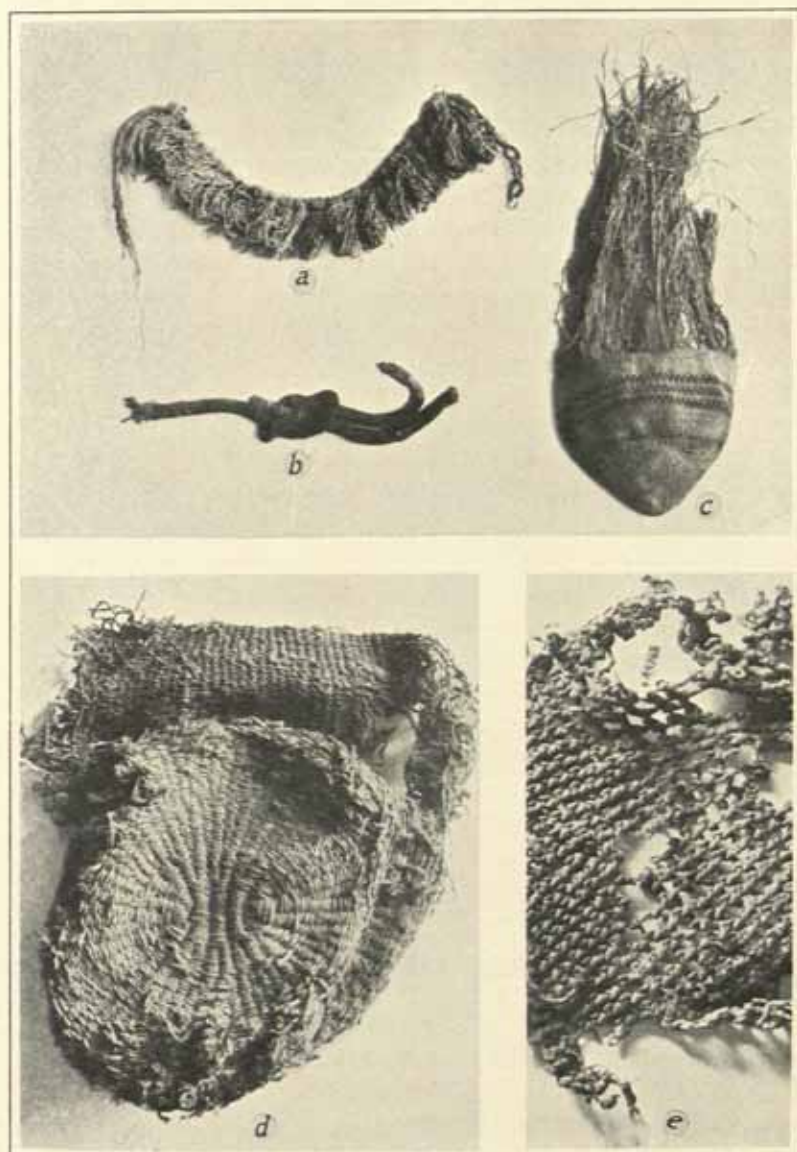
Necklaces. The one shown in Plate 48, d, was found at the neck of the adult in Cist 1, Broken Roof Cave. It is made up of alternate cylindrical black beads of rubbed-down seeds and pearl-seed beads. This order is varied occasionally by the introduction of pairs of black beads and pairs of white ones. The beads are strung on a two-ply fibre string. Attached to the necklace, and seemingly a part of it, is a heavy soft string of what appears to be dog hair.

The seed necklace shown in Plate 48, e, is made of pairs of long brown seeds or seed-pods, alternating with pairs of acorn shells, strung on a two-ply fibre string. It was found at the neck of one of the infants in Cist 1.

Bead Bracelets (Plate 48, b). One of these consists of seven discoidal shell beads on a coarse fibre string; the other, of four shell beads and one stone bead. They were on the wrist of an infant in Cist 1.

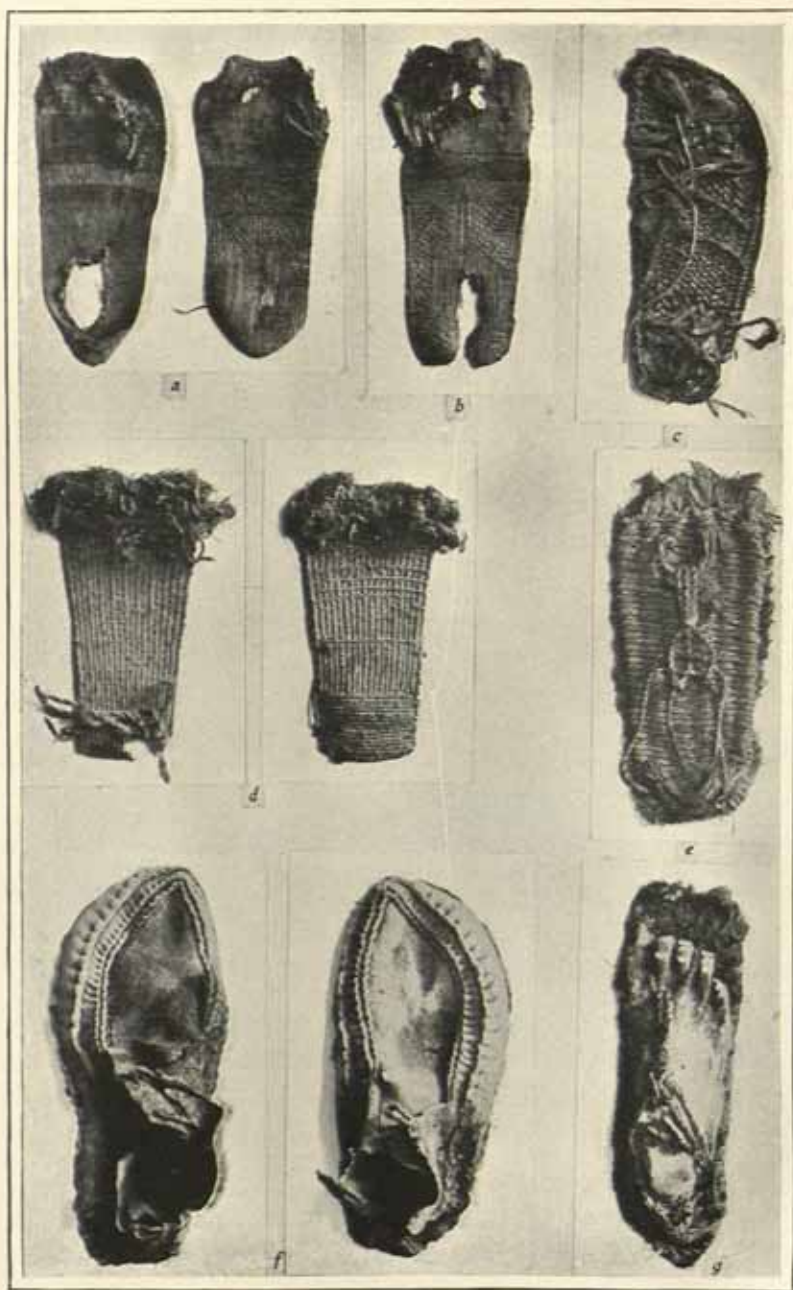
Pendant (Plate 31, h). This was found loose in Cist 1. This is a carelessly cut section of abalone shell, roughly triangular in shape,

¹ Hatt, 1897, pp. 147-250.



BASKET-MAKER II AND BASKET-MAKER III TEXTILES

a, Head band (?) Cist 1, Broken Roof Cave, Basket-maker II; b, Knotted waist cord from wrappings of adult, Cist 1, Broken Roof Cave, Basket-maker II; c, Twined-woven bag, unfinished, Cist 1, Broken Roof Cave, Basket-maker II; d, Bottom of twined-woven bag, High Cave, Segihatsoi, Basket-maker III; e, Coiled knitted fabric, Cave 1, Segi, Basket-maker III



COMPARISON OF TYPES OF FOOTWEAR

a, b. Typical finely woven Basket-maker III sandals, Cave 1, Segi; *c.* Common type of Pueblo III sandal, twilled yucca leaf, Poncho House; *d.* Finely woven Basket-maker II sandals, Broken Roof Cave; *e.* Coarsely woven Basket-maker II sandal, Broken Roof Cave; *f.* Basket-maker II moccasins, Grand Gulch; *g.* Mummified foot, fitted to Basket-maker II sandal, White Dog Cave

and measuring $1\frac{3}{4}$ by $1\frac{3}{8}$ inches. It has two perforations at the top for suspension.

Head Band (?) (Plate 46, *a*). This is a fringed object of apocynum string. It consists of a cord 19 inches long, made by doubling and twisting eight 36-inch two-ply strings; to this is fastened a single long hank of the same string made up of thirty strings looped over and over, and fastened by two twining elements which at one end are wrapped about the central cord, leaving 5 inches clear at each end. This may possibly be a head band — the size is about right. With it were found five other hanks of the same string, each 10 to 14 inches long.

Hair Ornament (?) (Plate 49, *d*). This was found among the wrappings of a Basket-maker II mummy in Cave 3, Segi. It is a fragmentary specimen that apparently had already been broken when it was placed with the burial. It consists of a bundle of five neatly made bone pins, each originally about 8 inches in length. At one end are fastened by overwrappings of sinew some ten feathers, the quill of each feather wrapped for a space with flat sinew. It was presumably designed to be worn on the hair as an ornament. Similar ornaments have been found by us in other Basket-maker II burials; two almost identical to this one are figured in our previous report.¹

Feather Ornaments. Two of the feather ornaments shown in Plate 49, *f* and *g*, are from the second Basket-maker II burial in Broken Roof Cave. Ornament *f* is $7\frac{1}{2}$ inches long. Originally there were nine pendants, of which only three more or less fragmentary ones remain. The two most complete pendants are made up of a single long feather, with bundles of bright-colored feathers from small birds bound to the quill end of the feather and secured to the end of a thong of dressed skin by tight seizings of sinew.

Small saucer-shaped bone beads are bound partly under the sinew wrappings. One pendant has two of these. These are in imitation of beads cut from the curving walls of olivella shells.

The thongs to which the pendants are attached are bound by sinew to a little wooden spool one-half inch in diameter. Two of the thongs are bent over the top of the spool forming an eye for suspension. The ends of two coarse fibre strings are also fastened to the spool.

¹ Guernsey and Kidder, 1921, Plate 19.

Ornament *g* consists of five feathers arranged fan-like and held parallel to each other by wrappings of yucca twined through the quill ends and gathered in a tight bundle. The specimen measures 7 inches in length.

Plate 49, *a*, is a wand of reed, 3 feet 6 inches long, with remains of two black feathers tied to one end. It was found in the general digging in the talus of Section A.

Basketry. The baskets from the cists in Broken Roof Cave are very similar, both in general appearance and in the details of weave, to the Basket-maker II baskets from the Kayenta region.¹ They differ, however, in being nearly all "killed" by the forcible punching in of the center of the bottom (see Plate 16). This practice has not heretofore been recorded for basketry, although during the Pueblo III period the mortuary pottery of certain regions, notably the Mimbres, was "killed" by breaking small holes in the bottoms of bowls.

The finest of the Broken Roof Cave baskets is illustrated in Plate 13, left. It is a shallow, tray-like piece, 20 inches in diameter by 2 inches deep. The termination of the coil at the rim is plain-wrapped. Near the center are two dark colored coils, and the last turn of the coil below the rim is also dark; the principal decoration is a zigzag band of red bordered by black. A second large tray basket (Plate 16, lower left) is 19 inches in diameter and only three-quarters inch deep. Save for a single dark coil just under the rim, it is undecorated. The last inch of the rim-coil is finished in "false braid." The smaller tray basket (Plate 16, upper center) is 9½ inches in diameter and 2½ inches deep. The decoration consists of a single dark coil near the bottom and another just under the rim. From the lower band to the upper there radiate two paired lines and two single lines edged with small triangles. The little bowl-shaped baskets (Plate 16, right upper and lower) average about 3 inches in diameter. They are firmly woven and are almost as hard and stiff as wood. One of them was "killed" by breaking in one side.

Textiles. *Twined-Woven Bags.* Cist 1 in Broken Roof Cave contained one unfinished and two completed specimens. The best preserved of the finished bags is 10 inches long and 6 inches in diameter. The decoration consists of five bands, each made up of

¹ Guernsey and Kidder, 1921.

three stepped patterns in red and black. The three lower bands alternate two black units and one red unit, and two red units and one black unit; the last two have two black units and one red unit. The weave of this bag is exceedingly fine, there being 19 warps and 25 wefts to the inch. The other finished bag, though still fairly complete, is much discolored by wear and decay. It is decorated with bands of red outlined in black. It has 10 warps and 15 wefts to the inch.

The unfinished bag (Plate 46, *c*), judging from the length of the warps, would have been about 12 inches deep when finished. About 5 inches of the fabric is complete. The decoration, a stepped pattern, shows clearly in the plate. All the warp elements are loose except for one bunch of fifteen which are bundled together. This bag is a very light tan color.

Cordage. Snares. The snares from the Basket-maker II cache, found in the talus of the Basket-maker III cave at the head of Adugegi Canyon, are made of two-strand yucca-fibre string (Plate 31, *d*). Each snare is 49 inches long and was made separately, not cut from a long string, as is shown by the tapered ends. Knotted to each snare string is an 8-inch length of string with a little wooden toggle fastened to the loose end. The snare loop, spread out, measures 4 inches in diameter. The toggle indicates that these snares were set with a spring pole, probably for rabbits and animals of similar size.

Objects of Wood. Atlatls. The specimen shown in Plate 50, from Cist 1, Broken Roof Cave, is the most perfectly preserved of the five complete Basket-maker II atlatls now in the Peabody Museum collection. It is both shorter and thinner than the average, its measurements being: length, 21 inches; width at distal end, $1\frac{3}{8}$ inches; width at proximal end, three-quarters inch; and average thickness, one-quarter inch. It is made of oak and all surfaces are beautifully finished. In cross section the front is flat; the back is slightly convex. The present curved shape is due to warping. The spur is set 2 inches from the tip; the groove is $1\frac{3}{4}$ inches in length. The finger-loop is three-ply of heavy soft dressed skin and is made by folding a strip $4\frac{1}{2}$ inches long over a narrower strip the same length. This was perforated in the center and run up the shaft to notches cut 3 inches from the end, where it is secured with sinew lashings. The loose ends were then turned back and fas-

tened by sinew which is sewn through and through on either side of the shaft, the edges of which are cut away slightly where the finger-loops rest against it. All the work on the loop is very neat.

There are three charms — we can assign no practical use to them — fastened to the back of the shaft by sinew wrappings. One, just above the loop, is a small black nut or seed. Next to it is a "cat's eye" or moonstone worked down to a chunky loaf shape, with its under side flattened to fit against the shaft. The third is $7\frac{3}{4}$ inches from the distal end, and consists of a loaf-shaped dark red stone $2\frac{3}{8}$ inches long, 1 inch wide, and five-eighths inch thick. This stone was shaped with great care and is well polished. We estimate it to weigh approximately two ounces.

Another atlatl, from the disturbed Basket-maker II burial in Cave 3, is badly shrunken, but entire, except for one inch which is missing from the proximal end. It is 22 inches long, allowing for the missing portion; width at spur, $1\frac{1}{8}$ inches; thickness at middle, one-quarter inch. In cross section the two broad faces of the shaft are slightly convex. The spur is set $1\frac{1}{4}$ inches from the end; it is raised above the surrounding surface, the raised portion continuing as a narrow ridge to the end of the shaft. The groove below the spur is one-half inch wide at the top and $1\frac{1}{4}$ inches long. In the proximal end are two notches cut in the edge of the shaft for the attachment of the finger-loops. Just below these, the edges are cut away to accommodate the fingers. One foot from the distal end are marks of the wrappings that once bound the atlatl stones to the shaft.

Atlatl Stones. The two atlatl stones in Plate 48, figure *a*, are the ones referred to above. They were found in contact with an atlatl which was complete except for the finger-loops. The larger one, which is made of a close-grained gray stone, measures 2 inches in length, seven-eighths inch in width, and one-half inch in thickness. The under side is flat. The second stone, of dark bluish color, measures $2\frac{1}{8}$ inches in length, three-quarters inch in width, and seven-sixteenths inch in thickness. Both stones retain the marks of the bindings that held them to the atlatl.

Wooden Doll. Plate 51, *f*, is probably a Basket-maker II doll. It is $3\frac{3}{4}$ inches in length, is roughly shaped from a piece of hard wood, and seems to have been painted red. It is from the general digging, Cave 3, Segi.

Objects of Horn and Bone. Flaking Punches. In Plate 34, *d*, are two objects of mountain-sheep horn of the same shape. One measures $2\frac{1}{2}$ inches, the other $2\frac{3}{4}$ inches; both are five-eighths inch in thickness. These may be flint-working tools. Similar objects of antler from Madisonville Cemetery, Ohio, have been identified as flint-working punches,¹ being used with mallets of wood or stone for flaking pieces of suitable size from large masses of flint to make knives or points. In the same plate (*c*) are tubular bone beads and a short string of seed beads. Objects in Plate 34, *d*, *e*, are from Burial Cist 2, Broken Roof Cave.

Objects of Stone. Pipe. The smoking pipe, *f*, is made from some compact stone of reddish color. It measures 2 inches in length, is neatly finished, and the surface is polished. Caked to the bowl are carbonized remains of the material smoked. The shape is typically Basket-maker II.

Foreshafts. Plate 34, *e*, shows a very small, rudely made foreshaft, measuring $3\frac{3}{4}$ inches over all. The point is of red flint or jasper. The notch is chipped at an angle to the long axis, whereas all the foreshaft points we have examined hitherto have been notched at right angles.

Of the foreshafts found in Cist 1 (Plate 34), one measures 6 inches in length over all, and two $5\frac{3}{4}$ inches. The complete ones are provided with points of red jasper which are fastened to the foreshafts by sinew wrappings.

Knife Blade (Plate 31, *e*). This blade, also of red jasper, is 4 inches in length by $1\frac{5}{8}$ inches in breadth at the base. It is very thin and is chipped in such a way as to leave no marked central ridge. The edge shows secondary chipping. We identify this specimen as a knife blade from the angle at which the notch is set. This in Basket-maker II knife blades is at an acute angle to the axis, whereas in the foreshaft points the notch is almost always set at right angles to the long axis.

Objects of Skin. Skin Pouches. One pouch found here (Plate 34, *b*) is long and narrow, measuring $11\frac{1}{2}$ inches over all. It is made of soft dressed skin sewn with coarse fibre string. The upper part of it is slit into narrow fringe-like strips 4 inches long. These, when twisted together, serve to close the neck or may be used to tie it. In the pouch were found a ball of yellow ochre, a piece of black

¹ Hooton and Willoughby, 1920, p. 49.

paint stone, and the lower jaw of a small rodent (Plate 34, *a*). About the jaw was wrapped a short string having twenty knots tied at regular intervals. This may have been a recording device.

Another pouch (Plate 34, *g*), a narrow-necked sack of soft skin 4 inches long, is provided with a tie-string.

A small bag of the undressed skin of some small animal, made with the fur side out, contained a piece of green paint.

A small pouch of squirrel skin was in excellent preservation. In it were found three atlatl dart foreshafts complete with chipped points, one foreshaft without point, a fine-chipped knife blade, and a crinoid stem (Plate 31, *g*).

The oddly shaped pouch (Cist 1) shown in Plate 34, *i*, is filled with a tightly packed yellow-brown substance containing a large amount of vegetable matter. Its exact nature we cannot determine. We found in Cave 1, in 1915, a pouch not unlike this one that contained pollen.¹ The present specimen is of soft, dressed, heavy skin showing a graining or striation presumably made by the fleshing tool. It measures 6 inches in length, 3 inches in width at the base, and 2½ inches at the top, and is made of a single piece of leather cut in the form of a trapezoid. The seams are very neatly sewn with a two-ply fibre thread. A strap, 46 inches long and tapering to a point from a basal width of three-quarters inch, is fastened to the upper end, the attachment being made by inserting the end of the strap into the neck of the pouch and sewing it through from both sides. This closed the opening, a new one being made just below the top by cutting a round hole about one-half inch in diameter. When found, the strap was wrapped about the pouch in a way to make a compact bundle.

A second pouch (Plate 34, *h*), from Cist 2, is smaller but otherwise exactly like the one described above. It is shown wrapped up as found.

Besides the small finished pouches just described, there were, with the burials in Cist 1, five containers made from whole hides, four of which are skins of young pronghorn, antelope, or deer, and one the skin of a small dog, apparently closely similar to the little dog from White Dog Cave.²

The antelope or deerskin pouches (Plate 52, *a*, *c*) are simply

¹ Kidder and Guernsey, 1919, p. 175.

² *Ibid.*, Plate 15.

cased skins with the openings made by removing the head and the lower parts of the fore legs and closed by tight ligatures applied when the skins were flesh side out, after which the skins were turned. The skin of the hind legs is slit open and serves as a strap either to close the open end of the sack or to carry it by. The largest of these pouches measures 20 inches in length. It was filled with the leaves of an herb. A dogskin bag (Plate 52, *e*) is made in the same way as those just described except that the lower part of the skin is closed, the neck being the open end. The skin is well dressed. In this bag were two small antelope skin bags and a pair of prairie dogskin bags. The latter (Plate 52, *b, d*), which are examples of the most common type of Basket-maker II container, are held together by a coarse fibre string. The skins are turned hair-side out; most of the hair has disappeared.

Skin Container. A small piece of dressed deer or mountain-sheep skin had wrapped in it a bone awl, a leaf-shaped blade, a ball of yellow ochre, and what is apparently a bit of fringe made of fine white animal hair.

BASKET-MAKER III

For the purposes of this report, the writer has considered the Basket-maker III period to have begun with the appearance of fired pottery, and to have ended with the introduction of the practice of leaving unobliterated structural coils on the exteriors of vessels. These are, of course, arbitrary criteria, employed for a classification which is admittedly tentative.

Dress and Personal Ornaments. *Body Clothing.* It so happens that all the Basket-maker III burials found by the Museum expeditions lay in open sites. Because of this, all clothing had, of course, disappeared through decay. We recovered, however, from Cave 1, Segi, fragments of fur-cloth blankets of the same type as those found with the Basket-maker II remains. These blankets are woven of heavy yucca-cord wrapped with strips of fur cut from the skins of small animals, rabbit skin being used most commonly.¹

Aprons (Plate 53, *a, b, c, d, e*). In all dry caves which had been occupied by the Basket-maker III people there are found great numbers of small bundles of string or of fibre. When unrolled they

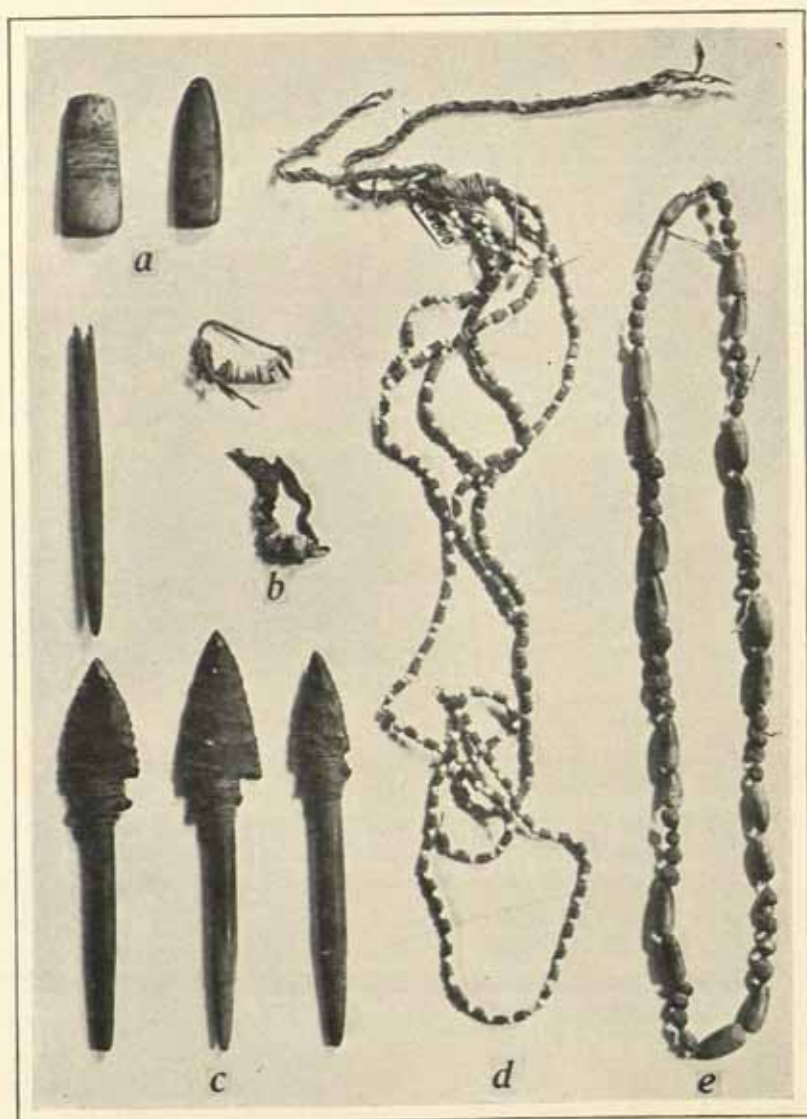
¹ Kidder and Guernsey, 1919; Guernsey and Kidder, 1921.

prove to be little aprons, made as follows: to the middle of a cord long enough to encircle the waist were attached strings, hanks of fibre, or shreds of juniper bark. These were either tied to the waist cord, or were looped over it and held in place by a twined-woven binder. The width of the apron at the waist cord is usually about 5 inches and the length of the fringe is about 36 inches. The condition of the specimens indicates that the fringe was drawn between the legs and caught over the waist cord at the back. Almost all of them bear evidence of use as menstrual pads, but whether they were worn habitually and only rolled up and discarded when soiled, or whether they were for special use at the time of the period is uncertain. Even the coarsest of the fibre must have required considerable labor in the making; while the more carefully made ones contain more than a hundred running yards of string, which must have called for many days of work in collecting and preparing raw material, and twisting it into the fine two-ply strands which were always used.

A very handsome variant of this article was made with a plain (not twined) woven crosspiece, 6 inches wide and 2 inches deep at the top. To the upper edge was attached the waist cord, and the warp ends were left hanging to form the apron. The crosspiece was decorated with woven designs similar to those of sandals and head bands. We have no complete specimen of the type, our only example being a single rather frayed crosspiece (shown on end in Plate 10, *b*); its identification was made from a more perfect specimen from Utah in the Museum of the American Indian, Heye Foundation. This fabric is very stiff, as the warp consists of 9 two-ply yucca-fibre cords bundled together. There are $6\frac{1}{2}$ warps to the inch. The weft is fine two-ply cord of the same material as the warp, 34 picks to the inch. Each unit of the design is woven separately. Ten wefts of units that touch each other between parallel warps interlock, and thus, with the interlocking pattern, bind the warps together. The color is red and black, and the natural color of the yucca-fibre.

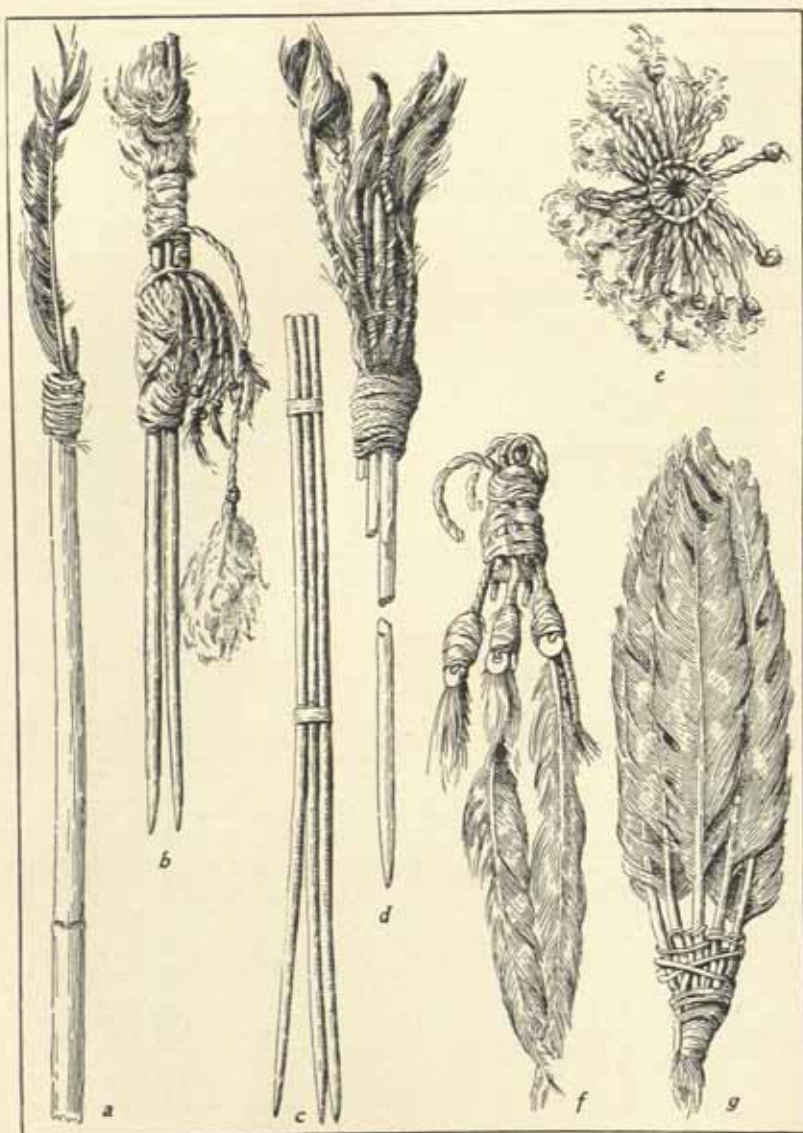
Sandals. The writer has been unable to find time for the careful dissections necessary for proper study of the extraordinarily complex weaves and elaborate decorations of Basket-maker III sandals.¹ Such a study, however, is being made by Mrs. Earl H.

¹ For a detailed description of a single sandal of this type, see Kidder, 1926.



OBJECTS FROM BASKET-MAKER II BURIALS

a, Atlatl stones, burial, Cave 3, Segi; b, Bead bracelets from wrist of infant, Cist 1, Broken Roof Cave; c, Foreshafts complete and one without point, Cist 1, Broken Roof Cave; d, e, Seed necklaces, Cist 1, Broken Roof Cave



FEATHER ORNAMENTS

a, Reed wand, Cave 1, Segi, Basket-maker II; b, c, Hair ornaments, Cave 1, Segi, Basket-maker III; d, Hair ornament, burial, Cave 3, Segi, Basket-maker II; e, Feather ornament, general digging, Water Fall Ruin, Pueblo I; f, g, Feather ornaments, Cist 2, Broken Roof Cave, Basket-maker II

Morris, using the magnificent collections made by her husband and herself in Canyon del Muerto. Our description is confined, therefore, to a few salient features.

The Basket-maker III people used a certain number of coarse twined-woven, round-toed sandals of crushed yucca leaves (Plate 9, lower row, second from right). Much more common, however, are very finely woven sandals made of apocynum string over yucca-cord warps. These are characterized by a single broad scallop across the toe, by a puckered heel, and by a division of the body of the sandal into three zones, the two forward ones decorated with designs in color, the sole of the rear zone bearing a raised self-pattern (Plate 9).

In none of our specimens of the fine type are the tie-strings well preserved. There was, however, always a toe-loop set about one-half inch back from the base of the scallop; the heel attachment was apparently usually made by some arrangement of the warp ends after they emerged from the complex manipulation which produced the typical heel pucker.

Methods of attachment of coarser sandals of this period are shown in Figure 24, *c*, *d*. That illustrated in *c* has heel-loops formed from warp elements; a single cord runs forward to the toe-loop; the size of the aperture for the ankle was regulated by twisting the front part. This also permits of its being taken on or off without untying. Specimen *d* also has heel-loops made from protruding warps. They were knotted at the heel, and were then run forward to be sewn into the fabric in long stitches on either side of the sandal. The tie-string was supplemented by a short cross-tie which went around the heel or possibly over the instep. Specimen *e* is of uncertain period; it may be either Basket-maker III or Pueblo I. The heel-loop is a single cord, its ends running through the fabric and knotted on the under side. The tie-string is composed of six warps that emerge at the heel.

Necklaces, Beads, etc. While our material is very scanty, being limited to the single string of olivella beads about to be described, Morris's excavations in Canyon del Muerto have proved that the Basket-maker III people possessed many elaborate and beautiful ornaments, a few of which he has illustrated.¹ The string (Plate 24, *a*) just mentioned was found in Cave 5 (see p. 15) and is

¹ Morris, 1925.

probably of Basket-maker III period. It is in perfect preservation; the original eleven-strand cord of cottony looking *asclepias* fibre (?) being still as fresh and strong as the day it was made, and the shells bright and pearly. It is 42 feet in length and contains 1720 olivella shells. Ten of these at one end are practically whole shells, the tip of the spire alone having been removed to allow stringing. The remainder have had their lower halves cut away; the purpose of this was presumably to obtain the thin outer lips from which saucer-shaped disc beads were made.

Feather Hair (?) Ornaments. Plate 49, *b*, illustrates a specimen consisting of two nicely made wooden pins $8\frac{1}{2}$ inches in length, placed side by side and bound together with fibre string. The wrappings occupy 4 inches of the length, and almost conceal a third pin or part of a pin. Fastened to the top is a quantity of the downy feathers of small birds. Below these are tied twelve strings, $1\frac{1}{2}$ inches in length, each knotted at the end for the attachment of feather pendants, which seem to have been made from bright-colored feathers of small birds. Fastened just above the short strings there is a single long string with a downy white feather pendant. It was recovered from Room *n*, Cave 1. Object *c* appears to be an unfinished ornament, made up of three fine wooden pins laid side by side and held by two bindings of sinew. This also is from Room *n*, Cave 1.

Basketry. Coiled Basketry. We recovered only a few fragmentary specimens of coiled basketry which could with certainty be assigned to the Basket-maker III period.¹ One is a piece of a large pannier or carrying basket. It is of coiled weave, the foundation consisting of two willow rods and a shredded yucca leaf bundle.² The work is coarse, 4 coils and 7 stitches to the inch, and there is much stitch-splitting of an irregular, careless sort.

Of somewhat finer weave and neater workmanship are several bits of coiled tray-shaped or shallow bowl-shaped baskets. They do not differ either in appearance or in technique from Basket-maker II specimens.

Yucca-top Baskets (Plate 11). Very ingenious little basket-like containers were made from the narrow-leaved yucca. The plant

¹ The Morris collections from Del Muerto are, however, very rich in basketry.

² For diagram of weave, see Kidder and Guernsey, 1919, p. 169, Fig. 80.

was cut off just below the leaves and the "heart," containing the immature leaves, was removed. The remaining leaves were next turned back (downward as the plant grew) over the severed stalk. Then about two inches of the tip of each leaf was turned back on itself, and then bent at right angles to the right, where it was wrapped about the tips of the two leaves preceding it in the series. This arrangement served the double purpose of forming a strong, semi-rigid rim, and of spacing the leaves at equal distances apart. Narrow strips of yucca leaf were twined spirally from bottom to top, reinforcing the sides. Specimen *c*, Plate 11, is provided with a handle of coarse yucca-fibre; *d* has a handle of braided white dog hair.

Three of the baskets illustrated (Plate 11, *b, c, d*) were found in the Basket-maker III debris of Room *n*, Cave 1, Segi. The fourth was taken from a Basket-maker II grave in Broken Roof Cave. A small container of somewhat similar type was found by the expedition of 1914 in Ruin 5, Hagoé.¹

Textiles. *Netting.* The specimen shown in Plate 46, *e*, was recovered from the fill of Room *n*, Cave 1. It is a fragment of coarse textile about 8 inches square, probably part of a bag. The material is a two-strand string of soft fibre. The weave is coil without foundation, each loop so knotted as to give the fabric a firmness that the common coil without foundation lacks. The stitch is illustrated in Plate 54, *b*. This knotted type appears, so far as we know, for the first time in the Basket-maker III period.

Rabbit Net. A fragment of a rabbit net was found in the High Cave, Segihatsosi, this identification being based on its similarity to a complete rabbit net found in White Dog Cave.² It is made from two-strand yucca-fibre string, with sections having one strand of fibre and one of human hair. The mesh measures $2\frac{3}{4}$ by 3 inches.

Twined-Woven Bags. The twined-woven bag is one of the most characteristic of all Basket-maker II products. Similar bags were also produced by the Basket-maker III people, but it would appear from the specimens found in the High Cave, Segihatsosi, and in Cave 1, Segi, that the art had degenerated. Our only reasonably complete specimen is illustrated in Plate 46, *d*. It is from the High Cave, Segihatsosi. The way in which the warps

¹ Kidder and Guernsey, 1919, p. 110, Fig. 40.

² Guernsey and Kidder, 1921, Plate 31.

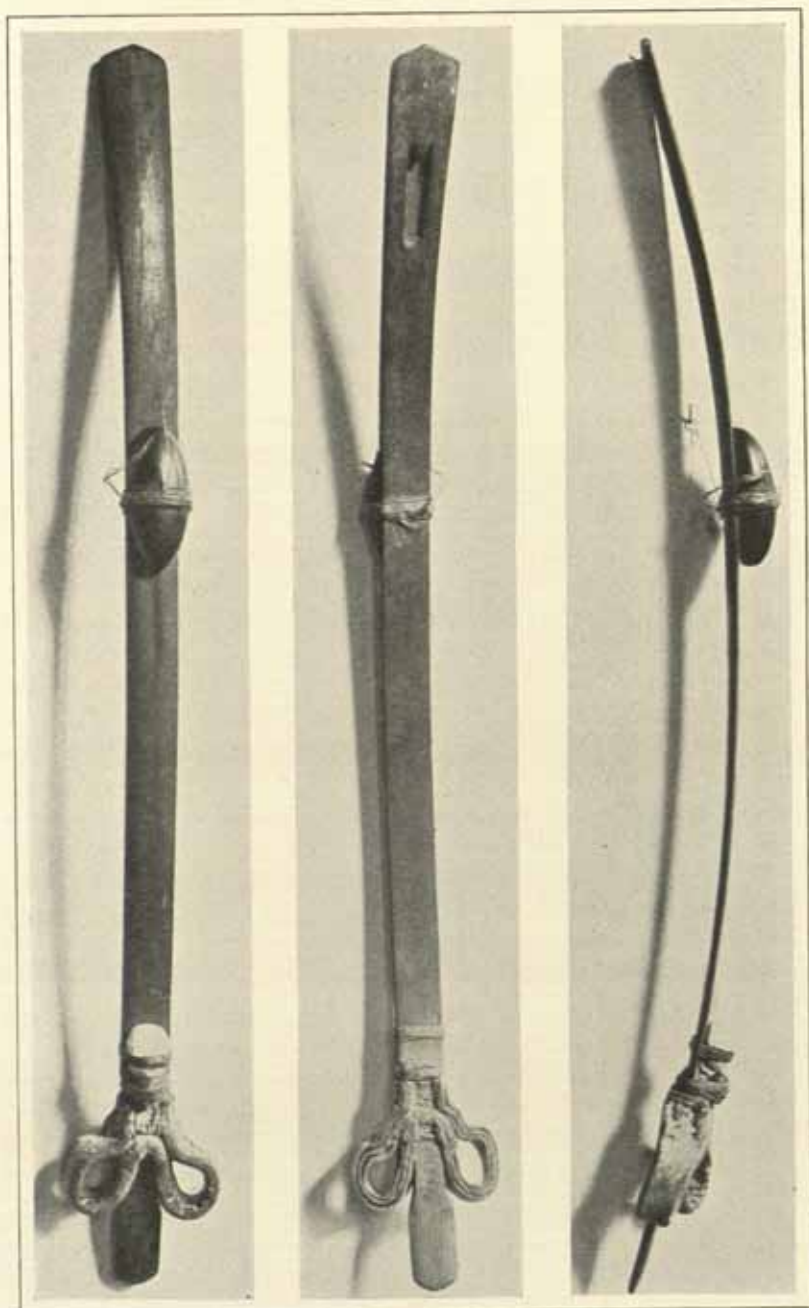
radiate from the bottom is well shown in the photograph. All the warps were apparently incorporated at the very start, and the fabric was flared, as in the bag next to be described, by reducing the number of warps enclosed by the twined weft element. The exact method of starting this bag cannot be made out without destroying the specimen. The body of the fabric is very coarse: 5 warps and 17 wefts to the square inch.

A fragmentary bag from Cave 1, Segi, lacks the bottom, so that we are unable to determine the method of starting the weave. Just above the bottom, however, the warps are gathered by the twined wefts into groups of two, three, and occasionally four. After about three inches had been woven in this way, the groups of warps gradually were broken up and the wefts ultimately enclosed each warp separately, thus widening the fabric and allowing the body of the bag to flare. This is a much cruder system than that used in Basket-maker II bags, which were flared by the skillful introduction of new warps at successively higher levels. In the body of the present specimen there are 9 warps and 17 weft picks to the square inch of the fabric.

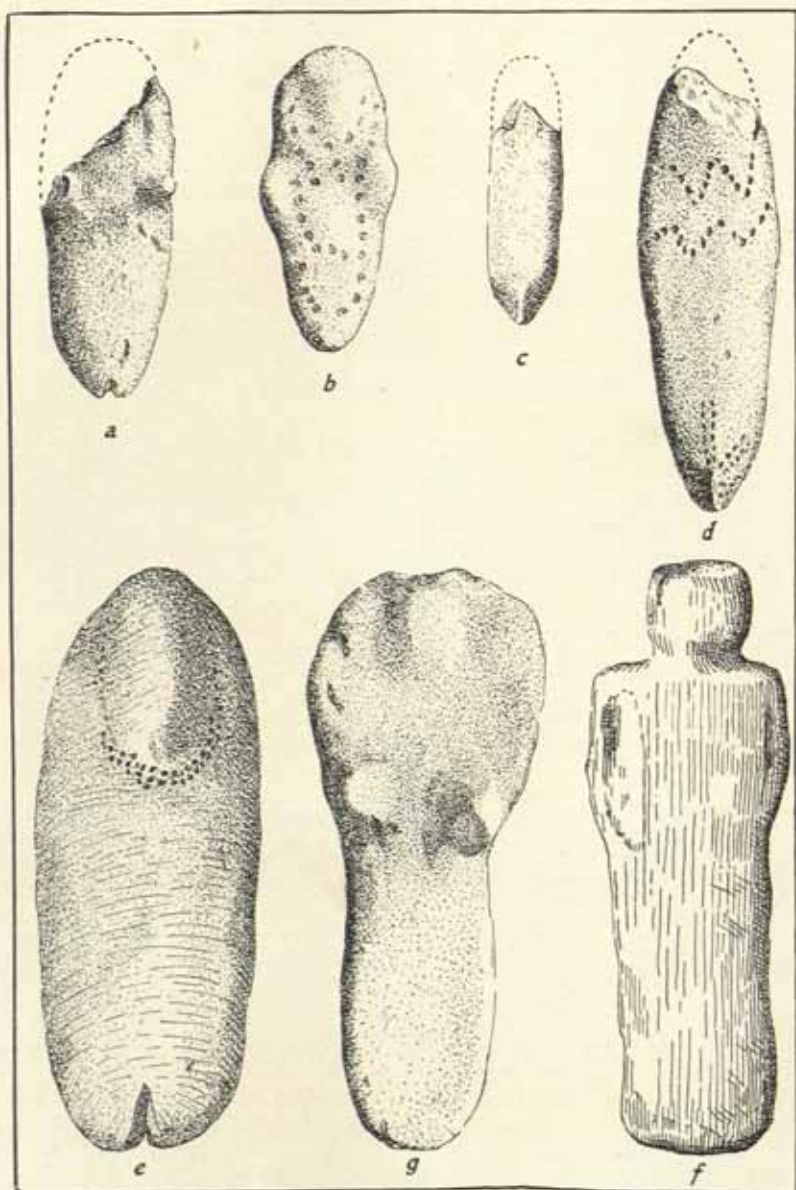
Carrying Bands. The carrying bands of the Basket-maker III people rank with their sandals as outstanding examples of the art of weaving. They are more finely made and much more elaborately decorated than are those of the Basket-maker II people, or the Pueblo I and III peoples. Examples are illustrated in Plate 10, *d, e, f, g*. Specimen *d* is 18 inches in length by $2\frac{1}{4}$ inches in width. It is a rigid, plain weave of fine yucca-fibre string. There are 24 warps and the wefts run 22 to the inch. The terminal loops were protected from wear by coverings of rawhide. One loop is partly torn away and replaced with a coarse fibre cord looped through holes made in the body of the strap. An elaborate painted decoration, now barely discernible, covers one side of the band.

Specimen *f* was originally about 18 inches long; the terminal loops, however, have been worn away. The width is $3\frac{1}{2}$ inches. The decoration is woven in dark and light brown strands. Cummings figures a handsome band of this general type which, like this one, was found in High Cave, Segihatsosi.¹ The second specimen (Plate 10, *e*) is $17\frac{3}{4}$ inches long by $2\frac{1}{8}$ inches wide. It has 32 warps of stiff two-strand yucca-cord. The wefts are of finer, softer

¹ Cummings, 1910, p. 10.

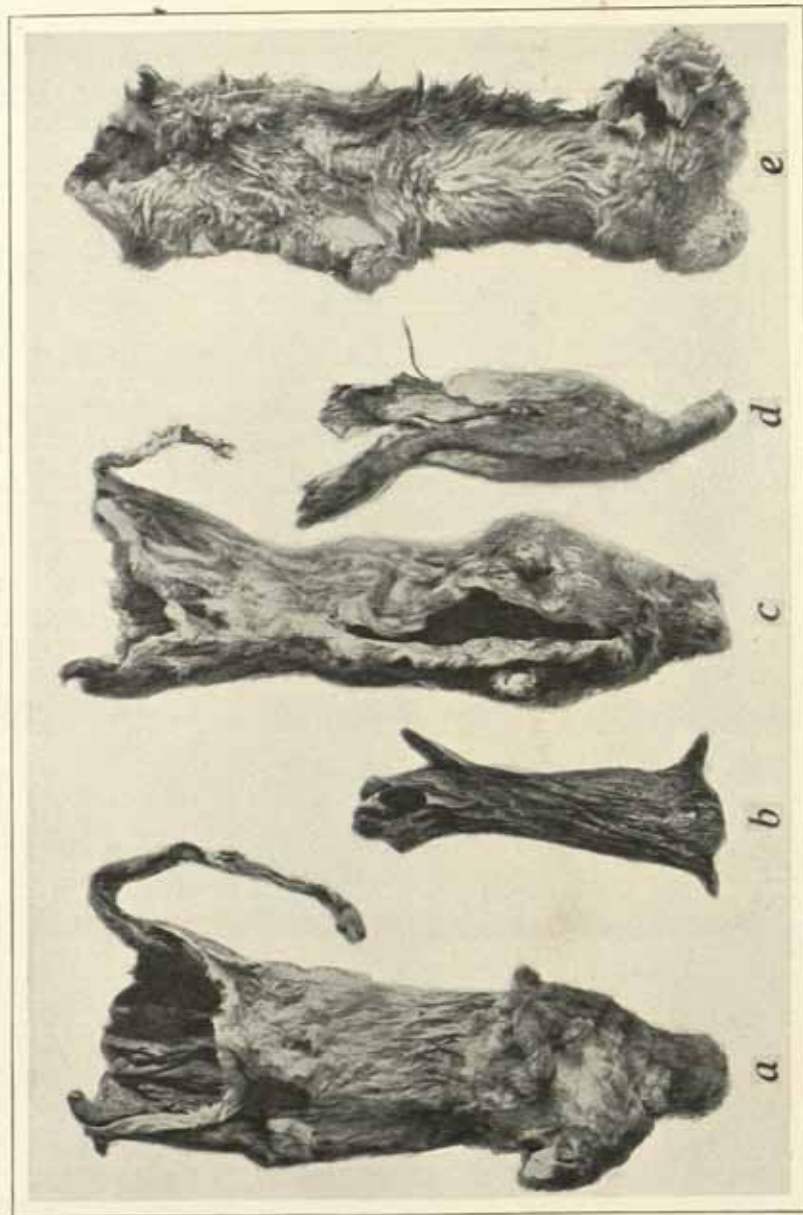


Back, front, and side views of Basket-maker II atlatl from Cist 1, Broken Roof Cave



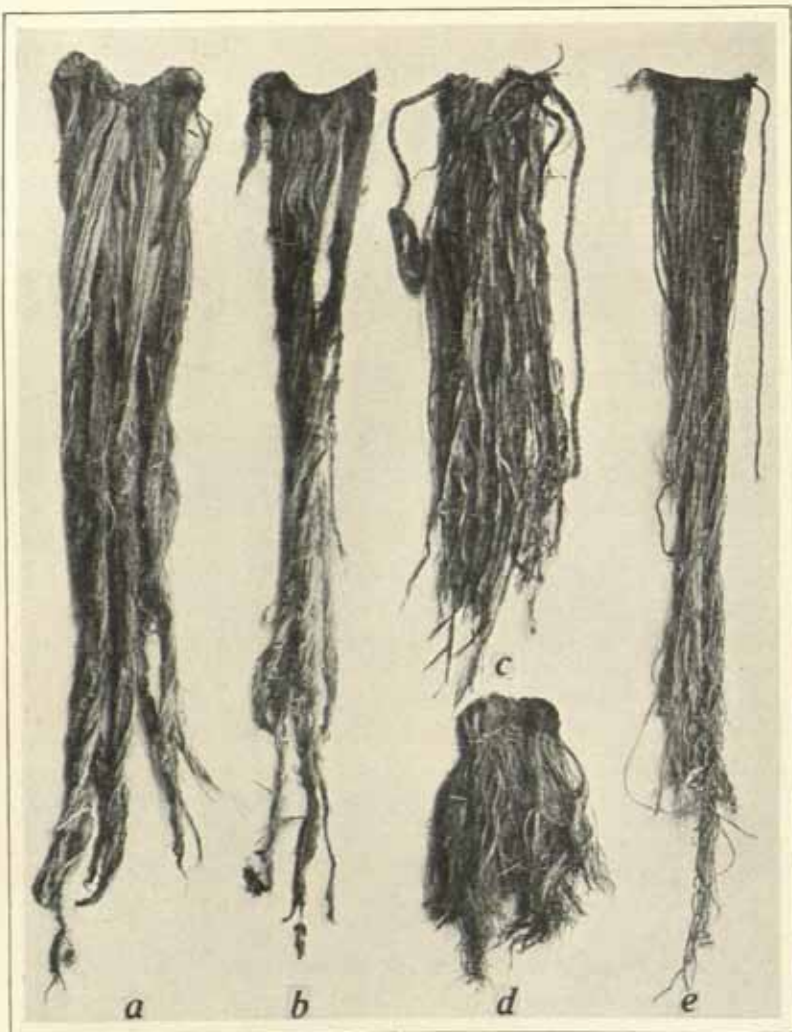
FIGURINES

a, c, d, e, Figurines from house foundation, Segi Sand Hill, Basket-maker III; *b*, Figurine, Keam Collection, Keam's Canyon (?), Basket-maker III; *f*, Wooden doll from Cave 3, Branch Canyon, Segi, Basket-maker II; *g*, Figurine from Room n, Cave 1, Segi, Basket-maker III



SKIN BAGS FROM CIST 1, BROKEN ROOF CAVE, BASKET-MAKER II

a, c, Pouches made from skin of young antelope or deer; b, d, Pouches made from skin of prairie dog; e, Pouch made from dogskin



BASKET-MAKER III APRONS
a, b, d, Fibre; *c*, Bark; *e*, String

string. The body of the fabric is twined weaving. The last ten or twelve rows just before the beginning of the terminal loops are twilled, thus breaking the "rep" effect of the body of the band. The strong, flat loops are made by dividing the warps in the middle and weaving each group together with an over-and-under binder which gradually reduces the width of the fabric by gathering the warps into fewer and fewer bundles. At the turn of the loop, all the warps are gathered into a single bundle which is wrapped by the binding element. The elaborate decoration of this band is painted on one side in thick colors, vermilion and black. The carrying band shown in Plate 10, *g*, is a fragmentary specimen from Room *n*, Cave 1, Segi. The two parts joined together have a length of 26 inches; the width is $1\frac{3}{4}$ inches. The material is apocynum-fibre, two-strand string. The method used in weaving the strap seems to have been as follows: a skein was made up of the proper length, possibly by winding string about two upright sticks or some sort of frame. In this specimen forty-two turns were made; each end of the skein was then given a half turn on itself as shown in Plate 54. The separate elements of the skein were then held parallel to each other by weaving back and forth from side to side a single continuous warp strand (*a*). Where this strand emerges and reenters at each side, the two outer woof strands are twined, as shown in Plate 54, Figure *e* (*b*, *b*). As shown in figure *e*, the loop ends are reinforced by a continuous seizing of string (*c*), with a separate string (*d*) along the outer side of the loop which passes around one and over one turn of the seizing string—a clever arrangement that would prevent all of the seizing coming loose if one strand wore through. The number of woof elements is reduced in the drawing and the seizing element is not carried out, in order to show how the loop was produced.

Objects of Wood. *Shafts* (?). Plate 55, *a* (Room *n*, Cave 1), shows a crooked stick $15\frac{1}{2}$ inches long. There is nothing about it to indicate its use. Crooked sticks much longer than this, though similar in other respects, are very common in Pueblo III collections. Plate 55, *b*, is a wood peg from Room *n*, Cave 1. Its length is 13 inches. One end is pointed and somewhat polished as if from much use. The upper end is bruised from pounding and is wrapped with yucca-fibre to prevent splitting. Plate 55, *c*, is 12 inches long, tapered at one end, and notched at the other. Perhaps it is a

drill shaft. Except for its length it might be an arrow foreshaft, though there is no evidence as yet that the Basket-maker III people used the bow. Plate 55, *d*, is a slender double-pointed stick, $14\frac{1}{2}$ inches in length, made from some hard wood. The lower end is stained and slightly polished, as if by wear. A section, $2\frac{1}{2}$ inches long, on the other end, has a fresh look, as if it might have been set in a socket. We have no idea of the use for which this was intended. Wooden points of Pueblo III arrows are not unlike it in appearance, though only half the length. Plate 55, *e*, is part of a shaft made from a peeled stick, and measures 3 feet 10 inches in length, tapering from one-half inch in diameter at the lower end to five-eighths inch in diameter at the break. The surface shows no finish other than smoothing the places where small twigs were trimmed off. The lower end of the shaft has a notch seven-eighths inch deep by one-quarter inch wide cut in it, which is seemingly intended for the reception of a point. (If this is true and assuming that approximately half the shaft is missing, the complete specimen would be a spear something over 7 feet in length and the first reported from prehistoric sites in the Southwest.)

Bird Snares. A bundle of fifty-five snare sticks from a cave at the head of Adugegi Canyon is shown in Plate 30, *a*. They are made from slender greasewood sticks averaging 15 inches in length and pointed at one end. Nine inches from the pointed end there are attached to each stick, by seizings of fine yucca-string, short threads of human hair, which is all that remains of the snares. The threads are two-strand, five hairs to the strand. These snares were no doubt used for catching birds; a method of setting similar ones is shown in the decoration of a bowl from the Mimbres Valley which is figured by Fewkes.¹

Spindles. In a number of caves we have found sticks bound together in the form of a cross. None of these was complete, but the care with which they were made and the appearance of long handling indicated that they were for some practical purpose. We had no idea what this could be until we recovered from Room *n*, Cave 1, one of these bundled up with a hank of human hair and a small amount of hair-cord in the process of making (Plate 31, *f*). From this it seems safe to assume that this is a form of spindle used in the manufacture of hair-string and possibly other kinds of string.

¹ 1923, No. 1, p. 27.

Just how they were used we do not know. Aborigines of North Queensland¹ use a spindle consisting of a shaft with a short piece of stick bound to one end at an angle to the shaft forming a sort of hook. These are used in twisting human hair-string, by rolling on the thigh or twirling between the fingers. Mr. Willoughby suggests that they may have been used for twisting two-strand, a strand being fastened to each end of the crosspiece. Experiment showed that a close, even twist could be produced in this way. The spindle in the figure has 5 inches remaining of the shaft; the unbroken crosspiece is $7\frac{1}{2}$ inches in length. Another specimen has $7\frac{1}{2}$ inches of the shaft remaining, and a complete crosspiece 9 inches in length.

Objects of Stone. Metates. On account of their weight we collected no Basket-maker III metates. Those found were roughly shaped sandstone slabs with shallow grinding depressions. A metate of this type, used in the wall of a house foundation at Segi Sand Hill, can be made out in the lower picture, Plate 25.

Manos. In Plate 27, *e* and *f*, are shown typical examples selected from twelve found in Room *n*, Cave 1. The two specimens represent the extremes of length, the other *manos* from Room *n* being intermediate in size, and resembling the *mano* shown at *g* from the Basket-maker III site at Segi Sand Hill. Specimen *e* is of sandstone very rudely shaped, measuring 5 inches in length, $3\frac{1}{2}$ inches in width, and $1\frac{1}{2}$ inches in thickness. The grinding surface of specimen *f* measures $6\frac{3}{4}$ inches in length and 4 inches in width. The upper surface is natural, the grinding surface markedly sharply curved upward at each end, as is always the case with *manos* used on the grooved or trough-shaped metate.

Chipped Implements. No complete knives or points were found in the Basket-maker III sites explored, although a number of fragments of both were picked up about the blown-out burial at Segi Sand Hill site.

Mauls. In Plate 28, *h*, *i*, are illustrated mauls from Segi Sand Hill, where there were a number like them scattered about the surface, some of which we judge would weigh 7 or 8 pounds, as against $3\frac{1}{2}$ pounds for specimen *g*. These were probably for driving the stakes commonly used in house construction and in breaking up firewood. We have found no stone axes in Basket-maker III sites.

¹ Roth, 1901.

Objects of Bone and Horn. *Chisels* (?). In Plate 56, are figured certain bone implements recovered from the digging in Room *n*, Cave 1. Of these, *a* and *b* show two views of a chisel-like tool, $5\frac{1}{2}$ inches long, having a chipped flint blade and a bone handle. The blade appears to be worn down by use and rechipping. It is set in a notch in the handle and held in place with a cement-like gum.

Beaming Tool (*i*). This is $4\frac{3}{4}$ inches in length and shows considerable wear from use.

Awls. The bone awl (*g*) measures $2\frac{1}{2}$ inches in length and is provided with a bone point protector which is shown below it.

The short awl (*h*) has a padding of yucca-fibre about the grip. Stubby, short-pointed awls of the type just described seem to occur more often in the Basket-maker II and Basket-maker III periods than in the later Pueblo periods.

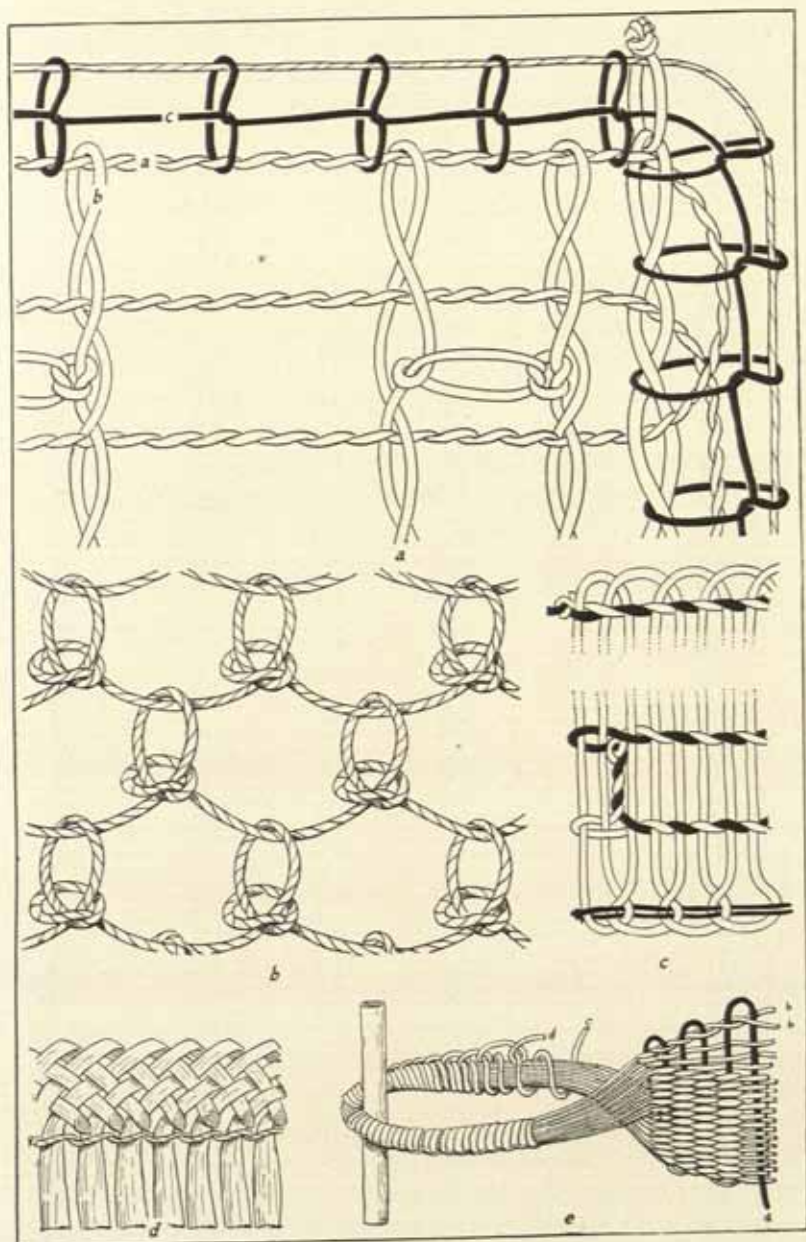
The bone awl (*j*) is fitted with a sheath of dressed skin. The longest awl of the lot (*k*) measures $6\frac{3}{4}$ inches in length. It is well finished and highly polished from long use.

Horn Knife Handle. Plate 31, *b*, is made of the tip of a mountain-sheep horn; it measures 3 inches in length. A notch three-quarters of an inch deep is cut in the large end for the reception of the blade, and a small amount of pitch still adheres to this part of the handle. There are two holes drilled through the handle and a third hole part way through. A cord was no doubt passed through one of these holes to hang the knife to a belt or about the neck when not in use. The purpose of the other holes is not clear.

Horn Digging-Stick Blade. In Plate 31, *a*, is the blade of a digging stick made from mountain-sheep horn. It was found in Room *n*, Cave 1, Segi. In its present state it measures $4\frac{1}{2}$ inches in length and $2\frac{3}{4}$ inches across the blade. We judge that the tang was originally about $3\frac{1}{2}$ inches in length. The blade, which shows much wear, is flat on one side, slightly convex on the other, and has a chisel-like edge. There is in the Museum's collection a perfect specimen collected by Dr. E. Palmer in 1877 from a cave near Johnson, Kane County, Utah. The handle of this specimen is 4 feet long and the blade slightly over a foot, not including the tang.

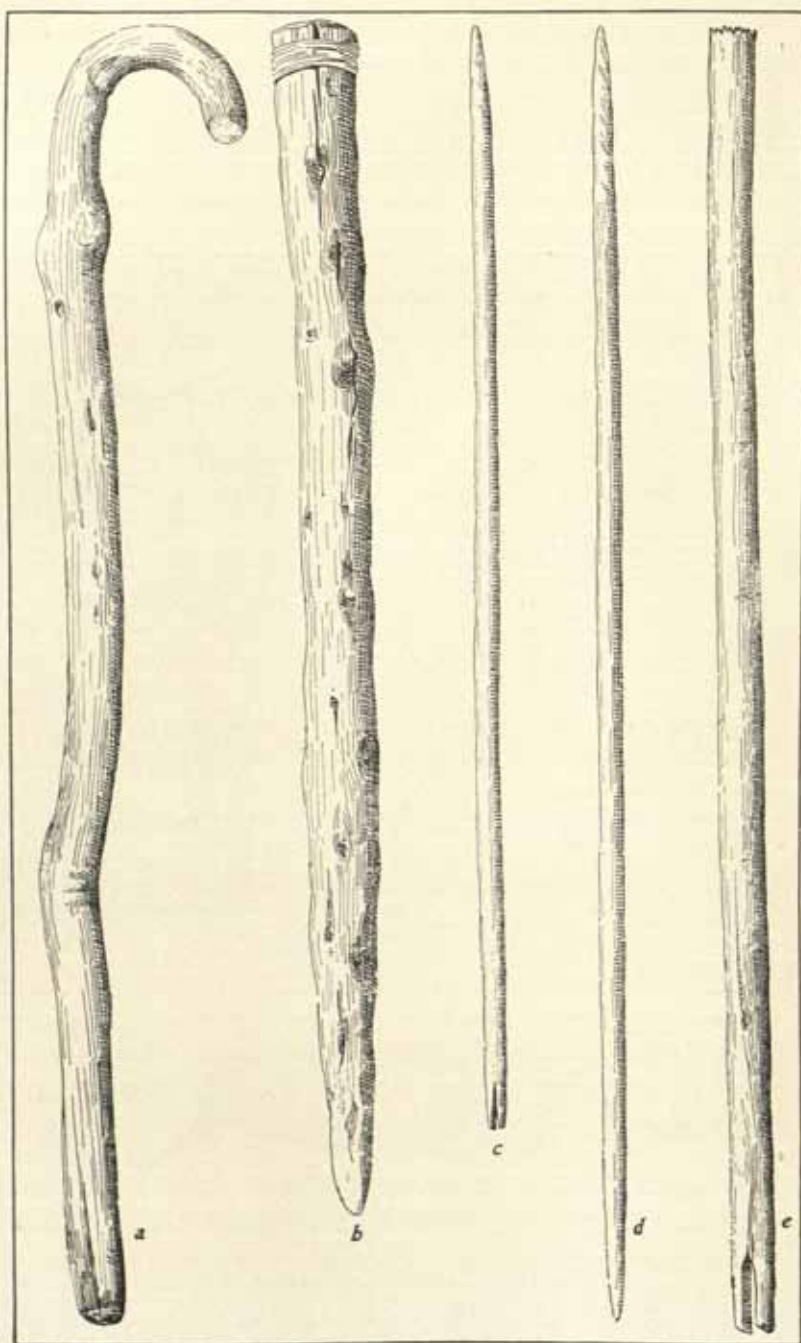
Objects of Clay.¹ *Unfired Clay Dishes*. In practically every Basket-maker III site that was found in the shelter of a cave there

¹ Since the following was written, Morris has published his very comprehensive paper on Post-Basket-maker pottery and objects of unfired clay. (Morris, 1927.)



DIAGRAMS OF WEAVERS

a, Fur-cloth blanket from Burial 2, Cave 1, Segi, Pueblo I; b, Coiled netted bag from Room n, Cave 1, Segi, Basket-maker III; c, Feather-cloth blanket, Burial 3, Cave 1, Segi, Pueblo I; d, Selvage of rush mat from Burial 2, Grave 1, Cave 1, Segi, Pueblo I; e, Carrying strap from Room n, Cave 1, Segi, Basket-maker III



BASKET-MAKER III WOODEN IMPLEMENTS

a, Crooked stick, Room *n*, Cave 1, Segi; *b*, Peg, Room *n*, Cave 1, Segi; *c*, Stick, tapered and notched, Cave 1, Segi; *d*, Double-pointed stick, Room *n*, Cave 1, Segi; *e*, Section of notched stick (about half size), Room *n*, Cave 1, Segi

occurred, in the rubbish, fragments of objects made of unbaked clay (Plate 26). While no whole or even nearly complete specimens were recovered, the pieces show that they once formed parts of shallow, dish-like or tray-like receptacles, 18 inches to 2 feet or perhaps even more in diameter, by about 5 or 6 inches deep (Fig. 25, *h*). They were made of dark adobe mud mixed with a large amount of shredded juniper-bark. Partly unobliterated horizontal

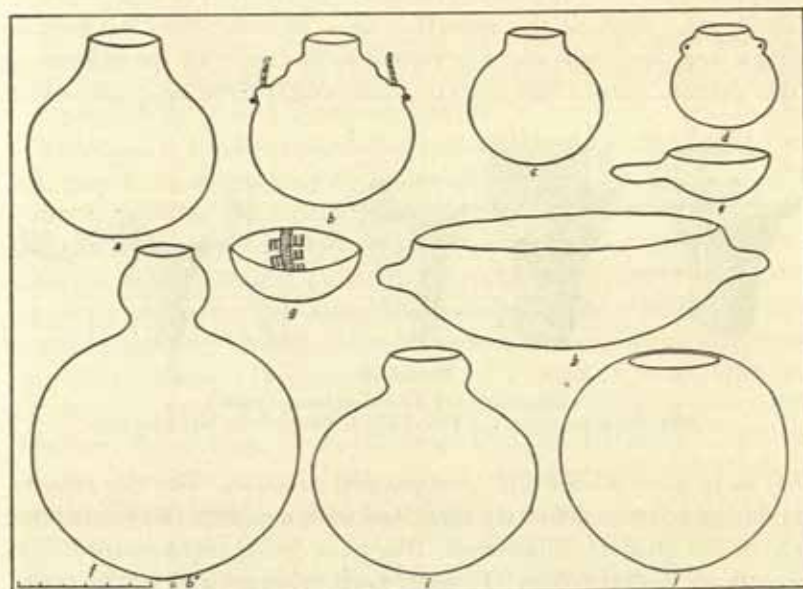


FIGURE 25

VARIOUS TYPES OF BASKET-MAKER III POTTERY

a, Olla; b, d, Canteens; c, Small pot; e, Ladle; f, i, Ollas with constricted necks; g, Bowl; h, Restoration of tray-like dish; j, Globular cooking pot

striations visible on their exterior surfaces show that they were built up (near the rim at least) by the same coiling process used in pottery making, the structural coil or roll being, however, much heavier than that used for true pottery. The thickness of the fragments varies from three-eighths to nearly three-quarters of an inch. The rims are rounded. The exteriors show that many of the dishes were made in baskets, the print of the fabric being very clear in some cases. The heavy perforated ears or lugs often attached to the upper sides are characteristic.

Figurines. Archaeological sites in the open yield only imperishable objects of stone, pottery, bone, or shell, with perhaps occasional bits of carbonized textile and basketry. Hence they furnish a very incomplete picture of the material culture of a people. This fact is most strikingly brought out by the Basket-maker II and Basket-maker III material in the Museum's collection obtained principally from dry caves, and which is particularly rich in perishable material, such as textiles, basketry, articles of fur, skin, feather, wood, etc. Such of the collection as is on exhibition completely fills a large wall case and a fair-sized table case. All the objects in this exhibit, except the pottery, that would have been preserved

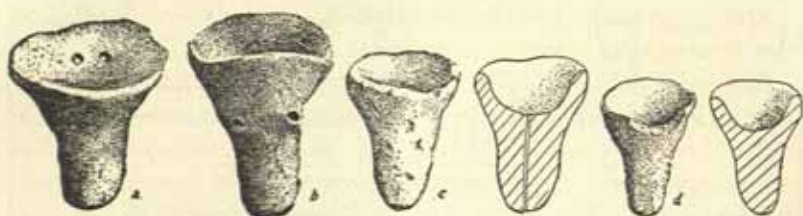


FIGURE 26

UNGLAZED CLAY FUNNEL-SHAPED OBJECTS

a, From Sunflower Cave; b, c, From Cave 1, Segi; d, From Segi Sand Hill

for us in open sites could be contained in a hat. For this reason, enduring objects, definitely identified with a culture or type of site, are of the greatest importance. We have found three items of this nature in Basket-maker III sites, both in caves and in the open. These are the perforated pottery side lugs, already referred to; the curious clay figurines shown in Plate 51; and the cornucopia-shaped clay objects shown in Figure 26.

The figurines are crudely modelled representations of human figures of unbaked or only slightly fired clay and are apparently intended to represent both sexes. The faces are mere pinched up masses without features. The arms, if indicated at all, are only suggested in low relief, while the legs are not even hinted at.

Specimen *e* (Plate 51) was found in the northeastern corner of the house foundation at the base of Segi Sand Hill Site. This figurine measures 4 inches in length, three-quarters inch in thickness, and is oval in cross section. The punctate dots possibly represent beads, though some of the figurines have patterns of punctate dots

all over the front, as shown in *b*, which came to the Museum with the Keam Collection and is catalogued as from Keam's Canyon, the exact locality not given. In length this figurine measures 2 inches. The relief at the sides seems intended to suggest arms.

Specimen *d* is from the house foundation of Segi Sand Hill Site. The upper part of the head is missing. The front has two rows of dots in zigzag in the upper half, and an arrangement of dots at the base, which is pinched up.

Object *a*, a fragmentary specimen, also from the house foundation, has breasts indicated and a notched base. Complete, the figurine would measure 2 inches in length.

Specimen *c*, also from the house foundation, is the smallest in the lot, measuring as restored $1\frac{1}{2}$ inches in length.

Specimen *g* is from Room *n*, Cave 1, Segi. It is 4 inches in length. We think the relief in the upper part is intended to represent arms, as there is no secondary indication of sex as in figurines where the breasts are shown. This figurine, like some of the others, is so elemental that some stretch of the imagination is needed to find in it any resemblance to the human figure. Figures similar to these are in the collection of the Institute of Arts and Sciences, Brooklyn Museum, New York, probably from Canyon del Muerto, where Morris has since found others like them associated with Basket-maker III remains.¹

Funnel-shaped Objects of Clay. We have no idea of the use of these funnel-shaped objects. They are not cloud blowers, as the shape might suggest, for the stems of most of them are without perforations. They are made, like the figurines, of unbaked or lightly fired clay. The two shown in Figure 26, *a*, *b*, are almost exact duplicates, each having two perforations in one side. Specimen *a* is from Sunflower Cave, which contained stratified Basket-maker II, Basket-maker III, and Pueblo III remains. Its dimensions are 2 inches high by $1\frac{1}{2}$ inches across the top. Figure 26, *c*, is from the Basket-maker III house foundation in Cave 1, and was recovered from the talus below the room. It is shown also in cross section. We are not quite sure that this is not a pipe, for it is perforated as shown in the drawing, and the bowl is blackened by burning. Object *d* is from the Basket-maker III room foundation, Segi Sand Hill Site. It was found in the same corner as the figurines just

¹ Morris, 1927, Figs. 8, 9.

described. Specimen *e* and another like it were dug from the talus in Section B, Cave 1, and there is one in the Museum collection from La Plata County, Colorado, very similar to those we found, except in size. It measures $3\frac{3}{4}$ inches in height by $2\frac{1}{4}$ inches across the top. The stem is perforated; the perforation is plugged with wood about half way down.

Pottery. Three wares appear in the collection: (1) gray, (2) black-on-white, and (3) red.

(1) *Gray.* Although many pieces of this pottery, particularly those which have been protected from the weather in caves, are deep black, the ware when new was light to medium gray. The blackness is due to carbon burned in, during use in cooking, and can readily be removed by a hot, open flame such as that of a Bunsen burner. The surface is normally of lighter color than the paste; this, in most cases at least, is the result of firing, rather than of the coating of the surface with slip.

The texture of the ware, both surface and paste, is characteristic. The paste is coarse and granular, so much so that sharp, clean breaks never occur, the cleavages being always exceedingly irregular. In spite, however, of the coarseness of the paste, the pottery is thoroughly fired to a hardness equal to that of any class of South-western ceramics known to the writer. The ware is literally full of tempering material, in the form of tiny bits of quartz, sometimes angular as if purposely crushed for use, sometimes rounded as if waterworn. A great many of these small particles appear on the surface, to which they give a faintly freckled appearance that is very characteristic. Furthermore, many minute, superficial cracks often radiate from the protruding particles of tempering material, or run from one to another, producing a fine veining. Some specimens are more carefully worked down than others, and some seem to have a true slip which masks the tempering material. In most cases, however, the slipped appearance is probably due to the wetting and reworking of the surface, thus covering it with a redistributed layer of fine clay, rather than to the application of an extra coat of slip. While a stone may have served as a finishing tool, it must have been cursorily used, for no example of the gray ware exhibits a true polish. The surface of many fragments shows traces of light scarring, which appear to be the marks of a finishing process prior to the final smoothing and almost obliterated by it. Where

such scars are visible they give the impression of having been made by wiping with a bunch of grass. The marks run, as a rule, obliquely downward to the right.

The types of gray ware vessels so far identified are bowls, seed jars, bottled-necked canteens, ladles, and ollas. The bowls run from truly hemispherical (Fig. 25, *g*, and Plate 19) to a flattened hemispherical form (Fig. 25, *h*); they seem to average about 8 or 9 inches across, though we have examples of 6 inches and one sherd of a bowl which was not less than 14 inches in diameter. The walls curve up evenly from the rounded base and end in an unthickened, rounded lip. The modelling always is more or less uncertain, the rims being normally slightly wavy. It is interesting to note that the forms shown in the figure are all such as are found in gourds.

Globular pots (Fig. 25, *j*) are only a little less common than bowls; fragments of these vessels are to be found at every Basket-maker III ruin, and the characteristic sherds of their round, rimless orifices form a very handy "field-mark," as the ornithologists say, for this culture. They may correctly be described as spheres from which a small segment of the top has been sliced. They are almost perfectly round, and are, therefore, much higher in proportion to their width and have relatively larger orifices than the pots of the later Pueblo periods. Our specimens run from $4\frac{1}{2}$ inches to $9\frac{1}{4}$ inches in height.

Of the form called canteens we have no complete examples, but the sherds indicate a spherical-bodied vessel whose upper part constricts gracefully to its junction with a tapering neck. On opposite sides at about the base of the neck are two heavy protuberances or lugs usually perforated vertically for the insertion of a carrying string. One of our fragments (Plate 26) has a bit of such a string still in place, its lower end knotted to prevent pulling through. The canteens seem to have had an average capacity of about two quarts. The specimen shown in outline (Fig. 25, *b*) and another in Plate 19, *d*, are from the Keam Collection, but the nature of the ware leaves no doubt that they are of Basket-maker III origin.¹

¹ The Keam Collection, now in the Peabody Museum, was made in the eighties and nineties by Thomas V. Keam, Indian trader at Keam's Canyon, Arizona, on the Hopi Reservation. The archaeological specimens therein were for the most part purchased from the Hopi and the Navajo, and while the exact provenience of the specimens is unknown, the great majority undoubtedly came from the country within a radius of 40 or 50 miles from Keam's Canyon. There are a number of Post-Basket-maker sites in the Hopi District. (Explorations of Department of Archaeology, Phillips Academy.)

Ladles are represented by but two fragmentary specimens (Fig. 25, *e*; Plate 19, *h*). Each is a small bowl with a short straight handle attached to the side well below the rim and slanting slightly downward. As no sherds of ladles were found in the various Basket-maker III sites, the ladle would appear to have been an unusual form.

Of ollas we have no complete specimens. From the sherds, however, and from certain vessels in the Keam Collection, one can make out that the typical form was a capacious, full-bodied vessel, ranging in capacity from a gallon or so up to about four gallons (Fig. 25, *a*). As in the canteens, the body is spherical and the neck rises in a gentle curve. The neck is normally plain, but in some cases is swelled just above the body, and again contracted at the orifice (Plate 19, *e*). This particular type of neck is not found, as far as we know, in any other group of Southwestern pottery. True handles are not represented in the collection, but there are two sherds evidently from the bodies of large ollas, which bear stout, down-raking tabs, that must have been very useful aids in lifting the jars when full of water.

The above list comprises all the vessel-forms of which we have evidence from the excavations. In the Keam Collection are a number of rather crudely shaped examples of the pitcher, with a round handle running from the lip to the body. The ware is almost certainly Basket-maker III, but as we have found no fragments of such pitchers or of their handles, it seems safer for the present not to include them as typical of the Basket-maker III culture of the region under discussion.

(2) *Black-on-white*. This pottery, which is very much rarer than the plain, is identical with it in paste composition. It occurs (so far as we have observed) only in the form of bowls. The interiors are sometimes covered with a thin, washy, whitish slip; about as often, apparently, the decoration was applied directly to the smoothed or rubbed-down paste. The designs are executed in black paint which is usually thin and often blurs out to a light gray. In no case has it any reddish or rusty tinge.

Decoration is confined to the interiors of bowls. Although our material is very scanty, we have enough sherds to show that ornamentation was limited to the use of a few characteristic and easily recognized devices, typical examples of which are shown in Plate

18. The system was based upon what may be called enriched bands. The typical band consists, as a rule, of a pair of rather stragglingly drawn lines, set one-half to three-quarters inch apart, which start from the rim of the bowl, and cross the interior to the rim at the opposite side, the lines being bent several times at right angles during the crossing to produce a staggered or stepped effect. There seem sometimes to have been a single pair of such lines, sometimes two pairs cutting across each other in the base of the bowl, or meeting at a small circle in the bottom. The embellishment of the bands consists of dotting between the lines and of the addition along their outer edges of series of small triangles of crooked or pennant-like lines; or (perhaps most characteristic) of rake-toothed appendages (Plate 18). There is also evidence that crude zoöomorphic representations were not uncommon.

(3) *Red*. This pottery is even more uncommon than black-on-white. We have fortunately two whole pieces: a bowl from the burial mound in front of Cave 1, Segi (Plate 19, *g*), and a ladle-like piece from the Segi Sand Hill (Plate 19, *h*). A number of sherds from these and other sites show that the two pieces are typical as far as ware is concerned. This pottery is distinctly superior, technically, to the gray and the black-on-white. The paste is finer grained, and contains a much smaller admixture of gross tempering material. The surfaces of the vessels are also more carefully finished. Of our two complete specimens, the interior of the bowl and all but the exterior bottom of the ladle are coated with a rich "Indian" red slip. Neither bears decoration, nor have we found any decorated sherd of the bright red ware. There is a single fragment of a well finished brown or fawn colored bowl from the Basket-maker III room in Water Fall Ruin (see p. 32), on the interior of which is part of a curvilinear design (apparently a circle with a large dot in the middle) in dark red, so crudely done that it looks almost as if it had been drawn with the finger tip. A few sherds similar in color and decoration were found by the Phillips Academy expedition in a typical Basket-maker III site at the junction of McElmo and Yellow Jacket canyons, southwestern Utah. It is possible, therefore, that this dark red-on-brown is a minor Basket-maker III ware.

On the exteriors of some pieces of gray ware and on one or two of the black-on-white, there occurs a thin coat of red paint, which is impermanent or fugitive, and washes off so easily that it is obvious

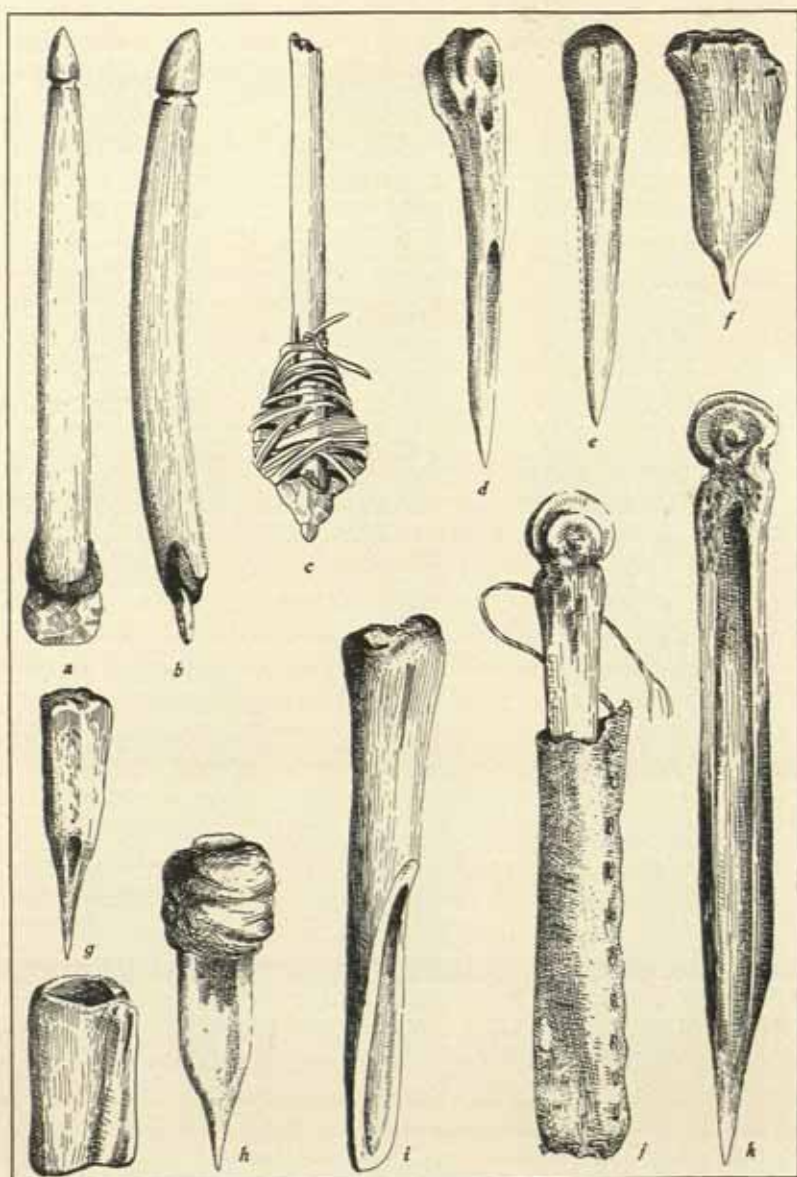
that it must have been applied after firing. Such specimens should not, of course, be confused with true red ware. One further point: many pieces show signs of having been mended by daubing along and over cracks with thick layers of pinyon gum. This practice was followed at all periods of Southwestern culture history, but in Basket-maker III times it was practically the only one used, as in the hundreds of sherds recovered there is but one that gives evidence of the method of boring and tying so common in the Pueblo III period.

PUEBLO I

Pueblo I objects of perishable nature are very rare. From the evidence so far recovered, it would seem that the people of this period lived less in caves than did the Basket-maker-III people, and buried their dead in them hardly at all.

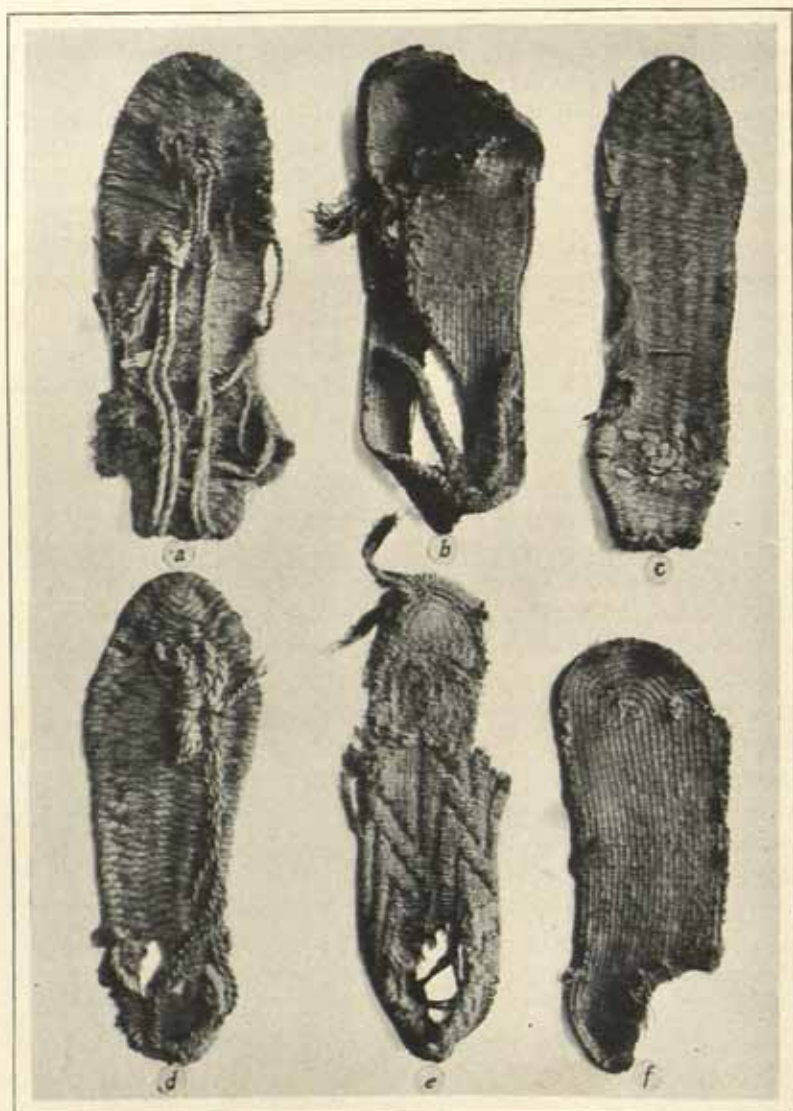
Dress and Personal Ornaments. *Feather-cloth Blankets.* The feather-cloth and fur-cloth blankets found with the Pueblo I burials in Cave 1 are a very interesting lot. The largest specimen was wrapped about the adult (Burial 2, Grave 1). It measured 4 feet 3 inches long by 3 feet wide, and except for the middle of one of the short sides, where it was so rotted as to fall to pieces on removal, is in good condition. As is so often the case with robes of this sort, insects have eaten away the bulk of the hide, but enough remains to show that it consisted of thin strips of the skin of some small, soft-haired animal, presumably the rabbit. The basis of the fabric is two-strand yucca-fibre string of three-thirty-seconds inch gauge. As a first step a large amount of this was prepared by wrapping it with fur strips. Then the wrapped string was doubled and twisted together to make a heavy, fluffy cord, which forms the body of the robe. In a former publication¹ we surmised that feather- and fur-cloth had been made by looping the string back and forth over a frame, and then weaving strings back and forth across it to hold the loops in place side by side. The more careful study which we have been able to give the present specimens disproves the above idea, and shows that the fabric was made with the loops pendent, as we might have realized had it occurred to us how nearly impossible it would be to introduce twined weaving into strings held at either end in a frame or loom.

¹ Kidder and Guernsey, 1919.



TOOLS, BASKET-MAKER II AND III AND PUEBLO I AND III

a, b, Two views of chisel-like tool, Room *n*, Cave 1, Segi, Basket-maker III; *c*, Chipped stone drill, Ford House, Pueblo III; *d, e*, Bone awls, Burial Site 6, Segihatsosi, Pueblo I; *f*, Bone awl, Cave 3, Segi, Basket-maker II; *g*, Bone awl and point protector, Room *n*, Cave 1, Segi, Basket-maker III; *h*, Bone awl, High Cave, Segihatsosi, Basket-maker III; *i*, Beaming tool, Room *n*, Cave 1, Segi, Basket-maker III; *j*, Bone awl and skin case, Room *n*, Cave 1, Segi, Basket-maker III; *k*, Bone awl, Room *n*, Cave 1, Segi, Basket-maker III



SANDALS

- a, From general digging, Cave 1, Segi, probably Pueblo I; b, From Water Fall Ruin, Basket-maker III; c, d, From Water Fall Ruin, Pueblo I; e, From Cave 2, above Poncho House, Basket-maker III; f, From Cave 1, Segi, Pueblo I

The diagrammatic drawing, Plate 54, *a*, illustrates details of the weave of this blanket. Strand *a* is the heavy fur-string warp element that forms the body of the fabric; *b*, the twining element that crosses and recrosses the blanket holding the warp in place; *c*, the cord that runs around the entire edge to finish it.

Other fur- and feather-string blankets that can definitely be assigned to the Pueblo I period are the three robes found with the body of an infant in Grave 3, Cave 1, Segi. These are all small and were doubtless especially prepared as part of the baby's equipment. The smallest, a fur-string blanket, is 18 inches long by 13 inches wide. It is so nearly perfect that it can be described in detail. The body of the fabric consists of a single long strand of two-ply yucca-string of rather uneven gauge (one-eighth inch to one-quarter inch in diameter) wrapped with strips of rabbit skin, three-sixteenths to one-quarter inch wide by 6 to 8 inches long. Most of the skin is still in place, but insects have eaten away the greater part of the fluffy gray fur. The long strand is crossed back and forth sixty-six times, the crossings being held close together and parallel to each other by one over-and-under and ten twined-binding elements. The method of attachment is as follows: at the upper edge of the specimen the successive turns of the strand are engaged as shown in Plate 54, *c*, by a pair of twined yucca-cords much heavier than those employed for the lower cross-elements. The back-and-forth twining element in the body of the fabric where it turns at the edge to re-enter is twisted in the manner shown in the diagram; this twining element is carried across the last time as the over-and-under binder at the edge.

The feather-cloth blanket measures 30 by 20 inches and is of a very much looser weave, the strands lying a full half-inch apart. There are sixty-two crossings and eight twinings besides the top one and the over-and-under bottom one. The warp is a two-ply string. Downy feathers, with the heavy part of the quills removed, leaving flexible strips of quill with the pile attached, are wrapped about this warp element. Parts of the blanket which have escaped decay show that, when new, it was soft and fluffy and of lighter weight than the fur-cloth blankets, but probably of equal warmth.

A blanket found with the remains of a child buried in the talus of Water Fall Ruin is identical with the specimen just described. It measured 3 feet 3 inches in length and 2 feet in breadth.

Sandals. We have no very good data as to Pueblo I sandals. Specimens of relatively coarse weave which were taken from rubbish presumably of that period appear in Plate 57, *a*, *c*, and *d*. It will be noted that they all have pointed toes. As to the finer types we are quite ignorant, but it seems probable that, like Pueblo III sandals, they had round or pointed toes.

Feather Ornament. Plate 49, *e*, was found in the general digging, Water Fall Ruin. In its present condition it measures $2\frac{3}{4}$ inches in diameter. It is made of fibre string, the strings radiating from the

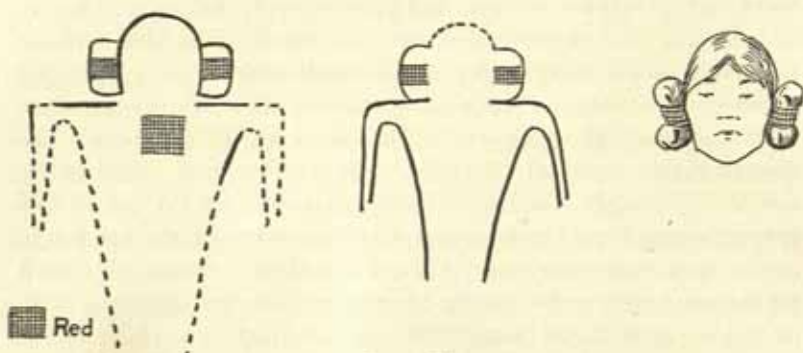


FIGURE 27

PUEBLO I PICTOGRAPHS

From small cave opposite Cave 2, Branch Canyon, Segi, and Cave 1, Segi. The drawing illustrates the manner of arranging hair as represented in the pictographs

center like the spokes of a wheel. In the end of each string was knotted a downy feather, some of which still remain.

Hairdressing. An idea of the way in which the women of the Pueblo I period arranged their hair can be obtained from Plate 12, a photograph of the skull from Burial 2, Grave 1, Cave 1, Segi. This grave, it will be remembered, contained the remains of a female about 18 years of age. Although the flesh had entirely disappeared from the skeleton, for some reason the hair, dressed as in life, remained. The long hair was gathered into two heavy bobs, which were wrapped with a cord about the thickness of a lead pencil made up of heavy strands of fine fibre string. This cord wraps both bobs, crossing from right to left at the nape of the neck. A pictograph on the back wall of Cave 1, and another in a small cave opposite Cave 2, are shown in Figure 27. These evidently depict hairdressing and may serve to identify the pictographs as of Pueblo I date.

Basketry and Matting. *Carrying Basket.* This specimen (Plate 13, right) is one of the mortuary offerings found in Burial 2, Grave 1, Cave 1, Segi. It is, so far as the author knows, the first Pueblo I basket which has been described. It has a flaring top and a narrow base. In cross section it is oval, one side somewhat flattened to fit the back. The height is $19\frac{1}{2}$ inches; width at top from side to side, 19 inches; width at top from back to front, 10 inches; width at base, 10 inches; and thickness at base, $2\frac{1}{2}$ inches. There are two pairs of holes in the back 6 inches below the rim for attachment of a carrying strap. The specimen is of coiled weave, two-rod-and-bundle technique, 5 coils to the inch and 10 stitches to the inch. The last $2\frac{3}{4}$ inches of the rim is finished in false braid. The technique of the weave is the same as that of the Basket-maker II except that possibly the stitches of the sewing element are set closer together.

The ornamental design is in red and black, shown extended in the diagrammatic drawing (Fig. 28). The two narrow black bands completely encircle the basket. One unit, in both the upper and lower designs, is omitted at the back. The design on the lower half is one used very commonly in Basket-maker II basketry, except for the teeth that embellish the triangular units. In textiles as well, in the upper half, the same units are used, but a new element is added which, so far as we know, is not found in Basket-maker II designs. This is the geometrical arrangement of narrow lines connecting the triangular units. A basket from a ruin in Segi Canyon, which in some way resembles our basket, is figured by Fewkes. Its design, however, lacks any suggestion of the Basket-maker II people.

We think it very probable that the design of the Pueblo I black-on-white pottery has its origin in basketry decorations such as this. The basic unit of the most common Pueblo I design is a triangle like that of the basket. These triangles are arranged either singly or in pairs, and still further resemble the basketry design in the series of teeth along one side. The origin of these teeth seems clearly to be traceable to a basketry design, where, owing to the limitations imposed by technique, this was the one way by which the triangular units could be embellished.

Another basket from this region that is similar in shape to ours is figured by Cummings.¹

¹ 1910.

From the talus in the west side of Cave 1, Segi, we recovered a sherd that seems to be from the bottom of a large basket like the one just described. It is coiled weave, two-rod-and-bundle technique, $2\frac{1}{2}$ coils to the inch and 6 stitches to the inch. The rods are

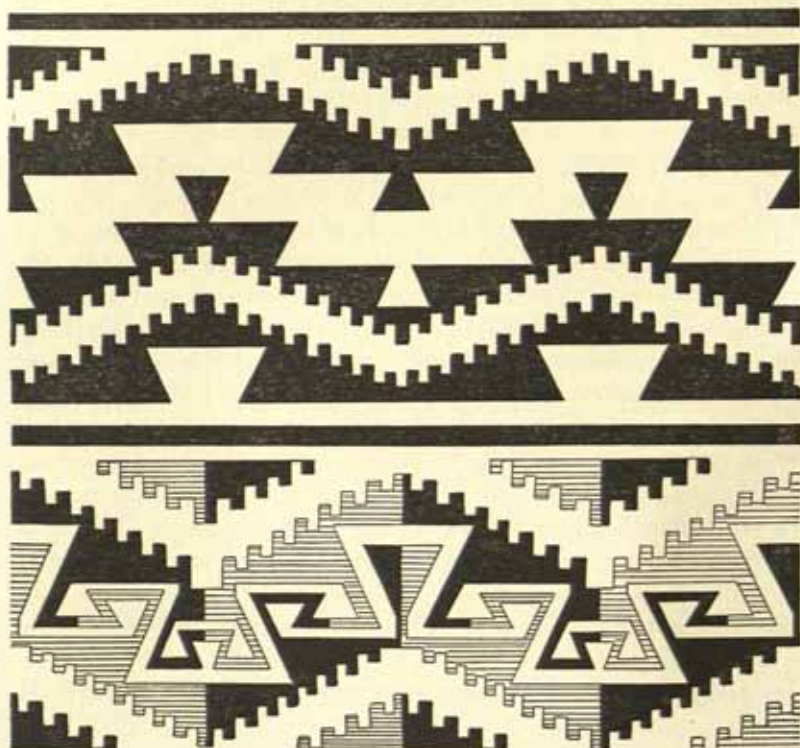
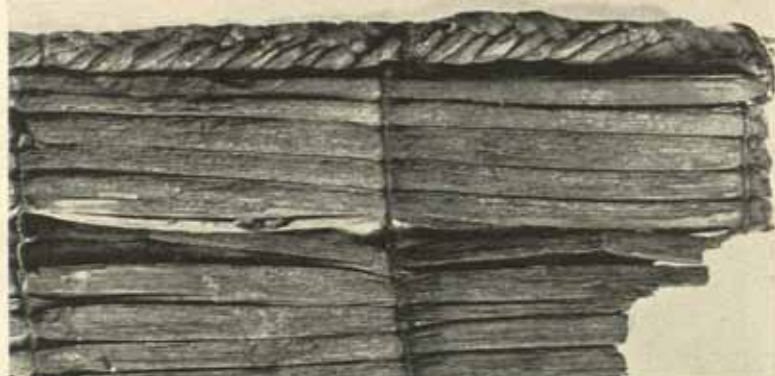


FIGURE 28

Diagrammatic drawing of design on Pueblo I carrying basket

heavier than usual, the sewing elements are drawn very tight but not laid close together.

Small Baskets. The small coiled basket-bowl from Grave 3, Cave 1, Segi, is shown below the ring basket in Plate 16. It measures $6\frac{1}{2}$ inches across the top and is $2\frac{1}{2}$ inches deep. The coils are two-rod-and-bundle, 6 coils to the inch and 12 stitches to the inch. The sewing element is laid close together so that the rod-and-bundle foundation does not show through between stitches as in the Basket-maker II baskets.



a



b



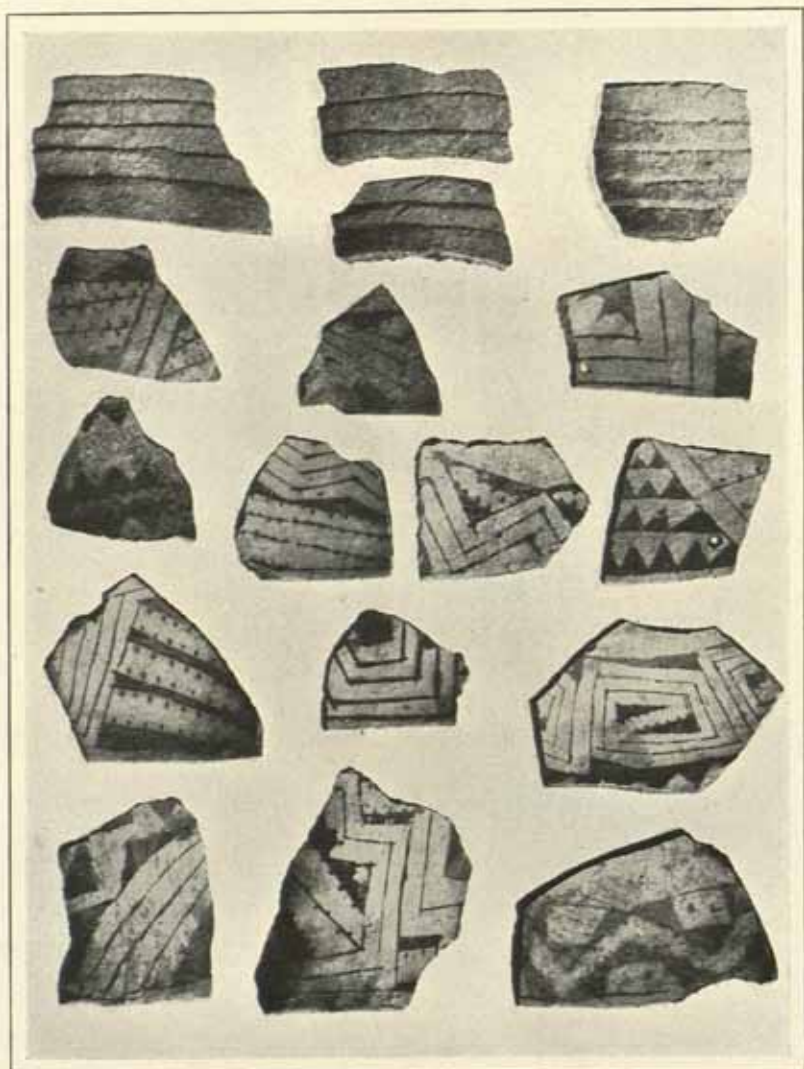
c

MATTING

a, From Burial 2, Grave 1, Cave 1, Segi, Pueblo I; *b*, From general digging, Water Fall Ruin, Pueblo I; *c*, From Cave 1, Segi, Basket-maker III



Gray ware cooking vessel, from Cave 1, Segi, Pueblo I



Pueblo I black-on-white and flat coil rim sherds



Pueblo I black-on-red sherds

Ring Basket. A small ring basket from Burial 2, Grave 1, Cave 1, Segi, is shown in the upper left of Plate 16. It measures $7\frac{1}{2}$ inches in diameter and $2\frac{1}{2}$ inches in depth. It is twilled weave of whole yucca leaves. This type of basket does not occur, so far as we know, in the Basket-maker II or Basket-maker III period, but it is the commonest type found in the Pueblo III period.

Rush Mat. At the top of Plate 58 is shown a section of the mat found with Burial 2, Grave 1, Cave 1, Segi. The longitudinal elements are made up of three rushes laid one upon the other: tight twined binders of string at intervals of $4\frac{1}{2}$ inches hold the fabric together. One edge is finished with a flat braid of rush, the other by trimming the rush bundles close to the binder (Plate 54, *d*). The opposite edge is finished as shown in the drawing.

Textiles. Cotton Cloth. In listing the articles found with Burial 2, Grave 1, Cave 1, Segi, a sleeve-like piece of cotton cloth is referred to. This consists of a well preserved piece of fabric, sewn up in a shape that immediately suggests the name given to it above. It is of rather loose weave, 22 warp and 28 weft picks to the inch. The warp threads are loose twist, about one-thirty-second of an inch in diameter; the weft threads are tight twist and about one-half the size of the warp. The piece of cloth from which the "sleeve" is made was originally rectangular in shape with a dimension one way of 6 inches. This could be determined by the lower part, which includes two corners of the original piece, along the edge of which a heavy cord is sewn with an overcast stitch. The upper edge is torn. The sewing of the seam is carelessly done with a running stitch. The whole length of the sleeve is 7 inches.

About the body in Burial 2, Grave 1, Cave 1, Segi, were remains of cotton cloth; whether these were formerly blankets or were parts of garments is uncertain. There are parts of two pieces. The larger was 3 feet 2 inches in one direction by at least 2 feet in the other; it is very dark, the result possibly of dyeing. It is very even, having 26 warp and 44 weft strands to the inch. The second piece of cloth is much lighter in color and coarser in weave, having 19 warp and 22 weft picks to the inch.

Carrying Bands. The two carrying bands found with Burial 2, Grave 1, Cave 1, Segi, are shown in Plate 10, *h*, *i*. One (*h*) is part of a band different from any in our collection; its original length cannot be determined. The piece, including a loop at the end,

measures 15 inches; the width, $12\frac{1}{2}$ inches. The material from which it was woven is a vegetable fibre that we are unable to identify.

The band has a decorative design woven into the fabric, consisting of parallel stepped zigzags in three colors: white, reddish brown, and red shading on yellow, the dark zigzags that appear in the photograph being made up of the last two colors. The white, now gray, we think was originally very white, and no doubt the reds were brighter. The color seems to be the result of dyeing.

The warp elements, black, twenty-two in number, are each made up of two-ply strands of fine string laid parallel to each other.

In producing the design, the weft strands are woven over and under four warp elements, turning back around the two outside ones until a step of the zigzag is complete.

Thus, if the design consisted of parallel stripes instead of interlocking zigzags, there would be a slit between the stripes the length of the band, but as it interlocks, the weft strands at these points engage a common warp by dropping a warp on one side and picking up a new one on the opposite, the slit being only for the space between the finish of one step of a design unit and the beginning of the next. The slit is not apparent in the fabric under discussion until it is held up to the light and slightly stretched. This technique has not, so far as we know, previously been noted from this area. It is, however, a common feature in Peruvian textiles. Crawford,¹ in his papers on the latter, calls this "tapestry weave." His description and diagrams of the technique make it much clearer than the foregoing.

The second band (*i*) has been used in securing the fur-string blanket about the mummy. It measures $13\frac{1}{2}$ inches in length, $1\frac{1}{2}$ inches in width. It is woven of fine yucca-fibre string over a two-ply warp of the same material, and the weave is very tight. There are 16 warp elements in all. The weft runs 34 to the inch. The loops are not the same on both ends. On one end the warp elements are paired and held by the same weave used in the body of the strap, the loop opening being in the form of a slot $1\frac{1}{8}$ inches in length. On the opposite end all the warps are gathered together in a bundle and seized with string. The loop is only three-quarters of an inch long and is probably not the original loop. This strap bears no trace of decorations.

¹ 1916, pp. 109-191.

A plain carrying band from Water Fall Ruin (Plate 10, *c*) is probably Pueblo I. It is not complete, the loop at one end being torn off. In its present condition it measures $14\frac{1}{2}$ inches in length; the original length was not far from 16 inches. The width is $2\frac{1}{8}$ inches. It is a very firm twined weave over stiff three-ply yucca-cord warps, 12 warps to the inch. The weft is two-ply apocynum-cord, 32 picks to the inch. The loop is formed by combining the warps and working them together on each side, at first for one-half inch with twilled twining, then the number of warps is reduced to 5 and plain twined weave resumed. This method produced a flat loop. In the photograph it has the appearance of being rounded.

Objects of Wood. *Bow.* The bow shown in Figure 29, *a*, is one of the offerings found in Burial 2, Grave 1, Cave 1, Segi. It is made

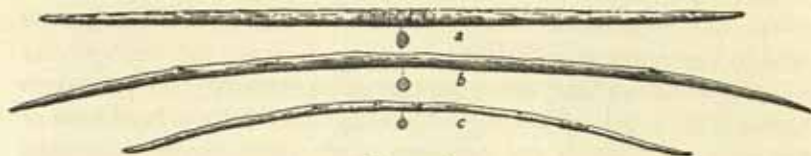


FIGURE 29

PUEBLO I AND III BOWS

a, Bow from Cave 1, Segi, Pueblo I; *b*, Bow from Poncho burial, Pueblo III; *c*, Child's bow from cave opposite Turkey Cave, Segi, Pueblo III

from a section of sapling unaltered except for removing the bark and tapering the ends. It measures 5 feet in length and $1\frac{1}{8}$ inches in diameter at the grip. There are marks of sinew or green-hide wrappings for a space at the grip. There are no notches at the ends for seating the string.

Objects of Stone. *Manos.* Pueblo I *manos* (Plate 27, *c*, *d*) are larger and better finished than those of the Basket-maker III period. The specimens illustrated measure respectively: 8 inches long, $4\frac{1}{2}$ inches wide, 1 inch thick; and 6 inches long, $3\frac{1}{2}$ inches wide, $1\frac{1}{8}$ inches thick. Both are made of close-grained sandstone and have flat grinding surfaces, which would seem to indicate the use of an ungrooved metate.

Objects of Bone. *Bone Awls* (Plate 56, *d*, *e*). There is nothing particularly distinctive about the two specimens figured, the chief interest in them being the fact that they are from a Pueblo I site, Site 6, Segihatsosi.

Pottery. There are three wares: (1) gray, (2) black-on-white, and (3) red.

(1) *Gray.* The cooking vessels of the Pueblo I period are of coarse gray clay. Perfectly plain specimens sometimes occur, but most examples have from two or three to a dozen or more broad flat rings at the neck (Plates 59 and 14, top row). In size, the vessels vary from little pitchers 4 or 5 inches high up to ollas holding several gallons.

(2) *Black-on-white.* No adequate studies of the shapes or designs have been made. Plate 14 illustrates bowls (*g, i, j, k, l*) as well as a pitcher (*h*), two small jars (*m, n*), and a seed jar (*o*). Ollas occur, but we have no fragments large enough to give any idea as to shape. The peculiarities of the decorative system, with its abundance of toothed or dotted lines, its slipshod drawing, and its general lacy effect, can be observed on the vessels of Plate 14 and the typical sherds reproduced on Plate 60.

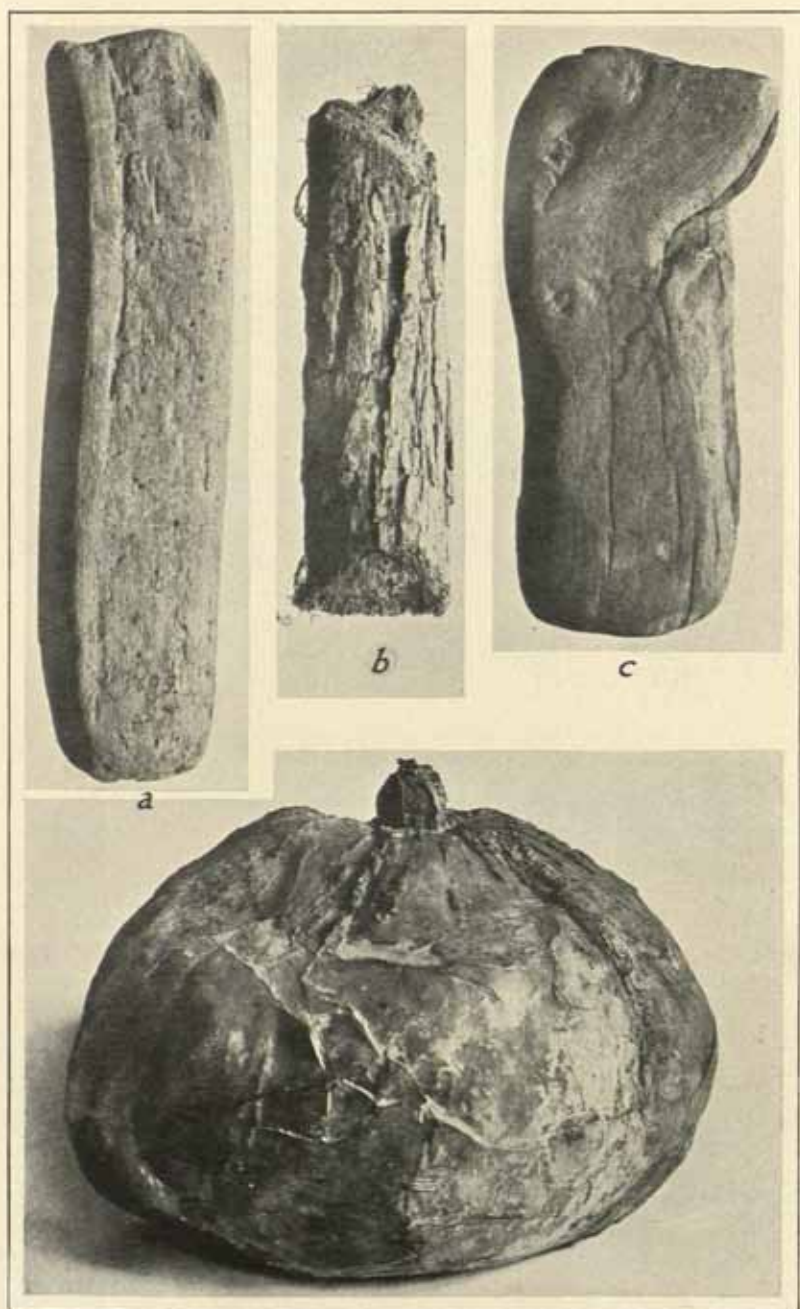
(3) *Red.* Although much less common than either of the foregoing classes, red ware is to be found at practically every Pueblo I site. Our material is not abundant, but a few pieces were taken from burials which also contained vessels of the much more easily identifiable black-on-white ware.

While this ware is distinguishable at a glance from the black-on-red and polychrome Kayenta groups, it bears a close resemblance to the pottery which in a former report we called "red ware with shining paint." We have no pieces of the latter which were found under surely pre-Pueblo circumstances and yet many of them may have been Pueblo I. The difficulty with sherds is that we cannot yet tell definitely which is which.

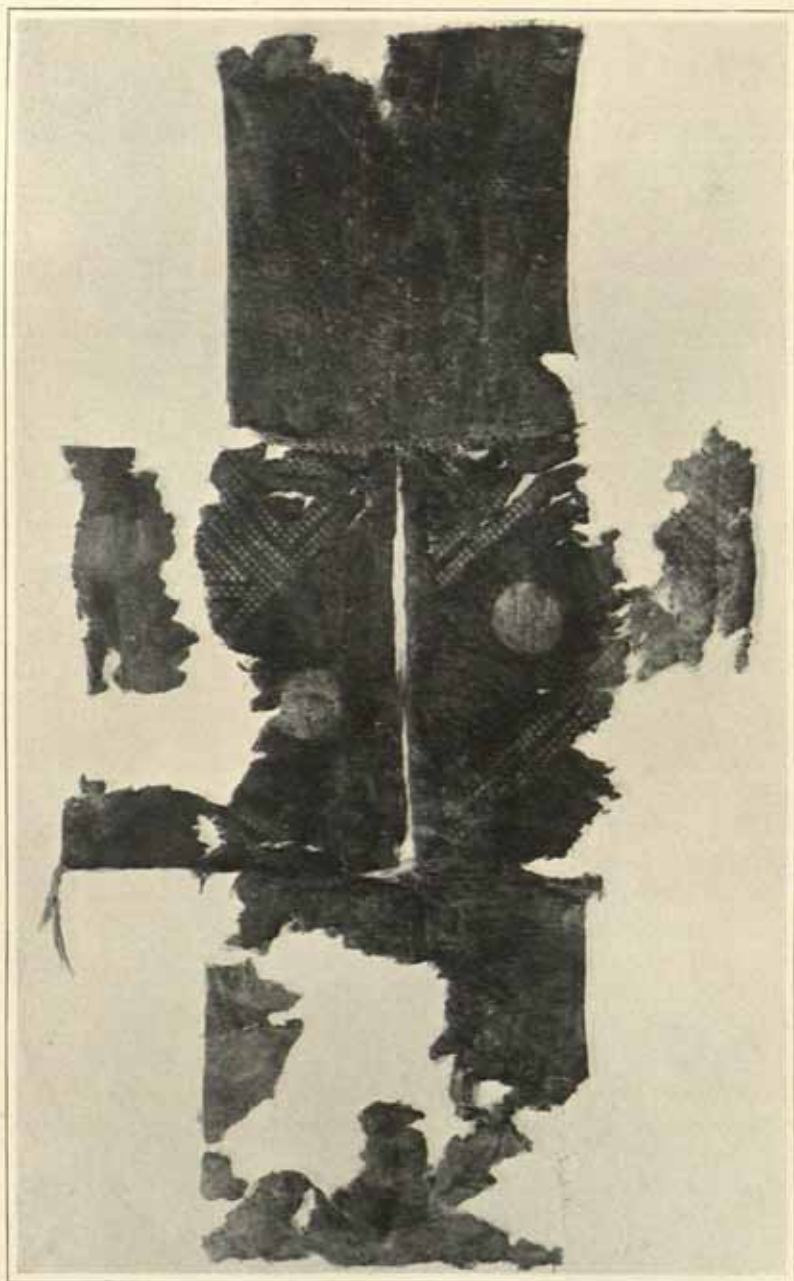
Examples of this red ware from burials are shown in Plate 15, *a, b, c, d*.

The small seed jar (*a*) is from Grave 2, Cave 1, Segi. Its dimensions are: height, $3\frac{3}{4}$ inches; diameter, $4\frac{1}{2}$ inches; diameter of orifice, $2\frac{1}{4}$ inches. It has a flat base. The decoration consists of six lines about the upper body put on with paint that shows a slight luster in the high lights.

The small gourd-shaped bottle with handle (Plate 15, *d*) is from Burial 2, Grave 1, Cave 1, Segi. It measures $5\frac{1}{2}$ inches in height, $4\frac{1}{2}$ inches in diameter, seven-eighths of an inch in diameter of orifice. In color it is light red. The decoration consists of three rib-



a, Cottonwood pillow from walled-up burial, Poncho House, Pueblo III; *b*, Chip showing axe scar, Pueblo III; *c*, Pillow from Cave 2, Segi, Pueblo III; Squash from walled-up burial, Poncho House, Pueblo III



Poncho-like garment of cotton cloth from walled-up burial, Poncho House, Pueblo III

bons that encircle the bottle. These are parallel lines about 1 inch apart, filled in between with wavy diagonal lines. This design shows more clearly on the sherd in the upper right corner of Plate 61 than in the photograph of the bottle, Plate 15.

In Plate 15, *b*, is a gourd-shaped bottle from a burial in Site 5. It is complete save for the handle which has broken away with a part of the neck. Its dimensions are: height, 7 inches; diameter, 6 inches; diameter of orifice, 1 inch. The color is a light shade of red. The decoration is done with faintly lustrous black paint, through which the ground color shows in places.

The design consists of a narrow line encircling the middle; above this is a central design unit consisting of a pyramid in solid black with lines radiating from it. This is enclosed by lines in form of a pyramid, above which are a series of stepped triangles and two stepped pyramids in line. Below the central line there is a zigzag that has the appearance of having been drawn with the finger wet in paint. Two sherds with zigzags like this are shown in Plate 61.

The fragment of a vessel (Plate 15, *c*) was obtained at Water Fall Ruin by the expedition of 1914. The potter has suggested the head of an animal by placing the opening in the neck a little one side of the center and adding ears in low relief on either side. The color is the same as that of the vessels just described. The decoration consists of zigzags and diagonal lines. The paint is black but very thin, showing as dark brown where the under color appears through. The interior of this piece is coated with pitch.

The small bird-shaped vessel in Plate 14, *c*, is also from Water Fall Ruin. It was found with the burial of a child. It measures 3 inches in height, is of light red color, and decorated with narrow lines in black.

A bowl was obtained from another burial in Water Fall Ruin. It is 8 inches in diameter. The interior is decorated with the finger-mark zigzag which we think is found exclusively on the Pueblo I red ware. This piece is in such poor condition that it is not figured.

The sherds shown in Plate 61 are, with one exception, from bowls. The middle sherd in the bottom row is part of a flat-handled ladle.

PUEBLO II AND III

Food. Squash. The squash from the Poncho burial, no doubt a food offering, lay at the feet of the mummy. When found, it was intact and only partly covered by the fine sand that had sifted through the roof of the chamber. When taken out it collapsed. Plate 62 shows it restored to its original form. In its present state, no doubt much shrunken, it measures 41 inches in circumference and is 9 inches high.

Dress and Personal Ornaments. Robes. The better preserved of the two feather-cloth robes which were wrapped about the body in the Poncho burial measures 26 by 18 inches. It is made of sixty-eight strands of heavy two-ply yucca-fibre string, wrapped with stripped pile from turkey feathers. Twined binders hold the strands close together in parallel order.

The second robe is in very poor condition. It was originally at least 46 inches long. The width cannot be ascertained. The wrapping has entirely disappeared, so that one cannot tell whether it was of fur or of feathers. The twined binders are inserted in close-set series of two or four with narrow spaces between the series. The cords which make up the body of the fabric are, however, set about one-half of an inch apart, so that the robe is of distinctly looser texture than the one described above.

The poncho-like garment, Plate 63, is made from four pieces of cotton cloth sewn together as they appear in the photograph, the slit between the two middle pieces being left so that it could be slipped on over the head and worn on the shoulder. The two pieces that form the front and back measure approximately 13 by 15 inches. Along the lower edges are remains of a fringe. In color these pieces are a rusty yellow of light shade on one side, and the natural color of the fabric on the other.

The shoulder pieces are 16 inches square and appear to have had tassels at the corners, only one of which remains. The character of the design, which is on one side only, shows quite clearly in the photograph. It was produced by dyeing or painting. The ground is solid color, leaving the pattern itself the natural color of the fabric. The coloring medium seems to have been in the nature of a dye as it has stained through the fabric so that the design can be traced on the wrong side. The color of the ground in its present state is dark

brown. The fabric is of fine, even, loom weave, 24 warp and 22 weft picks to the inch, the selvages all around being neatly finished.

Necklace. This ornament found with the burial of an infant in the talus of Cave 8, is three-strand, of fine disc-shaped stone beads. Attached to it as a pendant is a much worn olivella shell bead and a *pectunculus* valve. Two strands of the necklace have alternate red and black beads, and one strand is composed wholly of black beads. The latter measure less than one-sixteenth of an inch in diameter and run 46 to the inch or approximately 380 beads to the strand. These beads fit so snugly that unless closely examined the strand has the appearance of a black cord or piece of small iron wire. The beads of the red and black strands are slightly more than one-sixteenth of an inch in diameter and run 28 to the inch. They are strung on a fine cotton thread that ends at the tie in a tassel.

Mosaic Incrusted Blade (Frontispiece and Plate 24). This is one of the finest specimens of mosaic work that has come out of the Southwest, and it is certainly the handsomest single object found by any of the Museum's expeditions to northern Arizona. It was found with other specimens in the small red seed jar (Plate 41, upper right), uncovered at a depth of 5 feet below the surface in Poncho House. The jar fell bottom up when the face of the cut caved off, the shock of the fall loosening some of the mosaic, which has since been restored as accurately as possible. The restoration covers about half the surface of the blade. The blade itself is of dark flint, measuring $4\frac{1}{2}$ inches in length, $2\frac{1}{8}$ inches in breadth at the base, and three-sixteenths of an inch in thickness. The mosaic is made up of turquoise, shell, and lignite. A perforation for suspension extends through both the blade and mosaic.

We are not absolutely sure that the band of alternate triangular pieces of turquoise and lignite at the base is correctly restored. A fragment of a mosaic inscribed shell from Hawikuh, figured by Hodge,¹ and a bone scraper from Pueblo Bonito, figured by Pepper,² show, however, arrangements exactly like this.

It was found quite impossible to make the pieces fit as neatly in the restoration as did those of the undisturbed portion, where each unit is fitted with the greatest precision. Though there are more than enough loose shaped pieces of turquoise, shell, and lignite to cover the point, we had no idea of the pattern beyond the point

¹ 1921.

² 1920.

restored. From the number of left-over pieces, one of which has a hole drilled through like the piece on the face, it seems probable that the finished pendant would have been incrustated on both sides.

Turquoise mosaics have been recovered from a number of prehistoric sites in the Southwest, and the art in degenerate form is still practised by the Pueblo Indians. So far as we know, a flint blade incrustated like this one is unique for this region.

Turquoise Beads (Plate 24, e). These beads, 186 in number, were found loose in the cache-pot with the mosaic incrustated blade just described. They are disc-shaped, measuring three-sixteenths of an inch in diameter, are perfectly shaped, and highly polished.

Lignite Button, or Mirror (Plate 24, c). When taken from the cache-pot this specimen was in perfect condition, but upon exposure to the dry air it began to check. This was stopped as soon as we noticed it by covering with wet sand; later it was treated with paraffine. The specimen measures $2\frac{1}{2}$ inches in length, 2 inches in width, and three-sixteenths of an inch in thickness. A ridge in the back has a hole drilled through for attachment. The surface originally had a high polish. A similar specimen was found by us in a cache in Cave 1, Kinboko Canyon, in 1914.

Shell Ear Ornaments (Plate 24, b). These ornaments are thin discs of iridescent shell, probably abalone, with perforations near the edge for suspension. They measure $1\frac{1}{8}$ inches in diameter, and are in nearly perfect condition.

Bone Dice (Plate 24, f). This lot consists of eleven lenticular pieces averaging three-quarters of an inch in length by three-eighths of an inch in width; and four discoidal ones, three-eighths of an inch in diameter, all having one side rounded and the other side flat. The rounded side is polished, while the flat side is scored, and in most of them has a cement-like substance adhering to it. They were probably not dice, though the name best describes them.

A similar set of eight lenticular and three ovoid pieces was found by us in Cave 1, Kinboko, in 1914. These were of Basket-maker II origin. We have recovered a number of individual specimens from various sites, and they appear also in collections from Pueblo Bonito, Tularosa, New Mexico, and Tanners Spring, Arizona. They seem to have been used by both the Basket-maker II and the Pueblo II people.

Besides the articles already described, there were found in the

pot two squash seeds and two seeds that appear to be sunflower. The seed jar in which these articles were found is the one at the right in the upper row, Plate 41.

Objects of Wood. Cradle. Brief reference was made to this specimen in a previous report.¹ It was from the burial of an infant found in the talus of Cave 8. The description of the cave which follows is from the earlier report:

Cave 8. This cave is in the first branch-canyon leading out of Sagiotso to the west. It is in reality a shelter under the overhang of the cliff, 30 feet in width, some 70 feet in length and about 25 feet above the bed of the wash. There is in it ample evidence of Cliff-dweller occupation consisting of some foundation walls, a good depth of rubbish, with many potsherds, and a number of Cliff-dweller pictographs; there is also a square-shouldered human figure done in white and yellow paint. This shows very faintly and a small Cliff-dweller painting of a snake overlaps it in one place. It was this square-shouldered pictograph that induced us to dig here, as our previous experience had shown these figures to be of Basket Maker origin.

Our excavation disclosed considerable Cliff-dweller rubbish with hard-pan below it in which we found a number of cists, empty except for cedar bark or coarse grass. These cists and the square-shouldered figure are the only remaining evidence of Basket Maker occupation. From the general digging we obtained a number of Cliff-dweller specimens including the skeleton of a young child with which was a perfectly preserved cradle which had been buried under the rocks at the top of the bank at the front.

The grave was scooped out under a large rock that lay near the top of the talus, and a stone slab was set on edge across the front of the excavation. The infant's body lay at the bottom of the grave, wrapped in fragments of cotton cloth and a badly preserved feather-string robe.

The cradle and accessories (Plate 64) lay bottom up over the infant and were covered in turn by a large ring basket which was in a bad state of preservation. At the feet was a second ring basket covering a quantity of unshelled corn of which more had been placed near the head. A small bowl lay at the feet. In it were remains of some food offering, the bead necklace previously described, and a small-handled jug.

The cradle, so far as we know, is the only complete Pueblo III cradle of its type that has been recovered up to this time. Its dimensions are as follows: length, 28 inches; width at head, 11½ inches; width at foot, 8¼ inches; and the hood is 8 inches in height.

¹ Guernsey and Kidder, 1921.

Details of construction are as follows: the bow or frame is formed of two sticks about the size of the little finger, bent somewhat in the shape of a hairpin, one a little larger in the bend than the other. The open ends of the bent sticks are placed together one inside the other and lashed in place to form a continuous hoop. Eight inches from the small end, a small withe is bent around both sides of the loop forming a double transverse crossbar. The space within the loop above the crossbar is filled with twilled weaving of whole yucca leaves, the ends of each leaf being brought around the frame and crossbar, and secured in the same manner as in the common Pueblo III ring basket. Fastened to the back of the cradle are two sticks bent like those forming the bow. The bend of one is fastened to the bow at the head of the cradle; the second is three inches below the bend. Both of these bends are narrower than the bow, their ends extending below the transverse crossbar. One is more finished than the other, with the ends trimmed and sides rubbed down flat. A third loop of some tough vine is also fastened in the back of the cradle. The closed end of this loop passing up through the open end of the bow is bent back on itself to form a foot rest or to keep the baby wrappings from sliding out of place.

The hood is of some heavy bark, the bottom fastened to the twilled filling of the bow. The top is held open and strengthened by a stick bent to fit it and fastened three-quarters of an inch below the rim of the hood. Two guy strings of twisted yucca leaves fastened on each side of the end at the top and tied back to the bow inside the hood prevent the upper part of the hood from springing open. The whole affair is very light and strong.

Two ladle handles from Young's Canyon Cemetery and Holbrook, Arizona, figured by Fewkes, show cradles of exactly this type.¹

The cradle accessories consist of a head board and a band for holding the infant in place. The head board is $6\frac{1}{2}$ inches long, $4\frac{1}{2}$ inches wide, and three-quarters of an inch thick. It is carefully shaped and finished. The band is woven of feather-string, such as is used in the Pueblo II and III feather-string blankets. It is 13 inches long by $2\frac{1}{2}$ inches wide. At each end is fastened a toggle-like stick $5\frac{1}{2}$ inches long by which the strap or band was secured to the cradle frame. This probably was put on outside the wrappings of the infant.

¹ Fewkes, 1926, Plates 6 and 7.

Bows. This specimen from the Poncho burial is in a fair state of preservation. Each end had been broken off to put it in the grave, and it is shown mended in Figure 29, *b*. It is made from a limb or sapling of some wood we have not been able to identify. One surface of the belly of the bow is unfinished, save for removing the bark and twigs. The back is flattened. It is tapered at the ends, which have shallow notches for the reception of the strings. At the grip there were wrappings of flat sinew or hide, a little of which remains. The bow measures 4 feet $6\frac{1}{2}$ inches long, 1 inch thick, and $1\frac{3}{8}$ inches wide at the grip.

Another bow (Fig. 29, *c*) from a cave opposite Turkey Cave, Segi, is merely a stick tapered at both ends, and having sinew wrappings at the grip and at one point on the wing. Its dimensions are 3 feet 10 inches in length by five-eighths of an inch in diameter at the grip. It is in a perfect state of preservation and from its size we judge it was probably a child's.

Arrow. With the bow in this burial was a single arrow, broken in several pieces and otherwise in a bad state of preservation. It is the usual Pueblo III type — a reed shaft fitted with a wooden foreshaft. Its exact length cannot be determined. The reed shaft is one-quarter inch in diameter at the nock end, which is not plugged with wood to strengthen it as is usually the case with Pueblo III reed arrow shafts. The shaft is provided with three feathers, held in place by sinew wrappings. The feathering extends $4\frac{3}{4}$ inches down the shaft. Under the feathering the shaft is decorated with two broad encircling bands of dull red paint.

Pillow. The identification of a billet of cottonwood (Plate 62, *a*) as a pillow is based on the fact that the head of the mummy rested on it as on a pillow. It is 15 inches long, 3 inches wide, and $2\frac{1}{2}$ inches thick. Specimen *c* is another pillow similar to this one. It is from Cave 2, Segi, 1923. Similar objects are frequently found in cliff-house digging, and we know wooden head rests were used in Cliff-dweller cradles. Hence it seems probable that a habit acquired in infancy might continue through adult life.

A wooden implement (Figure 20, *b*) was found at one side of the grave. It is a thin piece from the outside of a log, measuring $12\frac{1}{2}$ inches in length and $2\frac{1}{2}$ inches in width. One end is charred and slightly sharpened, while the opposite end is cut down to form a rude grip. This implement might have served equally well for dig-

ging, or spreading adobe mortar. Tree shells which we have called trowels are invariably found in Basket Maker II caves. They vary greatly in size, but otherwise are not unlike this specimen with the exception that they are never provided with anything that suggests a grip.

Basketry and Matting. *Selva of Rush Mat.* Plate 54, *d*, shows the selva of a rush mat from the general digging, Water Fall Ruin.

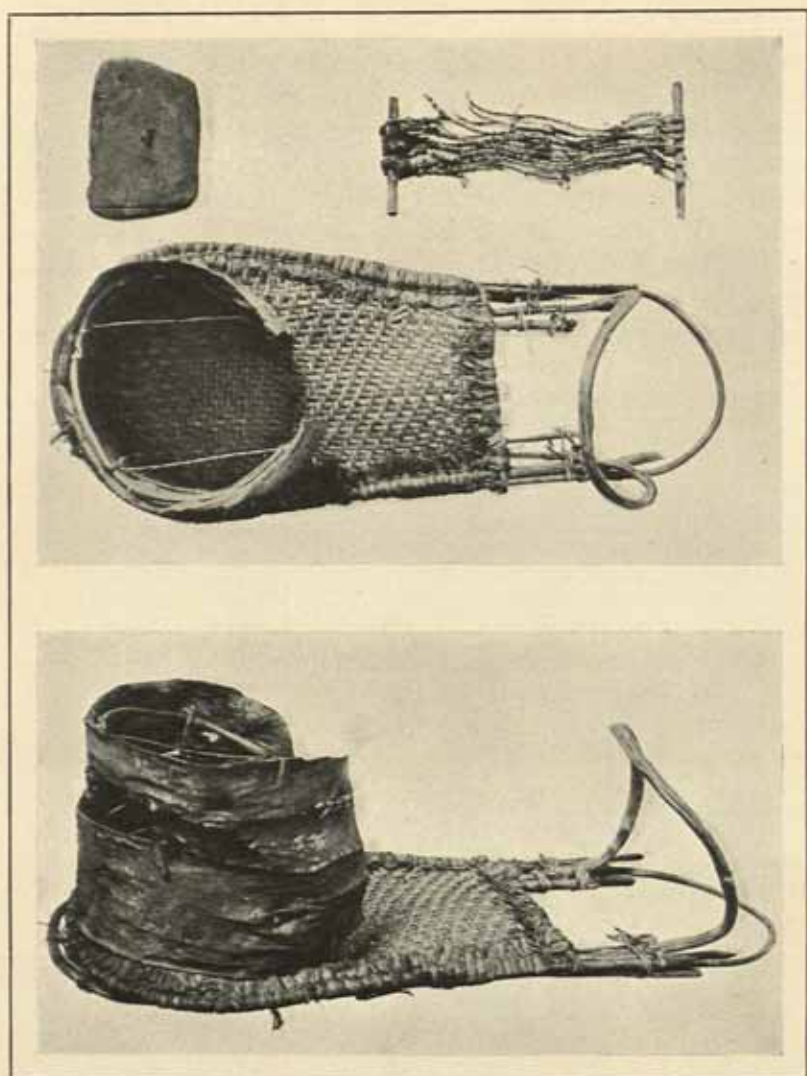
Plate 58, *b*, shows a fragment of reed mat from the general digging in Water Fall Ruin. The twining elements are spaced 3 inches apart. It was evidently a mat of considerable size.

Baskets. From the general digging in the small cave above Poncho House was recovered a ring basket of the type most commonly found in Pueblo II excavations. It measures 14 inches in diameter. Another ring basket was found at the foot of the grave against the back wall. It is a carelessly made coarse-weave affair measuring $7\frac{1}{2}$ inches in diameter. The grave also contained a coiled basket. It was in such an advanced state of decay that only a few fragments could be preserved. These show the close-set, tightly drawn sewing elements characteristic of the Pueblo II coiled basketry.

Objects of Stone. *Manos.* The Pueblo period developed a specialized form of *mano*, of which an example from Turkey Cave is shown in Plate 27, *a*. It is made from close-grained sandstone and measures $11\frac{1}{2}$ inches long, $4\frac{1}{2}$ inches wide, and 1 inch thick. The bevelled grinding surface is the distinctive feature. The advantage of this double plane grinding surface is understood when the process of grinding is considered. A handful of whole corn is placed on the upper end of the metate; a little of this is picked up under the *mano* and crushed with the downward stroke; the upward stroke of the *mano* picks up some of the crushed corn and grinds it still finer; and this process is continued until the meal reaches the desired degree of fineness.

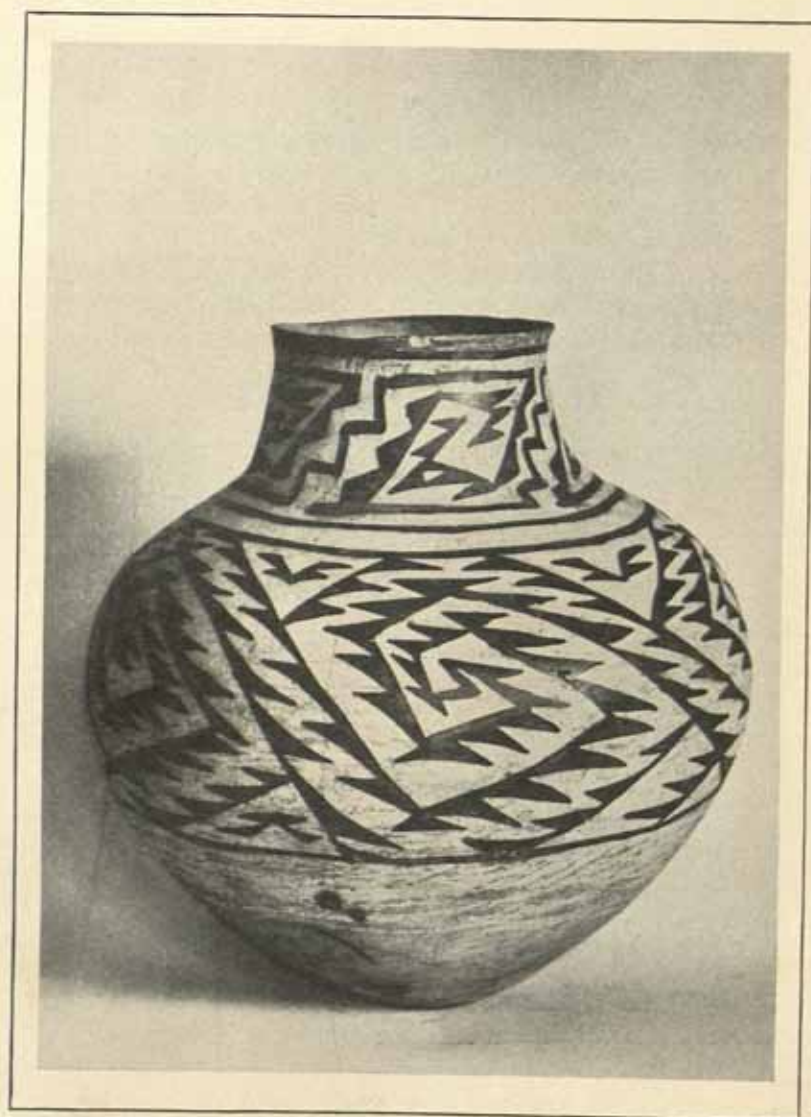
Specimen *b* is another *mano* from Turkey Cave. The central ridge is not so marked as in the one just described. The ends are markedly convexed from wear in a shallow grooved metate.

Grinder. A roughly shaped grinder of compacted sandstone, shown in Plate 28, *c*, is from Water Fall Ruin. Its size conveniently fits the hand. The upper side is unaltered; the side shown is worn flat from use, and has in it a deep groove, the result, probably, of a secondary use of the stone in shaping wooden implements or weapons.



PUEBLO III CRADLE AND ACCESSORIES

Front and side view of cradle. Wooden head rest and woven band. From Cave S, Adugegi Canyon



Black-on-white pot from general digging, Poncho House, Pueblo III

Arrow Flaker. Object *d* we identify as an arrow flaking stone. A similar stone found with other arrow flaking tools was figured and described in the report preceding.

Mauls. Objects *g* and *i* are grooved mauls; *g* is from Turkey Cave, and *i* from the small cave on the opposite side of the canyon.

Axe. A notched pebble, *a*, is probably an unfinished axe.

Adze. Object *b* is a small notched adze. Both this and the unfinished axe came from Poncho House.

Drill. The drill, Plate 56, *c*, is from the general digging in Ford House. As the drawing shows, it is a rudely chipped flint, set in the split end of a small stick and held in place by wrappings of

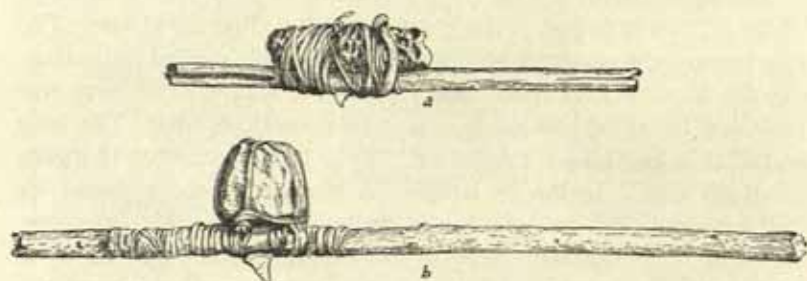


FIGURE 30

SCARIFIERS

a, From Ford House, Pueblo III; *b*, Room *n*, Cave 1, Segi, Basket-maker III

yucca leaf. The whole affair has the appearance of a hastily constructed but efficient makeshift.

Scarifier. We can think of no better name for the contrivances shown in Figure 30, the actual use of which we do not know. One of these (*a*) was from the general digging in Ford House, where we found no identifiable Basket-maker II or Basket-maker III remains. The second (*b*) was uncovered in the talus below Room *n*, Cave 1, Segi, and may be Basket-maker III. The former has for a handle or shaft a piece of stick with the bark on, just over 1 foot long, split part way down through the center. Set in the split, 4 inches from the end, at right angles to the shaft, is a sharp pointed flint flake. Above the flake is a piece of sandstone weighing perhaps three ounces. This is held in place by lashings of yucca leaf, which are also wrapped about the shaft above and below the flint flake, closing the split and holding the pointed flake firmly in place.

Specimen *b* is made in the same way as the one just described.

The shaft, a section of reed, is $7\frac{1}{2}$ inches in length. The "weight" is a piece of corn cob lashed to the shaft by yucca leaf wrappings, which also hold in a split in the shaft a small and very keen pointed flint flake. This "lancet," as may be judged from the material used in its construction, was designed for tapping very lightly whatever it was used on.

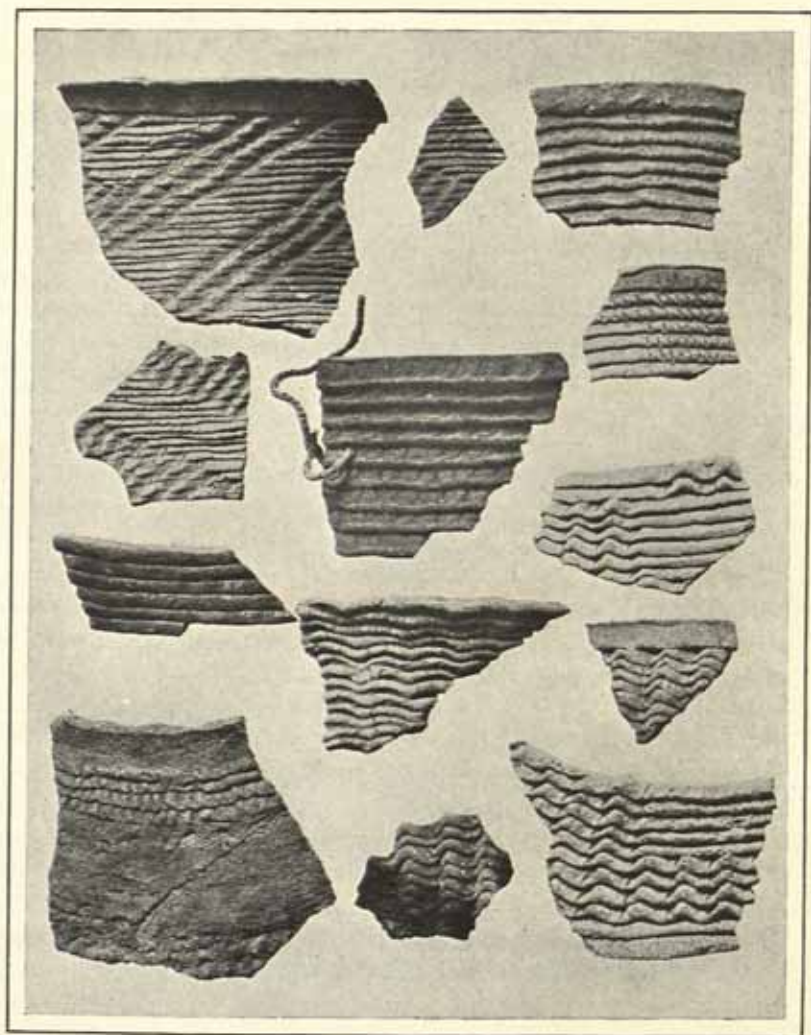
As the name we have given these objects would indicate, it has entered our minds that they have to do with some kind of primitive surgery or possibly tattooing. We have no evidence that tattooing was practised in the Southwest, however, so both suggestions are mere conjectures.

Objects of Horn. *Spade Blade.* A blade of mountain-goat horn, Plate 31, c, was found in the general digging, Poncho House. The side toward the observer shows clearly the folds caused by flattening the horn to give it a broad, spade-like shape. The horn was probably boiled to soften it, so that this could be done. The tang end of this specimen is broken off. The blade measures $4\frac{1}{2}$ inches in width and 5 inches in length. A similar specimen found by Palmer is deficient in data, but is probably Pueblo III. It seems, therefore, that the same type of implement was used in all three periods. We have found that the wooden digging sticks of the Basket Maker and Pueblo peoples are of distinct and easily recognizable types.

Pottery. We are forced to omit any adequate presentation of the pottery of the Pueblo period. A certain number of typical vessels are figured in Plates 41 and 45, but we have had neither the time to study nor the funds to illustrate the vast amount of ceramic material that has been gathered by the Museum's eleven expeditions to the Kayenta country. Such a study is much to be desired.

"Archer-Anderson" Potter's Outfit. In the lower half of Plate 15 is shown a complete potter's outfit from a remarkable grave a few hundred yards back of the trading-post at Kayenta. This burial was discovered by two ladies, Luella Archer and Helen Anderson, of Phoenix, Arizona. The Museum is indebted to them for the gift of the material found in it.

The grave in which this outfit was found had been excavated in solid rock to a depth of 8 inches. It was roughly rectangular in shape and measured 4 feet by 3 feet 6 inches. The remains, those of a woman well advanced in years, were in only a fair state of pres-



Rim sherds of Early Pueblo II pots

ervation. The skull shows marked occipital deformation. The body lay on its left side, knees drawn up, hands before the face with the head facing south.

The outfit contained sixty-one articles as follows: 29 moulding trays made from sherds reshaped and ground down; 14 moulding spoons of various shapes made from sherds; 7 polishing stones; a small red ware bowl with handle; a small corrugated pot; a decorated black-on-white pitcher; a red ware dipper; broken sherds; and lumps of paint.

Pipe. The pipe shown in Plate 31, i, was from the general digging in the small cave above Poncho House. It is 2 inches long and is made of hard baked clay. As the cross section shows, the bowl is shallow. The pipe is not the usual Pueblo II type and is quite different from the Basket-maker pipes. We are unable to identify it as the product of any particular period, but are inclined to think it is Pueblo II, there being evidence of Pueblo II occupation in the cave.

CONCLUSIONS

OUR knowledge of Southern archaeology is advancing so rapidly under the present method of investigation, with definite aims in view, that it does not seem wise to attempt to draw hard and fast conclusions from the data gathered in the limited area covered by the explorations recorded above. The remains considered in the foregoing report fall into the following chronological order: Basket-maker II (Basket-maker), Basket-maker III (Post-Basket-maker), Pueblo I (Proto-Pueblo), Pueblo II and III (Pueblo). The Basket-maker II people are dolichocephalic in contrast to the brachycephalic, artificially deformed heads of the Pueblo I period. Furthermore the Basket-maker II and Basket-maker III people appear to have been much more heavily boned than were those of the later cultures, closely resembling, physically, the Paiutes, whose ancestors they may well have been. Were it not for the definite break in physical type between the Basket-maker III and the Pueblo I periods, we would have an ideal sequence of occupation from the earliest inhabitants to the present-day Pueblo Indians. The author does not believe that the Basket-makers completely lost their identity as a distinct culture through contact with the late arrivals in this region. These later peoples took over

too many of the distinctive features of the earlier cultures for this to have been the case.

The Basket-maker II culture has been generally accepted as the earliest of which we have any knowledge, in the Southwest. Confirmation of this is seen in the very wide geographical distribution of these remains, which through recent explorations have been found to extend definitely from the Humbolt Lake region of Nevada to the vicinity of El Paso, Texas. It is important to note that the latter finds have many features common to the Coahuila Cave material of Mexico which now seems almost certainly of Basket-maker II origin. Thus we have a range in one direction of, roughly, fifteen hundred miles. To the west, skeletal remains from Santa Barbara Island, California, are, according to Dr. Hooton, of the Basket-maker II type, while a certain kind of stone pipe from California is identical in shape with those recovered by Nusbaum from Basket-maker II burials of southern Utah, as is also a twined-woven bag from an interment at Buena Vista Lake.¹ The extent of the culture eastward has not been determined.

We should expect that in the Basket-maker III period the range will be found to be less, as with each succeeding phase of occupancy in this region there has been a tendency to concentrate, which resulted finally in the compact communities of our modern Pueblo Indians.

This concentration was due to various causes, principally to the influence of agriculture and, in the later periods, to the necessity of mutual protection from the aggressiveness of the surrounding wild tribes. The latter influence, however, was not responsible for the changes in the mode of living which took place in the Basket-maker III era, when, owing to easier conditions of life made possible by an assured food supply, permanent habitations were built near their cultivated fields and in the shelter of the caves. As the caves were now occupied by the living, burials were as a rule made in the open. This period marks the first appearance of pottery. Changes are manifest in the shape of the sandals which are of most intricate weave with complicated woven patterns and designs, and in the carrying straps which are now elaborately decorated. The handsome twined-woven bags of the first period are replaced by more durable bags of coarser weave. Presumably the atlatl was

¹ Bureau of American Ethnology, Bulletin 78, Plate 63.

still used though as yet we have nothing to confirm this. The whole culture apparently still retains its identity, with no manifest tendency to develop into that of the succeeding Pueblo periods.

Our great need now is more knowledge of the Pueblo I period, the ruins of which are small and widely scattered, and occur in a region where there are many large and well preserved ruins that have hitherto engaged the interest of investigators. At last, however, the importance of these inconspicuous sites is being recognized and their intensive study should settle definitely the relation of the Basket-maker to the Pueblo people.

The following table of differences is an amplification of the one given in Bulletin 65. These differences are discussed in greater detail by Kidder in his Introduction to Southwestern Archaeology.

TABLE OF DIFFERENCES, MARSH PASS REGION

Basket-Maker II	Basket-Maker III	Pueblo I	Pueblo II	Pueblo III and IV
CRANIA				
Undeformed, long, sca-phoid.	Undeformed, long, sca-phoid.	Deformed back, round.	Same as preceding.	Strongly deformed, round.
SKELETON				
Heavy frame.	Heavy frame.	Light frame.	Light frame.	Light frame.
HOUSES				
Uncertain data. Slab cists lined with grass and bark built in caves seem to have been used for sleeping places. Temporary shelters in the open(?)	Houses with circular foundations of upright stone slabs, Pl. 23, 6, c, Figs. 8, 10, 14, conical or truncate roof of poles covered with grass mats, brush, and dirt. Built in caves and in the open. Foundations sometimes excavated.	Semi-subterranean rooms with roughly squared corners, slabs set in sides of excavation, occasionally sides showing traces of plaster. See Fig. 12. Roof probably conical, use ceremonial (Kivas). Square cornered rooms loosely grouped, built of adobe or stone, above ground, occur in caves and in the open.	No data, probably further development of architecture preceding period.	Vertical walls of well laid coursed masonry, walled walls. Rectangular and circular rooms. Highly specialized ceremonial rooms (Kivas). Communities of large size in caves and in the open.

FOOD

Small kernel yellow flint corn. Squash. No beans.	Corn. No data. Squash. No beans.	Corn, more than one variety. Squash. Beans.	No data.	Corn, large kernel, white flint. Blue and red flour, white and yellow Pueblo. Squash. Beans.
---	--	---	----------	---

CLOTHING

Fur-string blankets. Dressed skin robes.	Probably same as preceding.	Fur-string blankets. Feather-string blankets. Cotton blankets. Dressed skin robes (?)	No data. Probably same as preceding period.	Feather-string blankets. Fine cotton robes. Dressed skin (?)
---	-----------------------------	--	---	--

SANDALS

Square toe, twined-woven of fine cord, with toe-fringe. See Pl. 29. Coarse weave crushed yucca leaf. Coarse weave fibre. Twilled yucca leaf. Dressed skin moccasin (one example).	Scalloped toe, gathered heel, woven of fine string, intricate woven patterns on under side, design in color on upper side. See Pl. 9. Coarse weave crushed yucca leaf. Coarse weave fibre.	Round toe, woven of fine string. See Pl. 57, f. Coarse pattern on under side. Coarse weave fibre. Coarse weave yucca leaf.	No data.	Notched toe, woven of fine string and yucca leaf. Fig. 24, f. Notched toe, yucca leaf. Square toe, twilled, yucca leaf. Coarse weave crushed yucca leaf. Coarse weave worn feather-string.
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TABLE OF DIFFERENCES, MARSH PASS REGION (CONTINUED)

Basket-Maker II	Basket-Maker III	Pueblo I	Pueblo II	Pueblo III and IV
TEXTILE				
Twined-woven bags, designs in color, fine weave, of apocynum-fibre string. See Pl. 30, c and Pl. 46, e. Plain weave of apocynum-fibre. Coiled netted weave, human hair-string.	Twined-woven bags, no design, coarse weave. See Pl. 46, d. Coiled netted weave, coarse fibre string. See Pl. 46, e.	Plain loom weave, cotton cloth.	No data.	Plain loom weave, cotton cloth. See Pl. 63. Loom weave elaborately decorated. Coiled netted weave.
BASKETRY				
Coiled rod-and-bundle, loose weave, decorated. See Pl. 13, left. Abundant.	Coiled rod-and-bundle.	Coiled rod-and-bundle. Elaborate designs. See Pl. 13, right. Twilled ring baskets. See Pl. 16, upper left.	No data.	Coiled rod-and-bundle, rare but fine tight weave, no designs. Twilled ring baskets abundant.
MATTING				
No matting.	Loose twined mats of grass stalks for roof covering. See Pl. 58, c.	Twined rush mats. Twined reed mats. See Pl. 58, a, b.	No data.	Twilled rush mats. Twined reed mats. Twined rod mats.

CRADLES

Rigid frame, twig back, guitar shaped. Flexible grass bundle edge, yucca leaf back, guitar shaped. Juniper-bark containers.	No data.	No data.	Rigid frame, twilled yucca leaf back, bark hood. See Pl. 64.
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ORNAMENTS

Large stone beads. Olivella shell. Small saucer shaped shell beads. Disc-shaped shell beads. Seed beads. Shell pendants. Stone pendants. No turquoise. Feathered comb-like hair ornaments. See Pl. 49, d. Feather headresses.	Feather comb-like hair ornaments. See Pl. 49, b, c. Olivella shell beads. See Pl. 24, a.	No data.	No data.
			Shell ear pendants. See Pl. 24, b. Turquoise pendants. Lignite pendants. See Pl. 24, c. Olivella shell beads. Minute stone beads. Turquoise beads. Pl. 24, e.

WEAPONS

Atlal. See Pl. 50. Grooved clubs.	No data.	Bow.	No data.
			Bow. Throwing club.

TABLE OF DIFFERENCES, MARSH PASS REGION (CONTINUED)

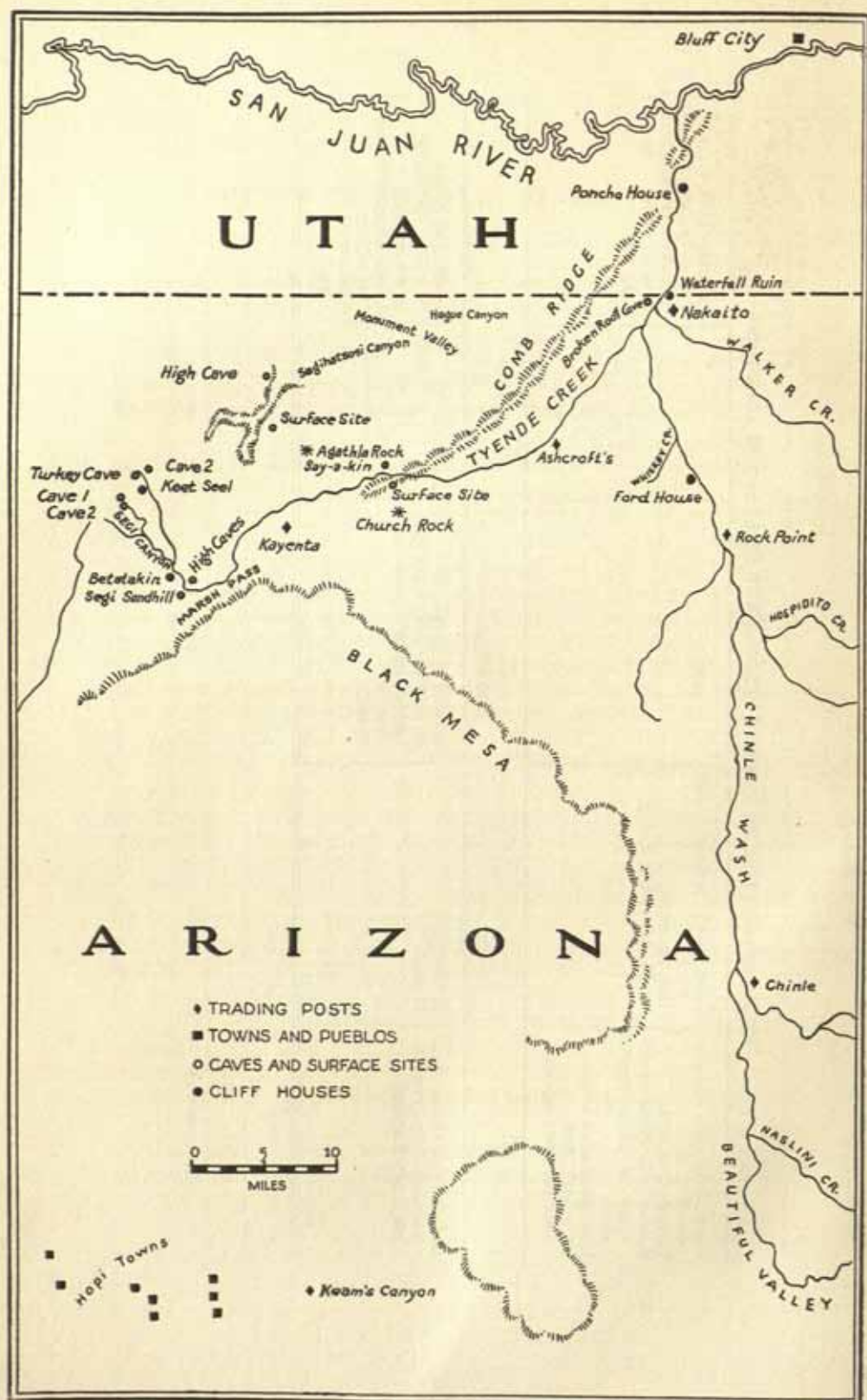
Basket-Maker II	Basket-Maker III	Pueblo I	Pueblo II	Pueblo III and IV
POTTERY				
No true pottery. Bark and grass tempered, unfired dishes.	Plain gray. Black-on-white decorated. Red. Granular structure. Coarse sand or crushed stone tempering. Well fired. Flinty hardness for black- on-white. Decoration applied usually to interior of bowls, rib- bon-like bands enriched with dots being charac- teristic. See Pl. 18.	Plain gray flat neck bands. Pl. 14, b, d, f, Pl. 59. Black-on-white decorated. Lustrous black-on-red deco- rated. Pl. 15, a, b, c, d and Pl. 61. Well fired. Fine tempering. Basic element of design being solid triangular units with ticks or den- tals along one edge. Pl. 14 and Pl. 60.	Data uncertain. The author be- lieves the fol- lowing will hold. Plain gray, plain and corrugated neck coils. Pls. 66, 42, 43. Black-on-white decorated. Black-on-red deco- rated, difficult to distinguish from black-on- red of preced- ing period. Decorated ware characterized by broad treat- ment of design.	Gray ware, all over corru- gation. Black-on-white deco- rated. Black-on-red decorated. Polychrome decorated. Decorated ware charac- terized by elabora- tion of design and fine- ness of detail.
PIPES				
Short, squat shaped.	No data.	Similar in shape to Basket- maker II. See Pl. 31, i.	No data.	Long, slim.

ITEMS DISTINCTIVE TO VARIOUS PERIODS NOT INCLUDED IN FOREGOING

Funnel-like clay objects. See Fig. 25. Tree shell trowels. Button-hole stitch on selvage of plain weave cloth. Lozenge shaped beads. Umbilical pads. (See previous report).	Cross stick spindle. See Pl. 31, f. Clay figurines. See Pl. 51, a, b, c, d, e, g.		Colander pots. Turquoise stone and shell mosaic. (Frontispiece.) Beveled <i>mano</i> . See Pl. 27, a.
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BURIALS

In stone slab cists and excavated cists in caves. Flexed and bundled.	In the open. Flexed.	In talus of caves. In rubbish heap and possibly under floors of rooms. Flexed.	No data.	In talus of caves. In walled up tombs. In cemeteries. Under floors of rooms. Cremations. Extended. Flexed.
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Sketch-map showing region explored

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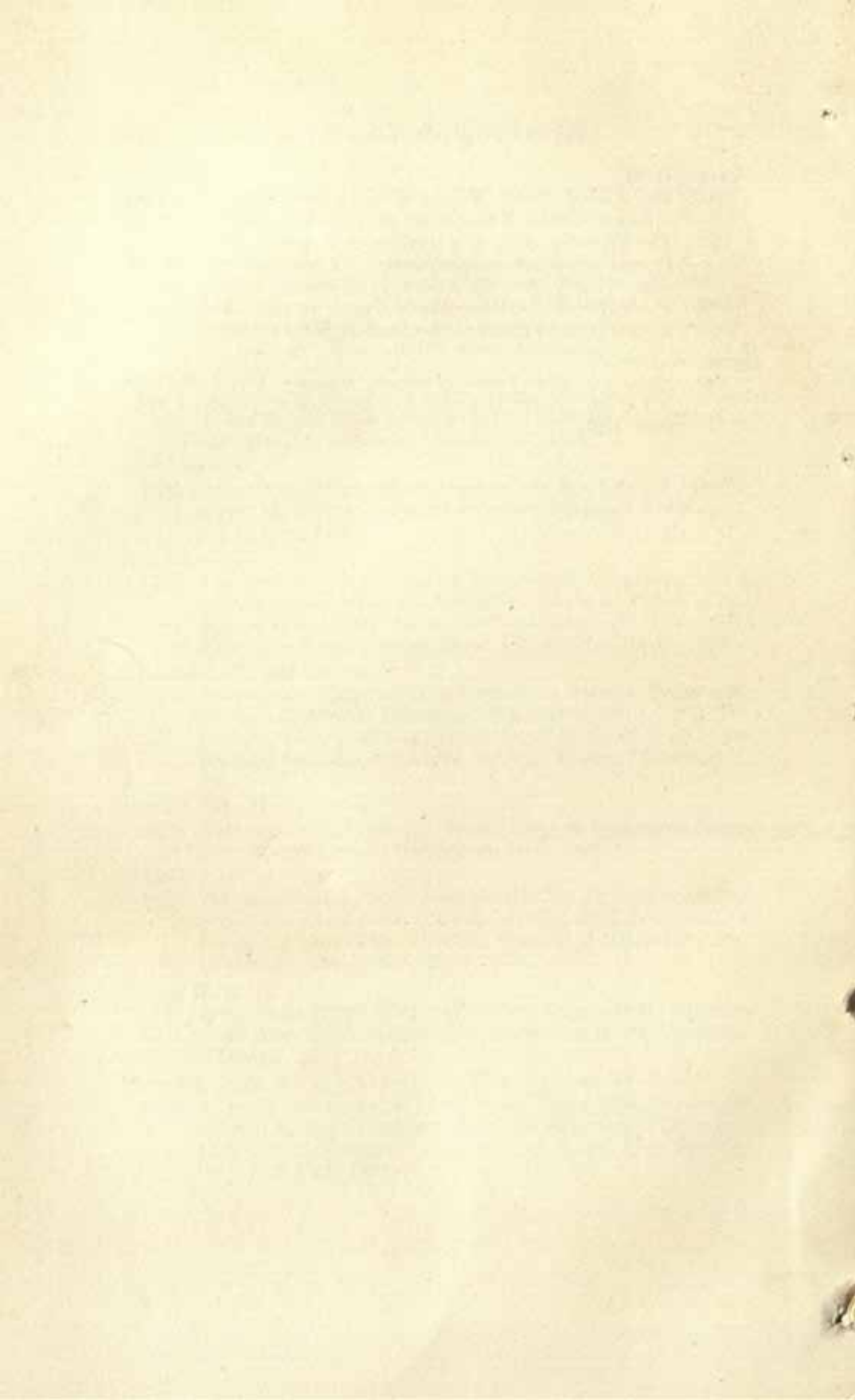
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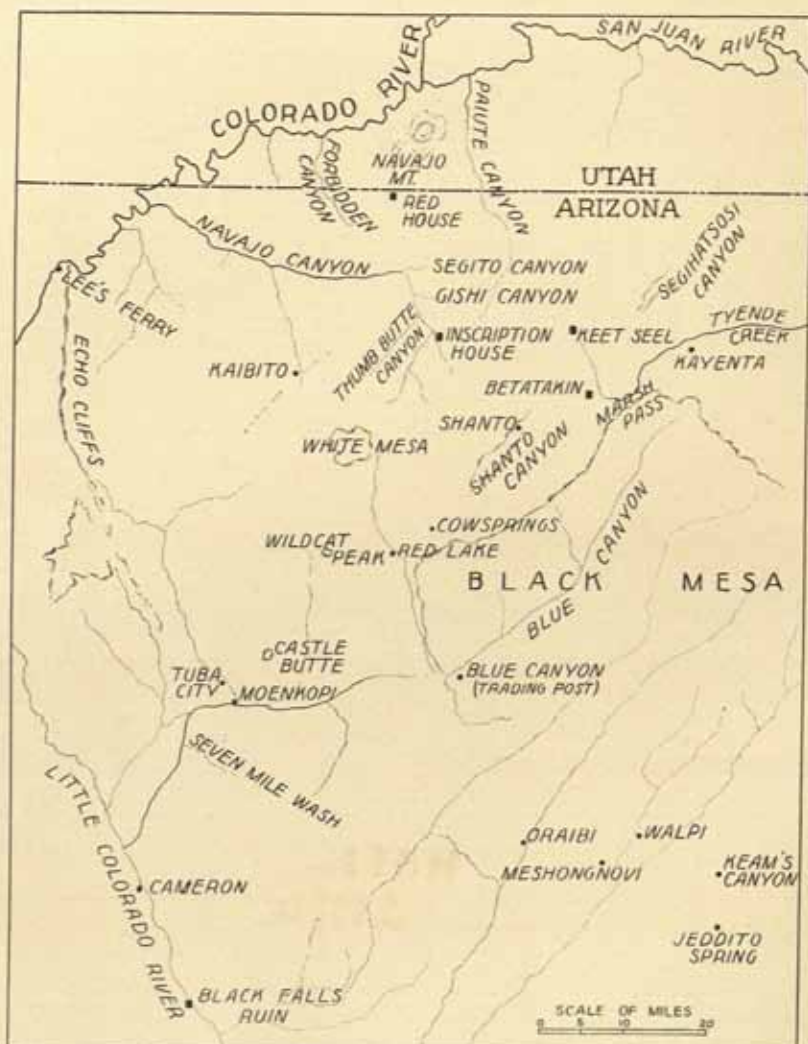
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MAP OF TERRITORY UNDER INVESTIGATION

PAPERS

OF THE

PEABODY MUSEUM OF AMERICAN ARCHAEOLOGY
AND ETHNOLOGY, HARVARD UNIVERSITY

VOL. XII.—No. 2

NOTES ON THE ARCHAEOLOGY OF
THE KAIBITO AND RAINBOW
PLATEAUS IN ARIZONA

REPORT ON THE EXPLORATIONS, 1927

BY

NOEL MORSS

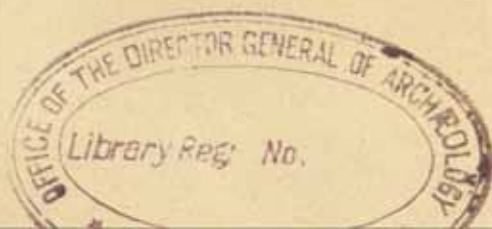
SEVEN PLATES

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CAMBRIDGE, MASSACHUSETTS, U.S.A.

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1931



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INTRODUCTION

PEABODY MUSEUM explorations in Northern Arizona, during the summer of 1927, were carried on by a party consisting of Henry B. Hosmer of Boston, Lyon Boston of New York, and the writer; about six weeks being spent in the field. The territory touched upon included the vicinity of Tuba City, the Kaibito district north of Red Lake, parts of Navajo Canyon and its tributaries, and the uplands above the north rim of Navajo Canyon to Navajo Mountain (Plate 1). For Navajo Canyon we procured a pack outfit and the services of a very capable guide, Henry Smith, from Mr. S. I. Richardson, proprietor of Inscription House Lodge near the rim of the canyon above Inscription House.

The archaeology of this region west of the Kayenta area proper has been briefly considered in several reports,¹ while much unpublished work has been done by the University of Arizona on the ruins about Inscription House and south of Navajo Mountain. Our object was to get an idea of the culture sequence of the district as compared with that in the Kayenta country, but no extensive excavation nor comprehensive survey of sites was undertaken. In this brief paper no site by site account of the operations as a whole will therefore be given, although notes on individual ruins of special interest are included. Where it is necessary to refer to individual sites they are designated by the numbers given them in my field notes. As shown by such numbers, the number of sites studied was thirty-seven. This does not include a number of ruins of the Kayenta period near Inscription House and Navajo Mountain which were only informally examined by us, as they were the subject of pending papers by the University of Arizona.

Dr. Harold S. Colton and Mr. Lyndon L. Hargrave of the

¹ Fewkes, 1911, *Preliminary Report on a Visit to the Navajo National Monument, Arizona*, shows ruins in the Inscription House district. Reagan, 1927, *Some Notes on the Archaeology of the Navajo Country*, refers to sites near Tuba City. Bernheimer, 1924, *Rainbow Bridge*, gives a good idea of the topography of the Navajo Canyon country. The most valuable work for our purposes is West, 1927, *Exploration in Navajo Canyon, Arizona*, where an accurate description is given of Inscription House and of several ruins in Segito Canyon which were revisited by us. Since our trip, Dr. J. Alden Mason of the University of Pennsylvania has worked in the same territory, as well as east of Navajo Mountain.

Northern Arizona Society of Science and Art have very kindly read the manuscript and have made valuable suggestions. The Hopi sherds were submitted to Mr. Hargrave for authoritative diagnosis. Mr. Donald Scott of the Peabody Museum has been most helpful as editor in matters of substance as well as form.

CAMBRIDGE, MASSACHUSETTS
1931

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NOTES ON THE ARCHAEOLOGY OF THE KAIBITO AND RAINBOW PLATEAUS IN ARIZONA

REPORT ON THE EXPLORATIONS, 1927

GEOGRAPHY

THE land rises from the crossing of the Little Colorado at Cameron, where desert conditions prevail, to the pinyon and cedar-covered uplands south of Navajo Mountain. The bluffs of Moenkopi Wash and Blue Canyon contain few caves suitable for habitation, while those in White Mesa are enticing from a distance but ordinarily lack good floors. Shanto Canyon, northeast of Red Lake, is said to contain a few small cliff-houses. Sherd sites in abundance and a few house sites occur throughout the region, while larger pueblos of the Kayenta period are found south of Navajo Mountain.

Navajo Canyon, cut a thousand feet into the sandstone, contains numerous excellent caves in the canyon itself and in its numerous bays, inlets, and tributaries. The most important group of ruins is centered on Inscription House; others visited by us were in Segito¹ and Gishi Canyons,¹ coming in from the north, and Thumb Butte Canyon,¹ coming in from the south, all within a day's ride from Inscription House, and in Forbidden Canyon, an independent canyon north of Navajo Canyon. The bottoms of these canyons, though much eroded in recent years, offered considerable arable land to the prehistoric farmers, and the favored areas were heavily occupied in late black-on-white times.

¹ These were the names given by our particular informants and can lay no claim to general recognition. "Thumb Butte Canyon" is perhaps identical with "Numiciteo Canyon" and "Gishi Canyon" with "Toen Le Shu She" shown on Fewkes' map (Fewkes, 1911, *Preliminary Report on a Visit to the Navajo National Monument, Arizona*, Plate 22). To "Segito," Dr. Mason's Indian guide gave the name "Tsebanahata Canyon."

CULTURES

BASKET-MAKER II AND III

(BASKET-MAKER AND POST-BASKET-MAKER)

WITH the probable exception of some large painted figures in a cave in Gishi Canyon which contained a later building, no evidences of Basket-maker II occupation were encountered. One Basket-maker III site (Site 8) was noted in a cave opposite Inscription House. This cave, which had not been recently disturbed, contained nine slab-walled cists topped with incurving courses of horizontal masonry in the typical Basket-maker III manner. No artifacts were present except fragments of an apocynum breech-clout of Basket-maker III type and sherds of two large Kayenta black-on-white ollas at the rear of the cave.

In view of the heavy occupation of the caves in later times and of the cursory character of our explorations, the failure to find early remains does not prove that Navajo Canyon was not a Basket-maker territory, though the absence of Basket-maker III sherds tends to show that the pottery making phase of the culture can not have been strongly represented there.

WESTERN PUEBLO I (PRE-PUEBLO)

It was pointed out at the Second Pecos Conference by Dr. Frank H. H. Roberts, Jr., that an eastern and a western variety of Pueblo I must be recognized, the western being identical with the original Pre-Pueblo as found by Kidder and Guernsey in the Kayenta country.¹

This culture peters out rather suddenly west of Kayenta. Only two very small open sites with pure Pueblo I sherds, unaccompanied by architectural remains were found by us, one in Gishi Canyon and one near White Mesa; while the slab-walled open ruins common farther east were conspicuous by their absence. Dr. Harold S. Colton states that the culture is equally rare in the country around Flagstaff.

¹ The pottery is illustrated in Kidder, 1924, *An Introduction to Southwestern Archaeology*, Plates 34, 35.

BLACK MESA PUEBLO II

An early black-on-white horizon encountered by us is closely related to a group of Pueblo II cultures recently recognized by Dr. Colton in the Flagstaff and adjacent areas. At his suggestion we adopt the tentative name Black Mesa Pueblo II to distinguish our northeastern sites.

Sites. Seven pure open sites belonging to this group were found, four in Navajo Canyon and its tributaries and three in the White Mesa district. At two open sites in Navajo Canyon, Kayenta camps had been made on the same spot as Pueblo II camps so that sherds of the two periods were mingled. A large cliff-house in Gishi Canyon (Site 33) yielded only Pueblo II sherds but, for reasons to be discussed, it is not believed that much of the ruin dates from this period.

No pure Pueblo II sites were found in the Tuba City district, but as they have been found much farther west this fact is probably without significance. At three open sites in this vicinity, Pueblo II black-on-white sherds were found at sites where the black-on-white was predominantly of the next (Proto-Kayenta) period. As at these same three sites, Proto-Kayenta polychrome was represented by only one or two sherds in each case, and the Proto-Kayenta black-on-white is perhaps less stereotyped than at other Proto-Kayenta sites in the vicinity, it would appear probable that these sites are early Proto-Kayenta.

At two of the pure Pueblo II sites the foundations of one or two small rectangular masonry rooms were present. At Site 1 on Seven Mile Wash, west of Tuba City, one of the mixed sites just referred to, there were perhaps thirty rooms, scattered in blocks of four to eight over half an acre. The rooms were built directly on a limestone ledge and had been tumbled about so, in the absence of protecting débris, that it was impossible to trace the outlines with great definiteness. The masonry at all three sites was of mediocre quality. Except for the cliff-house, Site 33, described later, no other architecture believed to be of this period was observed.

North of Flagstaff, Colton and Hargrave have found Pueblo II pottery associated with the vestibuled small houses earlier de-

scribed by Colton¹ and with a form of pithouse, related to the vestibuled house, which was also found in association with late Basket-maker III sherds, and, in one instance, with Pueblo I sherds.²

Pottery. Black Mesa Pueblo II pottery is immediately distinguished from Pueblo I by the presence of "all over" corrugated ware and from Proto-Kayenta and Kayenta by the absence of polychrome ware and of the barbed line design in the black-on-white.

Black-on-white design consists for the most part of rather simple, bold patterns made up of broad lines and filled in triangles (Plate 2). A reminiscence of Pueblo I is seen in the frequent use of ticked edges and narrow triangular elements. Running designs of rather coarse, oblique hatching in framing designs of equal width are common, but are seldom or never employed on the same vessel with broad line and solid elements. Indeed, the use of opposed elements of solid and hatched or solid and banded elements, so common in the pottery farther south, is not found in this region at any period.

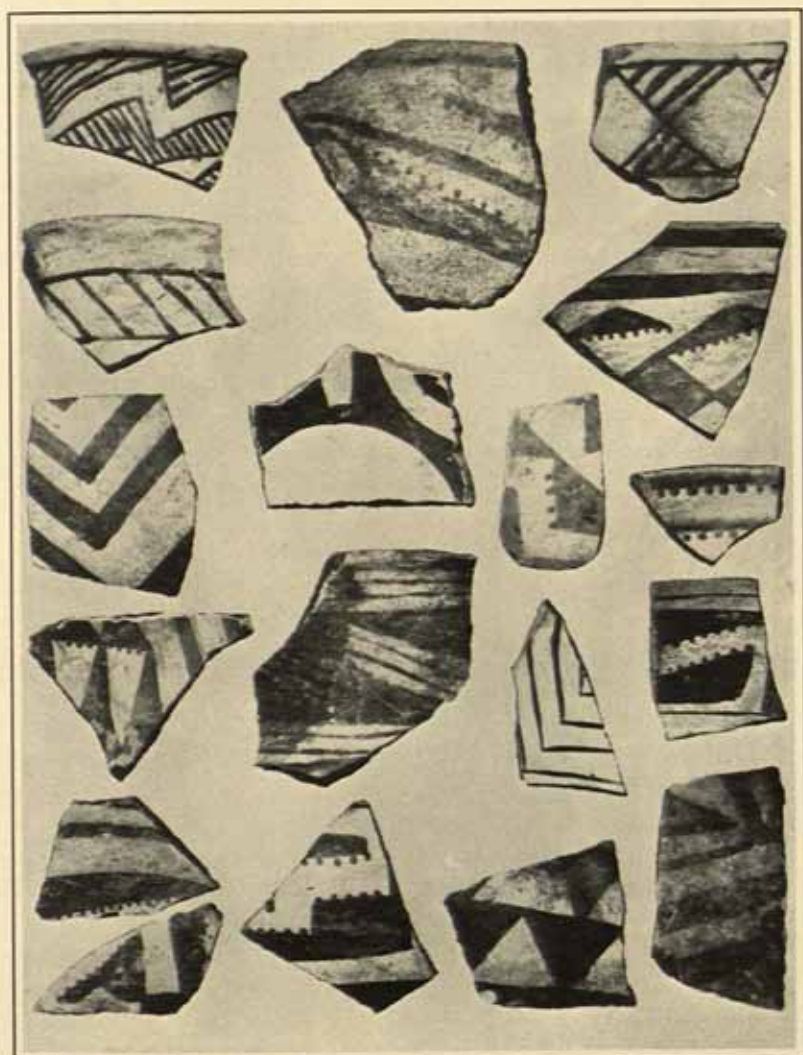
Red ware bowls are decorated mostly with straight lines. The relative simplicity of black-on-red design makes this ware of less value than black-on-white in distinguishing between the various periods, at least when found only in small sherds.

Relationships. The close connection between Pueblo I and Pueblo II suggested by the designs of Pueblo II black-on-white is borne out by the fact that sherds of Pueblo I type are found at nearly all Pueblo II sites (for example, Plate 2, second sherd from the bottom on the right margin), but are very rare in other sites. At Site 33 the characteristic Pueblo I small double cylindrical handles occur. No diagnostic Pueblo II sherds occur in the representative collection from the Kayenta district figured by Kidder and Guernsey,³ and although such sherds occur in their collections, the type does not seem to be common there, nor was it found by the present writer on the Chinle. On the other hand, pure Pueblo I sites are very rare in the area from Red

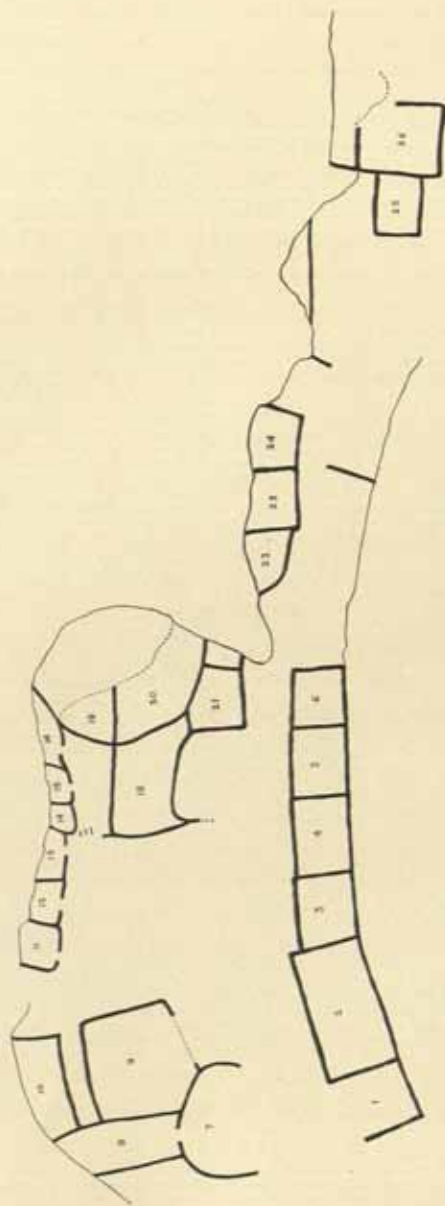
¹ Colton, 1920, *Did the So-called Cliff-dwellers of Central Arizona also Build "Hogans"?*

² Hargrave, 1930, *Prehistoric Earth Lodges of the San Francisco Mountains.*

³ Kidder-Guernsey, 1919, *Archaeological Explorations in Northeastern Arizona*, Plate 55.



BLACK MESA PUEBLO II BLACK-ON-WHITE SHERDS



PLAN OF SITE 33, GIAM CANYON

Lake to Flagstaff in which Pueblo II is found. It would therefore seem that the two cultures were to a large extent geographically complementary, and probably overlapped in point of time. Either Pueblo I reached the western country late, or Pueblo II reached it early, so that the former phase was short-lived; a conclusion which finds some support in the unchanged persistence of the Basket-maker III pithouse into Pueblo II times in the Flagstaff region. This is hardly surprising in view of the fact that in Nevada and in Utah the Pueblo II stage is found following close upon Basket-maker III without any apparent Pueblo I horizon,¹ while on the Chinle, Pueblo I pottery is found in association with well developed horizontal masonry.² None of these observations invalidate the original conclusion, on which the name "Pre-Pueblo" was based, that the specific Pueblo I culture known by that name arose before the development of all over corrugated ware and precedes cultures characterized by corrugated ware when found in the same locality.

PROTO-KAYENTA (PUEBLO III)

As some confusion seems to have arisen in regard to the use of the term "Tusayan" as applied to the culture called "Proto-Kayenta" by Kidder, which was proposed at the second Pecos Conference, Kidder's original term is retained in this paper.

Sites. A large open site with pure Proto-Kayenta sherds in great abundance is situated at Castle Butte, three miles north of Tuba City. While no walls now remain above ground, the abundance of spalls suggests that buildings formerly existed but were razed to provide stone for modern Tuba and Moenkopi. Five other Proto-Kayenta open sites were observed in the Tuba-Red Lake area, including two which also contained Pueblo II pottery, as already stated.

In the south face of White Mesa is a cave containing two large rooms and a number of storage chambers, with Proto-Kayenta pottery (Site 26). This site was not personally visited by the writer.

Although Gishi Canyon debouches on Navajo Canyon three or four miles below Inscription House (the mouth of Gishi being

¹ Harrington, 1927, *A Primitive Pueblo City in Nevada*.

² Morris, 1927, *Archaeological Explorations on the Middle Chinle*, p. 12.

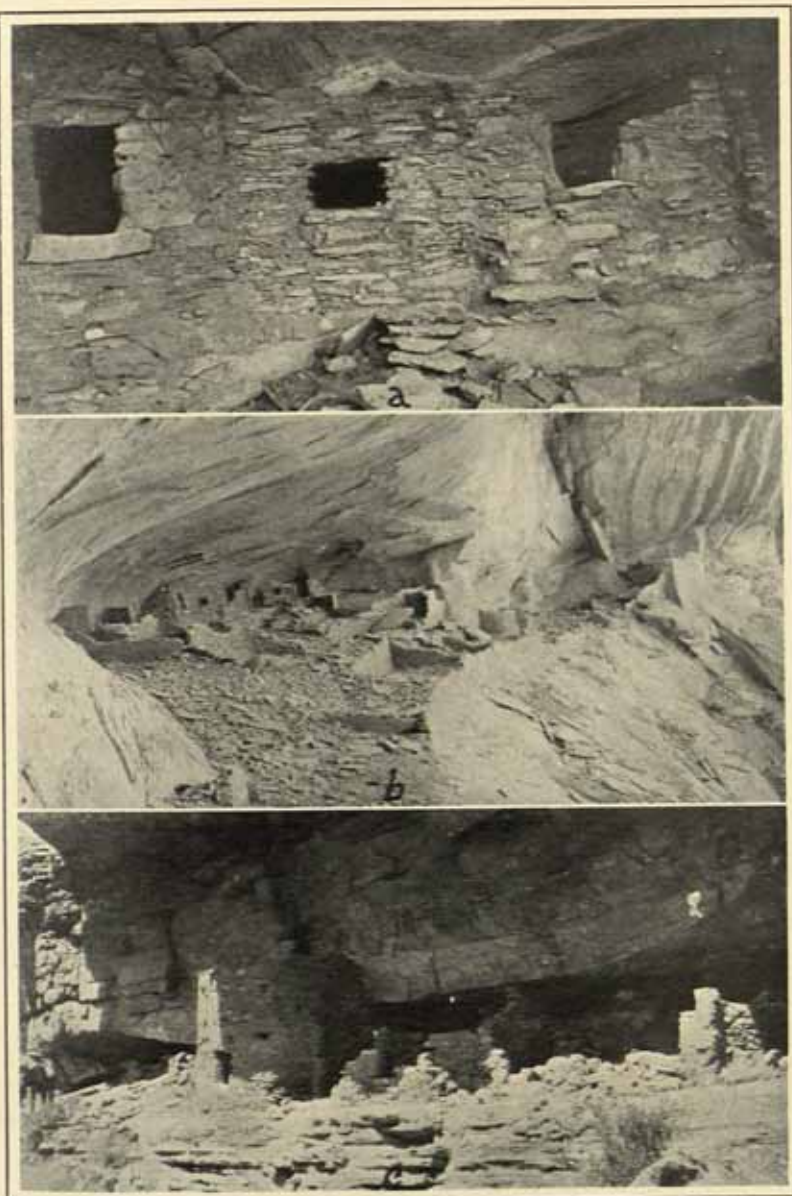
closed to mounted travel by the sideswiping of the deep arroyo), no Kayenta pottery was found in Gishi Canyon. It contained, however, in addition to earlier sites already described, four Proto-Kayenta cliff-houses and several camp sites of the same period. These cliff-houses were small ruins situated, with one exception, in easily accessible caves. None are in a good state of preservation. Site 31, containing about fifteen rooms, had a broken-down kiva of the simple circular type. Site 36, containing ten rooms, was remarkable for a two-storied circular structure suggesting the towers of the Mesa Verde (Plate 4, c). The lower story contained a slab deflector and had perhaps served as a kiva. Site 34 contained four rooms only, and Site 35, of which the main portion is now inaccessible, about fifteen rooms.

Site 19, in Forbidden Canyon, consisted of remnants of half a dozen or more rooms at the ground level and structures in a high cave. At either end of the cave were two small masonry rooms built against the back wall, two of them having perfectly preserved pole and adobe roofs while the other two utilized the cave roof. In the middle of the cave were the foundations of four rectangular living rooms of wattle-and-daub similar to those at the Kayenta Site 17 described later. The simple circular kiva, 13 feet in diameter, is free standing at the front and hence had no external ventilator shaft. The interior height was 6 feet, only the lower half of the wall being plastered. There was a slab deflector and a square firebox, and the slab door for the ventilator opening was found in place.¹

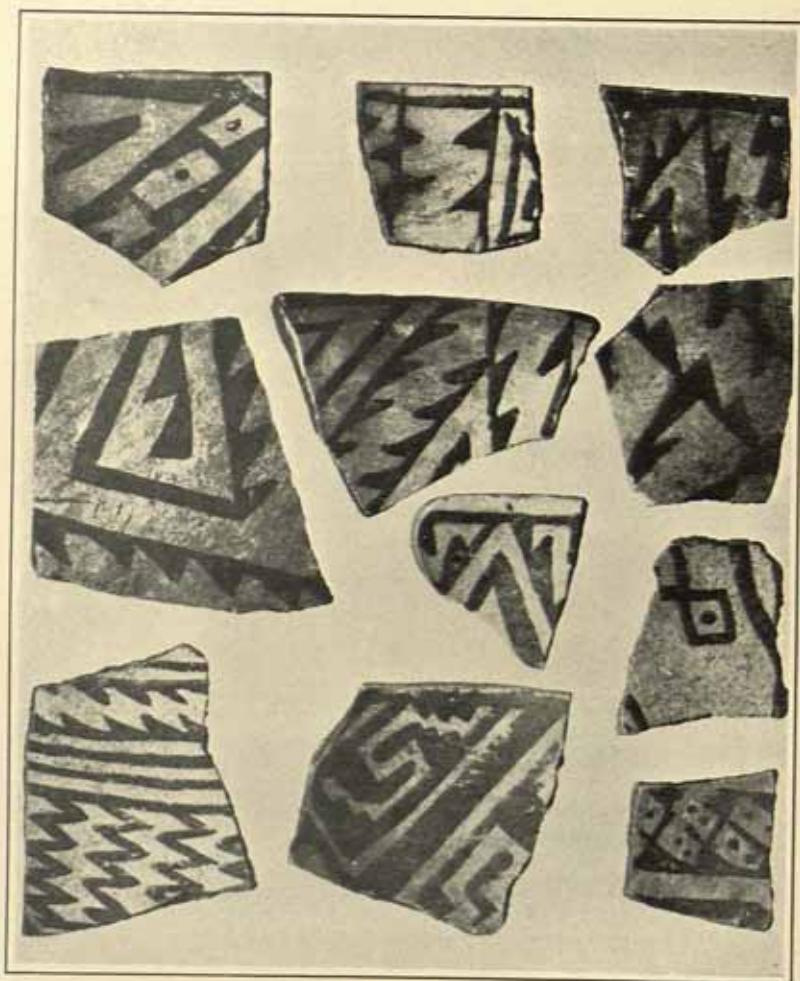
Doubtful sites. The two sites to be discussed here can not be classified with certainty, but probably belong to the Proto-Kayenta period.

Site 13 in Segito Canyon is the same as West's "Ruin 2." A detailed description with a plan and photographs will be found in his paper. The ruin is a cliff-house of some thirty-three rooms in a rather poor state of preservation. West is correct in describing the cliffs below the ruins as precipitous, but he inexplicably missed the natural ramp which forms a commodious stairway leading from the ground level to the east end of the cave.

¹ See Judd, 1926, *Archaeological Observations North of the Rio Colorado*, p. 102, and Guernsey-Kidder, 1921, *Basket-Maker Caves of Northeastern Arizona*, p. 24, for descriptions of similar covers, which were doubtless standard equipment.



a, Site 33, Gishi Canyon, old storeroom with low window flanked with rooms of later construction; b, Site 33, Gishi Canyon; c, Site 36, Gishi Canyon.



PROTO-KAYENTA BLACK-ON-WHITE SHERDS

West did not excavate. We attempted to do so but soon found that the rubbish consisted almost exclusively of fallen wall material and scale from the roof of the cave. A very small sherd collection was obtained, of which the larger part came from the vicinity of a slab-walled fireplace in room 30. (See West's plan.¹) This was a small room, evidently of a secular nature. A peculiar feature of the ruin was the absence of any indications of a kiva, either in the shape of any room or in the presence of centrally located firepits, or of deflectors, sipapus, or other ceremonial structures. At the same time, the front rooms in the main part of the ruin were of sizes much in excess of the normal living quarters in a cliff-dwelling, the largest measuring 19 by 10 feet and several exceeding 100 square feet in area. Nine-tenths of the secular rooms in the cliff-dwellings of this region would fall short of 70 square feet. The front walls of these large rooms are all so broken-down that the arrangement of windows or ventilators can not be ascertained. In the case of the better preserved smaller rooms it is noteworthy that none of the windows point to the front.

The absence of débris indicates that the ruin could have been occupied for a brief period only, and it is perfectly possible that the few sherds found by us, which, so far as they were identifiable, were of Proto-Kayenta types, including polychrome, were either earlier or later than the main body of the buildings. Below the cave, and far enough out to prevent direct sherd contamination therefrom, were two hillocks strewn with Pueblo II sherds (Site 14). On one were the masonry foundations of two small rooms extending a foot below the ground level.

Site 33 in Gishi Canyon is a cliff-house of twenty-six rooms, likewise situated in a high cave with an easy approach (Plate 3). The cave, although actually of fair size, is so placed as to appear insignificant at a little distance, and shows no signs of previous visits in modern times. The arrangement and general appearance of the rooms are shown in Plates 3 and 4, b. The balanced disposition of the rooms in the middle of the cave indicates that they were constructed at the same time after a general plan for utilizing the available space. At the back of the cave, rooms 12 and 15 were built first, and rooms 11, 13, 16, and probably 14,

¹ West, 1927, *Explorations in Navajo Canyon, Arizona*, p. 7.

were put in later, as is shown by the relations of the walls and by the slightly different masonry and peculiar low windows of the older rooms. These differences are brought out in Plate 4, a, which shows the older room 12 with rooms 11 and 13 built around it. Immediately in front of 15 are footholds cut in the ledge running down under the back wall of 18, which could only have been of use at a period when room 18 was not in existence and the mass of material in the central part of the cave held back by the walls of the front rooms, which now renders the center of the cave fairly level, had not yet been deposited.

Here, as at Site 13, there was relatively little habitation rubbish in the fill. Two floor levels were found in room 6 and again in room 12, separated in each case by about a foot of rubbish in which was found most of our small sherd collection. There was plenty of corrugated ware and the black-on-white was predominantly Black Mesa Pueblo II, although containing an unusually large proportion of sherds indistinguishable from Pueblo I. Close by the cave, again suggesting conditions at Site 13, was an open site with Pueblo II sherds (Site 33a).

Nothing suggestive of a kiva was found.

This cave was undoubtedly used in Pueblo II times, and it seems probable that the low-windowed rooms at the back were built at that period. With some hesitation, I incline to the belief that the main part of the ruin was built in the Proto-Kayenta period but occupied for so short a time, if at all, that no identifying sherds remain. The situation of the buildings, the apparent absence of kivas, and the slight evidences of occupation at this ruin as well as at Site 13 might be explained on the hypothesis that these villages were built largely as places of refuge, and that after a short time either they were captured or else, the danger having passed, the occupants moved to more convenient locations.

Pottery. Proto-Kayenta wares include corrugated, polychrome, black-on-red, and black-on-white. Inasmuch as Proto-Kayenta designs are found in the black-on-white sherds from nearly all Kayenta sites, no positive characteristic of Proto-Kayenta can be pointed to as marking it off from Kayenta, but it is sufficiently characterized when occurring in pure sites by the absence of Kayenta negative painting and "mosquito barring."

Proto-Kayenta black-on-white design in our district is shown in Plates 5 and 6. The dominant motif is the barbed line. This may take the form of straight lines with equilateral or raking triangles on one or both sides, or less commonly, the triangles may be set so close together that their bases overlap, forming a broader line, or an undulating line may be drawn along a base line to form rounded teeth. The barbed lines are arranged in parallel or helical formations, commonly with the teeth on one line in opposition to those of the next, which tend to fill all the available space in a rather desultory way. The design has limited possibilities but became an obsession with the Proto-Kayenta potters. Its greatest hypertrophy is to be seen in the pure sites near Tuba City. In the Kayenta period the barbed line was still used to some extent but was properly subordinated and combined with other elements.

A second common Proto-Kayenta design is the dotted space. The commonest form consists of "opposed sets of isosceles triangles with their points touching, thus leaving diamond shaped interstices, each one of which is occupied by a single dot,"¹ but it may occur in coarse cross hatching or in a line of outlined lozenges with their points touching, or occasionally more than one dot may be placed in a space. Other designs are the bird head fret, a distinctive herringbone design, a ladder with ticked rungs which is reminiscent of Pueblo II, and a heavy line with short cross bars. Hatching is rather uncommon, while cross hatching, which forms the basis of the characteristic work of the next period, is quite rare.

Relationships. The barbed line is apparently as common in the Kayenta district as here,² although rarer in the early polychrome sites on the Chinle where Mesa Verde influence is felt. Otherwise the pottery is very similar from the Chinle to Tuba City. A study of Spier's Zuni sequence shows the barbed line coming suddenly to the fore in his "10% red ware" period, which might be expected to correspond roughly to Proto-Kayenta in point of time. In the Zuni country that form in which the triangles are large and set so close together as not to show any base

¹ Kidder-Guernsey, 1919, *Archaeological Explorations in Northwestern Arizona*, 134.

² *Ibid.*, Plate 55; Kidder, 1924, *An Introduction to Southwestern Archaeology*, p. 73.

line between them seems to be exclusively favored.¹ This form was found dominant in a single site on the Middle Chinle, which was in marked contrast to other sites nearby.²

Proto-Kayenta sites with both barbed line black-on-white, indistinguishable from that found around Tuba City and Kayenta, and polychrome occur on the north side of the Colorado from the Grand Canyon at least as far north and east as the southern tributaries of the Fremont River.³ The easily recognizable Proto-Kayenta polychrome is of very wide casual occurrence, being found in western Arizona,⁴ in Nine Mile Canyon well up on the Green River in Utah,⁵ on the Mesa Verde,⁶ and in the Chaco. It does not, however, occur commonly west of the Little Colorado or east of the Chinle. While in the vicinity of Tuba City, the Proto-Kayenta phase seems to fit into a more or less continuous course of development from Pueblo I to the close of the black-on-white period, east of Red Lake the suppression of the Pueblo II term leaves an apparent break between Pueblo I and polychrome sites.

KAYENTA (PUEBLO III)

Sites. Ruins of the Kayenta period constitute the principal antiquities in Navajo Canyon and its tributaries (with the exception of Gishi Canyon), where Inscription House is *primus inter pares* in an extensive array of cave-houses, many of them of considerable size. Open pueblos are not absent from the canyons but are more abundant on the high land above the north rim, where several ruins occur that compare favorably with the larger cave ruins in magnitude. The pottery is identical. No detailed notes were made on most of these ruins, as they have already been the subject of observation, and, in many cases, of excavation, by archaeologists.

The architecture of the late period in the Navajo Canyon district is in the main similar to that of the great Kayenta diff-

¹ Spier, 1917, *An Outline for a Chronology of Zuni Ruins*, Fig. 11, u-z.

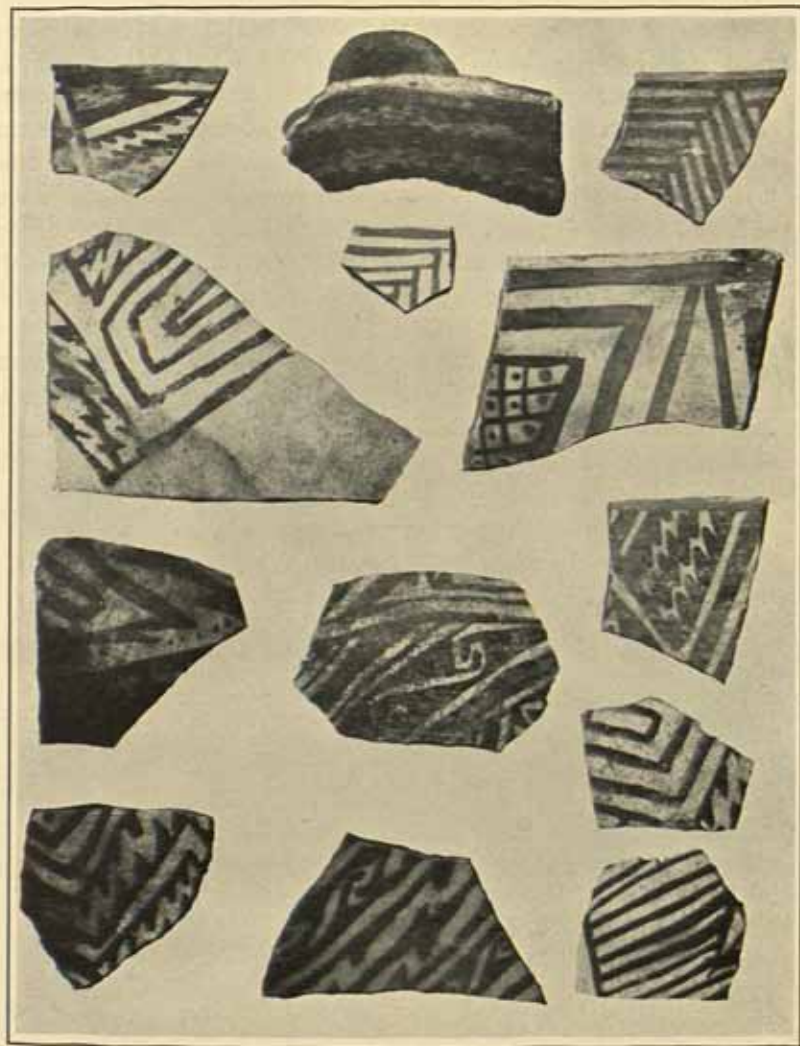
² Morris, 1927, *Archaeological Explorations on the Middle Chinle*, p. 14, Plate 10, d.

³ Judd, 1926, *Archaeological Observations North of the Rio Colorado*, p. 145; Morris, following paper.

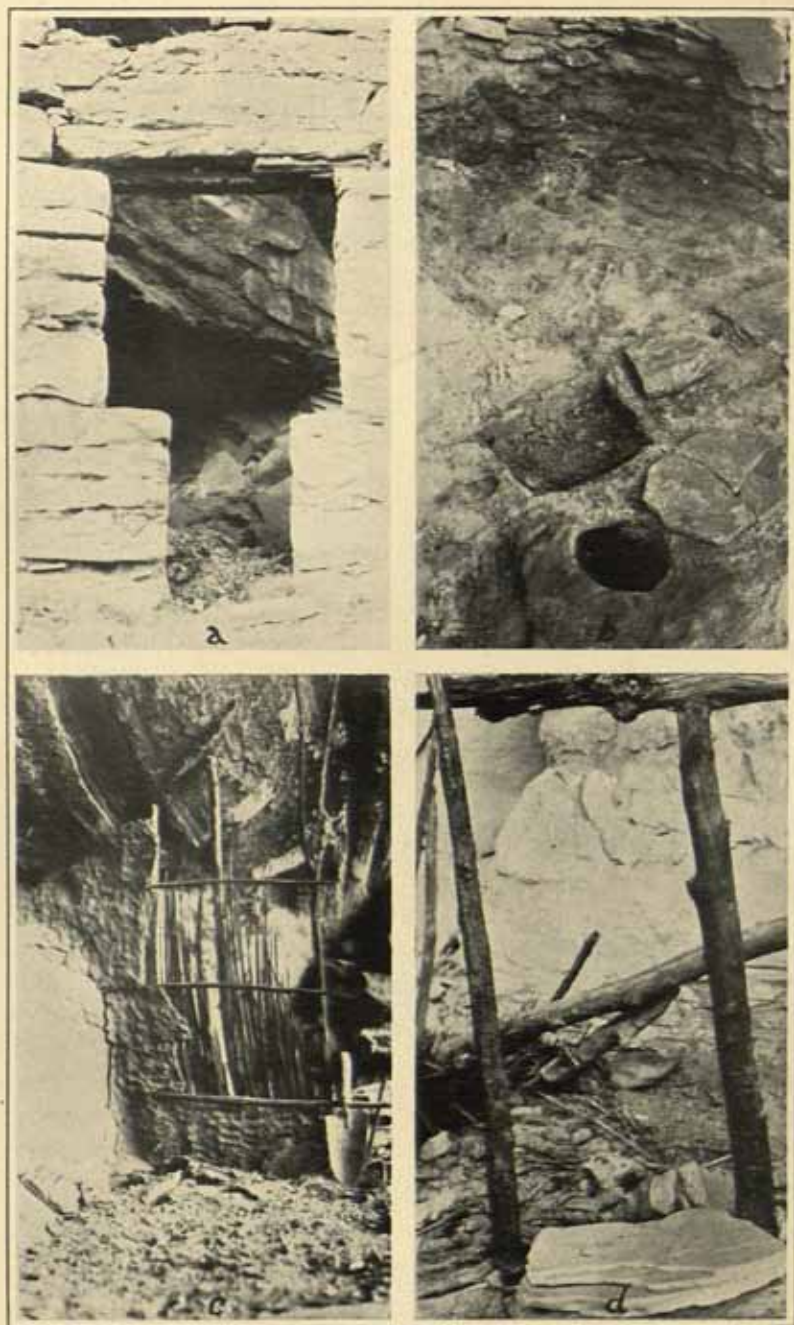
⁴ Harrington, 1926, *Primitive Pueblo Ruins in Northwest Arizona*.

⁵ Morris, in following paper.

⁶ Kidder, 1924, *An Introduction to Southwestern Archaeology*, p. 72.



PROTO-KAYENTA BLACK-ON-WHITE SHARDS



a, Tau door of the late Kayenta period, Site 11, Hummingbird House; b, Floor of Kiva 8, Site 17, showing rectangular firepit and terminus of subterranean ventilator shaft with circular opening and stone cover; c, Wattle-and-daub wall, Site 19, Forbidden Canyon; d, Framework of door, wattle-and-daub house, Site 17, Segito Canyon.

houses. Inscription House is well described by West.¹ Tau doors (Plate 7, a) and interior partitions of adobe reinforced with straw are typical of the larger sites. At "Hummingbird House" (Site 11) in Thumb Butte Canyon, a ruin of twenty rooms, there was evidence from the arrangement of the buildings that at least some of the rooms with tau doors were of later date than most of the pueblo. Such doors are not found in Betatakin² and Keet Seel. Kivas vary in construction as at other Kayenta ruins, although the circular form is the commonest. Frontal niches and banquettes may or may not be present. Two large open pueblos near Navajo Mountain have large circular kivas with banquettes extending all the way around. A small circular kiva in a ruin in Segito Canyon not visited by West (Site 16) was remarkable for a free standing inner shell of adobe, the 6-inch space between it and the outer wall of the kiva being filled with clean straw.

An outstanding architectural distinction between these ruins and those of the Kayenta district is the exclusive use of square fireboxes in both the kivas and secular rooms of the former. We met with no circular firepits in either Proto-Kayenta or Kayenta ruins, while Kidder and Guernsey found the square form only in one ruin in Marsh Pass.³

Site 17. A Kayenta ruin in Segito Canyon presenting features of special interest is our Site 17, West's Ruin 3. It consists of a cliff-house of eighteen rooms, the superficial aspect of which is described and illustrated by West. An abundance of Kayenta pottery is present.

The ruin consists partly of masonry of the heavy, well built type characteristic of the late Kayenta period and partly of wattle-and-daub, the two types of construction appearing both separately and combined. No chronological distinction can be made between them. The wattle-and-daub construction here is similar to that at the Proto-Kayenta Site 19 in Forbidden Canyon. For some reason, probably the proximity of small standing timber, this ruin has escaped the usual looting of beams and the woodwork remains almost intact except for the ravages of

¹ West, 1925, *Exploration in Navajo Canyon, Arizona*, p. 30.

² Fewkes, 1911, *Preliminary Report on a Visit to the Navajo National Monument, Arizona*, p. 16. For the architectural details of Betatakin see Judd, 1930, *The Excavation and Repair of Betatakin*.

³ Kidder-Guernsey, 1919, *Archaeological Explorations in Northeastern Arizona*, p. 65.

natural decay. The greater part of it is of cedar. In those rooms in which wattle-and-daub is used independently and not as mere partitions, the frame of the house consists of uprights set at intervals of a couple of feet, between which rise light rods reinforced with cross pieces and plastered on both sides with adobe (see West's figures, 31-35). An excellent idea of the same type of construction at Site 19 is given by our Plate 7, c. Plate 7, d, shows a doorway at Site 17. The heavy architrave is supported at the left in a fork of the upright, while on the right it is seated on a pad of cedar bark resting directly on top of the upright. No bindings appear to have been used to keep the roof beams on the uprights, with the result that most of the roofs have collapsed bodily. The typical roofing system consists of two or three large logs laid either from front to back or from side to side; secondary beams at right angles; light rods or withes loosely bound together; straw; and finally a coating of mud to keep the straw in place. The interior height of the rooms was not more than 5 feet.

A peculiar structure occurring in three of the wattle-and-daub rooms (rooms 5, 6, and 9 on West's plan) was a "forebox" consisting of a rectangular compartment of slabs built against the front wall. That in room 5 was 2 feet, 8 inches long; 1 foot, 6 inches from front to back; and about 1 foot, 8 inches high. These boxes are not fireplaces, as they contain no ash, and in room 5, two smaller structures away from the wall constitute the fireplaces. A "forebox" in one of the wattle-and-daub rooms at Site 19 is similar in size, shape, and position, but is made of wattle-and-daub instead of slabs. The forebox seems to be not a casual storage bin but a special structure with some definite function.

The two kivas shown on West's plan were excavated. The western one (room 3) is rectangular, measuring 13 feet, 6 inches by 8 feet. At the rear it is flush with the ground. The roof, though somewhat collapsed, is still complete, and is similar to those of secular rooms. The two primary beams run forward and back on either side of the manhole, for which no special supports are provided. There are the secondary beams, rods, straw, and adobe finish described above. Slabs border the manhole. On account of the condition of the roof only that portion of the kiva immediately about the manhole was excavated, but there appears to be no banquette.

Two feet, 6 inches above the floor there is an opening in the front wall 9 inches in diameter. The rectangular firebox is set back from under the manhole. Just forward of the firebox is a rectangular vault below the floor level, 20 inches broad, 15 inches from front to back, and 8 inches deep. A passageway 1 foot across and 33 inches long, roofed over with small sticks, leads from the vault under the floor and wall of the kiva to the outside. The vault is covered by a flat stone laid flush with the floor, in which is a round hole 9 inches in diameter. The round stone cover of this opening was found in place.

The other kiva (Room 8) is circular. The front wall is gone. There was evidently a semilunar frontal recess and banquette, of which only the southeast corner remains. Enough of the roof remains to show that its support was based on a single large beam running crossways a little forward of the greatest diameter, with secondary beams running to the crossbeam from both the front and the back. The subterranean ventilator with passage, vault, round opening, and lid is identical with that in the west kiva (Plate 7, b). The floor was cleared but revealed no sipapu or other special structures. The wall had originally been plastered from top to bottom.

The sub-floor ventilators of these kivas are surprising both geographically and chronologically. Such ventilators have been found elsewhere only in the small kivas of the Chaco¹ and in the related pre-Hawikuh kivas excavated by Hodge in the Zuni country.² The latter resemble Navajo Canyon kivas in having rectangular firepits. The associated pottery is allied to "10% red ware," which would tend to date them in Proto-Kayenta rather than in Kayenta times, while on the basis of the tree-ring determinations, Pueblo Bonito came to an end about a century before the Kayenta pueblos were founded. Nevertheless, it would seem that the ventilators of Site 17 must have been copied from contemporary models. Here, as in Kiva 2 at Promontory Ruin east of the Chinle,³ is an interesting example of the incorporation of foreign elements in Kayenta kivas. Such a phenomenon denotes active, peaceful intercourse with distant villages, for while pottery may travel by a series of exchanges or

¹ Kidder, 1924, *An Introduction to Southwestern Archaeology*, p. 51.

² Hodge, 1923, *Circular Kivas near Hawikuh, New Mexico*.

³ Mors, 1927, *Archaeological Explorations on the Middle Chinle*, p. 32.

be the work of women captured in hasty raids, the details of kiva construction could only be copied by those who had had opportunity for leisurely inspection of the foreign models.

Pottery. While at some sites Kayenta black-on-white with negative painting occurs almost to the exclusion of other varieties, Proto-Kayenta designs, often in improved forms, usually are met with among Kayenta sherds. How far this is due to survival of the designs and how far to continued occupation of the same sites can only be determined by careful stratigraphical work. The late black-on-white in Navajo Canyon is on a par in excellence and variety with that of Betatakin and Keet Seel, and the same specialized vessel forms, such as the colander, are present. A noticeable difference is the great scarcity of white-edged polychrome, which is even rarer in Navajo Canyon than in the Kayenta ruins on the Chinle. The polychrome does, however, show the extensive use of superposed black elements which, as well as white edgings, tend to distinguish late polychrome from the simple designs of Proto-Kayenta polychrome, in which black is used principally in marginal lines between the bands of red and yellow.

Sandals. About a dozen sandals were recovered at Hummingbird House. To our surprise, no examples showing the offset on the outer edge, common in other areas, were included; those found being all of Kidder and Guernsey's type 1, a, (1), "coarse twilled woven yucca leaf" or type 1, b, "wickerwork," both very simple types.

Relationships. In spite of the rarity of white-edged polychrome and the minor architectural differences, it is obvious that the Kayenta ruins of the Inscription House district can not be far removed in point of time from Betatakin, Keet Seel, or "Ruin A" in Marsh Pass, and can therefore probably be assigned to the thirteenth century A.D., although the beginnings of continuous occupation at many sites may well have been a century or two earlier.¹ Doubtless the exact relation of the Navajo Canyons to the Kayenta sites in point of time, as well as the terminal dates for black-on-white in the Hopi country, will soon be ascertained by the Douglass chronology, that brilliant achievement which

¹ See Douglass, 1929, *The Secret of the Southwest Solved by Talkative Tree-Rings*, p. 43, for dates of Kayenta ruins.

has placed Southwestern archaeology on a new basis and rendered ingenious deductions wholly unscientific wherever tree-ring material is available.

HOPI (PUEBLO IV AND V)

One or two casual sherds of Jeddito yellow were found at two points near White Mesa and at Red House, a large Kayenta pueblo near Navajo Mountain. These are similar to stray sherds found by the writer on the Chinle.¹

A Hopi settlement of twenty-seven ground floor rooms grouped on three sides of a rectangle was found on the north side of Moenkopi Wash just east of the modern Hopi village of Moenkopi, from which it is separated by a small arroyo. The ruin is on an outcrop of rock and modern quarriers have removed all but the foundations of the building. The few sherds are principally of the early historic period. The modern village of Meonkopi is stated to have been founded in Mormon times on the site of an ancient ruin.²

SUMMARY

A BRIEF survey of representative sites in the region from Navajo Mountain southwest toward the Little Colorado shows four black-on-white periods constituting an uninterrupted course of development from Pueblo I down to the close of the black-on-white era and the abandonment of the region. The Pueblo I phase when found is identical with the original "Pre-Pueblo" of Kidder and Guernsey, but pure sites are rare and this culture seems to overlap the Pueblo II horizon. Open sites of the latter period are not uncommon and show a use of horizontal masonry. The pottery includes all over corrugated ware and a black-on-white ware which shows the influence of Pueblo I. This culture seems to be rare in the Kayenta district, but related forms occur to the west of our area at least as far as the San Francisco Mountains.

¹ MORSE, 1927, *Archaeological Explorations on the Middle Chinle*, p. 35.

² FEWKES, 1911, *Preliminary Report on a Visit to the Navajo National Monument, Arizona*, p. 8.

Black Mesa Pueblo II is followed by the Proto-Kayenta period. In this period architecture is well developed. Kivas are usually of a simple circular form. In ceramics, polychrome (i.e., black and red on yellow) makes its appearance and new black-on-white designs appear, in this region the various forms of the barbed line becoming dominant. Except for this emphasis, the Proto-Kayenta period here is identical with the same culture as found over a wide area in Arizona and Utah on both sides of the Colorado River and having contacts, as shown by casual finds of polychrome or by similarities in black-on-white design, with the Mesa Verde, the Chaco, and the Zuni country. This period may have ended about 1200 A.D.

The final development in the Navajo Canyon region was the Kayenta culture, distinguished from the preceding by further development of black-on-white and the increased size and elaboration of the ruins. At this time Navajo Canyon was densely populated. The culture there was similar to that in the Kayenta district proper. Minor distinctions are to be seen, notably the use of rectangular firepits and tau doors and the rarity of white-edged polychrome in Navajo Canyon. Kivas in Navajo Canyon have the variability of other Kayenta kivas, the circular kiva with frontal recess and banquette being, perhaps, the normal form at this period. On the basis of the Kayenta tree-ring dates it would appear that the Puebloan civilization came to an end in Navajo Canyon not long after 1300 A.D.

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THE ANCIENT CULTURE
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REPORT ON THE EXPLORATIONS UNDER THE
CLAFLIN-EMERSON FUND, 1928-29

BY
NOEL MORSS

*FORTY-THREE PLATES AND FIVE ILLUSTRATIONS
IN THE TEXT*

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INTRODUCTION

THE Utah explorations of the Peabody Museum of Harvard University are due to the generosity of Mr. William H. Claffin, Jr., Curator of Southeastern Archaeology at the Museum, and Mrs. Claffin, and of Mr. and Mrs. Raymond Emerson. Largely as a result of a trip made by Mr. Claffin and Mr. Emerson in the fall of 1927 into the wild country near the Colorado below the mouth of the Escalante River, a region almost unknown archaeologically, the donors conceived the project of an extended survey of southeastern Utah west of the Colorado River, and established an ample fund to enable the Peabody Museum to prosecute the plan, the explorations to continue over a five-year period.

During the spring of 1928, Mr. Donald Scott, now Assistant Director of the Peabody Museum, and Mrs. Scott took a trip along the Colorado from the Escalante to the Fremont and thence into the country near Torrey in the Fremont valley, making careful notes of any evidences of prehistoric remains. These notes were placed at the disposal of the writer when he commenced work in the Fremont region in July, 1928, under the Claffin-Emerson project, and were of invaluable assistance, both in making it unnecessary to traverse much unprofitable country and in guiding us to some of the best sites.

The work of July and August, 1928, revealed an unexpected and interesting situation. To the southeast of the district under examination, across the Colorado River in San Juan County, a rich series of remains had long been known, ranging from the classic Basket-maker II sites of Grand Gulch to ruins of the Mesa Verde period. To the west, the explorations of Judd had also established the presence of a definitely Puebloan culture, while Nusbaum as well as Judd had found typical Basket-maker II remains. Consequently, we had every reason to believe that any remains found by us would fall readily into the established sequence of Southwestern cultures with only minor local varia-

tions. Quite to the contrary, the Fremont drainage proved to be the seat of a distinctive culture, to which nearly all the local remains are to be assigned. This culture was characterized by cave sites with a slab cist architecture similar to that of the Basket-maker and Pueblo I periods; by a distinctive unpainted black or gray pottery; by the exclusive use of a unique type of moccasin; by a cult of unbaked clay figurines obviously related to, but more elaborate than Basket-maker III figurines; by abundant pictographs of distinctive types; and by a number of minor features which tended to identify it as a Southwestern culture on approximately a Basket-maker III level, but which showed consistently a degree of divergence from corresponding features of orthodox cultures. The presence of small amounts of black-on-white and corrugated pottery, with other evidence, showed that this complex was contemporary with Pueblo II in other regions.

During a short field season in 1929, the writer confirmed the results of the previous year at additional sites on the upper Fremont and made a hasty trip as far as Nine Mile Canyon, well up on the Green River, where evidences of the same culture, or something very like it, were found. A second party, under Mr. Henry B. Roberts, was at work in 1929 and again in 1930 on the Muddy River, a northern tributary of the Fremont, and in Barrier Canyon and other canyons along the Colorado north of the Fremont. Mr. Roberts also excavated an open house site at Torrey. The present paper, however, deals only with the writer's own work during 1928 and 1929.

The writer was accompanied in 1928 by Mr. Robert Sanderson of Littleton, Massachusetts, and in 1929 by Mr. Lyon Boston of New York. To these friends he attributes in large part the success of the expeditions. We availed ourselves at different times during the season of 1928 of the services of Mr. David Rust of Provo, Bishop E. P. Pectol of Torrey, and Mr. Clarence Mulford of Fruita, the latter also being with us throughout the season of 1929. Without their enthusiastic coöperation and knowledge of the country little could have been done.

The writer is much indebted to Mr. Roberts and Dr. Alfred V. Kidder, who have gone over the manuscript; to Mr. Samuel J. Guernsey for helpful comments on the specimens and for the lucid diagram of the structure of a moccasin (Figure 5); to

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Mr. Winthrop Pierce, who most kindly undertook the execution of Plates 16, 18, and 25; and finally to Mr. Scott for the use of his field notes in 1928 and for his editorial assistance in the preparation of the manuscript. Thanks are also due to Dr. Harry N. Eaton, who drew the attention of the Museum to the remains around Torrey; to Dr. Glover Allen for the identification of bones and of skins; and to Professor Earnest A. Hooton for determining the sex of the human skeletal material.

BOSTON, MASSACHUSETTS

November 1, 1930

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THE ANCIENT CULTURE OF THE FREMONT RIVER IN UTAH

REPORT ON THE EXPLORATIONS UNDER THE
CLAFLIN-EMERSON FUND, 1928-29

FIELD WORK

Geography. Sites 1 to 23 inclusive were visited in 1928; the remainder in 1929. Those in the Fremont region all lie within two days' ride of Torrey, Fruita, or Notom, which are readily reached by automobile from Richfield, Utah (see Plate 1). Nine Mile Canyon, Thompson, and the Black Dragon Canyon may be visited by automobile from Green River, horses being taken at San Rafael for the Black Dragon trip. A bad automobile road, almost impassable in wet weather, extends from Green River to Hanks-ville, on the Fremont, and a slightly better one from Hanksville to Fruita.

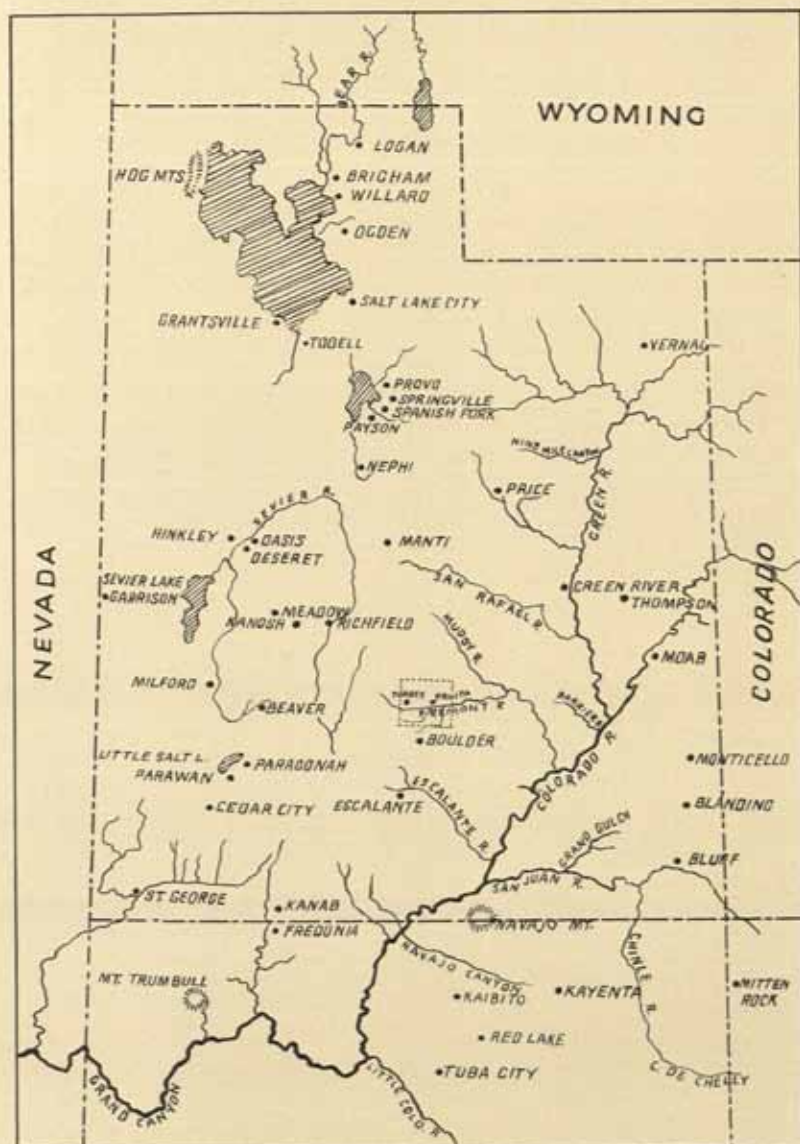
The Fremont, or Dirty Devil River, has its origin between the Thousand Lake Mountain and the Aquarius Plateau, locally known as Boulder Mountain, the latter feeding the southern tributaries, Oak and Pleasant Creeks (see Plate 2). At Fruita the Fremont cuts through the Water Pocket Fold, a pressure fold a thousand feet high and six to seven miles across, which runs north-south from Thousand Lake Mountain to the Colorado River. Beyond this reef, the river runs through semi-desert down to the broken country about the Colorado River. Between the Fremont and the Circle Cliffs the Water Pocket Fold is pierced by Capitol Gorge (a dry cut) and the canyons of Pleasant and Oak Creeks, while various narrow, ramifying canyons strike back into the reef from the east. The country is scenically impressive and the geological strata and life zones represented range from the intrusive lavas and quaking aspen on the high plateaus to the blue clay and rabbit brush of the malpais east of the Fold. The exposed ledges are for the most part soft and crumbly so that good caves are scarce, but small rock shelters are common.

BOULDER

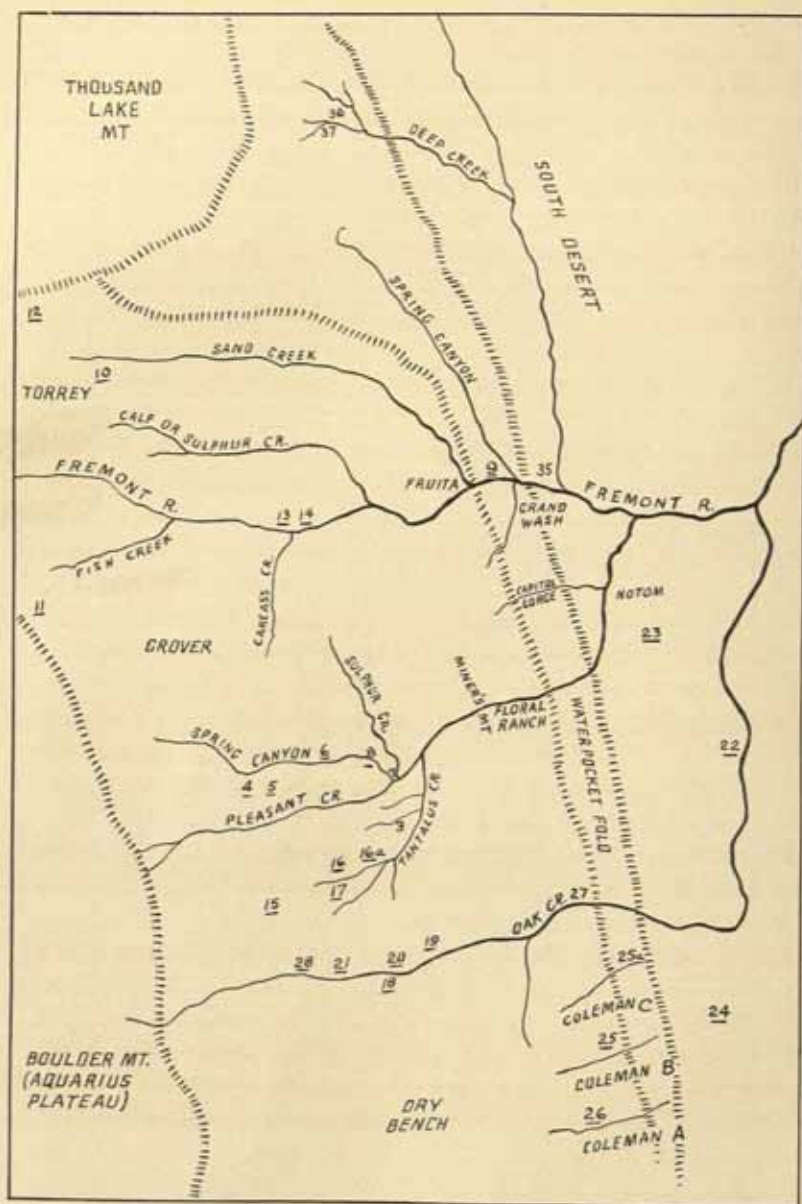
Before beginning work in the Fremont drainage we excavated a Pueblo open site at Boulder, which lies between the Escalante and Fremont Rivers and is separated from the latter by the Aquarius Plateau.

Site 1. This site, occupying a hillock two hundred yards north-east of the Church House, had been previously visited by Messrs. Claflin and Emerson, and by Mr. Scott. The hillock is about 15 feet in height, and sherds, flints, etc., are scattered over it and the adjoining slopes in an area about one hundred and fifty yards in diameter. Preliminary tests showed that the mound is not of artificial origin, but is a limestone outcrop against which more or less sand has drifted, particularly against the southern face. Coals and sherds occur in the surface soil everywhere, but thin out within a foot or 18 inches of the surface, the ground becoming progressively harder. At the top of the hill are remnants of several groups of small rooms. These were built on and of the ledge rock and have tumbled down, there being no protective drift at this point, until it is impossible to trace the outlines except in a very vague way. They appear to have been rectangular, though no sharp corners now remain, and of small size. At one or two places small portions of walls of cobblestones could be distinguished.

Turning our attention to the drift against the southern face, next to the road, we found that while there were no continuous rubbish deposits of any great extent, ashes and other remains occurred here and there in the clean drift sand. Thus a typical test pit showed well defined ash lenses or hearths at depths of 1 foot 7 inches, 2 feet 3 inches, and 3 feet 7 inches, the last a large circular hearth 3 feet in diameter. Around the first two the sand bore a small proportion of ash and straw, which ran out at about 2 feet 6 inches, so that the deepest hearth was covered with a foot of almost clean sand. Several burials had been uncovered on this slope, some when it was being used as a sand-pit and others by pot-hunters, and several pieces of pottery had been removed. Burials were not closely spaced, but seemed to occur in shafts or pockets of rubbish, and by following these out we found three in as many days. All three skeletons were of adult males and all three skulls were occipitally deformed.



MAP OF UTAH AND NORTHERN ARIZONA



MAP OF A SECTION OF THE FREMONT DRAINAGE, SHOWING SITES BY NUMBERS

Burial A. Found about two-thirds of the way up the slope. Depth, 2 feet 5 inches. Body on its side, head to west, arms partly extended, femurs at right angles to body, knees doubled up, and face upward. Four corrugated jars and one black-on-white bowl at left of skull. (These pots intruded into a rectangular slab-walled hearth which, however, appeared to have no connection with the burial.)

Burial B. Twenty feet northwest of Burial A. Depth, 2 feet 10 inches. Body on left side, head south, femurs at right angles, knees doubled up, arms doubled up beside chest, and face up (Plate 3, a). A corrugated jar lay east of the shoulders, while six pots, for the most part badly broken, were grouped about the head in nests of pairs. These included one black-on-white bowl, one plain ware shouldered pot, and four corrugated pots. Half of an undecorated small bowl, found near the knees, was possibly not a mortuary offering but a constituent of the rubbish. One of the jars lay on a flat, circular platter of limestone.

Burial C. Six feet south of Burial B. Depth 2 feet 8 inches. Thin slabs of sandstone had been laid on top of the body, which lay directly on hardpan. Body on back, legs on right side, partially flexed and slightly higher than body, head to south, face up. Skull badly rotted but showing extreme deformation. A mano by the head appeared to be the only mortuary offering; small, scattered sherds constituting about a third of a corrugated jar were probably not a part of the burial.

Several pan-shaped metates of igneous rock were found at the site as well as a rock with grinding depressions and a small mortar.

Site 2, on the southerly high point of the high butte west of Boulder Church House, is situated on the eastern side of the promontory, where it is sheltered from the prevailing west winds. This is an excellent spot for a lookout, giving within a few yards unobstructed views of the arable lands now constituting the Boulder ranches, the Aquarius Plateau to the north, the Henry Mountains to the east, and distant Navajo Mountain to the south, with numerous buttes in the middle distances which might have served as intermediate signal stations. There remain the masonry foundations of five rooms arranged in an L at the edge of the promontory, and a few Pueblo potsherds.

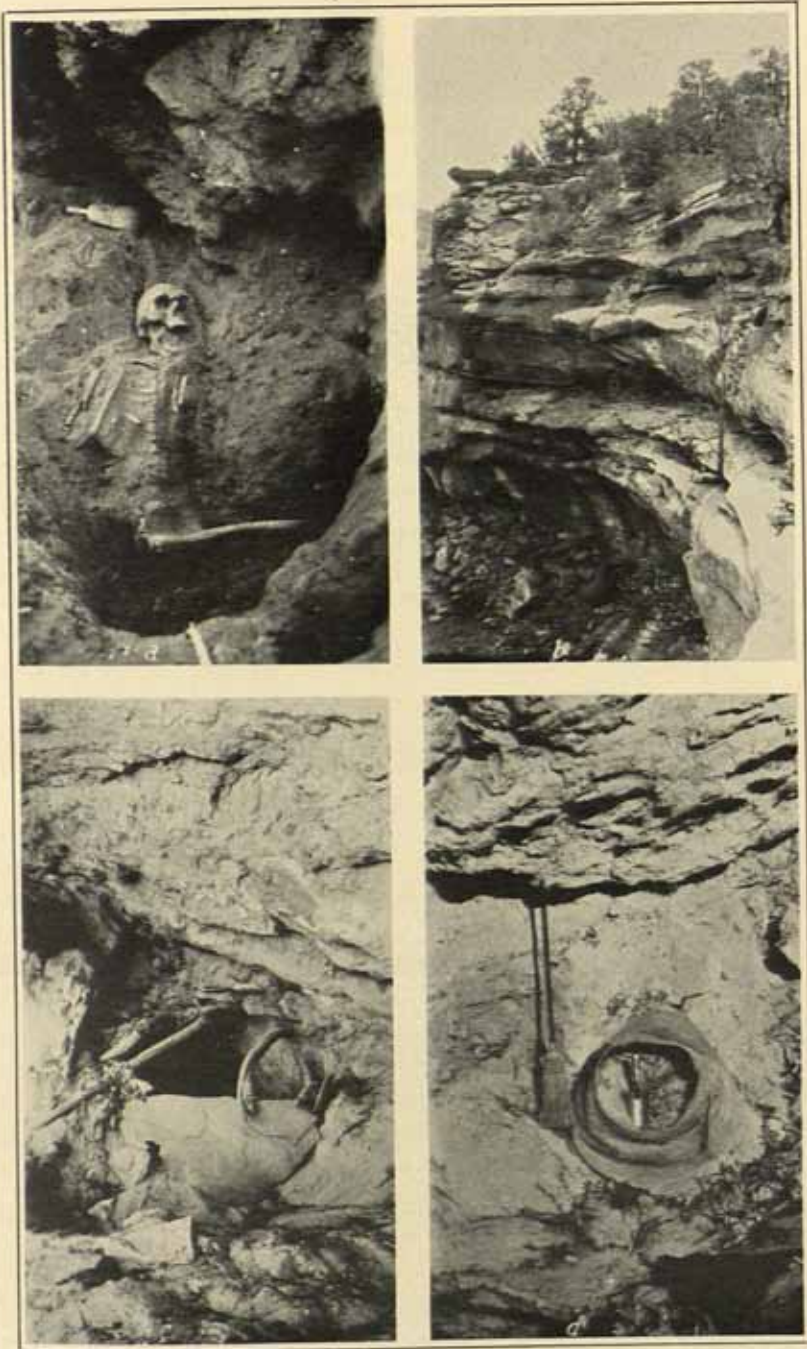
PLEASANT CREEK

Crossing the southern end of the Aquarius Plateau or Boulder Mountain, we camped on Pleasant Creek, which was at this point a clear mountain stream. The creek itself is in a small gorge cut into a broader valley. To the south, a line of buttes separates it from the Little Tantalus valley, while to the north of our camp was a narrow indented ridge in the face of which Sites 4 and 5 were located.

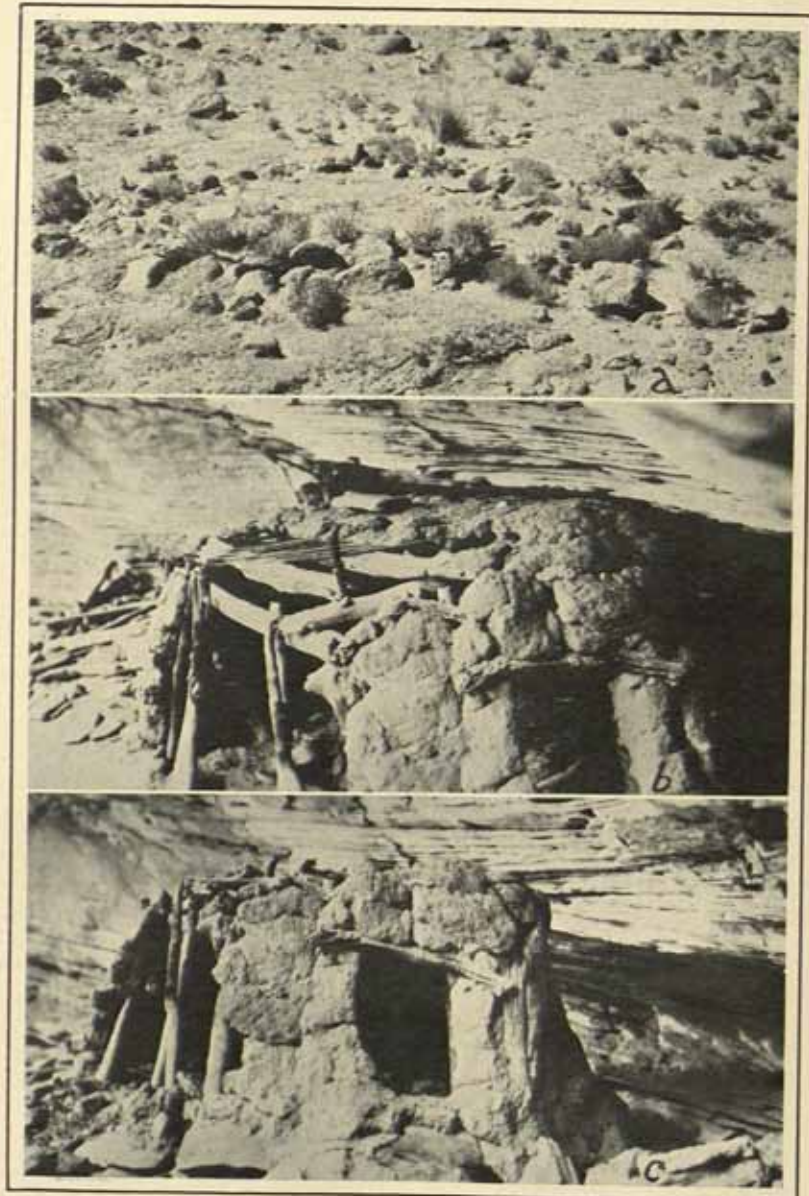
("Temple Creek," "Tantalus Creek," and "Aquarius Plateau" on the Geological Survey Maps are respectively known in private life as "Pleasant Creek," "Oak Creek," and "Boulder Mountain," while the name "Tantalus" has become transferred to a small southern tributary of Pleasant Creek. While local names are often confusing, "Pleasant" and "Oak" seem so well established that they will be used here in preference to the earlier names, and the term "Little Tantalus" (coined by Mr. Scott) will be used for the tributary of Pleasant Creek to avoid confusion with "Tantalus" as a name for Oak Creek.

Site 3. On a small draw entering Little Tantalus Creek (new style) from the left, Mr. Scott had located a small structure high above the canyon floor (Plate 3, b). We effected an entry from above with the aid of a rope. It is situated under an overhanging ledge 8 feet high in front but sloping rapidly toward the back. The chamber, 4 feet high, is remarkable in that it is entirely free-standing, though only a couple of feet from the back wall and ceiling. Four posts arranged in a rectangle, 5 by 3 feet, are the main supports, bearing two longitudinal beams over which are laid three crossbeams at each end. The walls are composed of poles set rather close together and canted inwards sufficiently to give support to a sheathing of adobe turtlebacks (Plate 4, b, c). The frontal opening showing in the photographs is merely a breach in the wall, the small window at the side being the entrance. To the left is the framework of a similar structure. Nothing was found in the cave save a couple of corn-cobs. This house is the only example of such construction we have seen in this area.

Site 4. North of our camp on Pleasant Creek was a high but readily accessible cave 40 feet long and 20 feet deep. The floor was



a, Burial B, Site 1, Boulder; b, Site 3, Little Tantalus Creek; c, Cist, Site 13, Fremont River;
d, Carrying basket in situ, Site 13.



a, House foundation, Site 12, Torrey; b, c, Site 3, Little Tantalus Creek.

composed of a few inches of drift sand over a layer of hardpan. In the latter were sunk seven cylindrical holes 2 feet deep and of varying diameters; the largest, which contained a quantity of cedar bark, being 5 feet across. No structures were present and no sherds, corncobs, or other material were found. At the back of the cave were a couple of inches of ash, and the ceiling was slightly smoked. At the front of the cave was a sloping ledge on which were sharpening grooves and a few small pictographs of sheep.

Site 5, Image Cave. Just around the corner from Site 4 is a large cave facing south, commanding a magnificent view (Plate 5, a). It is 165 feet long, 50 feet high at the front, and 25 feet deep. As is often found in such cases, an ancient fall of rock forms a breastwork along the front of the cave. Toward the western end of the cave were two circular slab-sided cists, neatly paved with stone, 2 feet 3 inches in height, and 4 feet 6 inches and 3 feet 6 inches in diameter, respectively (Plate 5, b). Near these cists and at the front of the cave among fallen rocks was an area 8 feet in length of matted cedar bark. Ten yards farther east excavation revealed a roughly circular platform of packed dirt walled about with slabs, on top of which was a rectangular hearth of slabs. Toward the eastern end was a group of four small cists of irregularly circular or polygonal shapes, each about 2 feet in diameter. The whole central part of the cave, including the cists, was filled with from 10 to 20 inches of rubbish containing a great deal of straw, ash, flint chips, and fragments of bones. Corncobs and husks, while present, were not very abundant. Much of this rubbish had to be hand trowelled. From it were taken a moccasin, bone awls, arrowheads, manos, metates, a mortar, grains of corn, a bone pendant and several small bone beads, a pair of nicely matched hammerstones, a rather small number of sherds of plain, fired pottery, and, last and most important, a large collection of clay figurines, as well as small clay dishes and other objects, and many lumps and pellets of clay.

A little desultory digging had been done here and some of our best specimens were picked up on the dirt piles which were thrown up, but fortunately the major part of the rubbish was undisturbed. The clay images occurred throughout the cave, including the cists, and from top to bottom of the rubbish more or less

indiscriminately, though there were particularly rich "pay streaks" in certain places. In particular it can be stated positively that here, as also at Site 27, there was no stratification between the objects of unfired clay and the sherds of true pottery, which were sometimes found in the closest association. Specimens probably from this cave in the possession of Bishop Pectol at Torrey include half the skin of a deer's head, dressed and sewed, which apparently was part of a headdress; snare sticks; and a few figurines.

Three or four inches of clean sand covered the rubbish deposit.

Just beyond the cave to the east, on the same ledge, are well executed pecked anthropomorphic pictographs (Plate 14, b). The cave wall itself was friable, and any decorations had sloughed off with the exception of a few lines of red paint.

Site 6. Site 6 is situated high up above a branch of Spring Canyon,¹ and is visible by climbing up on the point behind Site 5. It is a medium-sized cave with a southern exposure, the floor a jumble of fallen rocks. Six small slab-sided cists are tucked away here and there. These had been cleaned out by pot-hunters. We found nothing except a few corncobs and a sherd of unfired clay.

Site 7. This is a large cave on the north side of Pleasant Creek just below the mouth of Spring Canyon. Previous digging and cattle have torn it up a good deal. On digging, a figurine was soon turned up and we hoped that conditions at Site 5 might be duplicated, but in the course of a morning we gutted the promising deposits and found only one more. The deposit in the central portion was a foot in depth, with a thin lower layer, containing ash only, separated from the upper rubbish by a foot of clean fill. As at Site 5, the deposit was characterized by a scarcity of corncobs and an abundance of bones. Flints were numerous. A good deal of cedar bark was found, an occurrence characteristic of almost every site examined, from small rock shelters to large caves. Specimens found included metates, manos, chipped flint implements, a scraper wrapped with sinew, bone awls, a small piece of cane wrapped with sinew, and plain ware sherds.

Site 8. This is a small cave, 15 feet in diameter, on the left bank of Spring Canyon, a mile above its mouth (Plate 5, c). On

¹ Not to be confused with another Spring Canyon running north into the Water Pocket Reef from the Fremont Gorge.

the wall are small painted figures (Plate 14, e). The cave contains, below a superficial ash layer, a deposit of drift sand, the upper 30 inches of which contain some rubbish. Here were found, beside the usual flints, corncobs, and cedar bark, a clay figurine, bits of fur-string and of coiled basketry, a bundle of three string snares, metates, and sherds.

Besides the sites mentioned, pictographs of minor interest were found at three points on Pleasant Creek: on the north wall about a quarter of a mile above Site 4, on a wall directly to the north side of the creek close to camp, and on the south wall south of camp in a large cove.

Irrigation Ditches. Several intelligent persons bore witness to the existence of an ancient irrigation ditch which could be traced several miles and which had served to bring water from the head of Pleasant Creek onto the flats above the creek on the south side, above the junction of Tantalus. The writer was shown a portion of the ditch about three miles above the junction. At that point it was a shallow depression 2 feet wide, on a side hill, and looked very similar to the natural channels and sheep trails in the vicinity. Mulford, our guide, was positive, however, both as to its continuity and as to the existence of places showing obviously human handiwork in cutting across ledges and the like. A few years ago there was a farm on the same flats, since abandoned, which had been irrigated in a similar fashion. Mulford stated that the ancient ditch showed the lack of modern tools in the way it had been carried around obstructions which a modern trench digger would cut through. I am strongly inclined to believe in his testimony concerning this ditch, particularly as there is sufficient corn refuse in the Pleasant Creek sites to make it seem probable that farming was carried on in the valley, although there are no arable bottom lands and the practicability of dry farming on the uplands under present conditions would be very dubious.

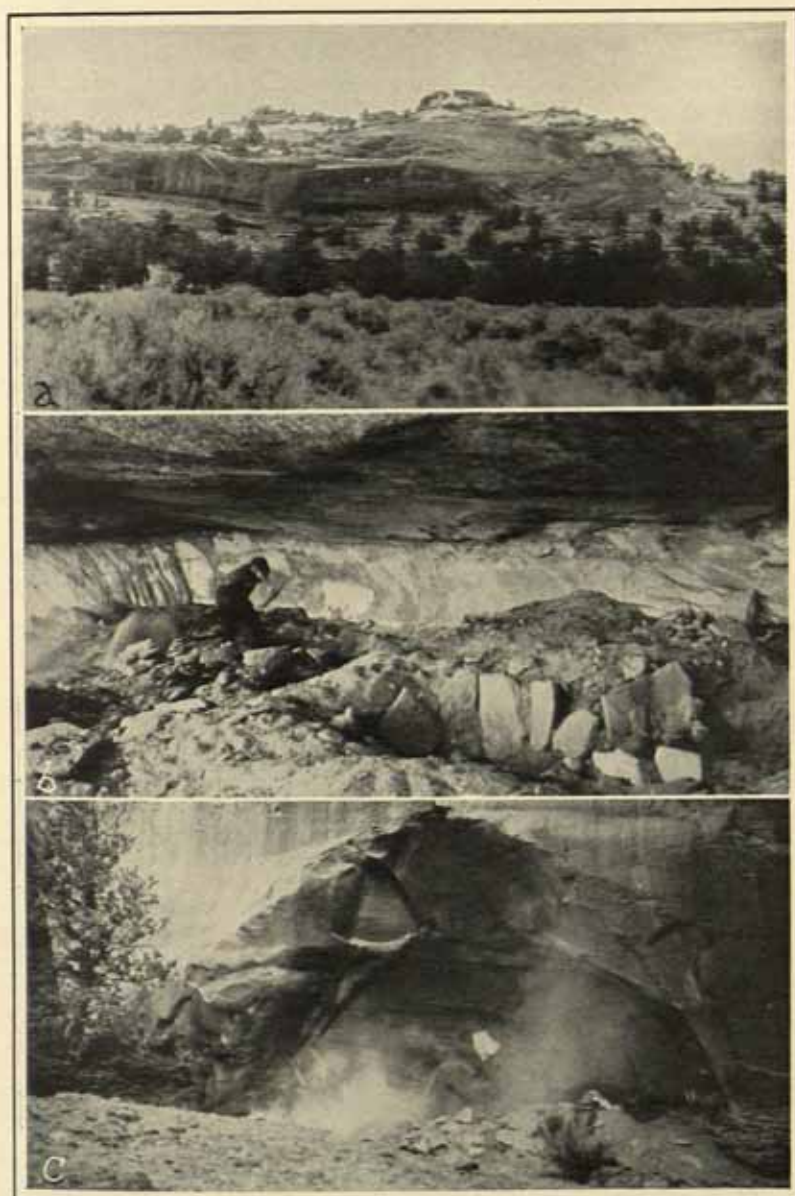
OAK AND TANTALUS CREEKS

Above our camp on Pleasant Creek the trail turns south from the wagon road and skirts the head of Tantalus, finally reaching a large, low cave used as a camp ground by sheep men and called by them "Quaking Asp Cave."

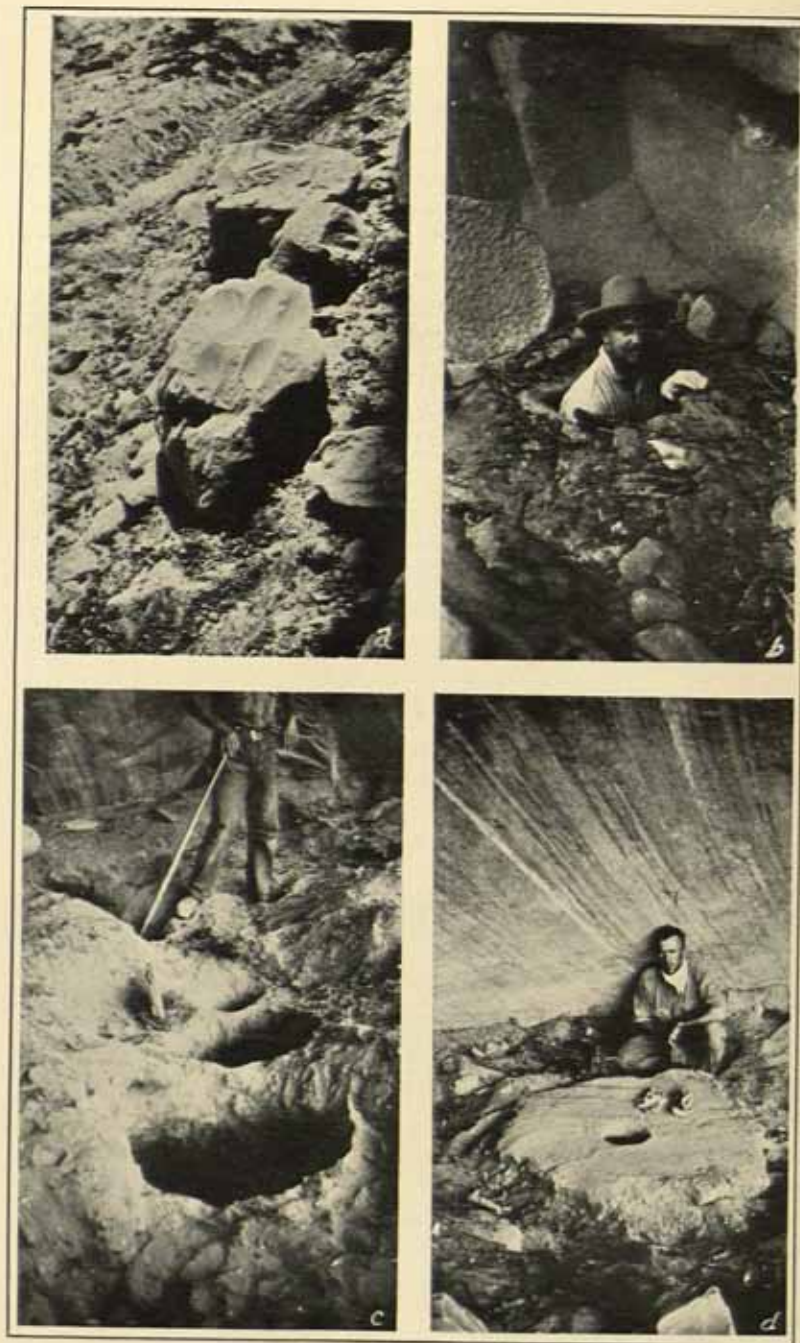
Site 15, Quaking Asp Cave. The cave takes its name from Quaking Asp Spring, about a quarter of a mile distant, but better and more accessible water was running in a small draw close to the cave. This is 135 feet long, 30 feet deep, and 25 feet high, with a southern exposure. A large rock at the west end has the familiar shallow depressions and grooves similar to those at Site 11 (Plate 6, a). No structures were visible at the surface. At both ends of the cave are deposits of cedar bark at a depth of 2 feet. In the main part of the cave our excavations were limited to a couple of large test holes. The first 8 inches were of sand having the appearance of a water-borne deposit, accounting for the absence of perishable artifacts in the underlying dirt, which was, however, very dry at the time of our visit. Below this we dug down through a homogeneous deposit with no stratification, consisting of fine dust from the surrounding formation, interspersed with sparse ash and charcoal and small bits of vegetable refuse, with an occasional flint or bit of marrow bone. A handful of plain black or gray sherds was recovered in a morning's work. Three feet down were found a metate and a mano. Three feet from the back wall and 4 feet 4 inches below the surface was a small cist consisting of seven slabs set up in the loose dirt, an unimposing structure 9 inches deep and 18 inches in diameter. Revisiting the site in 1929, an enlargement of the hole revealed at a depth of 5 feet an adobe-capped cist against the back wall. This cist, which was not completely uncovered, was about 5 feet long. We discontinued our deepest test at 6 feet below the surface, at which depth the deposit was of the same character and showed no signs of coming to an end.

Northeast of Quaking Asp Cave are a number of box canyons draining into Tantalus and containing a few caves, both in the limestone upper ledges and in the underlying sandstone.

Site 16 is of the former category, a large cave in a canyon heading up toward the trail to Pleasant Creek. Two or three years ago a row of pine and cedar posts with willows between, forming evidently a wall of typical daub-and-wattle construction such as is found in Kayenta cliff-houses, is reported to have been visible all along the front of the cave, as well as partition walls. The building of the Bown reservoir at the head



a, Site 5 (Image Cave), Pleasant Creek; b, Cists at west end, Site 5; c, Site 8, Sulphur Creek.



a, Grinding and sharpening depressions in rocks, Site 11, Fish Creek Cove, Grover; b, Storage cellar with circular manhole cover, Site 25a, Coleman Canyon; c, Cists in hardpan, Site 27, Oak Creek; d, Circular platform, Site 27.

of Oak Creek has caused springs and seeps to break out in numerous places in the formation below it. Such a new spring now gushes out below the cave in question, and probably to the same cause may be ascribed a fall of the roof which has buried the whole floor of the cave under tons of rock, except for a space of about 20 feet square at the east end. Here the end of the wall and a short section of masonry partition are visible. This was the only site at which we observed true walls of daub-and-wattle, although Site 11 had a daub-and-wattle partition in a cist. Several sherds of corrugated and black-on-white obtained here show that the buildings were of Puebloan date.

Site 17. On the opposite side of the same canyon, lower down in the sandstone stratum, is a shallow cave with a deep bank of clean, slightly damp drift sand in its central portion. Two small cists at one end were at the surface and appeared to postdate the central drift, though this was not certain. At a depth of 3 feet a few coals appeared in the drift sand.

Site 16a. Three quarters of a mile beyond Site 16 on the north rim of Tantalus is a large cave which was observed in 1928 but not entered until the following year. The only floor space was at the southwestern end, which was largely taken up by an oval slab-walled cist, 5 feet by 4 feet and 2 feet 6 inches deep. The bottom of the cist was filled with clean sand to a depth of 15 inches. Over this was a nest of shredded cedar bark. On the bark lay two oval pieces of stiff buffalo hide, with loops along the sides and equipped with straps as if forming some sort of armor. On top of these lay several large pieces of elk hide, beautifully dressed and retaining the hair, and with them two or three fragments of mountain sheep hide. On top of these was a pair of large elk horns which projected above the 6 inches or so of sand which covered the cache.

No other artifacts were found in the cave. The fact that there was clean fill at the bottom of the cist makes it possible that the cache of hides was put there in later times, but this seems unlikely. Bright red oak leaves among the hides indicate the season at which they were deposited. Plain ware sherds, squash rind, corncobs, and cedar bark were found in the cave as well as in a small rock shelter nearby.

Going south from Quaking Asp Spring about half a mile a trail leads down into Oak Creek, an independent tributary of the Fremont.

Site 28. Throughout this region are many small nooks and crannies in the rocks, too numerous to admit of systematic investigation and which are, for the most part, empty.¹ In some few of these, however, interesting specimens lie concealed. A good example was a small rock shelter at the foot of the trail into Oak Creek which was casually investigated by Mulford while we were camped nearby in passing through in 1929, this particular district theoretically having been exhausted the previous year. The protected area was about 6 feet by 3 feet and removal of a couple of feet of sand showed a lining of slabs of pine bark covered with shredded cedar bark. On the bark lay a buckskin bag containing materials and implements for the manufacture of a large necklace of seeds.

Site 18 is in a sandstone cave on the right bank of Oak Creek, a mile or so downstream from our point of entry, and a few hundred yards above a draw known as the "Dry Fork of Oak Creek" which enters on the left. The exposure is northerly. The cave, which is 90 feet long, appears, like Site 15, to have been flooded. On the wall are small pictographs of some sheep and a snake. On or close to the surface are metates, manos, flints, and plain ware sherds. A test in the middle of the cave showed ash-bearing earth with lenses of ash at intervals, as at 1 foot 10 inches and 2 feet 4 inches. At 2 feet 10 inches, the earth became cleaner, but coals were still appearing at 4 feet 6 inches although the ground was quite hard. Near the ends of the cave the ledge thrust out close to the surface.

Site 19 is a shaly cave with little floor space, a few hundred yards up a small draw entering Oak Creek on the right-hand side. The exposure is westerly. Here were found six small cists with stone floors. One cist was bowl-shaped, the wall slabs, which were about 12 inches in length, sloping out at an angle of 45 degrees or more from the perpendicular. In the rubbish under the floor of another cist were a tule mat and a large knife-like implement of wood which was later stolen from our camp by pack-rats. A third cist contained half a dozen ears of corn. A tubular device of bone,

¹ The formation in which they occur is well shown in Plate 7, c.

beans, squash rind, down plucked from some bird, bits of string, and sherds were also found here.

Site 20 was a small open sherd site with a hearth and metates near Site 19.

Site 21 is a cave with southern exposure in a sandstone bluff on the left bank of Oak Creek half a mile above Site 18. This cave is about 20 feet long and 10 feet deep. The back wall is of a very soft, vari-colored sandstone which can be gouged out without great difficulty. At the west end there is a gently sloping ledge of the same material a couple of feet high at the front

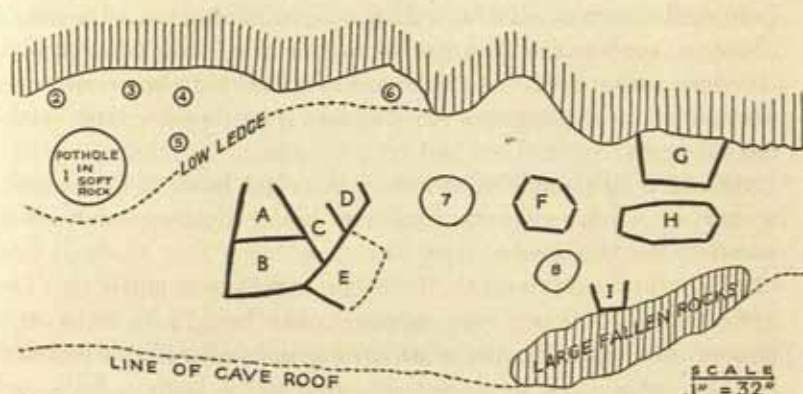


FIGURE 1

Plan of Site 21, Oak Creek: potholes in hardpan shown by numbers, slab cists by letters.

(Plate 7, a). In this, a number of holes had been cut as shown on the plan (Figure 1). No. 1 is of flattened hemispherical shape, 30 inches in diameter. At the bottom was found a handsome bag of bark. The smaller holes had mouths from 5 to 7 inches wide but opened out into jar-shaped cavities. Each was provided with a flat cover with the exception of 4 and 6. A cover of the proper size for No. 4 was found in the rubbish about 6 feet away. All were empty except No. 5. On removing the cover from this hole a sandstone plug which neatly fitted the opening was revealed. Taking this out, a number of handfuls of tightly packed cedar bark were found to fill the recess. At the bottom were a pair of horns from a female mountain sheep, a strip of wolverine fur sewn along one side and with a piece of string attached, and a

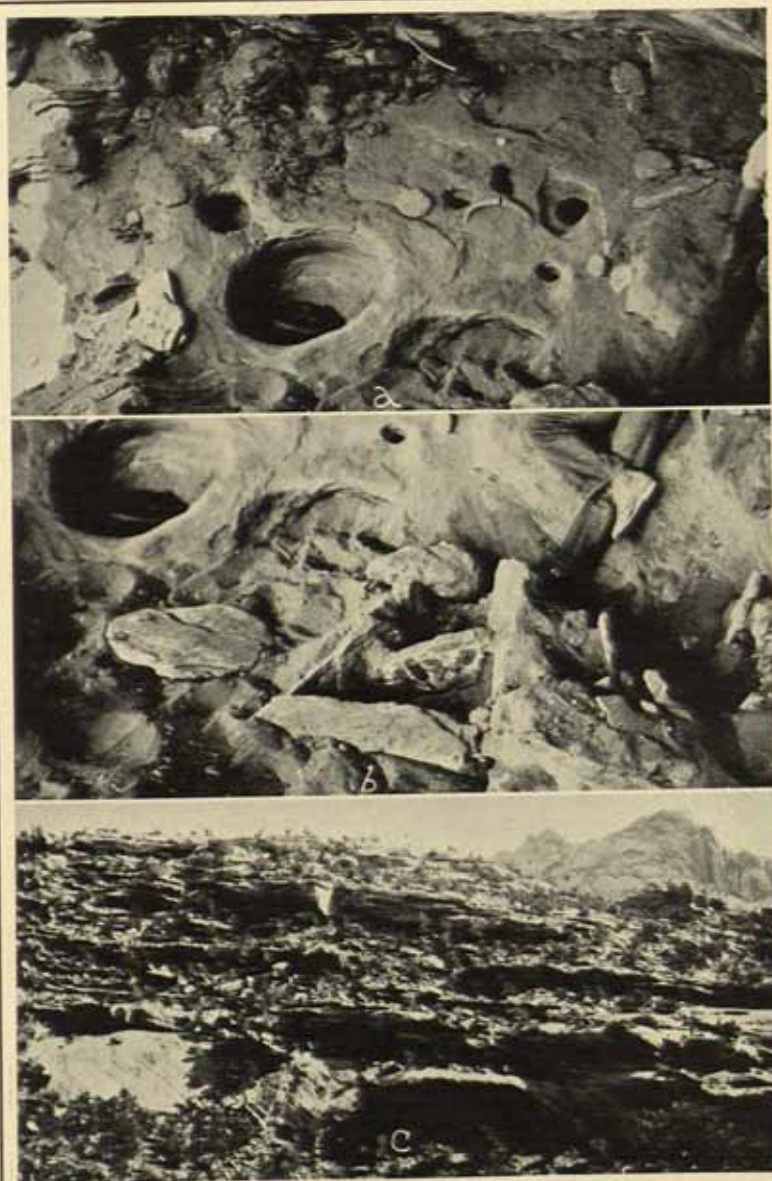
ball of white paint, the whole evidently forming a treasured part of some medicine man's regalia.

The floor of the cave consisted of hard packed sand overlaid with 18 inches of rubbish-bearing deposit, in which were numerous fallen rocks. Sunk in this deposit were nine cists with stone floors, somewhat damaged by further falls from the roof (Plate 7, b). Cist F has sloping sides similar to the cists at Sites 11 and 19. Nos. 7 and 8 are potholes similar to No. 1, sunk in the hardpan. If these were in use at the same time that the cists were, it would have been necessary to excavate a foot or more of dirt each time anything was put in or taken out, for the general level of the rubbish must have been at least this much above the floor in order to support the cists, particularly Cists F and I. Evidence that these potholes had, in fact, been in disuse for some time was provided by the condition of a lid which, from its size, must have been made for No. 8. This had been broken in two parts, one of which, much blackened by smoke, was found below the ledge at the west end, while the other half, which had no smoke stains, was set up on edge behind Cist F.

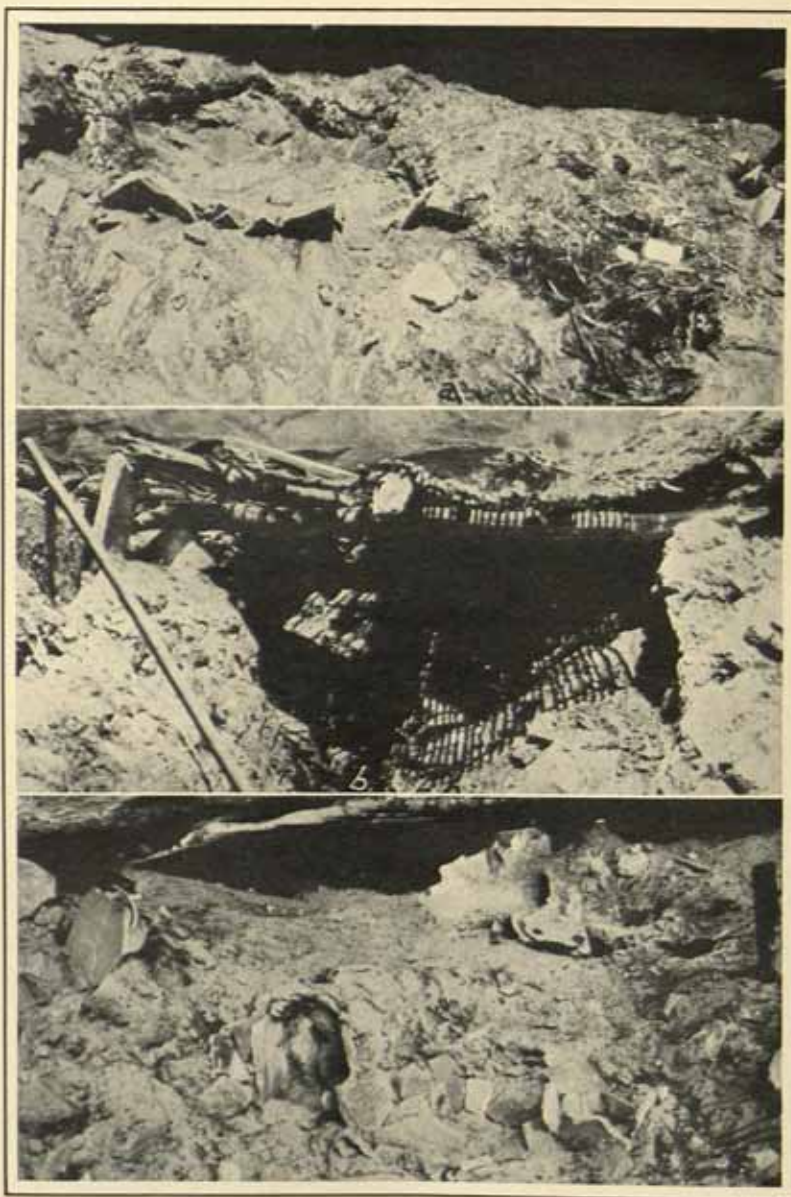
The rubbish contains ash lenses close to the surface, and is filled with sand grass, corn refuse, cedar bark, and charcoal. From it were taken manos, a rubbing stone stained with paints, a flat slab which had been used as a palette for white paint such as was found in Pothole 5, a small twined-woven mat, sherds, beans, squash rind, and red feathers from the flicker's wing. Close to Cist I and at a lower level were found a bundle of string snares and two ears of corn.

Site 27. The lower reaches of Oak Creek above the Water Pocket Fold were explored in 1929. The only additional site discovered was a large cave on the left bank about ten miles below Site 18 and two miles above the point at which Oak Creek emerges from the Fold.

The cave, which is readily accessible, has a southeasterly exposure and is about 165 feet long and 25 feet deep. (Plate 7, c). The habitable portion with a relatively level floor is only some 75 feet in length. Surface indications of ancient habitation were a slanting rock at the east end with grinding and sharpening grooves and pecked designs, heavy smoke on the roof of the cave, and remnants of small painted figures at the west end, of which



a. Potholes 1-5, Site 21, Oak Creek; b, Pothole 1 and Cists a-e, Site 21; c, Site 27 and typical ledge formation, Oak Creek.



EXCAVATION OF SITE 11, FISH CREEK COVE, GROVER

- a, Top of Cist 1, below burnt roof layer, cedar bark thatch of unburnt roof at right; b, The roof on a temporary crossbeam, Cist 1, at left, Cist 2, under roof; c, The roof removed, Cist 1, at left, Cists 2, 3, 4, in foreground, Cists 7, 8, at rear, post A, at right.

two, in a greenish paint, were clearly discernible as horned and narrow-waisted figures very similar to the larger examples at Site 5.

Below a few inches of recent sand the rubbish in the center of the cave was from 1 to $2\frac{1}{2}$ feet deep, depending on the level of the hardpan, and contained ashes and habitation refuse of the usual character, with great quantities of bark and grass toward the rear of the cave. No stratification was observed. Toward the eastern end of the cave eight circular or elliptical holes varying in diameter from 1 to $4\frac{1}{2}$ feet and in depth from 18 inches to 4 feet had been sunk into the hardpan (Plate 6, c). The smaller ones were enlarged below the opening and had been closed with circular covers as at Site 21. One such cover was found in place lying on a sort of washer made of two coils of cedar bark such as were commonly used for torches. The cist beneath was lined with slabs, which were free-standing on the outer side, while one other cist had a slab partition. Another had two lateral cubby-holes of a size to admit the hand, in one of which was found a small net. At the back of the cave, west of the cist, was a floor or platform of adobe, 6 inches thick and so hard that at first we thought it was composed of stones. The edges had been somewhat broken away, but the floor had evidently been circular and was some 5 feet in diameter. In the center was a circular opening 9 inches wide (Plate 6, d). Underneath the floor, so far as could be observed, was the regular cave deposit, which was relatively clean at this point, while about 9 inches of similar dirt lay above it. The central opening was unwallled and the content below it indistinguishable from the surrounding dirt. There was no evidence of any structure other than the platform itself, and no fireplace or ash deposit on top of it as on the platform at Site 5.

At the west end of the central floor, two lateral holes 10 inches in diameter and a couple of feet in length had been cut into the hardpan. In one were strips for moccasin soles from the four legs of a mountain sheep, bound together, in the other, a handsome figurine.

In the general digging were found bone, wooden, and flint implements, string, both fur-wrapped and plain, fragments of basketry, a miniature basket, a tule mat, two pairs of moccasins, (buried together) and other objects. Potsherds, which were sparse,

were plain, corrugated, or black-on-white. The plain predominated, and all types were found at all levels, as were the figurines, of which eight in all were obtained. Pellets of worked over clay were numerous. At the base of the rubbish in the central part of the cave was a buckskin bag containing shelled corn, beans, and squash seeds. The ratio of bones and other animal refuse to corn-cobs was somewhat lower than at Sites 5 and 11.

TORREY-FRUITA DISTRICT

Considerable interest in the local antiquities is taken by the inhabitants of Torrey, so that the immediate neighborhood has been thoroughly prospected. Bishop Pectol now maintains an informal museum in his store which serves as a repository for objects found locally. Previously a number of finds appear to have been made, most of which have been lost or dispersed.

Site 10. The site called by Bishop Pectol "the battlefield" lies on Sand Creek, northwest of Torrey. Here is an open valley, parts of which are arable, from which rise hillocks strewn with blocks of basaltic rock. For a distance of a mile or more, sherds and chips occur at intervals, both on these knolls and on the level, and the ground contains charcoal. One or two burials have been found here and a large number of arrowheads have been picked up. On three of the knolls are house foundations consisting of circles 10 to 15 feet in diameter of large boulders of basalt.

Site 12. On the ranch of Mr. James Pace, due north of Torrey, is a similar site with scattered sherds and flints and with two or more of the enclosures of boulders (Plate 4, a). One of these was excavated by Mr. Roberts. In this example the floor plan was rectangular. The large boulders were employed in a wall two courses in height, the superstructure having evidently been of some sort of pole and adobe construction. Sockets for posts were found in the floor, which was slightly below ground level, and a quantity of burnt clay with marks of withes and beams indicated that a flat roof had been employed. A more detailed account of this excavation will be published by Mr. Roberts.

Foundations of this type are common at open sites in the vicinity, but are never placed close together and would seem not

to have been present in most of the houses in the villages which the extent of the sherds, flints, and charcoal indicates.

On a large boulder near one of these houses are pecked serpents. Such pictographs on basalt were observed at several such sites and are always on a side hill facing down and away from the houses, while the subjects depicted are invariably either serpents or serpentine spirals and mazes (Plate 19, a, b). Mr. Sanderson suggests very plausibly that these pictographs serve to guard the house site by warding off evil spirits or perhaps rattlesnakes as they seek to come up onto the hill. Metates found here and at similar sites clearly indicate that the inhabitants were agriculturalists.

"Moki Houses." The formation from Torrey to Fruita is a friable sandstone, which breaks off into series of ledges 2 to 5 feet high with numerous projecting shelves forming small rock shelters, which appear quite unpromising archaeologically. Nevertheless, wherever there is protection from water, and a little sand, these shelters usually yield evidences of human visitation in the shape of beds of cedar bark, occasional corncobs, sherds, and charcoal. Several pieces of pottery in Torrey are said to have been found in such places, as well as Bishop Peetol's shields and Mr. Earl Buhinnon's baskets, which will be discussed later.

In similar locations, often just under the rim of cliffs, are found "Moki Houses" — small chambers built up of thin slabs of sandstone set on edge and reinforced with quaking aspen or (less commonly) cedar poles. The back wall and roof of the rock shelter are employed to form as much of the structure as possible, some examples being a mere hole in the rock walled up in front. Where undamaged, they have a small, rounded entrance which could be tightly sealed with a heavy slab. The average diameter of a "Moki House" is about 5 feet. They occur either singly or in groups of two or three.

They were evidently used as storage chambers for corn, beans, and squash. While relatively few of them present any difficulties in access when once discovered, the care with which they are concealed under inconspicuous ledges, often visible only from the opposite rim of a canyon, shows a fear of theft.

"Moki Houses" are common throughout the vicinity, for

example: six or seven in Calf Creek ¹ southeast of Torrey, which are visited by tourists (Plate 9, a); one above the Pace ranch; three on the Fremont itself, just below the Hiskey ranch at Teasdale; one above the Cooper ranch on the Fremont, opposite Torrey; two in a small branch of Sulphur Canyon ² and close to the Torrey-Fruita road, three and a half miles from Torrey; one in the Miner's Mountain Gorge of Pleasant Creek; one which we did not visit, on the left bank of the Fremont, two miles above Fruita, said to be very neatly constructed; one on the right bank of the Fremont a mile below Fruita — this example, of which only the lower half remains, is unique in that it is constructed of horizontally laid stone; one on the trail to the Fruita Natural Bridge; one on the south side of Capitol Gorge, below Fruita, about a quarter of a mile east of the tanks; and three in the upper ledges above the north side of Capitol Gorge, about opposite the one last mentioned (Plate 9, c); also at Sites 23, 25, 25a; and one at Site 30 in Nine Mile Canyon.

In a very much broken-down granary a short distance west of the Notom road, two miles below Fruita, some one had dug out a number of snare sticks, of which we were able to recover a few that had been either discarded or overlooked. It is said that years ago a sealed chamber near Fruita was broken into and yielded a great store of objects, such as pottery, arrowheads, feather work in excellent condition, and bone fishhooks.

Miscellaneous Sites. About half a mile above C. Mulford's ranch at Fruita, on the right bank of the Fremont River, is an overhanging ledge. Some one had recently dug down 2½ feet and uncovered a well-made small hexagonal cist with stakes at the junctions of the slabs. White beans and plain ware sherds had been taken from the excavation. At the same point, at a height of 10 feet, there are partly incised and partly pecked representations of round shields ornamented with vertical panels.

Two of the rock-circles such as those at Sites 10 and 12 occur on the ledges below Oyler's ranch at Fruita, on the left bank. On the hill back of Chestnut's ranch we came across a very elaborate specimen of black boulder design covering three sides of a rock 5 feet high. On the eastern face was a large and well made

¹ Not to be confused with Calf Creek, a tributary of the Escalante River.

² Not to be confused with Sulphur Gulch or Canyon, a tributary of Pleasant Creek.

spiral (Plate 19, b), from which an unbroken line went through complicated evolutions on the southern and western faces, finally running up over the top. Similar, though less elaborate, designs are to be seen on several rocks on a hill just above the Floral ranch. We did not explore the top of these eminences thoroughly for rock-circle sites. On a similar hill above the abandoned Noyes ranch a few miles below Notom, are quadrangular foundations 14 feet in diameter of the usual igneous boulders. On the side hill below, were well executed snakes on a boulder, a metate, and one or two sherds.

On a high rock promontory on Sulphur Creek near Torrey are the remains of a circle of large slabs of the local laminate sandstone some 15 feet in diameter. These slabs are not set into the ground but are propped up against the ledges and held in place by a few loosely piled rocks. It is not certain that they ever formed a complete circle. Short bits of similar slab wall form, as it were, railings on the edges of the lower ledges. This would seem probably to have been a shrine.

Site 9. A high bluff 600 feet to the right of the trail to the Fruita Natural Bridge, shortly after it climbs out of the river, has a number of pictographs. Below it were collected a number of sherds.

Site 11, Fish Creek Cove. Back of Ernest Cullum's farm at Grover, seven miles by automobile road from Torrey, white sandstone ridges projecting from Boulder Mountain form a large bay known as Fish Creek Cove. Here, on land owned by D. N. Covington, is a large, low cave with a southerly exposure, on the walls of which are numerous pictographs, both pecked and painted, which will be discussed in detail in another part of this report. The cave is 168 feet long and about 15 feet in depth. Preliminary examination showed that two or three holes dug by previous visitors had penetrated rich rubbish in the central part of the cave to a depth of 2 or 3 feet. This central portion, 48 feet in extent, was at one time much lower than the ends, from which the occupation dirt has drifted into the depression until now the surface is nearly level. The high west end is almost free of deposit for 30 feet. On the surface of the eastern portion is a great deal of fallen rock, and numerous hollows and grooves on some large boulders showed that these antedated at least the last

occupation of the cave. This was confirmed by excavations showing that these rocks lay on clean soil. Attacking the central area with a scraper, structures necessitating hand shovelling were soon revealed, so after skimming the top layer, the scraper was employed in digging a deep cut along the front, into which the dirt could be thrown. Seven working days were consumed in the excavations.

A glance at the plans and elevation (Figures 2, 3, and 4) will elucidate the relationships of the various structures uncovered. It is evident that the site was occupied for a long period, the total depth of the deposit being 8 feet. The lower part consisted of fine dirt interspersed with charcoal, but contained no other

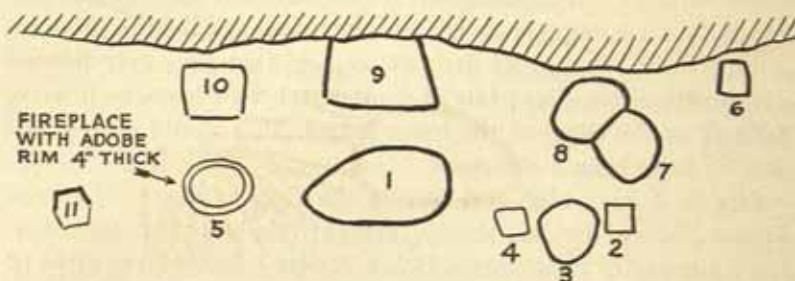


FIGURE 2

Plan of central area, Site 11, Fish Creek Cove, Grover, to show cists.

signs of occupancy except an occasional metate, flint, or sherd. While the dirt appeared to be wind deposited, a certain amount of water doubtless drained into the caves when the floor was at this low level and destroyed any perishable remains. Grooved sharpening stones were found just above the clean hardpan. The deep Cists 1, 2, 3, 4, and 5 were all set in loose dirt (Plate 8, c). The circular Cist 3 was a shallow, hearth-like affair with flaring sides, such as were found on Oak Creek. The lowest ash layer shown on the elevation marks perhaps the remains of a floor layer of bark or straw, as it contains no coals of any size. It is relatively indistinct to the right of Cist 1. The floor just above Cist 4 consists only of a hard packed layer of the same dirt that occurs on either side of it. Unfortunately, the immediate vicinity of Cist 4 was dug out before we recognized the existence of a definite floor level, so that we did not record the exact relation-

ship of Cist 4 to this. Cist 4 was provided with a domed cap of adobe with an opening at the top in which a flat slab was neatly fitted. Without much doubt, there was an opening in the floor above at this point and Cist 4 constituted a sub-cellar for the room above. Cists 2 and 3, on the other hand, undoubtedly represent an earlier occupation.

Above the floor lay 7 or 8 inches of dirt mixed with much straw and strewn with slabs of red sandstone, which had apparently fallen down between the roof timbers above. Their exact function is not clear, unless to give added weight and insulation to the roof above the beams, as they could not have come through the

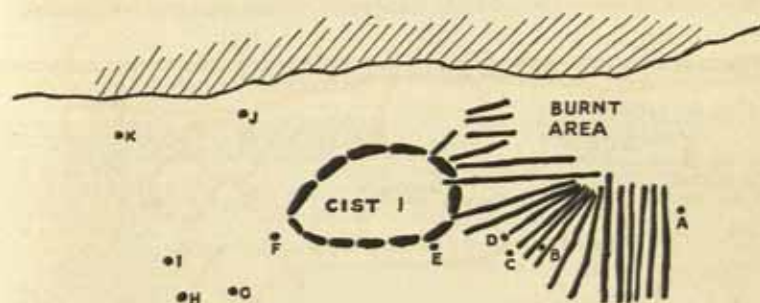


FIGURE 3

Plan of central area, Site 11, Fish Creek Cove, Grover, to show posts and beams in relation to Cist 1.

overlying thatch, nor were they numerous enough to have formed a flooring below the roof. The beams themselves were of quaking aspen, those on the right laid parallel with those on the left curved round in a semicircle. The last three had their inner ends lashed together with withes, while the others had been burnt at the back so that it was impossible to tell how they were secured.

Stretched over the aspen poles was a framework of unique construction, consisting of willow rods with their tops braided together to form a neat selvage, while at intervals of 1 foot, twined-woven withes gave a firm cross support (Plates 8, b, 10, a). The wickerwork thus formed was so substantially constructed that sections 5 feet long and 4 feet wide were readily taken up and carried about. The rods were laid parallel to the roof beams with the braided tops forward, except for a section

3 feet wide between Cists 1 and 4, which was laid with the cut ends to the front.

This framework was covered by 5 to 6 inches of cedar bark strips matted together (Plate 8, a). There was no layer of adobe on the top of this such as is usual in Cliff-dweller construction. Above the thatch was a foot of ash-bearing dirt and above this again was a layer of from 8 to 10 inches of dirt mixed with much loose straw and other débris. A light covering of sand, blown in since the last occupation, topped off the deposit.

To return to the roof level: the beams projected slightly over Cist 1, and a thick layer of burnt cedar bark lying on the same flat slabs as were found in the intact portion of the roof extended

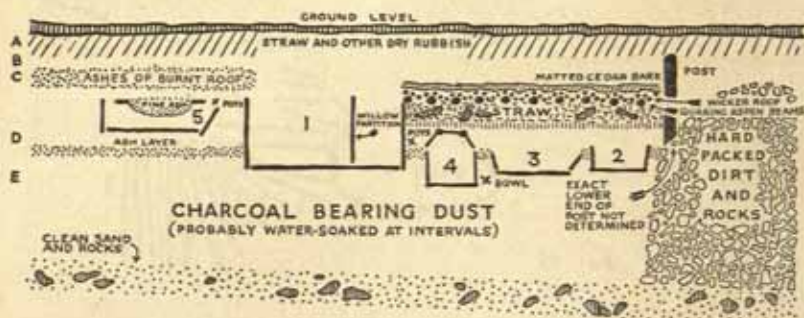


FIGURE 4

Elevation of central area, Site 11, Fish Creek Cove, Grover.

around Cist 1 and over and beyond the hearth at 5, showing that the whole had once been roofed over. The posts (Figure 3, A-I) were the only remaining indications of the supporting structure. Of these, A is broken off a couple of feet above the floor level, while all the others consisted only of charred fragments a foot or so in length near the floor level. It is by no means clear just what the arrangement of the framework was. Either each beam had its own support at the front, or crossbeams went under the curving front. The post at A must have supported a crossbeam. The situation at the back is obscured by fire, but that would not account for the disappearance of the supports under the intact portion of the roof. Perhaps after the fire the larger beams and the uprights were removed for use elsewhere.

Cist 1 was divided by a light daub-and-wattle partition of



a, Storage chamber, Calf Creek; b, Fireplace and Cist 5 beneath, Site 11, Fish Creek Cove, Grover; c, Storage chamber and door, Capitol Gorge.



a. The roof viewed from Cist 1, Site 11, Fish Creek Cove, Grover; b. Use of pine bark in cists, Site 13, Fremont River; c. Cellars, Site 23, Sandy Creek.

which only the base and one crosspiece remained. The walls of this cist were originally some 3 feet high. At 5 was a fireplace consisting of a circular adobe rim 2 feet 10 inches in inside diameter and 4 inches thick, within which lay a hemispherical bed of fine ash (Figure 2). Under this was an older cist (Plate 9, b).

The adjoining Cists 7 and 8 were under the floor. Cists 6, 9, and 10 were at about the same level, but as no definite floor existed at this point, their relationship to the other structures was less certain. Cist 11 was beyond the building and a foot or so higher than the others, owing to the rise of the ground toward the western end of the cave. Every cist had a flat stone floor with the exception of No. 2, which had no floor at all.

To summarize: above 3½ feet of occupation rubbish is a level containing several cists. After these had fallen into disuse and had filled up, a wooden structure (or structures) was erected, containing a large divided bin, sunk into the floor, and a fireplace. This was destroyed by fire, causing the roof to collapse, and the cave was occupied thereafter for a sufficient period to allow 2 more feet of rubbish to accumulate.

There was no demarcation of culture levels on the basis of specimens found. Plain ware sherds, flints, metates, manos, corn-cobs, bones, horns and hair of deer and mountain sheep, and bits of dressed skin and of string were found at all levels above the bottom of the cists. Whole pieces of pottery were found below the floor level as follows: a black-on-white bowl low down between Cists 3 and 4; two large plain ware vessels, cached side by side, upside down, between Cists 1 and 4; two small, plain jars similarly placed between Cists 1 and 5; a small corrugated jar and a seed-jar, similarly inverted, at the east end of Cist 8, and probably from a level corresponding, a small pitcher between Cists 9 and 10. The seed-jar lay on a nest of three shallow baskets. Unfortunately, this was the one spot which seepage through the back of the cave rendered comparatively damp and the baskets were so rotted that only fragments could be preserved by the application of shellac.

Among other objects under the floor between Cist 1 and Post A were a mountain sheep horn, a small buffer, a small basket, a reed mat, and a pair of moccasins. Parts of several arrows and

fragments of basketry were found between floor and roof. From the back of the cave came two bundles of string snares, the hearth for a fire drill, and other objects.

The deep trench was only carried down to the bottom at the front of the built over area, as the paucity of material in the lower strata did not seem to justify destroying the cists, particularly in view of the fact that they had aroused considerable interest locally and are comparatively accessible to visitors. At the completion of excavation, therefore, the cut was partly filled in to guard against their collapse, and a rude framework was erected, over which the roof beams and wickerwork were laid as nearly as possible in their original position. A section of the bark thatching was also replaced.

Site 13, Moccasin Cave. This cave is situated about three miles downstream from Cooper's ranch on the Fremont River, which is four miles from Torrey. The trail along the river is difficult to travel, the site being most easily reached by following along the ridges on the south bank to Carcass Creek, a small stream running in from the direction of Grover to the southwest, and then dropping down to the river. The cave is then directly opposite in the face of one of the limestone bluffs which form the lower level of the river canyon along this stretch. The cave, which faces south, is some 210 feet long and of considerable height, but the habitable floor, which is reached by a steep slope from the river, is only 15 feet wide at the widest part.

Starting from the western or upstream end of the cave, the first 50 feet are taken up with large fallen rocks. Next is a small plaza about 30 by 6 feet, at the western end of which is a rectangular structure 9 by 4 feet, consisting of rocks piled up without any mortar or any attempt at neatness, to a height of about 2 feet. Directly under this structure are rocks, but the rest of the area contains about 2 feet of sand, in which are some ash deposits. Several broken manos were found here. A second walled room of similar construction has its front wall largely provided by two large rocks *in situ*. (Both structures employ the back wall of the cave for one side.) Its dimensions are 12 feet by 6 feet. At present, there is an entrance between the two rocks in front. Inside is a thin layer of ash, below which the sand is largely filled with rocks. A metate and mano were found here.

Continuing to the east, a narrow passage 57 feet long, behind large rocks, leads to the main floor of the cave, 66 by 15 feet in area, beyond which the cave ends. This area, too, is not free from rocks, but contains considerable stretches filled with dirt. The rubbish overlaid by 4 to 6 inches of clean sand, is full of corn-cobs and husks, wild cane, pine branches, cedar bark, sand grass, pieces of igneous rock, relatively few bones, squash rind, string, broken manos, pebbles from the river-bed, small sticks, and very sparse potsherds. Most of it is overlaid by a thin layer of ash, while toward the western end of the area a second ash layer is separated from the first by a layer of unburned rubbish. The total depth of the deposit varies with the very uneven rock-strewn floor, but is usually about 30 inches.

Twelve feet from the western end of the area was a curious structure 4 feet by $1\frac{1}{2}$ feet. The back was formed by a large fallen rock and the sides were blocks of the local limestone set on edge. A slab of introduced sandstone was used for a central partition, but the front wall was a fence of four aspen bars lashed to uprights with withes. The height was less than 20 inches; no definite measurement can be given as there was no floor and the whole arrangement collapsed when fully exhumed. Below it was a deep pocket of dirt, and a nest of cedar bark, in which were a couple of shovelfuls of pinyon nuts.

Against the back wall just east of the foregoing was a neatly made bin of six sandstone slabs, supported by the surrounding dirt, mudded at the joints and protected on the outside by cedar bark (Plate 3, c). It was paved, and had been roofed with five poles covered with sandstone slabs. This cist measured 3 feet 6 inches in breadth, 2 feet 10 inches in length front to back, and 2 feet in height.

Twelve feet east, against the back wall, was encountered a large carrying basket laid upside down in a hole which had been dug for it into the clean sand below the rubbish layer (Plate 3, d).

Nine feet still farther east and about 5 feet from the back wall are two cists of unique construction (Plate 10, b). The larger is roughly circular, 2 feet 9 inches across, and 9 inches high. About three-fifths of the wall is composed of strips of pine bark 1 foot to 20 inches in length, set on edge and neatly mudded up. The floor is of the same materials. The remaining two-fifths of

the wall, at the rear, is of local stones rather irregularly piled. Ten inches to the front and east is a second cist, oval, 2 feet long by 9 inches wide and 13 inches deep, made entirely of slabs of bark about 9 inches in width, set on end. It is floored with adobe (which may have a bark foundation) and the walls are also lined with a coat of mud. These cists, as well as the proto-masonry and fence construction, were doubtless inspired by the fact that no suitable stone slabs are to be had in the immediate vicinity of the cave. A good grade of ripple-marked sandstone, such as is used in the one slab cist, occurs perhaps a mile away.

In the rubbish were found two images, of which one fortunately came to light in the first few shovelfuls of the preliminary test and induced us to return to the site; a pair of moccasins and one dozen moccasin soles; stone arrowpoints and a stone awl; two small tule mats; prayer sticks (?) of cane with feathers; pieces of arrows; planting sticks; a small basket; a bit of fur blanket; and numerous bits of string and dressed hide, including a large strip of buffalo hide, as well as other objects.

The pitted wall of the cave was unsuitable either for taking or for retaining pictographs, but five or six vertical streaks of red paint remain at a spot near the west end.

Around the corner from the cave, to the right and somewhat higher, is a small cavern typical of the grottoes formed all along in the limestone strata by percolating water. As compared with the usual type of dwelling cave it is quite deep, opening out from an entrance about 6 feet square, and has a sloping floor falling away sharply toward the front. The floor and crevices in the roof are covered with a deposit of a yellow, pungent, bitter substance, apparently resin from pine trees growing far above the cave. These caves were not used as living quarters, the half-dozen which we examined below Fruita yielding only a hoe of mountain sheep horn. The present example, however, had evidently been used to store food, perhaps corn or jerked meat. A light pole 15 feet in length was stuck in two crevices and propped with another pole so that it was from 3 to 10 feet above the steep part of the cave floor. Suspended from it were a half-dozen handles, like straps in a trolley car, made of a withe looped over the pole and twisted together. No evidence remained of what had been suspended there.

Site 14. Two miles downstream from Moccasin Cave the river narrows to a gorge, impassable unless on foot. At the entrance to the gorge, on the left bank, is a low, shallow cave which is evidently reached by unusually high floods. The cave floor is rocky but in places there is about 2 feet of deposit, containing only sparse charcoal, with two thin layers of fine ash a foot apart. Two skeletons with markedly deformed skulls had been found here by Clarence Mulford, but it developed that these had lain in a pocket among a fall of rocks at the lower end of the cave, which had taken place since the ash and charcoal was laid down. He described the bones as being bunched together as if the bodies had been crumpled up and roughly thrust into the hole. There was no grave furniture. On the wall were pecked pictographs, so low as evidently to have been made before the fall of the rocks among which the burials lay.

EAST FACE OF THE WATER POCKET FOLD

Site 22. In 1928 a brief trip below Notom was undertaken to investigate a large cave which contained cists, on Sandy (the name taken by Oak Creek after it emerges from the Water Pocket Fold, about nine miles south of Notom). Earl Mulford, our guide, was unable to find this, and indeed Sandy, a dry wash running through a perfectly barren limestone and clay country, seemed a most unpromising locality. We found, however, an overhanging ledge in a small draw, beneath which were two cists with stone floors which may have once been mudded up to form structures of the "Moki House" type. Potsherds, corncobs, and ash were found to a depth of over a foot beneath the floor of one cist. Forty-five feet away was an unimposing hemispherical cave 12 feet in diameter. Near the top was a quantity of cedar bark, below which, to our astonishment, instead of striking the ledge, we encountered dirt and ashes to an unascertained depth. At 3 feet, there were several inches of clean fill, hard and vaguely stratified, as if deposited by water, below which the coal-bearing layer continued. We desisted from further attempts to reach bottom after unearthing a metate at a depth of 6 feet.

On the main wash, under a slight overhang, were seven imprints

of a right hand in red paint, below which a little cedar bark was found.

Site 23. About a quarter of a mile over the crest of the mesa due east of Durfee's sheering corral at Notom, is a small butte under the west face of which is a low rock shelter. Here two cellars present a variation on the usual "Moki House" theme (Plate 10, c). Each is excavated in the hard green clay to a depth of 2 feet 9 inches and a diameter of approximately 4 feet 6 inches and roofed over at the ground level, with a manhole which could be closed by a round lid 22 inches in diameter. That on the right has a simple rectangular arrangement of the roof-beams, covered with light lathes and adobe. That on the left is cribbed in such a manner that the front is nearly level with the back, the interstices being filled with mud. The beams are of quaking aspen and show the marks of stone tools.¹ These chambers contained only drift sand. A couple of sherds were picked up in the open within a hundred yards.

Coleman Canyon is a name somewhat vaguely applied to one or more of three short canyons emerging from the Reef south of Oak Creek. All are very narrow at the mouth but widen slightly farther up, and are dry except after rains. They head against a tongue of land running down from Boulder Mountain known as Dry Bench, on which sherds and flints have been found by sheep herders. For convenience, the three canyons may be designated Coleman North, Middle, and South.²

Site 24. Sherds and flints were picked up on a knoll above our camp, which was located on the ditch which carries water to the Bown ranch (now split up into several ranches) about halfway between Colemans North and Middle. Sherds also were found farther up the ditch.

Site 25. In a small, high cave near the mouth of Coleman Middle were two small slab granaries in a ruinous condition. In the débris formed by their collapse were corncobs, an ear of corn with some kernels remaining, a fragment of buckskin, and a small medicine bundle.

Site 25a. Near the mouth of Coleman North, under a slight

¹ The absence of stone axes or any large stone tools (except manos) in Fremont sites raises an interesting problem as to how such poles were cut.

² Shown as Coleman C, B, and A, respectively, on Plate 2.

overhang, was a granary made by edging a depression among the rocks with slabs and covering it with timbers wedged in among the rocks and mudded over to form a slightly convex irregular chamber 6 feet in greatest interior dimension and $2\frac{1}{2}$ feet deep. A manhole in the roof was closed by a disk of sandstone 26 inches in diameter (Plate 7, b). This little cellar contained sherds from a plain ware olla, cobs, and a flint knife blade.

Site 26. Two miles up Coleman South is a well protected cave 40 feet long and 10 feet deep with a low smoke-blackened roof. The floor is level but rocky with a few inches of dirt among the rocks. There were evidences of habitation in the form of ashes, burnt bones and fragments of deer and sheep hide, corncobs, plain sherds, among which were a few corrugated and black-on-white pieces, sherds of two unfired clay dishes, several flint blades, and a lump of salt.

Site 35. At the mouth of the Fremont box is a camp site with sherds and metates.

Immediately after it emerges from the Water Pocket Fold the Fremont is joined by an alkaline wash coming down from the northwest parallel to the Reef for about thirty miles, the valley being called the South Desert. The valley is bounded by scenically colorful but archaeologically uninteresting cliffs of hardened clay. We were unable to find reported remains at the head of the Desert. Halfway up the Desert, Deep Creek enters from the west, where it strikes back into the Fold, forks, and heads into a number of box canyons, which we explored.

Site 36. Two miles above the main fork of Deep Creek, in the right or south branch, is water and a pleasant grove of cottonwoods. On the right, immediately above the grove, is a small cave with a hard clay bottom, where flints, fragments of a basket, corncobs, a bit of fur-string, and ashes indicated visitation.

Site 37. Above Site 36, Deep Creek forks again. At the head of the right branch was a small, high cave, which was not personally visited by the writer. Here the other members of the party found several small potholes covered with a thin layer of rubbish. The floor was strewn with small pieces of mountain sheep hide, not dressed, and cedar packing. While no basketry was recovered, splints for basket weaving were abundant. An ear of corn, a lump of paint, and a large piece of tendon from a sheep's neck from

which sinew was obtained, were the other specimens. No sherds were found anywhere in Deep Creek.

GREEN RIVER TRIP

Nine Mile Canyon, which on most maps is called Minnie Maud Creek (according to some local authorities the latter name properly applies only to one branch of the former), is a tributary of the Green River coming in from the Tavaputs Plateau on the west, about 55 miles north of Green River City and 95 miles north of the Fremont.¹ The canyon contains a good stream of water and there are several ranches. The canyon was until recently a part of the Ute reservation, and numerous low walls of rocks without mortar in small shelters and on points on the cliffs are attributed to them. The cliffs bear small groups of pictographs at numerous points, of which some are probably recent.

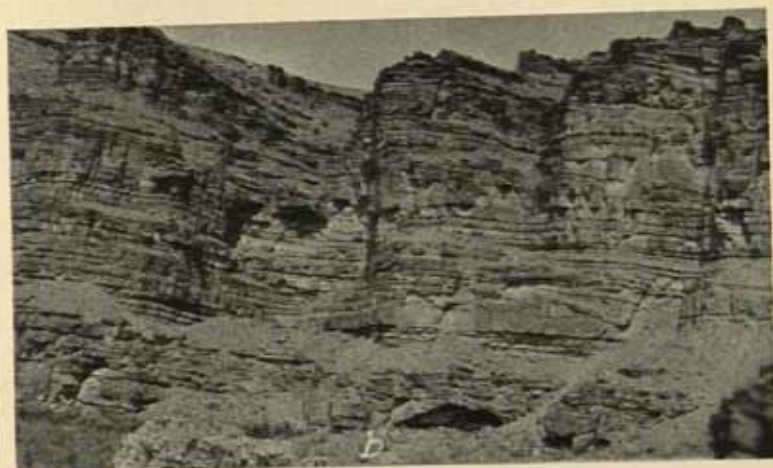
While virtually no sherds were found by us, a number of plain gray sherds, a few pieces of black-on-white and corrugated, and one sherd of Proto-Kayenta (Tusayan) polychrome in the possession of Miss Catherine Nutter had been picked up locally.

Our observations were limited to the ten-mile stretch from the Nutter ranch to Cottonwood Canyon, which enters Nine Mile about twenty miles from its junction with the Green. Further pictographs and small inaccessible cliff-houses were reported farther down.

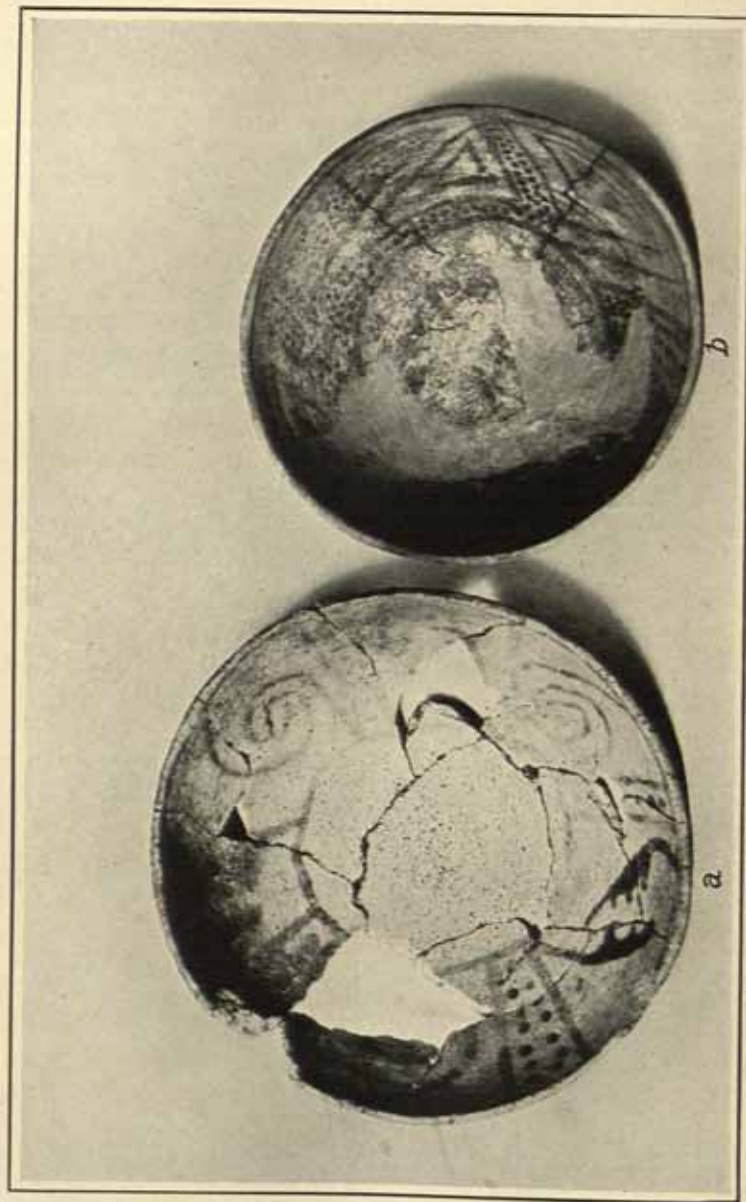
Site 29. In a small, high cave three miles below Nutter's ranch, were found a few ashes, bones and cobs, fragments of two twined-woven tule mats, grains of dent corn, a piece of feather-string, and a single sherd.

Site 30. Just below Site 29 a small sheltered ledge in the cliff, from 3 to 7 feet wide by 20 feet long and 4 feet high, is walled up from the floor to the roof with large undressed blocks laid without mortar (Plate 11, a). The placement of these stones, some of which weighed a hundred pounds, in the cramped space available must have been a laborious task. Near the cave are the remains of a wall, also apparently laid without mortar, which

¹ Several house sites and pictograph sites are described by Montgomery, 1894, *Pre-historic Man in Utah*. The principal sites visited by him were apparently farther down the canyon than we went.



a, Site 30, Nine Mile Canyon; b, Site 31, Rasmussen's Ranch, Nine Mile Canyon — main cave in center with overhang sheltering pictographs to right; c, "Utah type" grinding depressions, Site 31.



MORTUARY BOWLS, SITE 1, BOULDER.

contains a small window. The wall is irregular in shape to conform to the edge of the bluff on which it stands, and encloses a space about 20 feet in diameter. No artifacts were found in these structures, which are perhaps of recent origin.

Site 31. At the Rasmussen ranch, seven miles below Nutter's, are excellent springs. In two small caves (Plate 11, b) and for some distance beyond them on the cliff are numerous pictographs, both painted and pecked, which will be considered later. The only rubbish deposit was in the large cave, where a crevice some 20 feet long and 2 to 5 feet wide beside a large fallen rock was filled with ashes, packing, and refuse to a depth of $3\frac{1}{2}$ feet. Nearly at the bottom of the rubbish was found the partially mummified body of a child. It lay on its back, the arms flexed at the sides, and the femurs pointed almost straight up, the lower legs missing. The lower jaw was also missing, probably having been dragged away by rats. There was no evidence of anything accompanying the burial other than rotted fragments of mountain sheep skin adhering to the back of the head. The skull showed moderate occipital deformation. Five feet away at the same level and probably unconnected with the burial were a number of snare sticks and a rotted fragment of a twined-woven mat. From higher up in the rubbish came numerous fragments of worked over clay, only three of which were definitely recognized as fragments of modeled objects; cobs and grains of dent corn; a bone awl and a bone pendant; a hearth and point of a fire drill; a tiny fragment of basket; and a small sherd of black polished plain ware. A Fremont type mano was picked up three miles down the canyon.

Site 32. The pictographs near Thompson, 35 miles east of Green River, were visited and will be discussed later.¹

Site 33. Black Dragon Canyon is a short, narrow cut in the east face of the San Rafael Reef two miles south of the San Rafael River. Under a high overhang near the mouth is a narrow protected floor on which are bits of wall composed of single courses of large stones without mortar, probably recent. On the walls are peculiar paintings which will be discussed later.

Site 34. Two miles south of South Temple Wash a cave can be seen in the San Rafael Reef from the Hanksville-Green River

¹ These were seen by C. K. Gilbert of the Geological Survey in 1883. Mallery, 1886, *Pictographs of the American Indians*, p. 117.

road. On close approach this turns out to be a very impressive double cave, the chamber on the right being lighted by a large, circular opening in the domed roof. The whole place is very damp, but in the left-hand compartment, a low ceilinged gallery running back into the rock, is a thin layer of ash a foot below the surface and, in favorable spots, nests of cedar bark. One such nest contained a cache of three tibiae, three ulnae, and one scapula from the mule-deer and two sandstone arrowshaft smoothers. As no sherds, flints, or other artifacts were seen in the cave, these objects cannot with certainty be attributed to the Fremont culture.

Reports from local sources indicate that the Fremont culture will be encountered along the west front of the San Rafael Swell and in the broken country north of the Muddy River known as the Sinbads.

MATERIAL CULTURE

BOULDER (PUEBLO II-III)

THE culture of the two Boulder sites presents a relatively simple problem and may be disposed of first.

SKELETAL MATERIAL

The three skulls found were all occipitally deformed. Burial is on the back, oriented in any direction, with the knees to one side, slightly flexed.

FOOTGEAR

A "sandal-stone" (without the customary offset) found at Site 1 indicates, if the theory of their origin is correct,¹ that sandals were worn by the Boulder aborigines.

POTTERY

Four of the whole corrugated pots which were from the Site 1 burials are wide-mouthed ollas of varying size and of a fairly good grade of corrugated ware without special treatment of the corrugations. These in every instance start at the bottom. One piece only has a small quadruple handle set vertically under the rim. The fifth is longer in the body, and is of such coarse lap-streak construction that structural weakness between the corrugations is apparent. The pot is noticeably misshapen (Plate 24, b).

A pitcher 6 inches high and 17 inches in circumference has a slightly convex neck, a handle coming up to the lip and a pentagonal shoulder. The surface is smooth and sooty black in color (Plate 23, b). A similar shouldered pitcher from Meadow, Utah, is illustrated by Judd.²

The two decorated bowls found with burials are of an unslipped grayish ware, on the surface of which coarse particles of igneous temper are in evidence (Plate 12). The black designs

¹ Kidder-Guernsey, 1919, *Archaeological Explorations in Northeastern Arizona*, p. 105. But compare the "shoe-last celts" of Europe which have been found hafted as hoes.—Peake and Fleure, 1927, *Priests and Kings*, p. 141.

² Judd, 1926, *Archaeological Observations North of the Rio Colorado*, Plate 40, g.

are discolored and lacking in sharpness. One has a crude and slightly asymmetrical decorative scheme of vertical panels containing dots and an opposed scroll-like element. The second bowl bears a more sophisticated design in which free-standing black dots also figure.

The surface pottery at Site 1 is characterized by the preponderance of corrugated ware, which forms about 95% of the sherds on the site as a whole. A test taken at a spot chosen for the large amount of ornamented pottery showed corrugated, 63%; black-on-white, 11%; red ware, including polychrome, 8%; and plain or unclassifiable sherds, 18%.

The black-on-white from the surface, in marked contrast to the mortuary bowls, has a good white slip and sharp black decoration. The designs are simple arrangements of fairly broad lines, such as are found commonly in Pueblo II pottery, together with typical Proto-Kayenta¹ barbed lines of the simpler sort. They occur only on bowls. Only one sherd picked up shows a dotted area, and in this the dots were much finer than on the mortuary bowls. (Claffin, however, found a sherd of the coarser dotted ware.) The red ware bears simple dull-paint lines. Only four or five sherds of Proto-Kayenta polychrome were picked up. Other sherds of interest are a few from undecorated bowls, two of corrugated ware with black-on-white interiors, and an undecorated ladle of the bowl and handle variety.

The sherds from Site 2 were similar, including polychrome, a sherd or two of the Northern Arizona Pueblo II ticked triangle, and the Proto-Kayenta barb.

It is obvious that these sites approximately correspond to the early part of the Proto-Kayenta or Tusayan polychrome period, differing only in the small amount of decorated ware present. Since no polychrome or Proto-Kayenta barbed black-on-white was found at Site 1 except close to the surface, it would appear that these wares belong only to the close of the occupation. The two mortuary bowls represent a primitive variant of early Pueblo design, possibly corresponding to the Beaver-Paragonah culture. In general, the evidence fits in with that of Judd in pointing to

¹ At the second Pecos Conference, "Tusayan" was adopted to replace "Proto-Kayenta." Unfortunately, the new term has since been used in other senses and the writer therefore temporarily retains "Proto-Kayenta" until this confusion shall have been definitely cleared up.

an early Utah Pueblo culture replaced geographically or chronologically by Proto-Kayenta in the southern part of the state. This culture never had much foothold in the Fremont valley.

FREMONT CULTURE

TYPES OF SITES

To summarize briefly the descriptions of sites visited, excluding the Pueblo sites, they may be roughly classified as dwelling caves, storage places, and rock-circle sites. The dwelling caves are normally characterized by absence of house structures of any kind, and by the presence of cists, usually rather small. Here the resemblance to Basket-maker sites ends, for the Fremont caves contain quantities of habitation rubbish, often of depths usually found only in village sites of some size. The small cists, like Eeyore's "useful pot to put things in," were doubtless for general storage purposes. It does not appear that many of them could have been roofed over; they probably served mainly as places to keep household supplies out of the dirt.

The raised circular platform at Site 5 and the circular adobe floor at Site 27 perhaps have some functional connection, although not at first sight similar. Neither showed evidence of having been covered over.

The one building found, at Site 11, appears to be affiliated with the hogan-like structures found by Judd in the Willard and Beaver cultures. To anticipate, it may be said that the artifacts found at this site show a connection with a Puebloan culture but are predominately of Fremont type. It is therefore interesting to observe that the stratigraphic evidence shows that a long period of occupation, including typical cists, preceded the building, but that the building can not be said to follow, or even mark the end of the plain ware occupation.

The storage places are clearly linked with the cave-dwellings by the sherds, occasional fragments of basketry, snare sticks, and foodstuffs found in them, and by the use of quantities of cedar bark. They also agree with the cave-dwellings in the ante-Puebloan nature of their architecture, the example of horizontally laid masonry below Fruita hardly amounting to an exception.

Their sherds and the presence of metates likewise link up the rock-circles with the general complex. The fact that a fairly extensive site contains only three or four, and those not close together, perhaps suggests that these circles are the foundations of chief rooms or proto-kivas, the dwelling houses being less substantial.

It is unfortunate that the lack of artifacts in connection with the wooden structure at Site 3 makes it impossible to assign it to its proper period. It may be pointed out that it is not Puebloan wattle-and-daub, but bears a close resemblance to Judd's reconstruction of a Willard house, and may well represent a type of open site house, reduced in size for use as a storage chamber instead of the usual "Moki House."

PARIETAL ART

The pictographs¹ of the Fremont region are among its most interesting antiquities. At the same time they present some of the most difficult problems. While the correlations of the principal types with the other remains can be established with reasonable certainty, every variation from the norm raises the gravest suspicions in the mind of the observer as to its antiquity, while studies in style, subject matter, and superposition do little to clear up the confusion.

Black Boulder Pictographs. This interesting type of pictograph, associated with rock-circle sites, has already been discussed under Site 12 (Plate 19, a, b).

Dancer Pictographs. The most striking pictographs of the region are anthropomorphs which may be fairly taken as representations of gods or of priests or dancers personifying the gods in the manner of the modern Pueblo Katchinas,² although it seems improbable that the individual characters are clearly defined as in the case of the latter.

The figures vary in height from 8 inches to heroic size and may be painted, grooved in outline, pecked or scooped out in whole or

¹ This term is here used for all forms of representations on rocks, whether painted, pecked, or grooved.

² See Steward, 1929, *Petroglyphs of California and Adjacent States*, p. 217, for a discussion of Katchina-like pictographs; and Fewkes, 1903, *Hopi Katchinas*, for types of Hopi Katchinas.

in part, or partly incised and partly painted. They often appear in small groups, in which, however, the individual figures are not connected. The figure is presented in full front view, the arms hanging straight by the sides and the fingers outspread. Arms and legs are evidently considered of minor importance and are frequently omitted altogether, the technique in this respect suggesting that of the figurines. The basic type of body is a trapezoid broadest at the shoulders, on which is set a trapezoidal head without any neck. A common modification is a constriction at the waist, giving the appearance of a man wearing a kilt. Nearly every figure wears a headdress of some sort, the commonest being a pair of deer or elk horns. The face may be left blank or the features roughly indicated or a mask may be shown. A broad, semicircular collar is very characteristic, and there may be in addition ornaments on the breast, commonly spiral. Finally, clothing at the waist is regularly indicated by horizontal lines.

The simple type of cornute is shown in Plate 13, a, and d, from near Fruita. The former is from a group in yellow, white, and red paint, about 8 inches high, on the under side of a projecting cap rock. A number of other examples might have been given. Painted examples, too far gone to photograph in the dim light, were found in the cave at Site 27. Plate 14, b, shows large (*circa* 4 feet) pecked examples at Site 5 which were whitened in order to photograph them. At Site 8 were small (*circa* 10 inches) figures in red, white, and yellow (Plate 14a, b). Note that in the one on the left, the head is apparently omitted and the horns set directly on the points of the shoulders, a peculiarity which was also noted at Black Dragon Canyon, Site 33. Plate 13, f, is at Fruita and shows a rather common feature in the central spike on the head.

Other interesting types of headdress occur in a large panel of incised figures on the left bank of the Fremont at Oyler's ranch, Fruita (Plate 15). The very fine panel from the right bank in heroic size (Plate 16) brings out the unmistakable representation of masks.

The tendency toward formalization or shorthand representation is seen in Capitol Gorge (Plates 13, 9). In many places the essentials of the figure are rendered by a couple of lines for the horns, with perhaps the arc of the collar, the spiral of the chest, or

a suggestion of the shoulders. Plate 13, h, is a formalized group on the Fremont a few miles below Fruita.

Other types. Mountain sheep of the familiar Cliff-dweller types are found in close association with the anthropomorphs (Plates 15 and 13, e).¹ Many of these have more life to them than the general run of such pictures. Besides the religious anthropomorphs, others are occasionally seen which lack their set pose and ornamentation and appear to proceed from an informal artistic impulse. See, for example, the two travelers in Plate 16. There are also a good many snakes, serpentine designs, and various grotesque or meaningless designs, not all of which necessarily date from the Fremont period. At the Hiskey ranch at Teasdale are interlacing lines with what appear to be hands growing out of them. These are definitely superposed on Fremont anthropomorphs and are accompanied by stars and crosses which suggest European contacts.

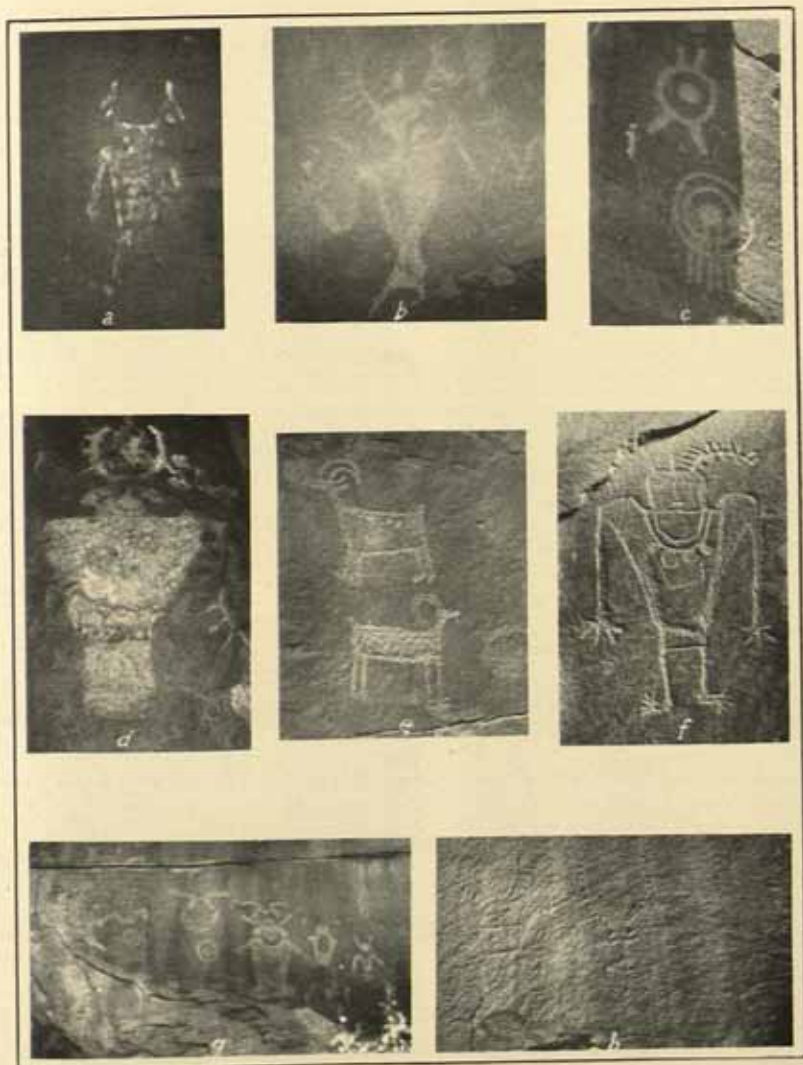
The finest pictographs in the Fremont region proper appear to be those on both sides of the Fremont at and near Fruita and those on Pleasant or Temple Creek at the Floral ranch, the latter, however, including few anthropomorphs. Additional illustrations of Fruita pictographs after photographs by the late Professor Andrew Kerr are given by Steward.² Those at the Floral ranch are probably the ones seen and described by C. K. Gilbert.³

Fish Creek Cove Pictographs. The pictographs on the cave walls at Site 11, Fish Creek Cove, Grover, are of great interest. As one approaches the cave, the eye is caught by a frieze of eight animals of about natural size in red paint (Plate 14, a). The height above ground suggests that they were painted by someone standing on the present ground level, but this is of little significance in view of the considerable heights at which pictographs are sometimes placed. The first on the left is a heavy-set animal with small horns. The second is apparently an unfinished body of the same type. The fourth, which is rendered in outline, is a horned creature such as the deer or elk. The other five (one of which does not show in the illustration) are rather delicately

¹ For the distribution of mountain sheep pictographs, see Steward, 1929, *Petroglyphs of California and Adjacent States*, Map 6.

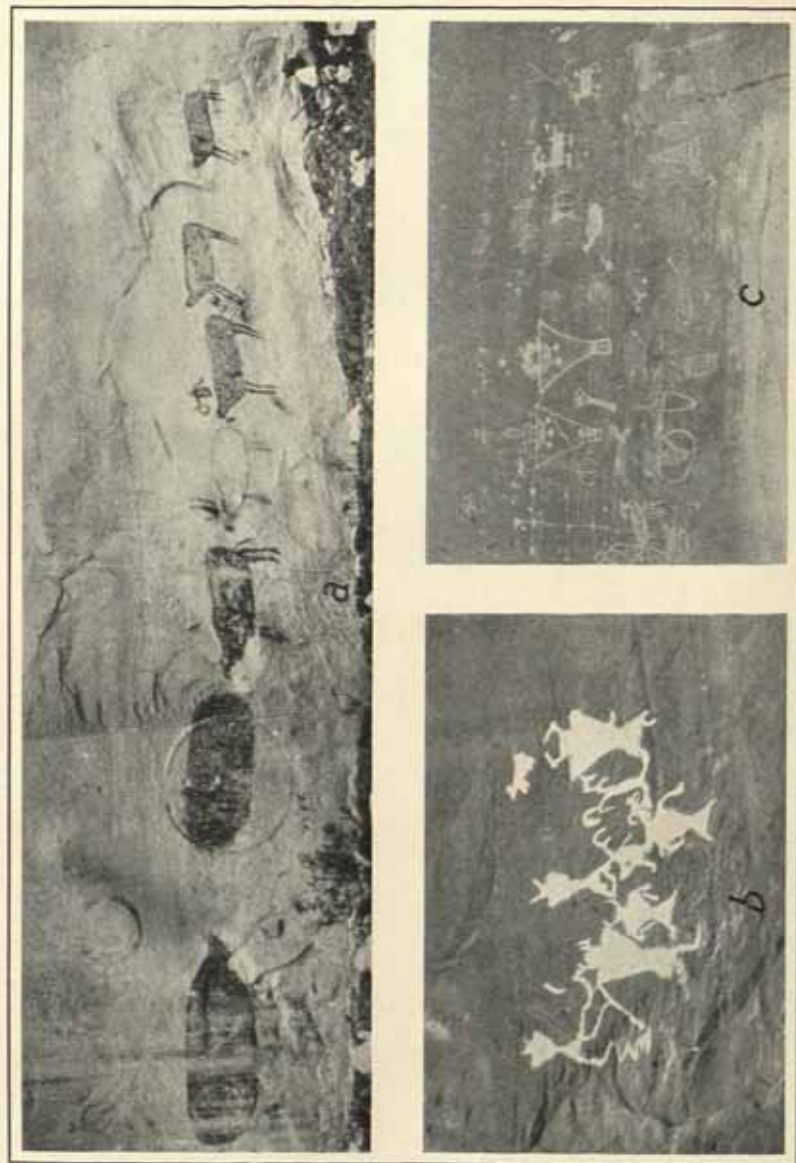
² Steward, 1929, *Petroglyphs of California and Adjacent States*, Plates 81, 82.

³ Mallery, 1888, *Pictographs of the American Indians*, p. 116. Mallery also illustrates Fremont pictographs from the Colorado River after Dellenbaugh (Figures 84, 87).



FERMONT PICTOGRAPHS

a, b, d, Painted, the rest pecked; b. From Site 31, Nine Mile Canyon, the rest from near Fruita.



PICTOGRAPHIS

a, Red paint, Site 11, Fish Creek Cove, Grover; b, Pecked, Site 5 (Image Cave), Pleasant Creek; c, Pecked, Panel 1, Site 32, Thompson.

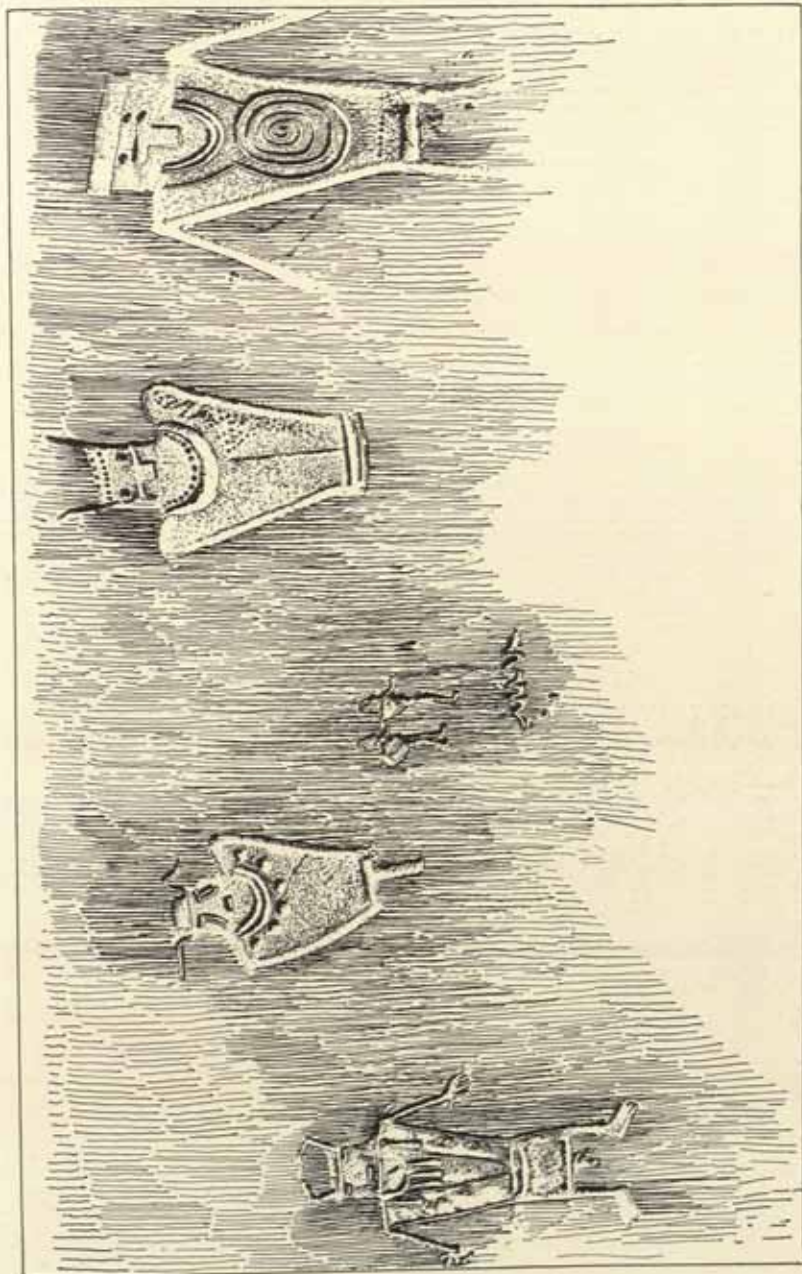


PICTOGRAPHS

a, Blue paint, Site 31 Rasmussen's Ranch, Nine Mile Canyon; b, Red and yellow paint over pecking, Site 8, Sulphur Creek; c, Red, brown, and white paints, Site 11, Fish Creek Cove, Grover; d, Red paint, Site 32.



LARGE PECKED FIGURES, FRUITA



LARGE PECKED FIGURES, FRUITA

proportioned and might be taken for doe. A peculiarity of all, except the outlined figure, is that they have no faces, although two have an amorphous white area ahead of the neck.

To the left of the painted animals is an object in a brighter shade of red and white which appears to be a shield with streamers, to the left of which again are two anthropomorphs in still a different shade, a chocolate brown (Plate 14A, c).

Other painted pictures include a man above the fourth painted animal in the same paint, a double circle in yellow and white over the second animal, a brown circle above (Plate 14, a), small animal figures near the ground level, small filled-in circles in yellow or red, and at some distance to the right, a nearly obliterated large human figure in red, and a Greek fret in red.

At the same site there is a considerable amount of pecked work, which is comprised mostly of mountain sheep and serpentine designs. A well executed representation of a buffalo is the only unmistakable example of this animal seen by us in the Fremont region proper (Plate 17, a). Pecked anthropomorphs are limited to a shorthand representation of the cornute figure showing the arc of the collar and two tall horns, the latter being grooves filled in with brown paint, which occurs repeatedly.

The physical evidence as to the relative age of these various types is not wholly satisfactory. The wall has been subjected to very uneven weathering and water action, so that relative freshness affords a poor criterion. The colors on the herd of animals and on the shield are so fresh as to suggest comparative newness. In the case of the indistinct, large painted figure, there is a clear superposition of the grooved horn of one of the dancer figures. On the other hand, another such horn underlays the right-hand streamer of the shield, as may be seen on close inspection of Plate 14A, c. The order of other interferences between the large animals and pecked figures is not wholly clear; the horns of a sheep cutting into the belly of the first beast on the left would appear to be later than the paint, as the grooves contain no paint, but it is possible that the paint, roughly applied, merely failed to reach the hollows, and the artist of the sheep would not be likely to place his subject in this position intentionally.

Turning to the subject matter, the painted animals and circular designs are unlike other Fremont work, but we have com-

paratively little painted material from this district. The same acephalous animals and small painted disks are found in Nine Mile Canyon and the former trait also occurs at "Cleopatra's Cave" on Crescent Creek. As to the large shield, somewhat similar designs were met with in pecked work at Fruita (Plate 13, c), and in recent work at Thompson (Plate 18, c).

Again, it may be thought that the large, short-horned animal is a steer; but it may equally well be a buffalo, and if any of the work was so recent, the absence of any representation of the horse is surprising.

On the basis of this evidence I am reluctant to express even an opinion as to the age of the large animals. I am, however, inclined to believe that the large, shield-shaped device is comparatively recent, basing this conclusion largely upon the fact that large, shield-shaped paintings in caves have been found in other regions associated with paintings of European animals, although the cave deposit contained only remains of unquestionable antiquity.¹ The fresh appearance of this shield is thus accounted for. The white faces on two of the animals appear to be rendered in the same pigment as the white half of the shield, but these may well be later improvements as the other animals do not possess them and no counterpart is found in the acephalous animals in Nine Mile Canyon.

The evidence of this painted shield would thus tend to confirm the evidence as to the age of the actual shields found by Bishop Pectol afforded by their resemblance to modern types.

Pictographs at Thompson. The group of pictographs located on the railroad and auto road leading to the coal mines, about seven miles north of Thompson (Site 32), have suffered considerably from defacement and imitation, making the more accessible panels rather difficult to unscramble. These contain pecked mountain sheep, etc., as well as a few simple painted anthropomorphs (Plate 14A, d). On the northwest side of the railroad are three important panels protected from the weather by slight overhangs and less seriously damaged by vandals.

¹ Mors, 1927, *Archaeological Explorations on the Middle Chinlee*, p. 8; West, 1925, *Cliff-dwellings and Pueblos in the Grand Canyon, Arizona*, Figures 38, 41. Near the paintings there illustrated is a domestic goat, unmistakable on account of his beard. Cf. Kidder-Guernsey, 1919, *Archaeological Explorations in Northeastern Arizona*, p. 91; Mallery, 1888, *Pictographs of the American Indians*, Figure 84; Mors, 1927, Plate 1, c.



PECKED OR INCISED PICTOGRAPHS

a, c, Site 11, Fish Creek Cove, Grover; b, d, Site 31, Rasmussen's Ranch, Nine Mile Canyon.



PICTOGRAPHS

a, White paint, Site 31, Rasmussen's Ranch, Nine Mile Canyon; b, Red paint, Panel 2, Site 32, Thompson; c, Scratched, Panel 3, Site 32.

Panel 1 (Plate 14, c). The pictures are some 15 feet from the ground, a circumstance which has not prevented an ambitious gentleman from reaching them, presumably with the aid of a telegraph pole, to add his name.

Series from three distinct periods are present. The first, which does not show in the photograph, is a line of rectangular-bodied, small-headed, unornamented figures of heroic size in dark red paint which is now very dim. Superposed on the first series is a line of anthropomorphs in full pecking. Each consists merely of two inverted trapezoids for the head and body except that one figure has short, straight horns. Superposed on these, in turn, are two anthropomorphs in deep grooved outline of the same shape as the second series, but with typical Fremont treatments of the collar and the waist. The second and third series are about life size. Mountain sheep and various peculiar designs which interfere with figures of the second series are as late or later than the third series.

It is believed that we have here stratigraphic evidence of the development of Fremont art from Basket-maker or quasi Basket-maker prototypes.

Panel 2. The second panel, which is around a corner from the first, exemplifies still another type. Here are paintings in red, of a lighter and brighter color than Series 1 of Panel 1, of figures from 5 to 8 feet in height, only a few of which are shown in Plate 18, b. The treatment of the shoulders and heads is quite different from Series 1 of the first panel. The staring eyes of the masks and striping of the bodies is characteristic.

This same type of painting was found by Scott on Crescent Creek, below the Fremont, and by Roberts in Barrier Canyon, north of the Fremont. It is believed to be closely related to the Fremont dancer pictures on account of the presence of masked and horned figures and of certain correspondences in detail, and because in the cave where the type occurs on Crescent Creek Roberts found a moccasin and other indications of Fremont culture.

Panel 3. As if to reassure the observer of the antiquity of the art just described, the recent work shown in Plate 18, c, is placed close by. It will be noted that a horned figure is present, but the treatment of the body and legs would set it apart

from any Fremont cornutes even without the accompanying horses.

Nine Mile Canyon Pictographs. In and around Site 31, the cave on the Rasmussen ranch, are a large number of pictographs, both pecked and painted, constituting the largest group observed by us in Nine Mile Canyon. As has been stated, this was a Ute reservation in recent times, and a few of the pictures are clearly modern, while others are doubtful. On the whole, however, the pictures appear to be ancient but show more resemblances to those of the Pueblo area than do the pictures of the Fremont region proper, a fact which accords well with the nature of the architectural remains in the valley.

The surfaces of the cliff for a couple of hundred yards east of the cave have numerous pecked figures, mostly of small size, sheep being the dominant theme, though other animals and human figures also occur. Cornutes are occasionally seen but are not of the more elaborate and characteristic Fremont types. Plate 17, b, shows two buffalo in full pecking with an elongated human figure and an unknown object between them. They stand about 20 inches high.

Similar pecked pictures occur in the cave itself. Plate 17, d, shows an amusing little scene of a man shooting a mountain sheep at close range, pecked on the flat rock on which occur the grinding hollows with secondary depressions to which there has been previous reference. This closely parallels a group at Site 11 (Plate 17, c). The most striking pictures in the cave, however, are wall paintings in a grayish paint. The subjects are cornute figures of Fremont type (Plate 13, b), very crude deer, a few sheep, and conventionalized or meaningless figures. There are a few deer in a brownish red outline. In at least one case there is a slight superposition of red on gray. There is also a horse, very well done in charcoal and similar in style to modern Navajo work, and several small round target-like designs in concentric circles of yellow and white.

Plate 18, a, depicts the wall of a small rock shelter a few yards east of the principal cave (Plate 11, b). The designs are in the same gray-white paint used in the large cave. In the case of the larger figures, the body of the figure has been pecked out before painting. At the right, the pictures are superposed on small

pecked designs. The faintness of the latter is apparently due to the poor quality of the surface. The two rhinoceros-like animals are, of course, buffalo. The curious "praying" sheep at the left continue for some feet beyond the limits of the photograph. A few of them are to be seen in the large cave.

Steward states: "It is very probable that a large number of apparently geometric figures are in reality highly conventionalized human or animal representations. This is especially true of crosses and of many figures which combine circle elements."¹ The figures on either side of the corner of the cave in Plate 18, a, illustrate various stages in the simplification of such figures and the approach to the symbol of a vertical line through a circle which is not uncommon in Cliff-dweller pictographs. Steward illustrates this same symbol from California.² It is also rather interesting to note that Capsian petroglyphs from Spain include this symbol as well as similar ones which can be closely matched with Southwestern examples.³

The horned animal shown in Plate 14A, a, is rendered in blue-green and follows after an acephalous animal in red similar to those at Site 11, which unfortunately did not photograph well enough to be reproduced.

It seems probable that the painted groups at least are the product of a culture similar to, if not indistinguishable from, that of the Fremont valley in view of their similarity to those at Site 11, the presence of Fremont type cornutes, and the character of the few artifacts recovered from the cave.

Black Dragon Canyon Pictographs. At the upper end of the cave at Site 33 are two large, faint, rectangular figures in red, one having "horns" at the corners and one a central spike, which, on the analogy of the example at Site 8 previously referred to, may represent human figures with the heads suppressed. The paintings in the central part of the cave are in red and dark green and differ in style from any yet described. The dominant feature is the use of short lines of alternating red and green either arranged in massed ranks or forming elements in such designs as

¹ Steward, 1929, *Petroglyphs of California and Adjacent States*, p. 181.

² Steward, 1929, *Petroglyphs of California and Adjacent States*, Plates 30, a; 33, d; 45, e; etc.

³ Obermaier, 1925, *Fossil Man in Spain*, Plate XXIA (reproduced in several recent popular works).

are shown in Plate 19, d. Spirals and the conventional line and circle symbol already discussed occur several times (Plate 19, c). In notable contrast to all other paintings studied is the absence of animal or human figures and of filled-in designs.

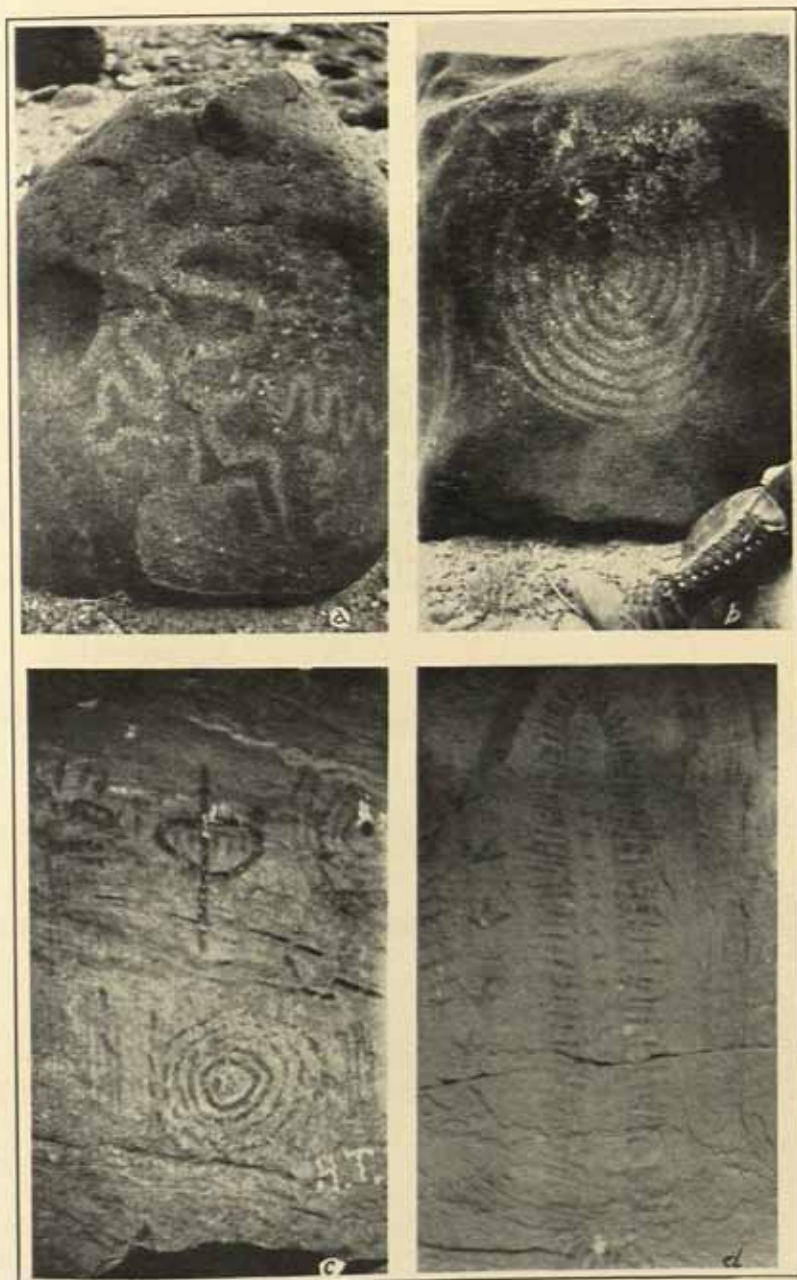
A similar use of dashes of red paint is to be seen in a rock shelter in Capitol Gorge where they cover the wall without, however, forming definite designs, and the same motif is worked out in pecking instead of paint in Dry Creek, an affluent of Nine Mile Canyon. The peculiar design represented in Plate 19, d, which occurs more than once, was not observed elsewhere. Taken as a whole, the pictographs at this site seem quite distinct from those at other sites but present familiar details which make it impossible to attribute them with certainty to a separate period or people.

Summary. The variety of pictographic material encountered in the two seasons' work contrasts with the comparative uniformity of the mobiliary culture. The Fremont anthropomorphs seem to have been developed from Basket-maker prototypes and indicate the personification of supernatural beings in forms similar to those now familiar in the Southwest. Pictographs, other than ceremonial anthropomorphs, show strong resemblances to Cliff-dweller types, but such typical Pueblo features as phallic figures, the hump-backed flute player, and representations of human and animal tracks are rare or absent.

POTTERY

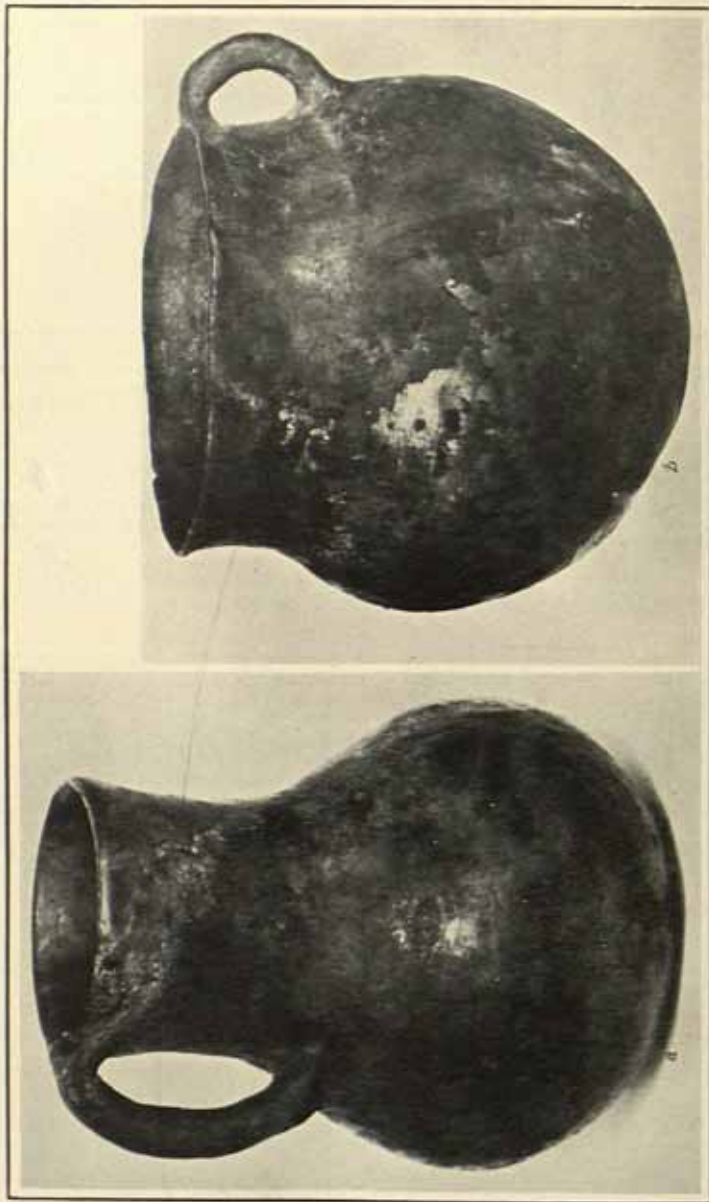
Plain ware. Except for a few scattering pieces, the pottery of the Fremont district is undecorated. The ware is usually rather thick. The paste is good and for the most part is tempered with particles of black igneous rock. The surface texture varies from well polished to quite rough. The basic color is gray, but this may be fired to black. Where this occurs on the outside of vessels it is usually in the form of irregular firing clouds. In the case of some bowls, however, the interior is covered with an even coat of black, which is sometimes highly polished and sometimes not.

The prevailing shapes are straight-rimmed bowls and round-bodied, large-mouthed ollas or jugs of various sizes. The latter type, which is more common, has the recurved lip and was usually



PICTOGRAPHS

a, b, Pecked on black lava boulders, Site 12, Torrey and Fruita; c, d, Red and green paint, Site 33, Black Dragon Canyon.



LARGE VESSELS

provided with simple cylindrical handles running from the lip to a point slightly below the curve of the neck. Bowls have no handles. Other shapes are seed-jars; "gourd-shaped" vessels, that is, with a tall, straight neck; pitchers; and ollas with a doubly-recurved neck.

The five whole plain ware pots from Site 11 are all of a prevailing black color. They are:

A one-gallon olla with a handle (Plate 20, b). Red paint has been used to fill in a small crack on the bottom. Sad to say, this pot was cached away in an unwashed state after the morning meal of corn meal mush; the fact that it was found upside down shows that the deposit is not the remains of stored contents.

A gourd-shaped pitcher, also handled, holding $2\frac{1}{2}$ quarts (Plate 20, a).

A fat-bellied small olla or jug, handled, holding 1 pint (Plate 23, a). Around the neck are rough vertical scorings, as with a thumbnail.

A seed-jar holding $1\frac{3}{4}$ pints, with two small holes on the lip for suspension (Plate 22, b). Beside one of the holes is a small lug or knob. This vessel was probably cut down from a high-necked pitcher, the knob being the remains of the handle.

The fifth specimen possesses real artistic merit (Plate 23, c). It is a small "cream pitcher," holding three-quarters of a pint, with a straight neck, bearing the usual handle. The body is flattened and adorned with eleven projections around the middle so that it closely resembles a summer squash. This motif, which, so far as the writer knows, is unique in the Southwest, is found rendered in exactly the same manner on several pieces collected by Dr. Edward Palmer from mounds near Savinito in Vera Cruz, now in the Peabody Museum. These pots are, however, considerably larger and the handle is somewhat differently treated. On either side of the neck of the little pitcher is an ornament consisting of 5 horizontal by 3 vertical rows of small raised squares, made separately and stuck on.

This same type of raised square decoration, but extending all the way around the neck, is common on Fremont vessels. In most cases, however, the squares seem to have been produced by grooving the neck of the pot instead of being separately applied.

The only recorded specimen of this neck incision known to the

writer from outside this district is a whole specimen from Meadow, Utah, figured by Judd.¹ Another plain ware jug from the same place closely resembles those of the Fremont district, while the third pot from Meadow has the projecting shoulder already referred to as corresponding to a specimen from Site 1.² Judd states that the remains at Meadow are of straight Beaver type. While it is possible, since these particular specimens were gifts, that they came from a site of a different type, the shouldered pot, found by us with corrugated wares, supports the belief that they are of Puebloan date, and tends toward the conclusion that there was contact between the Fremont and Beaver cultures.

Two other sherds from Site 11 showing moulded decoration, are a piece of a jar rim with a band of small indented bosses, perhaps representing kernels of dent corn, and a handle with an incised herringbone design. On a sherd from Site 27 the incised neck decoration is elaborated by the introduction of diagonal lines (Plate 21).

If certain plain ware forms suggest a connection with the early Pueblo of Utah, the connections with Basket-maker III (Post-Basket-maker) pottery are much more marked. The general character of the ware seems rather similar to Basket-maker III wares,³ most of which were undecorated, the igneous temper pointing perhaps to the late Basket-maker III period rather than to the Standard Complex. The Black Shiny ware of the late period⁴ is a more definite connecting link. Specific forms common to the Basket-maker III and Fremont cultures are the doubly recurved neck,⁵ "gourd-shaped" pitchers with rim-to-body handles,⁶ and cooking pots with necks and the same type of handle,⁷ while the "seed-jar" — though found in later periods — also occurs in Basket-maker III.⁸ Finally, the squash effigy pitcher is paralleled by a gourd or squash effigy of a different type from a Basket-maker III grave in the Navajo country.⁹

¹ Judd, 1926, *Archaeological Observations North of the Rio Colorado*, Plate 40, b.

² Ibid, Plate 40, e, g.

³ Cf. Morris, 1927, *The Beginnings of pottery making in the San Juan area*, pp. 163 and 177.

⁴ Ibid, p. 186.

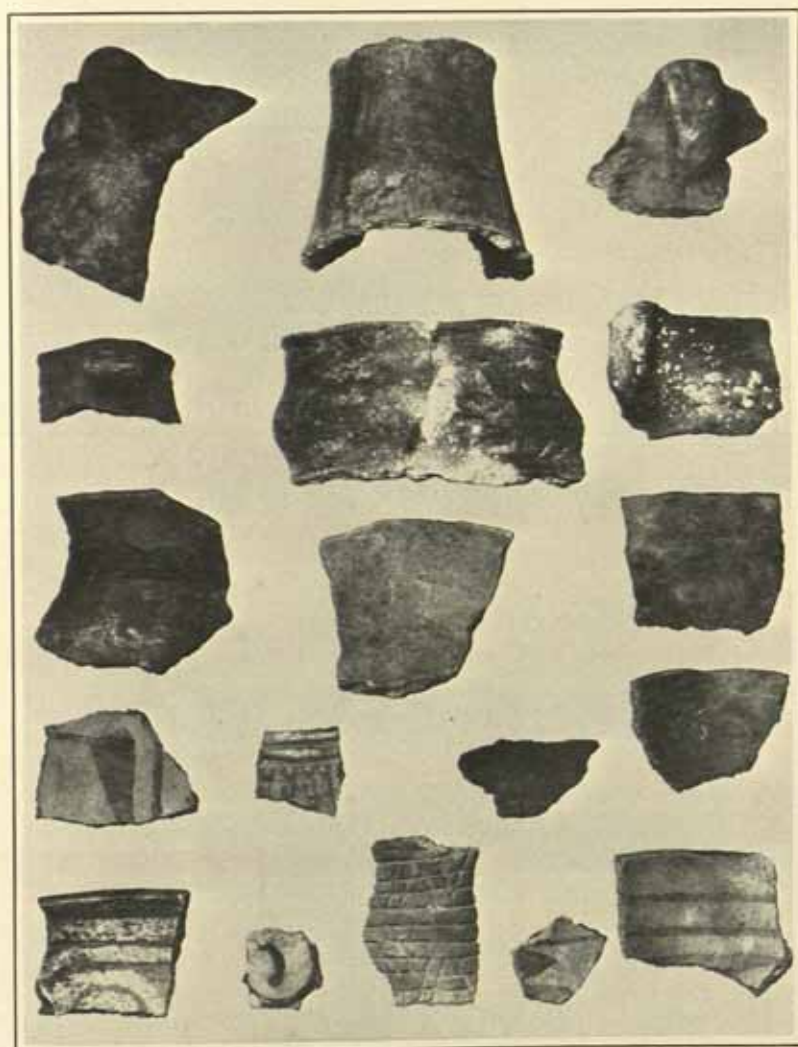
⁵ Guernsey, 1925, in Guthe, Carl E., *Pueblo Pottery Making*, Figure 1, b.

⁶ Morris, 1927, Figure 17, m. Others less close to our example are also shown.

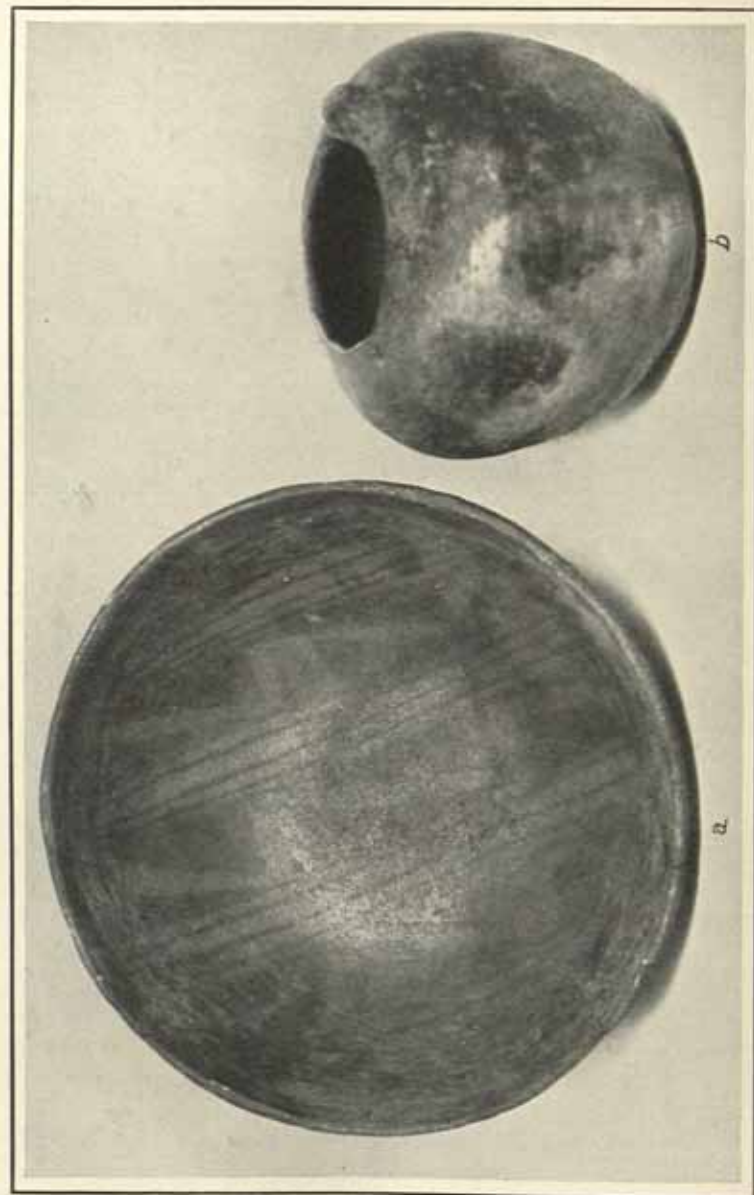
⁷ Ibid, Figure 17, b and i, Roberts, 1929, *Shabik'eschee Village*, Figures 29, e; 30, c.

⁸ Ibid, Figure 16, s; Roberts, Figure 29, b; Guernsey, Figure 1, a.

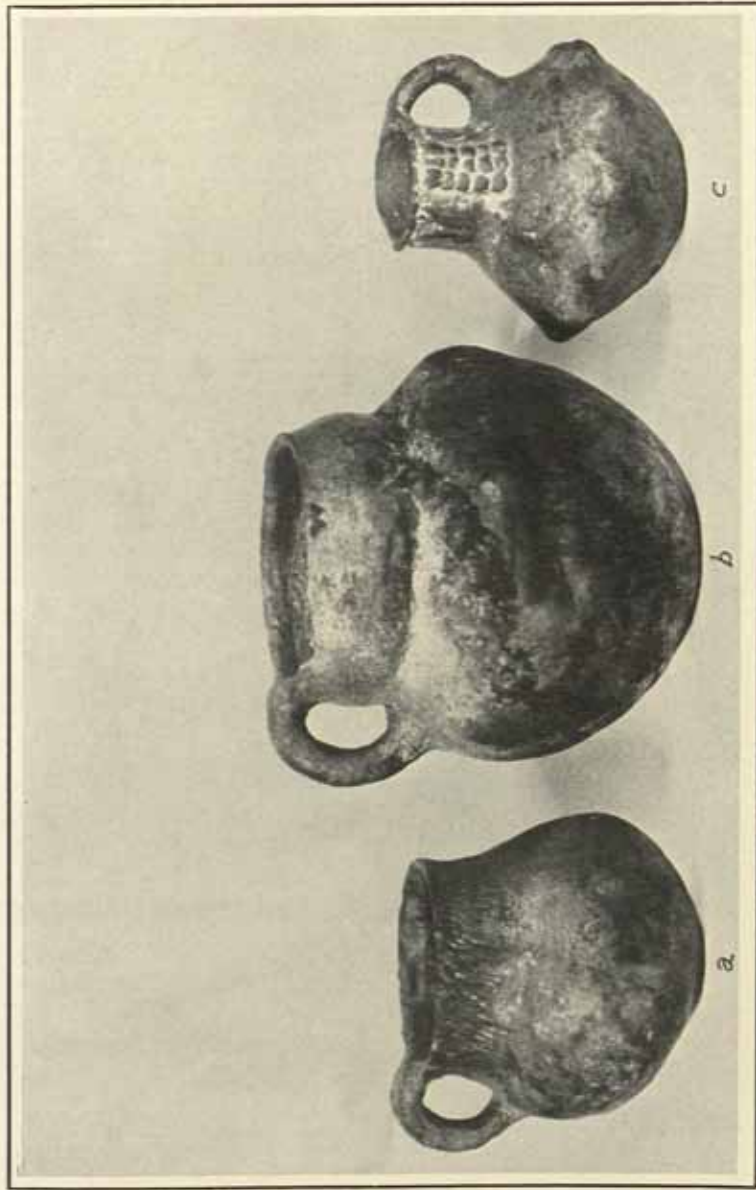
⁹ Roberts, Figure 16, q.



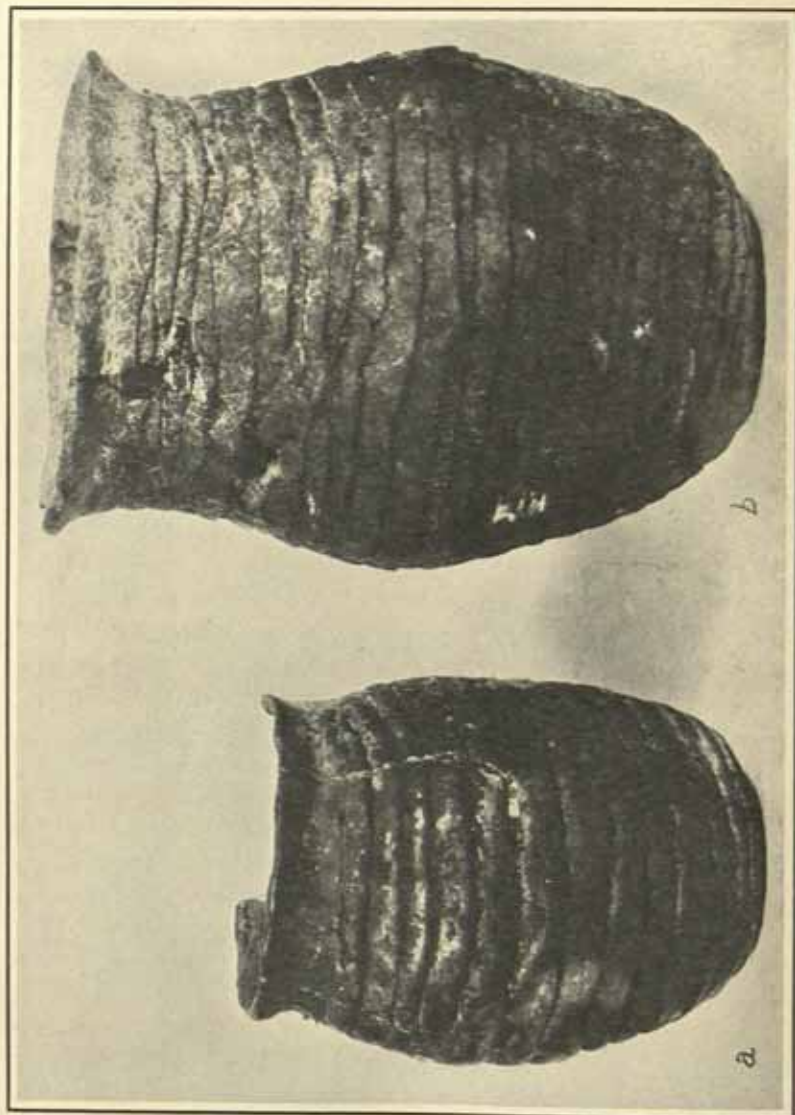
FREMONT POTSHERDS



BLACK-ON-WHITE BOWL AND SEED-JAR



SMALL PITCHERS



"LAP-STREAK" CORRUGATED JARS

Painted and Corrugated Wares. At the close of the 1928 season we had noted the occurrence of casual sherds of corrugated or black-on-white pottery at six sites, namely, 7, 8, 10, 11, 12, and 20. Those at Site 11 were definitely in a plain ware horizon, but as no figurines were found there, and as the other occurrences were at surface or somewhat disturbed sites, it was not certain that the figurines extended into Pueblo times. All doubt was removed, however, by the finding of sherds of several Puebloan vessels in the same or lower levels than figurines at Site 27 in 1929. Such sherds are also represented in undisturbed association with plain ware at Site 26. At all sites the wares occur in such small quantities, even taking into account the sparseness of all potsherds, that they may not have been made locally. A single sherd of undecorated red ware was collected from Site 12.

Corrugated ware is of a simple type. A small whole vessel from Site 11 is of a coarse lap-streak construction similar to one from Burial A at Boulder and of the same shape (Plate 24, a). Pitted ware, that is, corrugated ware in which the corrugations remain only as discontinuous depressions, occurs at several sites.

Black-on-white sherds are both slipped and unslipped. The designs may probably be classed as Pueblo II, being apparently limited to simple arrangements of lines with bordering triangles or squares and occasional scrolls (Plate 21). In particular, any Proto-Kayenta elements are lacking. This is of particular interest in view of the occurrence of such elements at Boulder and of the fact that potsherds collected by Scott on a Pueblo open site on Oak Creek not visited by us were typical Proto-Kayenta black-on-white and polychrome. The absence of such sherds among the intrusive black-on-white sherds in Fremont sites is almost conclusive proof that the latter antedate the Proto-Kayenta development.

Sherds from the Puebloan Site 16 are too few to date the settlement as between Pueblo II and III, but it seems most likely, owing to its position in the heart of the Fremont country, that it, like the site on Oak Creek just mentioned, is a later Puebloan outpost.

The black-on-white bowl from Site 11 (Plate 22, a) is 8 inches across. The white field is rather dark, perhaps denoting absence of a slip. The design of simple straight lines with bordering triangles

is not divided into panels, but covers the whole bowl in one band from side to side. A piece an inch square, broken out of the rim, has been gummed in place and secured by withes through holes in the sherd to the adjacent part of the rim, the knots being cut off short and made solid by an application of resin. The patch so made is neat and strong.

The evidence of these wares dates the Fremont culture with practical certainty in Pueblo II times, although its origins are probably to be placed further back. It seems to be related ceramically with the culture of Beaver and Paragonah, although the dished bowls characteristic of the latter have not been noted.

FIGURINES AND OTHER OBJECTS OF UNBAKED CLAY¹

Two images were found at Site 7, one at Site 8, two at Site 13, eleven at Site 27, and three at Site 31. (The term "image" is used here to include any fragment recognizable as part of a definite modelled object, the great majority being anthropomorphic female figures.) Site 11 yielded a fragment of a clay dish and a clay pipe, and Site 26, sherds of two clay dishes. All the other specimens here considered are from Image Cave, Site 5, on Pleasant Creek. The material is clay varying in shade from grayish yellow to brick red, scarcely any two pieces showing quite the same shade. The images and numerous pellets from Site 31 are all of a gray clay. To some of the harder pieces sand temper has been added, while two images show vegetable temper in the overlaid decoration. The main body of the figure is made in one piece, while details are rendered by laid-on strips and beads of clay, made fast by pressing into lines of holes made in the underbody. The human figurines are made to lie flat on their backs, to which moulding and laid-on decoration is not usually extended. The largest human figurines when complete must have been between 4 and 5 inches long and the smallest $1\frac{1}{4}$ inches, the majority being around $2\frac{1}{2}$ inches in length.

The figurine specimens, most of which are fragmentary, may be classified as follows: complete figure, 4; head and chest, 5; head only, 35; chest only, 13; chest and lower extremities (re-

¹ See Plates 22-25.

ferred to hereafter as "terminus"), 12; terminus only, 41. In some cases different parts of the same figure may be represented, so that the whole collection represents a minimum of about 85 figurines.

In considering the material in detail it will be convenient to deal separately with the head, chest, and terminus. In order that the relation of fragmentary pieces to the whole figure may be clear, restorations of several figurines are given in Plate 26. With the probable exceptions of a and e these restorations are combined from fragments of different individuals.

Head (44 examples). (Plate 25.) These vary in width from $\frac{3}{8}$ to $\frac{1}{2}$ inch, and in dorso-ventral thickness from $\frac{1}{8}$ to 1 inch. The back of the head, as indeed of the whole figure, is flattened and without decoration. Viewed from above, the head is triangular, the face consisting of two planes meeting in the nose, a prominent ridge which extends to the top of the head (Plate 26, d). The nose in profile is in many instances markedly convex, and terminates sharply, approaching a parrot- or owl-beaked form, an effect which is heightened by the fact that the mouth is never represented. In some cases, however, the face is much more human in appearance, and it is impossible to state definitely whether an ornithomorphic, or perhaps zoomorphic, cast of countenance is intended. Below the nose or beak is a broad concave depression extending down the chest. The head viewed from the front is broadest at the level of the eyes and is usually rounded, though in a few cases the forehead and sides are nearly straight.

In twelve cases the eyes are not represented. Where present they are usually well toward the top of the head. In twenty cases the eye is a bead-like disk of clay with a hole in the center, separately made and stuck on to the figure. In ten heads the eyes are merely round holes, but in many of these, bead-eyes may have been originally present. There is no example of the horizontal slits which form the eyes of the Arizona figurines collected by Morris and by Guernsey.

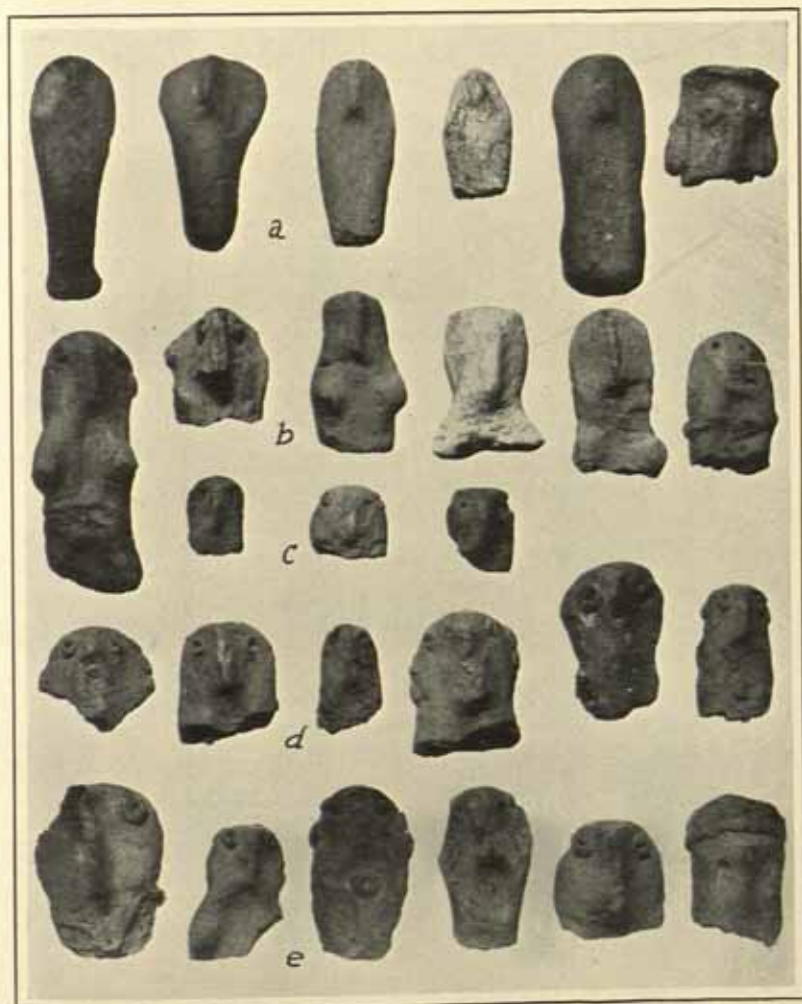
Eleven heads bear an ornamentation consisting of two or three beads of clay, with or without punctations, on each side of the head in the region of the ear, depicting either ornaments worn in the hair or the dressing of the hair itself. Two specimens wear an ornament at the throat, in the one case, a pierced bead such

as form the eyes (Plate 25, e, 3), the other a pendant-shaped object with a small opening, as for suspension, at the upper end (Plate 25, d, 6). The former head, which is broken below the neck, is painted slate color. Another, the face of which is badly abraded, has a strip of clay forming a collar across the throat (Plate 25, b, 6).

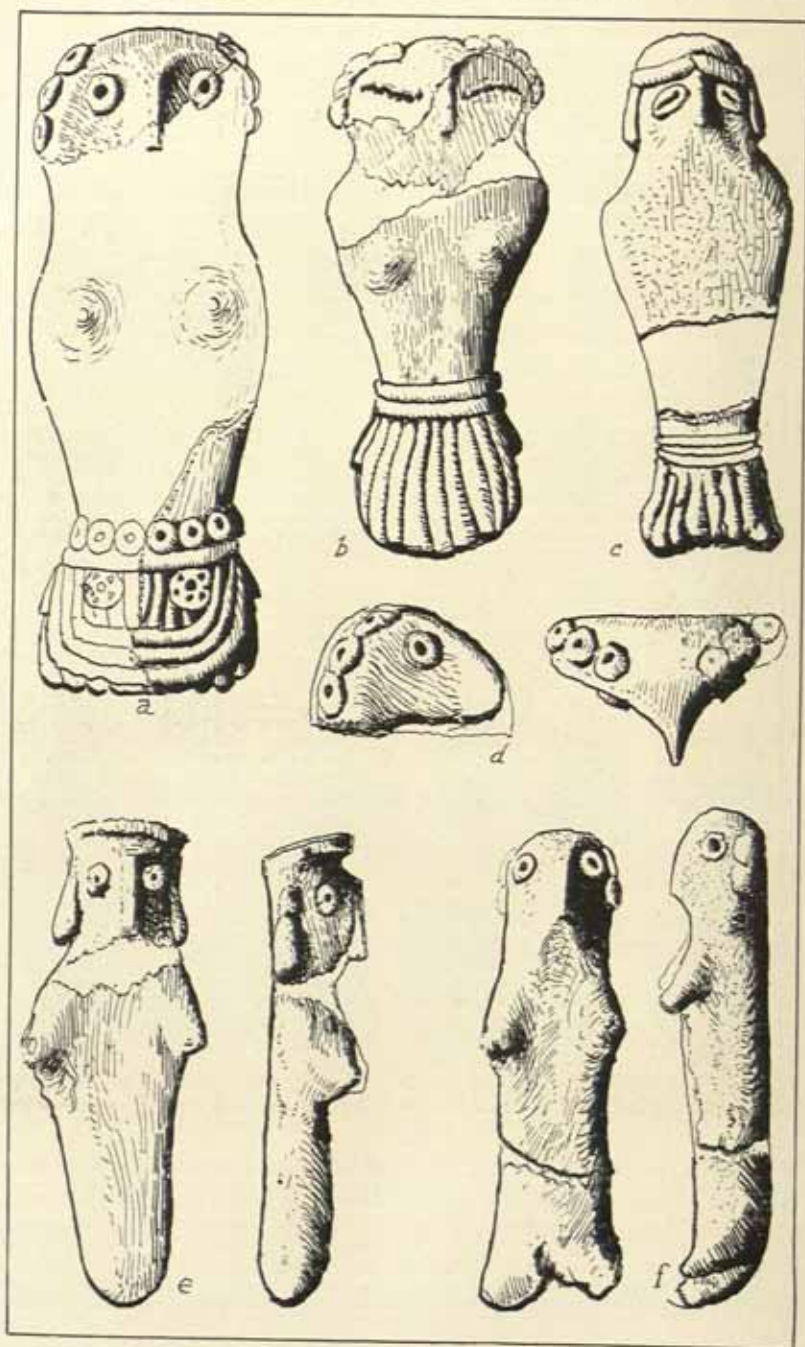
A few other heads are of special interest. One of the largest, broken diagonally from the left eye to the base of the nose, had the eyes painted blue and the nose and lower part of the cheek red (Plates 26, a, d; 27, a, 3). A simply made head with holes for eyes has two grooves down the cheek from each eye, as if weeping (Plate 25, e, 4). Another has a fillet across the forehead, above which protrudes a ridge of upstanding hair or cap (Plate 25, e, 6). Still another wears a flat cap protruding slightly over the forehead while long pendants or bobs of hair hang down over the ears (Plates 26, e; 25, a, 6).

The heads just described are all from Site 5. One from Site 27 combines the interesting features of the last two, having the bobs over the ears, the band across the forehead, and a rounded cap-like piece of clay over the top of the head (Plates 26, c; 27, c, 2). The headband is remarkable for the fact that it is carried completely around the head. An additional refinement is seen in the eyes which, instead of being perfectly round, are elliptical. The entire headdress, the eyes, the nose, and the tips of the shoulders have been painted the same slaty blue found on figurines from Site 5. The chest, which is intact, is flat, an unusual feature on such an elaborately done figure. In a second fragmentary head from Site 27 the eye is a straight, raised line instead of a bead, with a slight depression which is accentuated with blue paint, and the usual beads in the region of the ears are replaced by short, overlapping blobs of clay without openings (Plate 26, b).

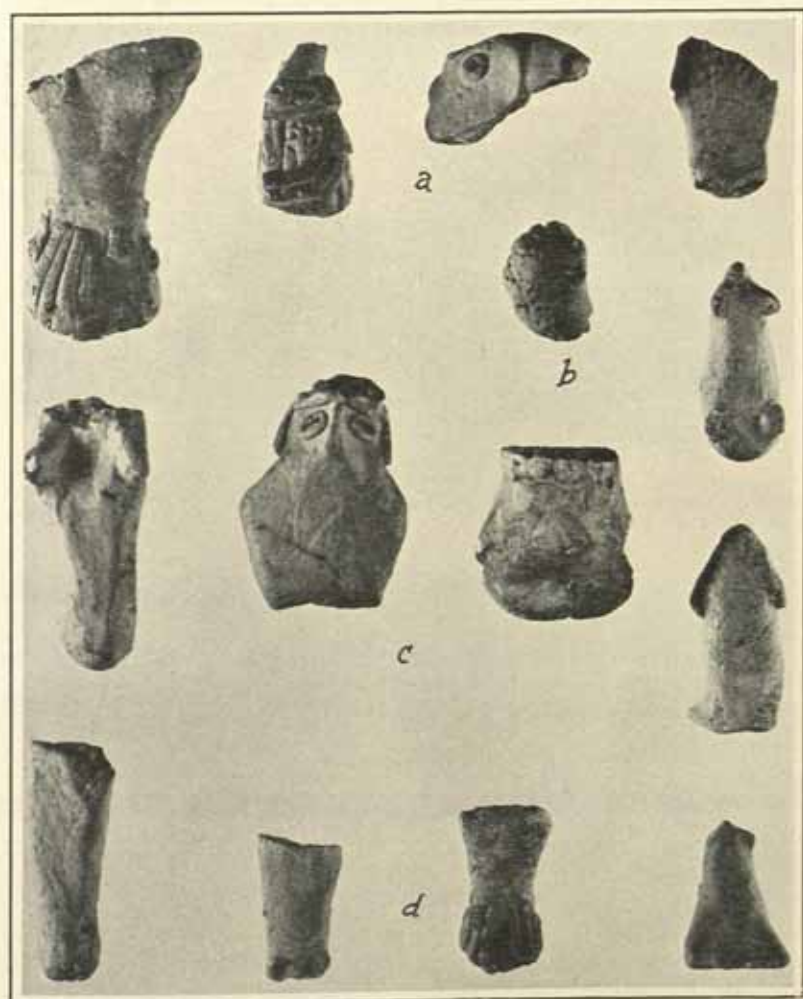
The two heads from Site 13 resemble each other in having straight lines at the nose and sides of the head, instead of the usual rounded contours (Plate 25, b, 3, 4). Neither has eyes or other applied elements. One is broken at the waist. The other is complete and is unusual in that it is only a bust, finishing at the breasts, the tops of which are indicated. The bottom has been somewhat roughly finished off as if the figure was broken while being made and converted into a bust from a full figure. These



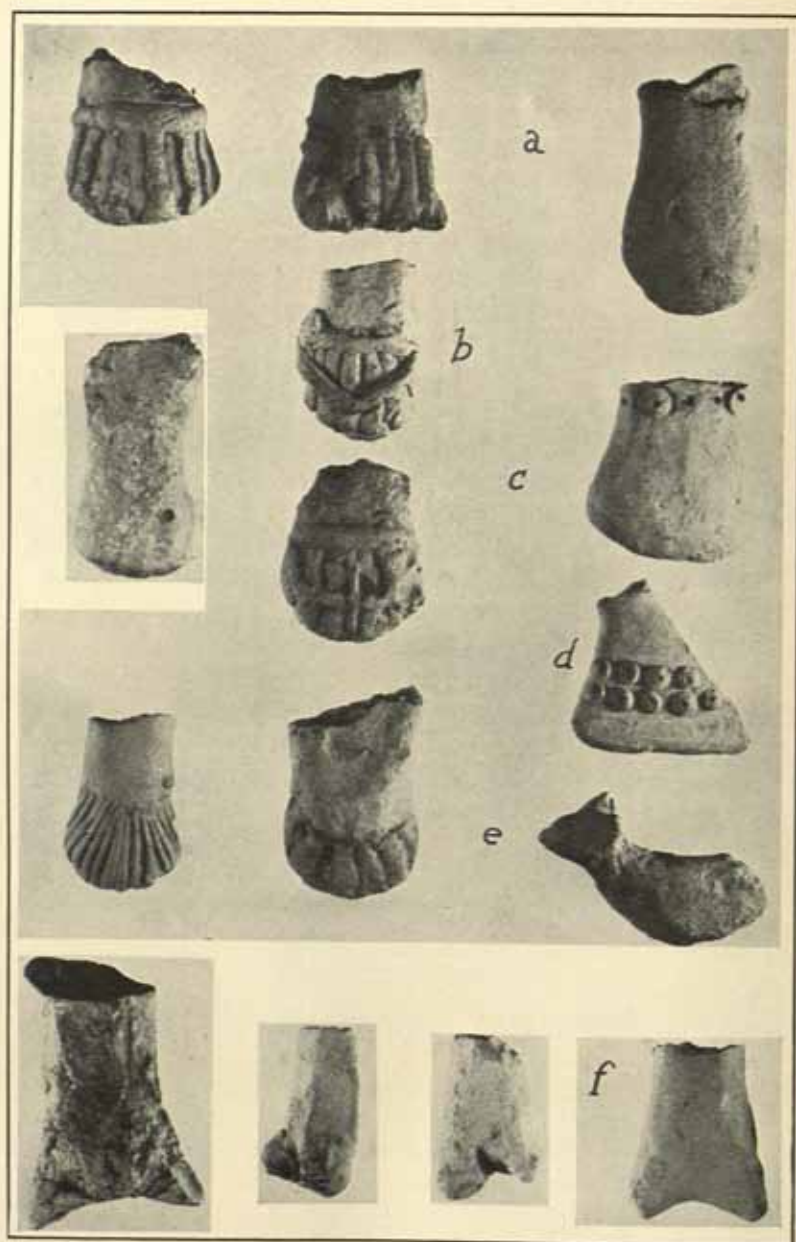
HEADS OF CLAY FIGURINES



COMPOSITE RESTORATIONS OF CLAY FIGURINES



MISCELLANEOUS CLAY FIGURINES



TERMINI OF CLAY FIGURINES

two heads are closer to each other than to any others in the collection, but a series from Site 5 could be arranged showing a gradation toward their rectilinear outline.

The three other complete figures, one from Site 27 (Plate 25, a, 2) and two from Site 5 (Plate 25, a, 1, 5), are all of the simplest type, being without eyes or other applied detail. The head merges directly into the terminus without modelling of the chest, the terminus being in two cases of the simple "handle," the other of the "stump-leg" type (Plate 25, a, 1).

Chest. The chest is least well represented among our fragments, breakage usually having occurred in this region. In seven cases certainly, including three of the whole figures, and in three others probably, the chest receives no special treatment, a flattish surface extending the length of the body. In eleven cases the figure is somewhat broadened in the chest and has pointed breasts. One of these has a terminus of the "handle" type (Plates 26, e; 27, c, 1) and one a flattened terminus as in the "skirt" type, but without the skirt.

In one large specimen from Site 5 the thorax is unusually broad and flat, while the breasts are small and rounded, more closely approaching those of Arizona Post-Basket-maker figurines (Plate 28, a, 1. The holes marking the point of attachment of the elements of the skirt are clearly visible in the illustration). The figure narrows to a shapely waist and terminates in a skirt.

Terminus (42 examples). Nineteen termini are of the "handle" type, that is, the figure below the breasts becomes a simple flattened cylinder, rounded off at the bottom, without any attempt to depict the lower part of the body (Plates 26, e; 27, c, 1, d, 1; 25, a, 1, 5). In the "stump-leg" type, comprising eleven examples, there is a slight crotch and the figure terminates in two points, or rudimentary legs, pointing slightly forward or downward (Plates 26, f; 28, f; 27, d, 2). At first we took these for animal heads, since the legs look like cat ears when viewed upside down. What is perhaps a very broad and flat terminus of this type bears two rows of incised lines at the bottom.

The "skirt" terminus, shown on 12 specimens, is the most elaborate (Plates 26, a-c; 28, a-e). The figure is flared and flattened at the thighs and wears a skirt or apron consisting of seven

to ten vertical strips of clay attached to a horizontal band at the waist. In some, perhaps originally in all cases, a second band suspended from the waist at the ends droops across the vertical elements about halfway down. In one case the skirt is applied over a terminus of the "stump-leg" type (Plate 28, a, 2); in the others no attempt is made to indicate legs. In a very elaborate specimen, of which only the left half remains, the waistband is adorned with beads, such as are used for eyes and head ornaments, while the lower crossband consists of three contiguous strips, painted blue (Plate 27, a, 2). Attached to the skirt below the waistband is a disk or rosette having six perforations concentrically arranged about a seventh. This is in all probability the terminus of the large painted head described from Site 5, as shown in the restoration (Plate 26, a), both being of the same tone of red clay and corresponding in size. In some termini of the flaring shape the skirt is omitted or simplified in treatment.

A terminus from Site 31 is similar in general shape to the "skirt" terminus, and has the crotch indicated by a cleft in the bottom (Plate 27, c, 3). Instead of the skirt a small garment or ornament hangs from the waist below a waistband of beads. The body above the waist is missing.

Other Forms: Headless Figures (11 examples). A different type of figure is represented by two complete and nine fragmentary examples. It consists of a rounded body, larger at one end than the other, with four conical legs, a fifth conical projection terminating the smaller end (Plate 27, b, 2, c, 4, d, 4). It resembles nothing so much as a full wine skin. It is impossible to say whether these figures are intended for human or animal forms. They are all approximately $1\frac{3}{4}$ inches in length.

Animal Figure. This unique effigy from Site 5 is $1\frac{1}{2}$ inches long and has a pointed muzzle, prominent ears, slender neck, and a narrow body without legs (Plate 28, e, 3). It might stand for any one of a number of animals, such as rabbit, deer, or dog.

Nipple-shaped Objects. Six more or less fragmentary nipple-shaped objects, similar to those described by Morris,¹ are each about 2 inches long. None of them bear any decoration.

¹ Morris, 1927, *The beginnings of pottery making in the San Juan area*, p. 126; Roberts, 1929, *Shabik'eschee Village*, p. 125.

Dishes. No unfired sherds or vessels of any size were found. A sherd 1 inch long from Site 27 is a possible exception, as it appears in cross section to be a bowl-rim, but as it shows no perceptible horizontal curvature the vessel would have to be of immense size. As it shows basket moulding on one side, it was probably the lining for a basketry tray. Fragments of several flat dishes seemed to have come from vessels not more than 6 inches in diameter, while two almost complete specimens were but 2 inches across. One sherd bears a simple zigzag incised on the outside. A fragment of a small bowl or dish somewhat deeper than these was found at Site 11.

Unidentified Objects. Two fragments, very similar, consist of rounded rectangular corners of some flat objects. Each has two lines of pierced beads (Plate 28, d). This may be a formalized "skirt" terminus.

At Site 31 there was found a small fragment of an unknown object, consisting of a wedge-shaped piece of clay with a rounded edge bearing two parallel diagonal bands of clay on one side. From the same place comes a fragment 1 inch in length, comprising the rounded end of a cylindrical object, something like a "handle" terminus, with a wedge-shaped depression on one side. On the back or opposite side are lines of stippling similar to those found on Morris's nipple-shaped objects,¹ while on the end of the objects are several small beads of clay similar to those on Fremont figurines (Plate 27, b, 1). A cylindrical fragment with the same depression, but undecorated, occurs in the Image Cave collection.

Numerous pellets and unidentifiable fragments of modelling clay were found at Sites 5, 27, and 31.

Basket-moulding. A flattish sherd, presumably from a clay dish, has the imprint of coiled basketry, nine coils to the inch, on the *concave* side. Two of the figurines from Site 5 and the elaborate head from Site 27 have impressions of similar coils on the backs, as if they had been laid on baskets to dry (Plate 27, a, 4). The sherd from Site 27 has already been referred to.

Pipe. A clay pipe 2 inches long and three-quarters of an inch in diameter from Site 11 is nipple-shaped, with a constricted neck through which runs a small hole, opening into a larger cavity. It

¹ Seen also in Roberts, 1929, *Shabik'eschee Village*, Plate 15, f.

shows no smoke stains in the bowl but is somewhat darkened around the outside of the neck (Plate 29, b, 1).

Distribution. There is no definable disparity between different Fremont sites as far as type of image found is concerned. The two figurines from Site 7 and the pair from Site 13 are of the crudest type, but equally crude examples are not absent from Sites 5 and 27. The total absence of figurines from the large amount of rubbish at Site 11 is surprising, but the figurines are not so generally abundant that it can not be explained on the score of chance. An unfired clay dish and a clay pipe were found here. The collection from Site 27 contains practically all the types in the Image Cave collection, as heads, chests, skirts, stump-leg and handle termini, "wine skins," and nipple-shaped objects.

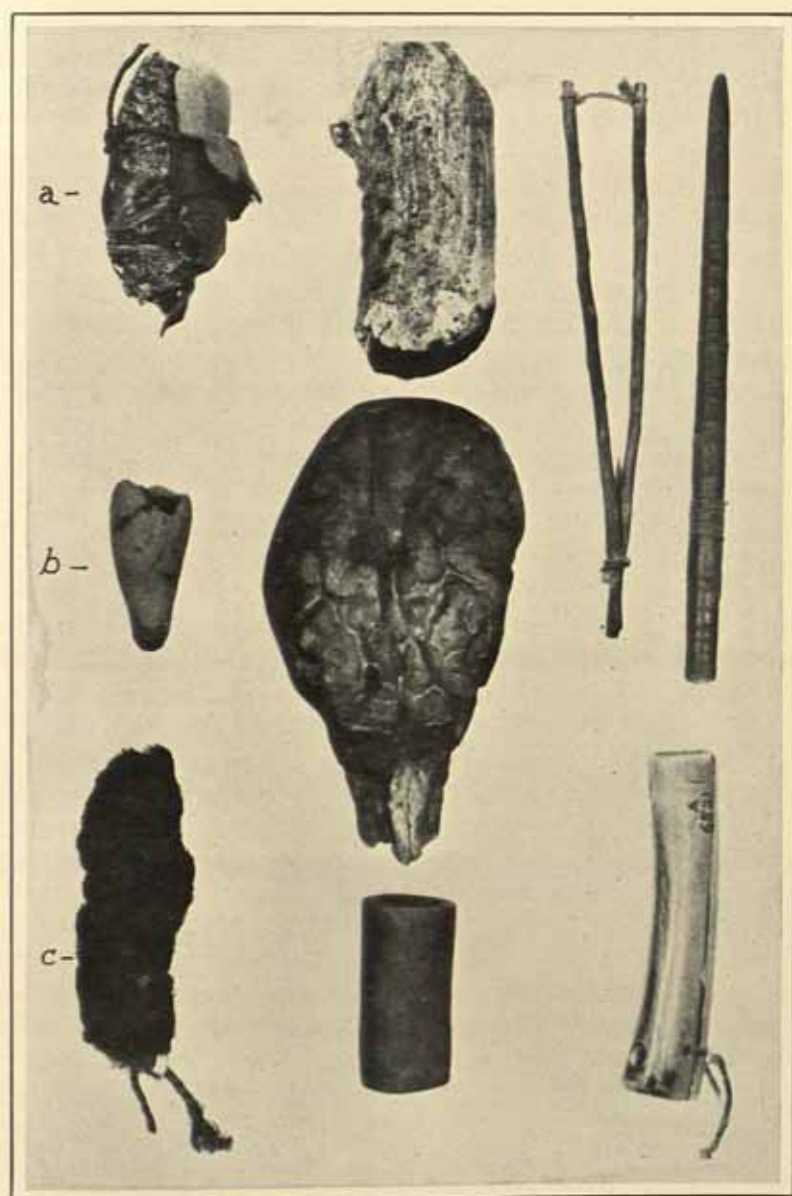
The collection of three fragments from Nine Mile Canyon is too small to base any comparison on. While none correspond exactly to Fremont types, they are close enough to fall possibly within the limits of variability of the Fremont material itself.

Similarities Between These and Other Figurines. Morris describes and figures five small figurines of unfired clay from Canyon del Muerto.¹ Several others of identical type were found by Guernsey in the Marsh Pass district. These show a definite generic relationship to the present collection in material, subject matter, and general technique and in association with nipple-shaped objects, but show a more primitive technique in all respects, particularly in the absence of overlaid elements. The Utah figurines might well have been derived from such prototypes. Figurines have recently been found by Harrington in Nevada both in Basket-maker III sites and, continuing with little change, in Pueblo II sites. These figures, which have not yet been illustrated, I understand to approach closely to the Arizona Basket-maker III type.

Another possible relationship is with the simple effigies collected by Kidder and Guernsey on a Pueblo III site in Marsh Pass, Arizona.² They are not unlike our crude whole figurines, but are

¹ Morris, 1927, *The beginnings of pottery making in the San Juan area*, p. 154. The disturbed condition of the caves in Canyon del Muerto made it doubtful whether or not the figurines occurred in conjunction with fired pottery. The similar figurines found by Guernsey, however, were in undoubted association with fired vessels of the "Standard Complex."

² Spinden, 1928, *Ancient Civilizations of Mexico and Central America*, p. 63; Renaud, 1929, *Prehistoric female figurines from America and the Old World*. For excellent illustra-



MISCELLANEOUS SMALL OBJECTS

made of fired clay. These, the only objects at all similar recorded from the Cliff-dweller culture, are perhaps a degenerate survival of earlier cult objects.

It has been suggested that the figurines of Morris and Guernsey may be related to the figurines of the Mexican Archaic, which from general theoretical considerations might be expected to correspond roughly to the Basket-maker III (Post-Basket-maker) culture of the Southwest.¹ The Arizona figurines bear little similarity to the Mexican figurines except in size and subject matter. The Fremont figurines, on the other hand, while still far removed from the naturalistic Mexican types, show certain features reminiscent of the latter. While the Fremont region is perhaps the last place in the Southwest where we should expect to find such influence, it is worth while to point out the observed points of resemblance.

1. *General Similarity of Subject Matter.* Both the Archaic and the Utah specimens are, in the majority of cases, female figurines. In both, the head receives particularly adequate treatment.

2. *Size.* The two types are comparable in size for the most part. "The figurines are usually from 2 to 5 inches in height."²

3. *Technique.* The following from Spinden's description of the Archaic technique is applicable to the Utah figurines:

"Most are modelled in a flat gingerbread fashion into a gross shape. Upon this gross shape special features are indicated by stuck-on ribbons and buttons of clay and by gougings and incisions with some sharp pointed instrument." The eyes are normally of the fourth Archaic type — "a round gouging in an applied ball or button of clay."³

The "stump-leg" terminus is closely paralleled on Archaic figurines.

4. *Types of Ornament.* The earrings, fillets, and caps of the Fremont figurines are closely paralleled by corresponding elements in Archaic examples. For example, the rosette on the fragment of painted skirt from Site 5 is duplicated by a rosette on the head-dress of an Archaic figurine in the Peabody Museum.

tions of some Archaic types from Zacatenco see Vaillant, 1929, *On the threshold of native American civilization*.

¹ Kidder-Guernsey, 1919, *Archaeological Explorations in Northeastern Arizona*, p. 143.

² Spinden, 1923, *Ancient Civilizations of Mexico and Central America*, p. 56.

³ *Ibid*, p. 53.

5. *Coloration*. Archaic figurines in the Peabody Museum from the Valley of Mexico show the same use of slaty blue paint, either all over or to emphasize elements in relief, which appears on the best Utah examples.

6. *Ceremonial Dishes*. Associated with the figurines from the Valley of Mexico are small clay dishes corresponding in size and general shape to specimens from Site 5.

The differences between the Utah and Archaic figurines are too striking to require comment and of course outweigh the resemblances so far as any close relationship is concerned.

It seems highly probable that the Archaic, Basket-maker III, and Fremont figurines are all manifestations of an ancient trait of the corn-growing complex. Whether the Utah type represents a later or closer Mexican influence than the Basket-maker III type, or is a local development from the latter, remains uncertain.

A crude pottery figurine bearing some slight resemblance to the Southwestern types was found in a recent California shell-heap.¹ Baked clay balls bearing punctation somewhat similar to those on Basket-maker III figurines are found in the San Joaquin Valley. These also are believed to be comparatively recent.²

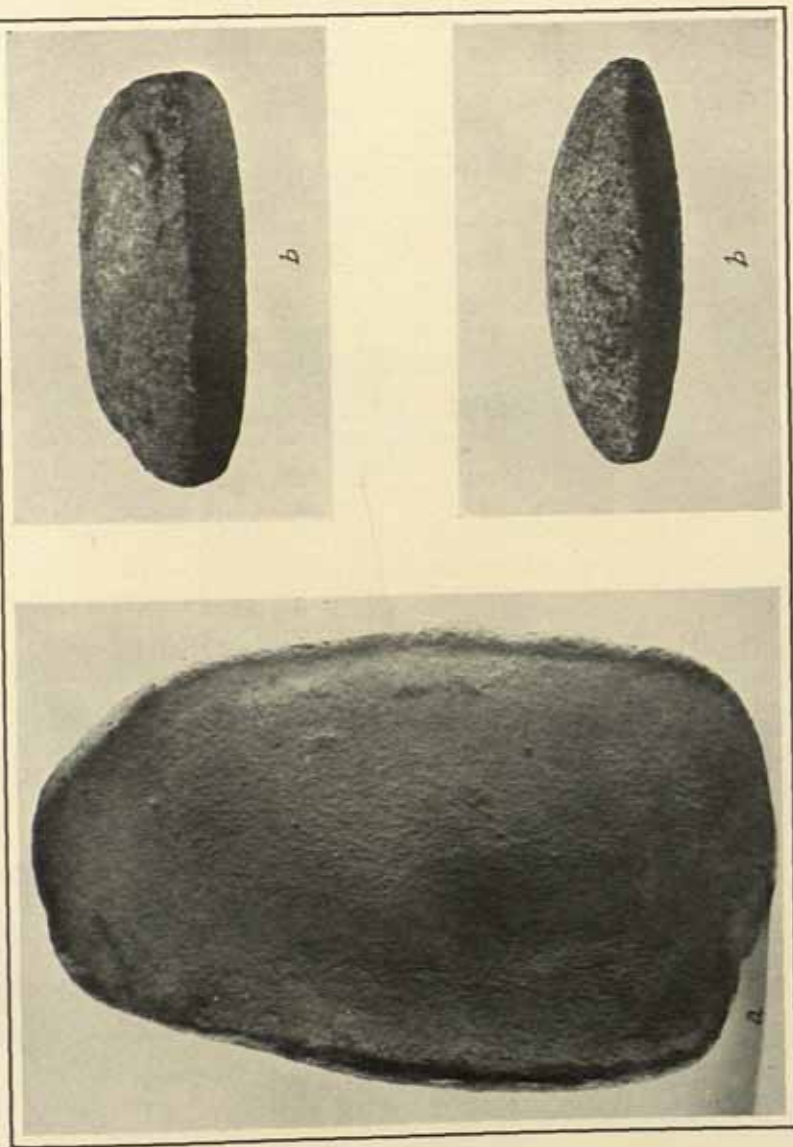
WORK IN STONE

Metates and Manos. The commonest material for metates and manos is igneous stone. Metates are of a simple pan type (Plate 30, a). In some cases the grinding surface is nearly flat while in others there is a considerable depression. Mortars are absent. In view of certain apparent resemblances between the Fremont and Willard cultures, it is noteworthy that no metates with the secondary depression characteristic of the Willard metates were found in the Fremont area proper. Roberts, however, observed a "Utah type" metate on the Muddy River, a northern tributary of the Fremont; and at Site 31 in Nine Mile Canyon in the Green River drainage, where figurines were found, we observed double depressions on a large, flat rock which were apparently a fixed form of Utah type metate (Plate 11, c).

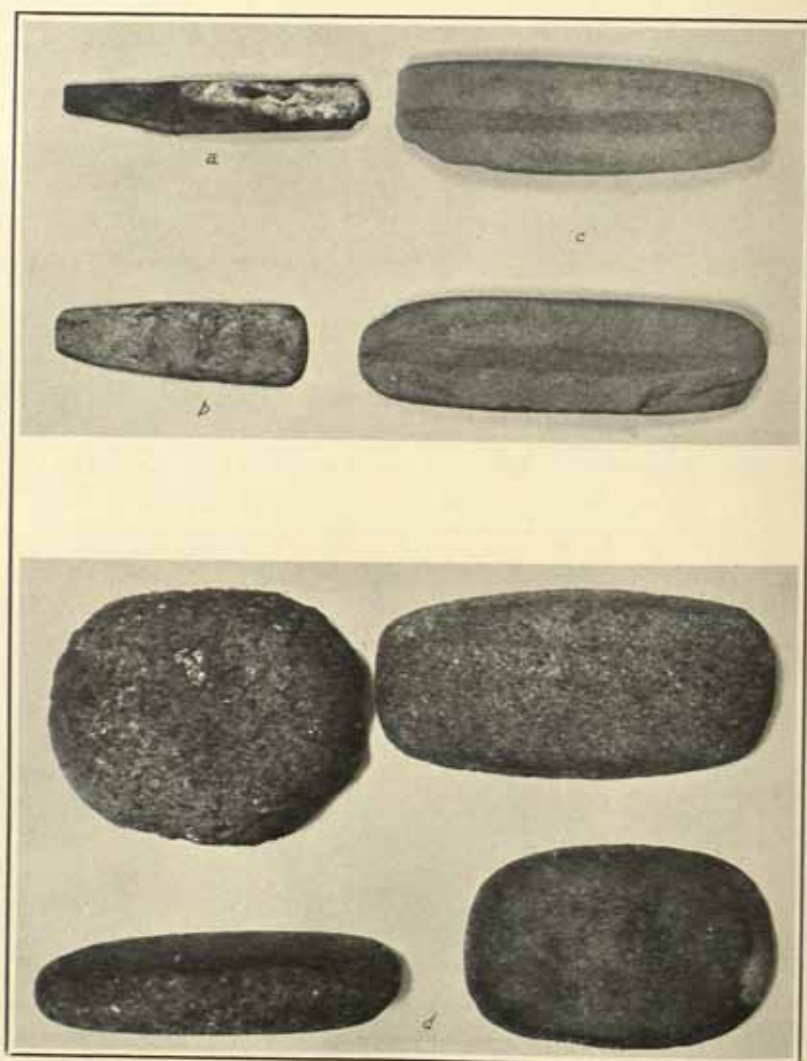
The shallow depressions about 8 by 5 inches (without the

¹ Saville, 1924, *A pottery figure of an Archaic type from Seriloma*.

² Schenck-Dawson, 1929, *Archaeology of the Northern San Joaquin Valley*, p. 368, Plates 83, 84.



METATE AND MANOS



a, b, Limestone implements; c, Sandstone shaft straighteners; d, Manos.

secondary depression) which are found in most Cliff-dweller sites, as well as in the Fremont region (Plate 6, a), are often referred to as "axe-grinding grooves," but the term is inappropriate here, as stone axes, celts, or mauls were not found on the Fremont.

Manos are of varying shape, but the long Pueblo mano is absent. The principal types are a flat, more or less oval, one-handed mano (Plate 31, d), and a heavy, two-handed type, characteristic of this region, which is narrow, slightly tapered at the ends, bevelled on the grinding surface, and very high-backed (Plate 30, b). Its average dimensions are 8 by 3 inches by $2\frac{1}{2}$ inches in height. A specimen of this type from Humboldt Lake in Nevada is figured by Loud. Since agriculture is absent there, it must have been used for grinding wild seeds.¹

Other Stone Implements. At Image Cave were found a round ball of hard volcanic rock, 4 inches in diameter and perfectly shaped, and a pair of sandstone cubes with slightly convex sides (mace heads?) each about $1\frac{1}{2}$ inches in diameter.

Of unknown use were two tablets of limestone from Site 11, each flat on one side and slightly convex on the other, about 5 inches long, 1 inch broad, and $\frac{1}{4}$ inch thick, and showing slight wear on the rounded side (Plate 31, b); and a knife-like limestone implement $6\frac{1}{2}$ inches long (Plate 31, a).

A pair of neatly made sandstone arrowshaft smoothers from Site 34 are in shape like an ordinary household pumice stone, somewhat flattened and with a narrow groove. Each measures $6\frac{1}{4}$ by $1\frac{5}{8}$ by $\frac{5}{8}$ inches (Plate 31, c). The lack of other remains in the cave makes it uncertain whether they are to be assigned to the Fremont culture. At all cave sites there are numerous grooves on the rocks, of varying size, which were doubtless used as shaft smoothers as well as for sharpening bone awls and the like.

Chipped Implements. (Plates 32 and 33.) Chipped implements are commoner at Fremont sites than in most Cliff-dweller sites.

When the implements found were assembled and studied it was found that nearly all fell into one or another of several definite types, each of which was surprisingly uniform in dimensions. The numbers given in the following table are not intended to show the relative abundance of the various types, since not all

¹ Loud-Harrington, 1929, *Lovelock Cave*, Plate 63, d, Figure 19, b.

flints observed were preserved and not all fragments could be identified, but are merely to indicate the number of specimens on which the dimensions shown are founded. A number of broken tips, not assignable to the proper class, would conform in size to the dimensions for the classes in which they might fall. Lengths are in all cases in inches. The dimensions expressed as uncertain are calculated from incomplete specimens:

TABLE OF CHIPPED IMPLEMENTS

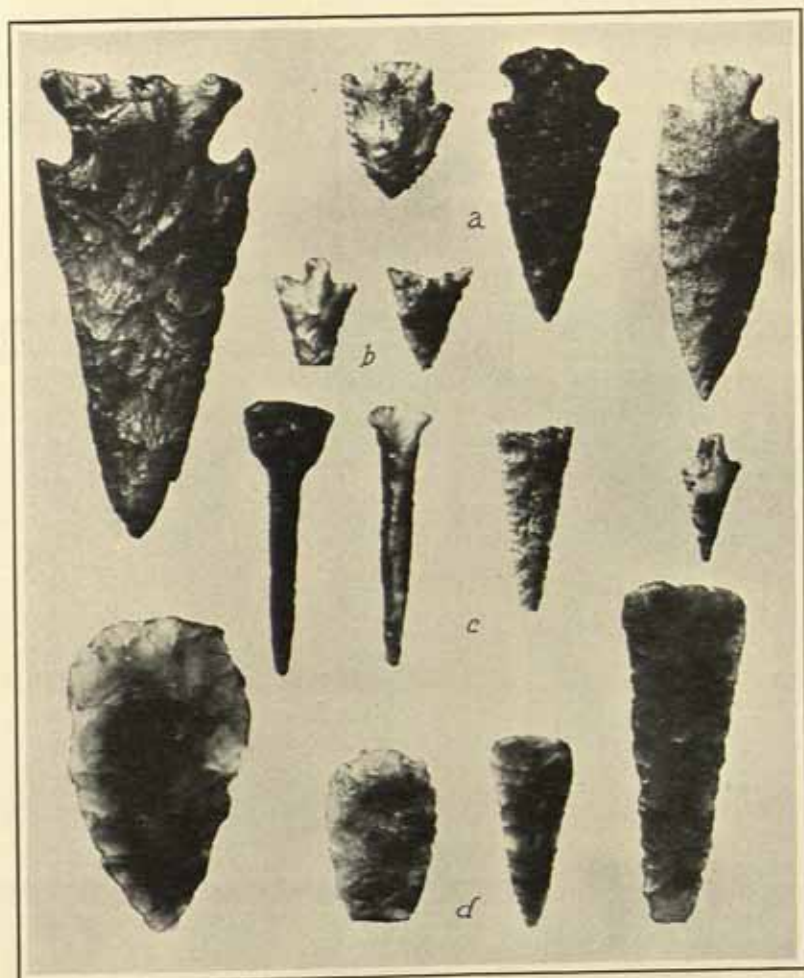
<i>Illustration Plate</i>	<i>Type</i>	<i>No. studied</i>	<i>Max. length</i>	<i>Min. length</i>
31, b, 1, 2, c, 4....	Arrowhead.....	8	1½	1
31, a, 1, 3, 4.....	Tanged blade.....	14	3½	Not less than 2
31, a, 2.....	Sawtooth blade.....	1	1½	1½
31, c, 3, d, 3.....	Small triangular blade	3	1½	1½
31, d, 4; 32, c, 3..	Long triangular blade	3	Not more than 3½	Not less than 2½
31, d, 2; 32, d, 2..	Small leaf-shaped blade.....	2	Not more than 1½	Not less than 1½
31, d, 1; 32, b, 1, 3, c, 1.....	Large leaf-shaped blade.....	11	Not more than 5½	Not less than 2½
32, a, 1, b, 2.....	Square-ended blade..	4
32, c, 2, d, 3.....	Scrapers.....	3	2½	2
31, c, 1, 2.....	Drill.....	2	2½	2½
32, a, 2, 3.....	Sawtooth scraper....	3	1½	1½

Arrowheads are all tanged, with one exception, which is of simple triangular shape with a depressed base.

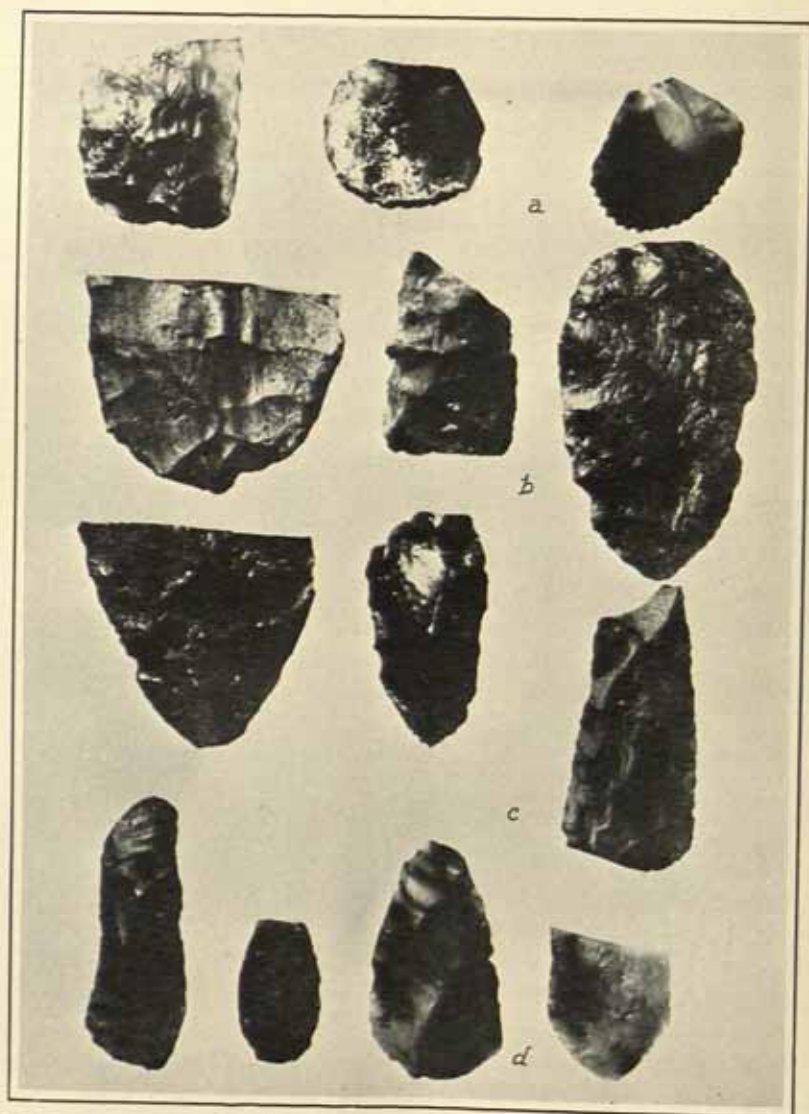
Tanged blades are quite flat, in contradistinction to arrowheads, which have a pronounced median ridge. Tanged blades are about of a proper size for atlatl dart points but I believe them to be knife blades. We have no other evidence of the use of the atlatl by the Fremont people; the blades seem somewhat thin for projectile points; and the notches are diagonal instead of at right angles to the blade, the latter being characteristic of dart points in Arizona Basket-maker sites.¹

The maximum length for this class of blades would be

¹ Guernsey-Kidder, 1921, *Basket-Maker Caves of Northeastern Arizona*, p. 87.



TYPES OF CHIPPED IMPLEMENTS



TYPES OF CHIPPED IMPLEMENTS

2¼ inches except for one specimen, from the medicine bundle at Site 25 which is 3⅝ inches long. This is a thin, well made blade of yellow jasper, in the crevices of which adhere particles of an orange-red paint, as if it had been used to rub off some paint from a lump. If so, the blade was unhafted at the time, as the paint stains extend over the whole surface on both sides.

The *tanged sawtoothed blade* was probably not a projectile point, as it is very broad for its length, too broad to fit a normal arrowshaft.

Small triangular blades fell within the limits of arrowheads in size, but are much flatter than the tanged arrowheads and are too small to be unfinished tanged knife blades.

Large triangular blades are narrower in proportion to their length than small blades and are thicker at the base than toward the point. The tips of both specimens are missing.

Small leaf-shaped blades are relatively thick. The smaller ends of both being broken, they may have been either pointed or rounded.

Large leaf-shaped blades vary in length and in thickness, the flattest perhaps belonging in a separate class by themselves. We have no complete specimens of the thick ones, but the size can be calculated with a fair degree of accuracy from the fragments.

Dimensions of *square-ended blades* can not be given, as we have only the ends, but they are of the same order of magnitude as the large leaf-shaped blades, averaging about 1 inch in width. Whether both ends were square or one rounded or pointed is problematical. There is one example of a parallel-sided blade terminating in a triangular point (Plate 32, d, 4).

Scrapers are very thick and lack the regularity of surface and the fine edges of other types. A cache of a dozen was found by Mr. Earl Buhinon of Torrey. A similar blade, rather more carefully chipped than ours, is illustrated by Jeançon from the Chama valley.¹

Drills are of the same type as a fragmentary specimen figured by Kidder and Guernsey.² The larger specimen shows a high polish at the point, resulting from long use.

¹ Jeançon, 1923, *Excavations in the Chama Valley, New Mexico*, Plate 15, d.

² Kidder and Guernsey, 1919, *Archaeological Explorations in Northeastern Arizona*, Figure 48, i. Such drills are not found in Basket-maker sites. Guernsey and Kidder, 1921, *Basket-Maker Caves of Northeastern Arizona*, p. 112.

Sawtoothed scrapers are thick around the saw edge and have a depression at the base on one side, the other side being flat.

A rough flake, $2\frac{1}{2}$ inches in length, triangular in cross section and with a rounded end, would hardly be classified as an implement, were it not for the fact that it is wrapped with sinew for half its length, forming a convenient grip. This was perhaps used in dressing hides, as it has no sharp edge.

In the absence of the flat Pueblo mano, the absence or rarity of the stone axe, and in the abundance of chipped implements, the Fremont culture agrees with that of western Utah.¹ The abundance of chipped implements and the existence of several forms apparently absent in the cliff-dwellings of northern Arizona supports the deduction that hunting played a more important part in the life of the people than it did farther south.²

UTILIZATION OF ANIMALS AND PLANTS

Animals. As has been stated, numerous fragments of bone, hide, and horns of deer, mountain sheep and elk show that game formed a large part of the food supply. Contact with the buffalo area is shown not only by the pictographs at Sites 11 and 31, but by the finding of a strip of buffalo hide and a bit of buffalo hair-string at Site 13 and of pieces of dressed hide at Site 16a. Rabbits and smaller rodents must have been hunted to a considerable extent, as is attested by the variety of light snares and traps. A bluish fur from some small rodent was much favored for fur-string. The domestic turkey was apparently not kept locally, although feather-string was found at Sites 11 and 30. Raptorial feathers and red feathers from the flicker were used for ceremonial purposes.

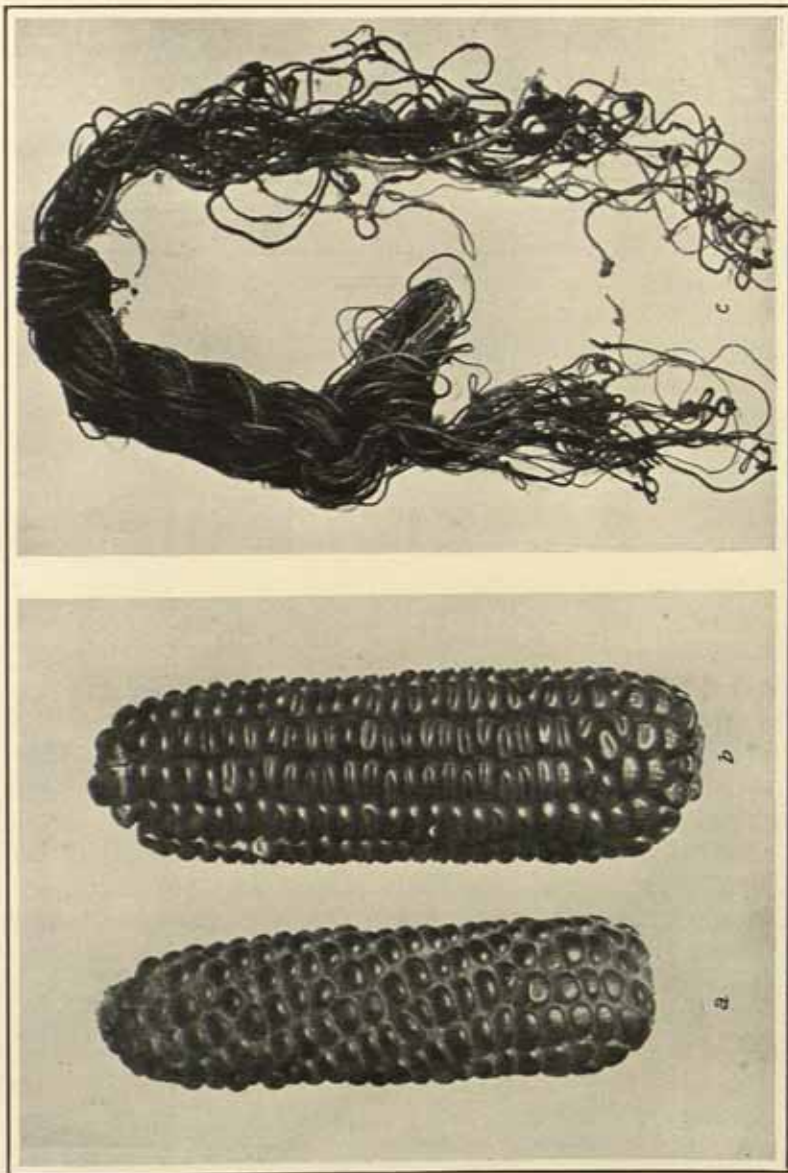
Plants. No trace of cotton was encountered. Apocynum, cedar bark or yucca was used for string, and tule for the small mats. Corn, beans, and squash were cultivated.

At Site 27 was found a buckskin bag containing about three pounds of beans, a half pound of squash seeds, and a couple of handfuls of shelled corn.

Beans. These were picked up in the rubbish at several sites, as well as in the cache at Site 27. The beans in the bag range from

¹ Cf. Judd, 1928, *Archaeological Observations North of the Rio Colorado*, p. 146.

² Cf. Kidder-Guernsey, 1919, *Archaeological Explorations in Northeastern Arizona*, p. 126.



a, b, Types of Maize; c, Bundle of Snarres

light to dark red and vary in size. There are also a few parti-colored beans. White beans were observed in a granary near Fruita.

Maize. Corn was of several varieties, of which the predominant one was a yellowish dent corn, grains of which were recovered in the rubbish at all large sites, including Site 31. The ear from Site 25, four of the six ears from Site 19, and one of the two from Site 21 are of this variety (Plate 34, b). These ears have twelve or fourteen rows of kernels. The other two ears from Site 19 have undented grains and were slightly darker than the dented ears. The second ear from Site 21 has eight rows of dark, full, red grains, and closely resembled Basket-maker corn (Plate 34, a). The ear from Site 37 has eight rows of full grains, of which some were yellow and others of a dark greenish color. The shelled corn in the bag from Site 27 included full green grains, similar to those from Site 37, the ordinary dented yellow grains, and dented grains of a rich red color.

Pinyon nuts, and at least two varieties of wild grass seed, were also gathered for food. A bundle of Brigham tea was found at Site 27.

WORK IN HORN AND BONE

Elk Horn. A large elk horn found at Site 13 had been split and all the branches but one chopped off to give a sort of pistol grip, while the base was roughly pointed but showed no signs of wear. This would have been very serviceable for any purpose where a heavy pointed tool with a lot of weight behind it was desired.

The pair of elk horns found at Site 16a, which are 2 feet 7 inches in length, have been cut off just above the first branching, but not otherwise worked. From the fact that they were found with odd pieces of hides, it appears probable that they are merely raw material to be worked up later. An implement from Site 28 is discussed below.

Mountain Sheep Horn. An implement of mountain sheep horn found by us in a cave below Fruita, otherwise devoid of interest, was matched by a specimen given to us by Clarence Mulford. In each case the horn has been split through from side to side and cut off below the point and diagonally above the base, forming a convex blade. One specimen is badly weathered. The other shows no wear at the end, but does show slight wear on what would be

the under side, if the implement were held horizontally in the right hand with the curve pointing in. It may well have been used with a scooping motion for digging in the sand. Both specimens are about 1 foot long.

Two small implements from Site 27 are pieces from the convex surface of a mountain sheep horn, one $7\frac{1}{4}$ by $1\frac{1}{4}$ inches and the other $4\frac{1}{2}$ by $\frac{3}{4}$ inches, both showing signs of wear.

A small cup, 4 inches long, made from a ewe's horn, also from Site 27, had been used as a receptacle for a red paint with a resinous base.

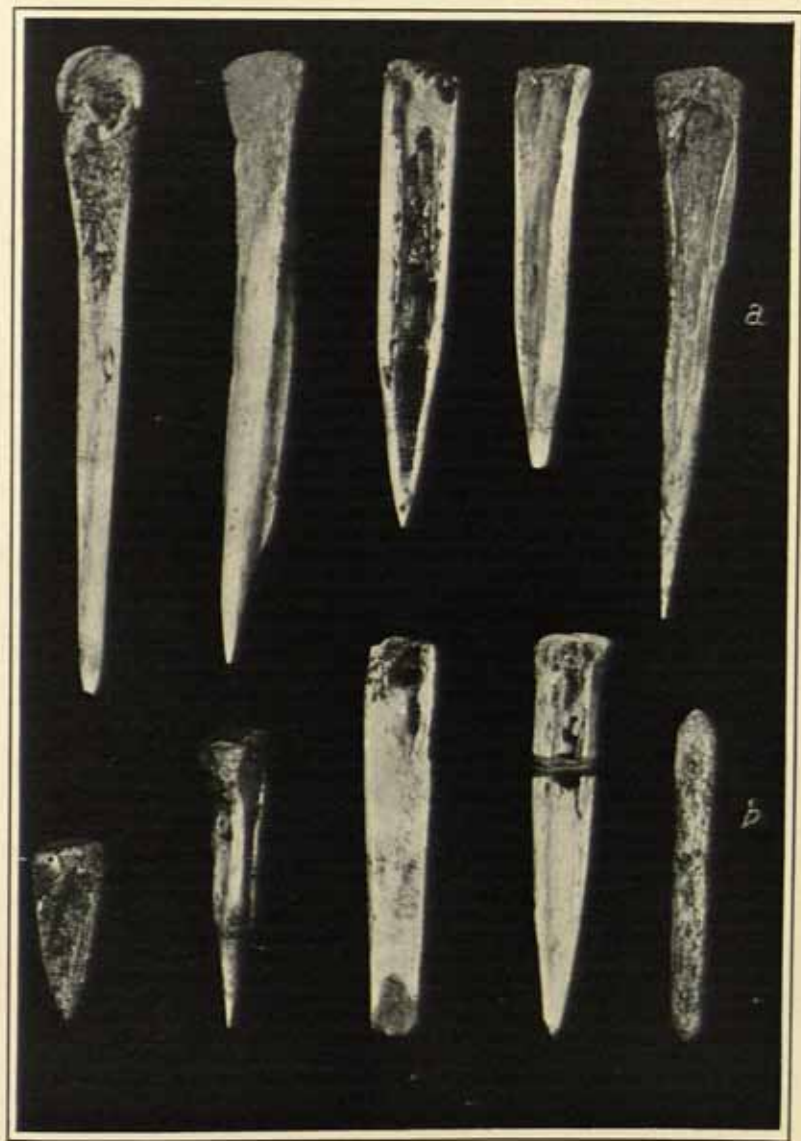
Bone Awls and Implements. The familiar bone awls turned up at several sites. The range of types is shown in Plate 35. From Site 11 came a cylindrical implement 3 inches long, bluntly pointed at both ends, perhaps a flaker (Plate 35, b, 5); and a spoon $4\frac{1}{2}$ by $2\frac{1}{2}$ inches made from the brain pan of a small animal (Plate 29, b, 2).

Bone Tube. An unexplained device from Site 19 consists of a bone tube $3\frac{1}{2}$ inches long and $\frac{3}{4}$ of an inch in diameter, the surface of which, including both ends, has a high polish (Plate 29, c, 3). The bone has been split in two, probably unintentionally. A pair of small holes at each end are provided for tying the two pieces together. When found, they were fastened at one end by a short piece of string, each end being drawn through the holes and knotted. Two larger holes, a quarter-inch in diameter, are drilled on the same side of one piece a half-inch from the ends. The dimensions of the tube and orifices are not such that it could be used as a fife or whistle.

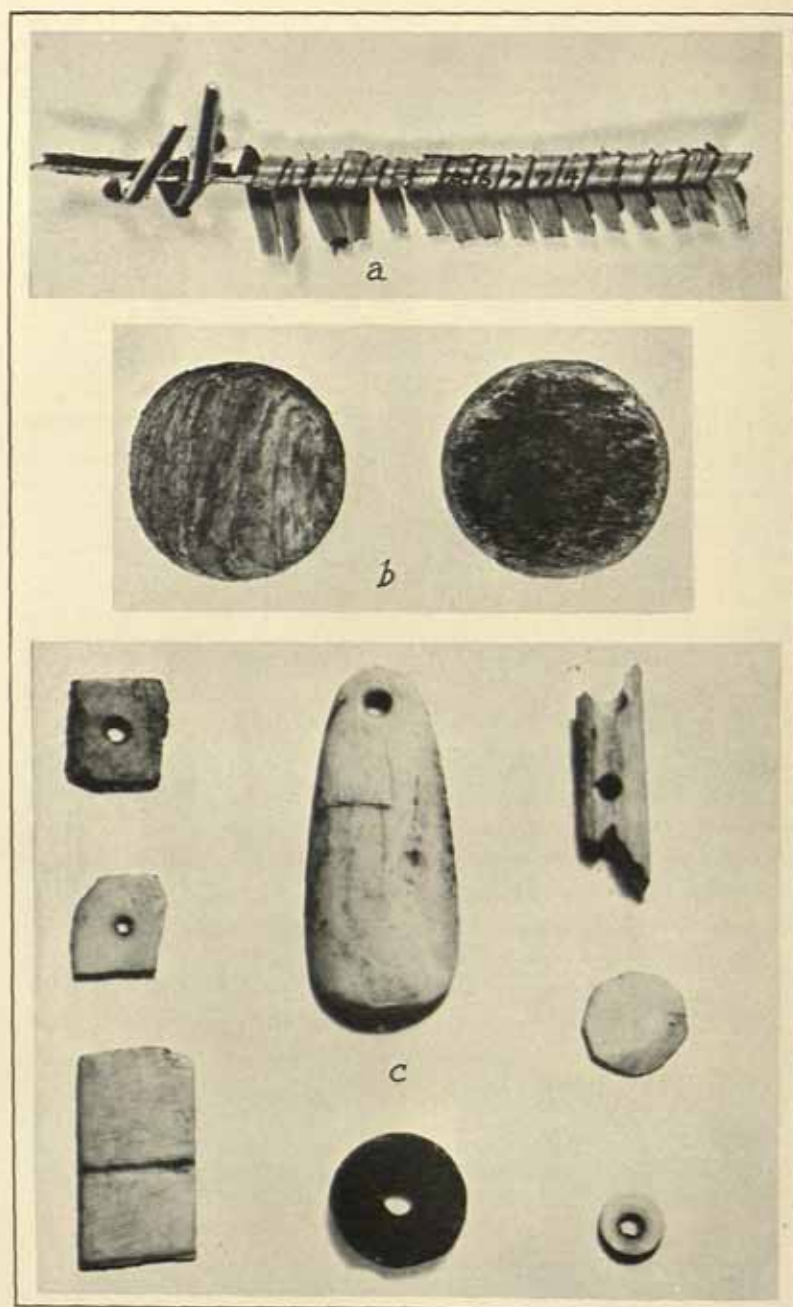
Ornaments.¹ At Image Cave there was picked up a polished bone ear pendant, 1 inch long, two tiny square bone beads, one discoidal bone bead, and what was perhaps two of the square beads in the making, consisting of a rectangular plate of bone a quarter-inch long and half as wide, with a transverse groove on one side (Plate 36, c).

From Site 27 comes a crooked bone pendant $1\frac{3}{8}$ inches long with an incomplete perforation, and a discoidal lignite bead seven-sixteenths of an inch in diameter (Plate 36, c). Probably to be classed as ornamental is a bone tablet $2\frac{3}{4}$ by $1\frac{1}{2}$ inches with a

¹ Compare the Post-Basket-maker ornaments illustrated in Roberts, 1929, *Shabik'eshchee Village*, Plate 30.



BONE IMPLEMENTS



BASKETRY, GAMING CHIPS, AND ORNAMENTS

perforation at one end from Site 31, the surface of which shows fine scratches (Plate 36, b, 3). A tubular bird bone bead was obtained at Site 36.

WORK IN WOOD

Planting Sticks. Two planting sticks were recovered at Site 13. The larger is 16 inches long and is a handsome piece of polished greasewood. The other, 1 foot long, is of some lighter wood and was made out of an old dead stick, as the marks of worms working under the bark are visible on it. The ends of both have been fire-hardened.

Arrows. While neither atlatls nor bows were found, the use of the bow is indicated by the presence of small points and by a notched plug for an arrow, as well as by the somewhat doubtful evidence of the pictographs. The arrowshaft was probably of wild cane as is the case in other parts of the Southwest, fragments of this material being not infrequent in the rubbish, while at Site 13 a fragment was found painted in bands of red and green. A typical notched wooden plug for insertion in the base of the shaft comes from Site 11 (Plate 37, d), while a piece of cane, wrapped with sinew, from Site 7 probably represents the socket into which such a plug was inserted. Several hardwood foreshafts were found at Site 11 and are all rather longer than is common in foreshafts from Arizona. The first measures $9\frac{1}{2}$ by $\frac{1}{4}$ inches (Plate 37, b). The last $1\frac{3}{4}$ inches has the usual taper and has remnants of resin on it. The front end has a shallow notch for the reception of a stone point. Below the notch the shaft is tightly wrapped with sinew for 1 inch. A second shaft, 9 inches long, is similar except that the tapered end has been broken off (Plate 37, c). A third shaft, 12 inches long, has a plain blunt point (Plate 37, a). A fourth foreshaft (Plate 37, e) was converted for use as a paint stick, having on the end a thick deposit of red paint with a base of resin, such as was found in the horn cup from Site 27.

A much more slender foreshaft, less than $\frac{3}{16}$ of an inch in diameter and 5 inches long, in addition to the seat for the point and anti-split wrappings has a spiral wrapping down its entire length, over which it has been painted white (Plate 37, g). The rear end of the fragment is neatly cut across.

Other Wooden Objects. A knife handle from Site 11 is $3\frac{3}{4}$ inches long, $\frac{3}{8}$ inch thick, and $\frac{7}{8}$ inch broad at the notched end, tapering slightly at the top (Plate 37, f). It is of unpainted wood. A different type of handle from Site 13 looks at first like a large arrow foreshaft (Plate 37, h). It is cylindrical, 5 inches long and $\frac{1}{2}$ inch thick. The notch is $\frac{1}{2}$ inch long and more than $\frac{1}{4}$ inch wide. Above the notch wrappings, four grooves $\frac{5}{8}$ inch long divide the surface into quadrants, running into an equatorial groove. The end is evenly cut.

Hearths for fire drills were found at Sites 11 and 31.

From Site 11 come two short wooden tubes of unknown function. One is 3 inches long, $\frac{5}{8}$ inch in outside and $\frac{3}{8}$ in inside diameter, while the other, $1\frac{7}{8}$ inches long, tapers in bore from $\frac{5}{8}$ inch at either end to less than $\frac{1}{4}$ inch at the center (Plate 29, c, 2). A cylindrical wooden plug is 1 inch long and $\frac{7}{8}$ inch in diameter.

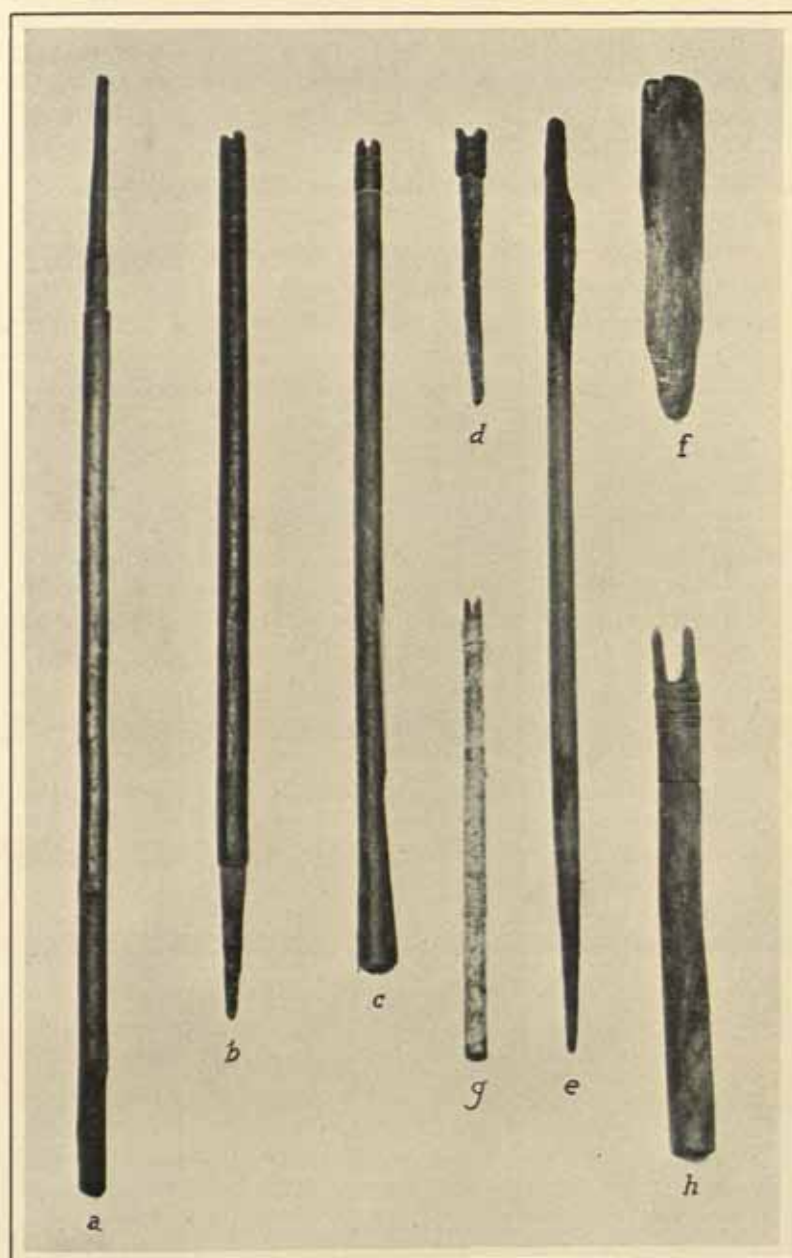
Snare sticks similar to those found in Cave du Pont (Basket-maker)¹ were found by us at Site 13, in a "Moki House" near Fruita, and at Site 31, while Mrs. Pectol reports finding some at Site 5. From Site 13 came another similar device (Plate 29, a, 3), a trap consisting of two 6-inch sticks tied loosely together at one end.²

A "ceremonial object" (Site 11) consists of a split stick $6\frac{1}{2}$ inches long and $\frac{1}{2}$ inch in diameter, tapered to a blunt point at one end (Plate 29, a, 4). Two inches from the other end is a sinew wrapping. The bark remains on the convex side. The inner side is decorated with broad bands of red and black paint.

Wooden Disks. An interesting object from Site 5 is an irregularly circular, polished hardwood whorl, slightly concave-convex, $2\frac{1}{4}$ inches wide, with a small perforation in the center. It is decorated on both sides with rude crisscross scratches, and shows wear on the concave side. This evidently is the counterpart of the familiar perforated concave disks made from potsherds (of which two were found at Site 11). These disks, when perforated, are usually referred to as "spindle whorls"; when unperforated, as

¹ Nusbaum, 1922, *A Basket-Maker Cave in Kane County, Utah*, p. 144.

² See Schellbach, 1927, *Bundles of Snarres from Nevada*, for a description of such traps complete with string and peg attachment as found in Nevada and Grand Gulch, Utah. Our specimen shows the Grand Gulch method of joining the two sticks. Similar traps made from a single bent stick were found at Lovelock Cave, Nevada. Loud-Harrington, 1929, *Lovelock Cave*, Plates 44, a; 48, a, b.



ARROW FORESHAFTS AND KNIFE HANDLES

"counters." It seems clear, however, that both types have a similar function.

At Site 27, in the rubbish in different parts of the cave, there were recovered four disks of quaking aspen, $1\frac{1}{4}$ inches in diameter and $\frac{1}{8}$ inch thick, painted black on one side in contrast to the natural white of the wood on the reverse side (Plate 36, b). These are obviously gaming counters. Wooden chips painted black on one side are used in a Navajo dice game.¹

Two wooden scoops, such as occur commonly in Basket-maker caves, were recovered at Site 27. Numerous billets, splints, and other objects of wood of no special interest, showing human workmanship, were turned up at nearly every site.

DRESS

Body Clothing. Fragments of fur-string and, at Site 13, fur cloth, were found, though in no great quantity. The cotton cloth of the Cliff-dwellers was unknown. The woman's skirt or apron depicted on the figurines suggests a twined-woven article, but nothing corresponding to these representations was found in the caves. It is probable that the bits of dressed and sewn buckskin found at all cave sites represent the principal clothing. Warm clothing of some sort must have been used in winter, as the temperature at Torrey is said to fall, at times, below -30° Fahrenheit, and the fur covered moccasins show an adaptation to a cold climate.

The pictographs, which have already been discussed, are probably of little value in reconstructing the garments of everyday life.

Footgear. Here, we are on firmer ground. No trace of sandals was encountered, while moccasins were found at four sites and we know of others which have been found.

The Fremont moccasins do not appear to fit into any of the recognized types of North American moccasin,² and there is an informality in their manufacture which at first glance makes

¹ Franciscan Fathers, 1910, *An Ethnologic Dictionary of the Navajo Language*, p. 479. Seven chips are used in this game, recalling the sets of seven dice found in Basket-maker sites (Guernsey-Kidder, 1921, p. 106). In the Navajo game the chips are tossed like coins. The Basket-maker compound dice must have been employed in a different manner.

² Classified in Hatt, 1916, *Moccasins and their relation to Arctic footwear*.

each pair appear to constitute a new type. On closer study, however, they turn out to conform fairly closely to one plan. The material is mountain sheep hide with the hair left on.

All modern moccasins may be said to start with a sole and deal with the problem of how to bring the shoe up over the foot. In the Fremont moccasin, on the other hand, the upper is the starting point. This is divided fore and aft into two main pieces joined at the heel and along a seam running diagonally from the

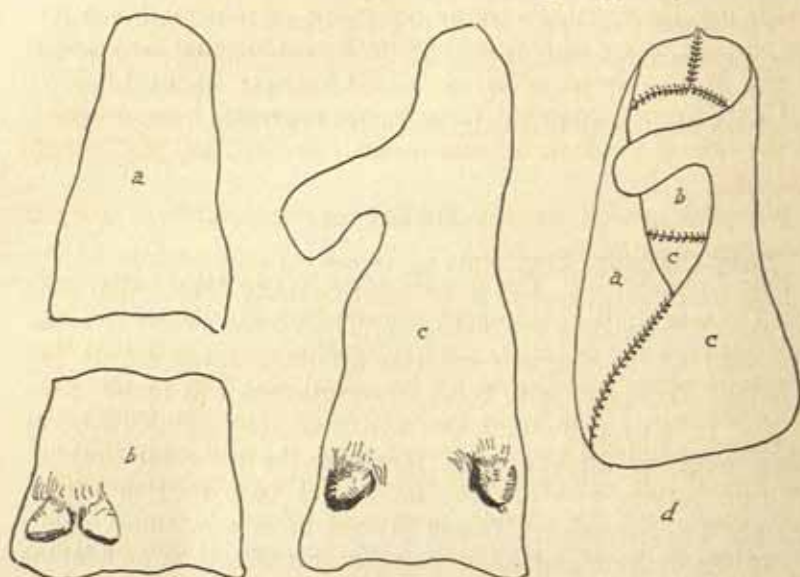


FIGURE 5
Template of Fremont Moccasin.

front of the leg outward toward and over the third or fourth toe. The inside piece extends over the front of the toes and comes under, forming a part of the sole for a third or more of its length (Figure 5, c). It is normally equipped with a projecting triangular tongue over the instep, which comes around the outside of the ankle. The smaller, outer side of the upper (Figure 5, a) forms no part of the sole. The sole is, in the new moccasin, a longitudinal strip extending from the end of the bent-over portion of the inner half of the upper to the heel (Figure 5, b). These parts are shown assembled in Figure 5, d, lettered to correspond with the separate parts just described. The sole may be

patched from time to time with numerous transverse patches. The outstanding peculiarity of the construction is that the seams joining the different parts of the sole to each other and to the uppers are all so located that they are exposed to a maximum of wear.

A remarkable feature of most of the moccasins is the use of strips from the foot of the sheep in the sole in such a way that the dewclaws project and serve as hobnails. Whenever a sheep was taken, these strips were probably cut off and preserved for the purpose, as a complete set of four, bound together, was found at Site 27 and eleven were found lying together at Site 13.

Tie strings are somewhat variable, but in general were attached at the side of the foot, brought around the heel, and tied round the ankle.

With this general introduction the peculiarities of the several specimens may be described.

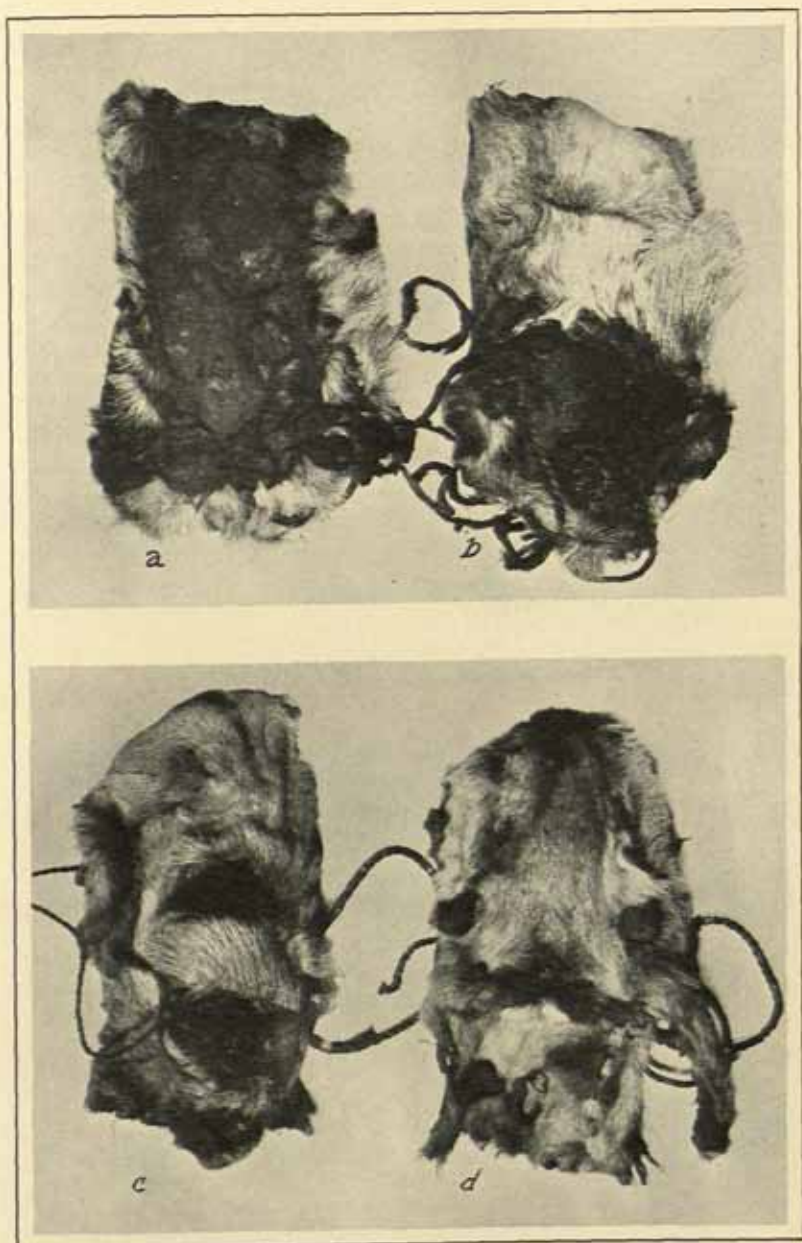
Pair from Site 27. The frontal seam is concealed under the fur. The inner half of the upper is made from the skin of the leg, split between the dewclaws, and applied in such a way that the dewclaws come, pointing backward, about one-third of the way down the sole, which is one piece with the upper for two-thirds its length. The heel is a piece from the leg, the skin being split on the frontal side so that the dewclaws, in their original relationship, come near the outside, projecting toward the heel. The tie string, of $\frac{1}{8}$ inch apocynum cord, fastened at the junction of the sole and upper on the outside, below the ankle, passes through the heel and the instep, probably in such a manner that it could be drawn tight when the moccasin was soft, and has a loose end 2 feet 5 inches long, which was probably wrapped around the ankle. The tongue to go over the ankle is provided with a shorter tie string of smaller cord. The shoes show slight wear, with the hair beginning to go at the heel, ball of the foot, and ball of the big toe, which has worn a small hole in each case. There is an inner sole of grass compacted with mud and a lining of loose grass.

Plate 38, c, and d, show respectively the left from above and the right from below. The seam between the heel plate and the upper of the latter has been cut. In Plate 39, e, the appearance of the right when on the foot is shown.

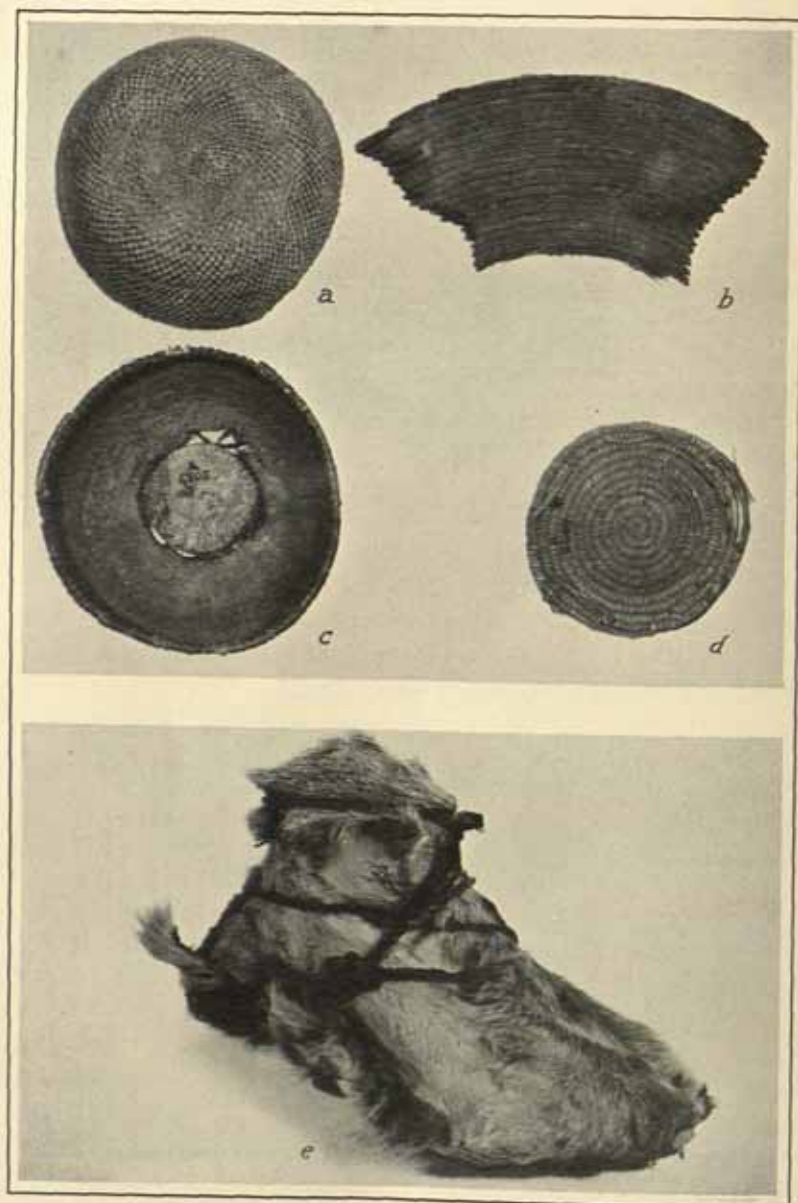
Second Pair from Site 27. Length 10 inches, width 5 inches. (As they were buried with the last and are of the same size they were doubtless for the same individual.) The upper at the heel of the left is a separate third piece, while the right has the usual two-piece upper with heel seam. The inside upper formed one quarter of the sole and is equipped with one pair of upper dewclaws coming on either side at the very front of the sole. The after part of the sole also had one pair, coming on either side $3\frac{1}{2}$ inches from the heel. The tie strings are broken, but started originally from the inside at the ball of the foot and came round the heel, where it is not clear whether they were looped through, and then through a hole in the upper in front of the ankle. As they broke they were eked out with odd bits of thongs. There is no sign at present of cords on the tongues. The soles are much worn. The left has been patched at the toe and at the heel with buffalo hide, and the right has been patched at the heel. There is a grass and mud inner sole.

Pair from Site 11. Length 8 inches, width $3\frac{1}{2}$ inches. The inner upper formed the front quarter of the sole. There are no dewclaws. The long tie string extended from the instep through loops at the heel under the ankle bone on the outside and at the top of the foot in front of the ankle. There is also a long tie cord on the tongue. The shoes are old, the hair being nearly gone from the uppers and wholly from the soles, which are reduced to masses of four or five patches badly in need of further repair. The patching modifies the usual square-ended appearance of the shoe by continuing the seam joining uppers and soles across the toes. This pair was found tightly stuffed with "shoe-trees" of grass.

Single Left from Site 5. Length 10 inches, width $4\frac{1}{2}$ inches. This specimen has been worn long past its normal period of usefulness, and is almost entirely lacking its hair. The original sole structure is lost in a maze of patches and stitches which nevertheless still form a remarkably serviceable stratum. From the welter there emerge two pairs of dewclaws, those near the front pointing back, and vice versa. The upper has the third piece at the heel. The usual tie string is replaced by thongs with fixed points of origin at either side of the heel, which were tied in back after the manner of the heel-loop on a sandal, but as this tended



TOP AND BOTTOM VIEWS OF MOCCASINS



BASKETS AND MOCCASIN, SHOWING PROBABLE ARRANGEMENT OF TIE STRINGS

to slip off, it was secured by a two-ply sinew string tied to it and brought farther forward on the outside. The usual ankle-tongue is matched by a corresponding one on the outside, forming, with the extra heel piece, an unusually high-topped shoe. The two tongues were joined by a thong passed through holes in their points.

Pair from Site 13. (Plate 38, a, left sole; b, right upper.) Length 8 inches, width 5 inches. This pair presents a modification of the usual structure. The heel seam is moved to the inside and the diagonal frontal seam moved back on the outside until each comes opposite the ankle bone. The outside upper is reduced to a mere rim at the rear of the moccasin, which is turned into a scuffer type of slipper. On this rim is one pair of dewclaws which thus come at the extreme rear of the shoe. The ties are of apocynum. One starts in back of the instep, passes through a loop at the heel, and is tied to another starting on the outside of the foot, the ends then being brought around the ankle and tied again. Another tie, of sinew string, passes from side to side across the top of the foot through a number of loops in the edge of the upper, and is perhaps also brought round the ankle. On the right shoe this has broken and has been replaced by an apocynum string. The bottoms of the moccasins show considerable wear and have been patched with large single patches running nearly the entire length.

Relationships. A single pair of moccasins found on an unquestionable Basket-maker II mummy in Grand Gulch, which is now in the Peabody Museum, appear to be the only moccasins of any considerable antiquity known from the Southwest proper. This pair bears no apparent resemblance to the Fremont examples, being made of well tanned hide and closely related to modern types in construction. The Museum also contains moccasins collected at Promontory Point, Great Salt Lake, by the late Professor Andrew Kerr, the antiquity of which is problematical but which again are morphologically unrelated to the Fremont type.

The usual footgear of the non-agricultural people who inhabited Lovelock Cave in Nevada was a rather crude rush sandal. One single moccasin and one pair of moccasins were, however, found there. The latter, though crudely made, is of a mod-

ern type, but the former appears from the illustration to be constructed in the same manner as the Fremont moccasin.¹ It is described (p. 47) as "made entirely of deer hide with the hair on, except for twine 3 mm. in diameter used in mending. The heel shows six thicknesses of hide. The specimen is too fragmentary to determine if the ankles were protected, though the covering of toes is present." Another patched sole, very probably from the same type of shoe, was also found. None of these specimens come from an ascertained stratigraphic level and, as Lovelock Cave was inhabited from Basket-maker to recent times, their age is undetermined.

Aside from the Lovelock Cave example the Fremont moccasin stands alone. Its uniqueness can not be explained on the ground of great antiquity alone in view of the fact that the more ancient Grand Gulch specimens are very sophisticated in construction. It would therefore seem that the Fremont moccasin is an original, local development not directly derived from Plains or Athabascan prototypes. The occurrence of one or two examples at Lovelock Cave suggests Fremont influence on the primitive Basin culture of the Humboldt Lake region rather than the reverse. The general structure and the arrangement of the tie strings on the Fremont moccasin can best be explained on the theory that it is morphologically a sandal adapted to a comparatively cold climate by being covered over. After reaching this conclusion the writer was interested to note that the same idea had independently occurred to Loud and Harrington, who refer to their Lovelock Cave example as a "covered sandal."² If this is the case, the use of the moccasin does not necessarily indicate any non-Southwestern influences in the Fremont region.

Cache of Hides. The cache of hides at Site 16a apparently was made up of worn-out pieces or cutting-room rejects. It included four irregular pieces of very well dressed elk hide which measured about 2 feet square, four smaller pieces of mountain sheep hide with loops on the edges, similar to those made to accommodate the tie strings on the uppers of moccasins, and two pieces of stiff, hairless, buffalo hide with similar but larger loops on the edges. It is impossible to determine the shape or nature of the object

¹ Loud-Harrington, 1929, *Lovelock Cave*, Plate 22, e.

² *Ibid.*, p. 173.



SHELDON OF BUFFALO HIDE FOUND BY BISHOP PECTOR OF TORREY

or objects from which these came. With them were several feet of buffalo hide thong cut or broken into short lengths.

The Pectol Shields. The low rock shelters which exist in numbers about Calf Creek near Torrey have already been described. In one of these Bishop Pectol of Torrey found in 1925 three shields, which are now in his possession. The writer examined the shelter in which they were found. It was very small, approximately 4 feet high and 6 feet deep. The shields were nested in a bed of loose cedar bark, such as is found in abundance at most Fremont sites, and were covered by about 2 feet of sand. There were no other artifacts in the shelter so that the manner of their finding sheds no light on their age. It should be borne in mind, however, that Fremont pottery and other specimens have been found cached in a similar manner, while considerable amateur research has apparently not unearthed any Indian specimens of obviously late date in such situations in the vicinity.

Plate 40 gives a good idea of two of the shields, the third being similar. A is in red, blue, and white; b, in green and yellow. All three have been damaged in one corner by some trickle of moisture into the shelter, but are otherwise in excellent condition. The material is stiff two-ply buffalo hide. The laces which at intervals secure the inner layer to the outer may be seen in the photographs. The designs are in dark green, red, and yellow. In construction and in the colors and general nature of the designs, the Pectol shields bear a strong resemblance to certain Apache shields in the Peabody Museum. The latter, however, are small, circular bucklers carried on the arm, while the Pectol shields are large, oval shields covering most of the body. The arm is inserted but the greater part of the weight is taken by a strap around the neck.

With a good deal of hesitation the writer expresses the opinion that these remarkable shields date from comparatively recent if not from historical times. This conclusion is based on their uniqueness among objects of ancient origin, on their resemblance to modern Athabascan shields, and on the pictographic evidence already discussed. Of course the existence of pictographs of shields accompanied by domestic animals does not prove that all shields date from the Spanish period, and there may well have been

Athabaskan clans in this vicinity at an early period,¹ so that the shields, while modern from the point of view of the Fremont culture, may still be old from a historical standpoint.

CORDAGE

String of various sizes was made, mostly of apocynum. Only two fragments of human hair string were found (Sites 13 and 27). The hair of the mountain sheep, and in one instance of the buffalo (Site 13), was also used.

The largest cordage found was quarter-inch rope, of a loose, two-strand construction, of which some feet, chopped into small pieces and apparently used for bedding, were found at Site 27.

Snares. The chief use of string seems to have been for snares, four bundles of which were found at three different sites, all of two-ply apocynum string. At Site 8, three snares were neatly tied up together. Each consists of a string 6 feet 4 inches long, tapering smoothly from .063 inch in diameter at the larger end, which is secured in a hard knot, to .044 inch at the smaller end, which carries a running noose. This tapering toward the noose end to a greater or less extent is characteristic of all the snares. Of a bundle of nine from Site 11, a typical specimen is 9 feet 2 inches long, .10 inch in diameter at the thick end, and .07 inch at the noose end. A second bundle consisted of two groups tied together. The first contained nine fine snares, each about 7½ feet long and .05 inch in average diameter, some being more markedly tapered than others. All but one of this group had slip knots at both ends. The other group comprised eight coarser snares with slip knots at one end only, the largest 10½ feet long and .12 inch in diameter. The bundle from Site 21 contained 32 fine snares (Plate 34, c). These have not been unwound, but they are of about the same length as the others.

Such snares with slip knots have been found in Basket-maker sites, but would doubtless not be out of place in any horizon.

Net. The small net found at Site 27 is identical in construction with one from Cave du Pont,² consisting of a nearly hemispherical net of fine cord 2 feet 4 inches in circumference at the rim and

¹ See Hodge, 1895, *The Early Navajo and Apache*, for an account of the origin and early wanderings of the Navajo.

² Nusbaum, 1922, *A Basket-Maker Cave in Kane County*, p. 145.

8 inches deep, with meshes thirteen-sixteenths of an inch square, looped on a string in such a way that pulling on the net will draw the mouth tight. To this string is attached a 2-foot cord. The use of the net as illustrated by Kidder and Guernsey seems obvious, the only problem being as to what game our example was intended for. It is much too small for rabbits.

TWINED-WOVEN TECHNIQUE

Bag. There were no traces of the Basket-maker twined-woven bags, but a cruder application of the technique is to be seen in a bag, or flexible basket, found at Site 21 (Plate 41, b). This bag is 14 inches in diameter, 9 inches high, and is shaped much like a flat-bodied, narrow-necked olla. It is twined-woven, both warp and woof consisting of loose bundles of cedar bark nearly 1 inch thick, there being 51 warp and 16 woof elements. The exact manner of originating the warps has not been determined. Warps are dropped in, forming the constriction at the neck. The ends of the warps project in a rough edge at the top, marring the appearance of the bag. Two woof rows of string are inserted near the top to give greater strength. This bag is very thick and heavy for its cubical content. Its most likely use would seem to be as a casing for a jar, in which case it would be woven in place around the jar.

Matting. No Cliff-dweller twilled matting was found, loose beds of cedar bark serving for floor coverings. A specialized type of small mat seems to have been much used, of which we have a fragment from Site 31 and three fairly complete specimens from Sites 11, 21, and 19, from 8½ to 11 inches wide and slightly less from top to bottom. These are plain twined-woven, the vertical elements consisting of strips of tule, twice as long as the mat, doubled over a cord at the top, while the horizontal bindings, set from ⅔ to 1½ inches apart, are of fine yucca string. The selvage is uniformly of a type which appears to have been the usual one at Lovelock Cave,¹ and is also known from Cave du Pont (but not the commonest type there),² in which at the end of a row of twined-weaving the two strands are twisted into one and carried down to the next row, which thus starts in the opposite direction from the last.

¹ Loud-Harrington, 1929, *Lovelock Cave*, Plate 24, a, c, d, e.

² Nusbaum, 1922, *A Basket-Maker Cave in Kane County, Utah*, p 101, Figure 15.

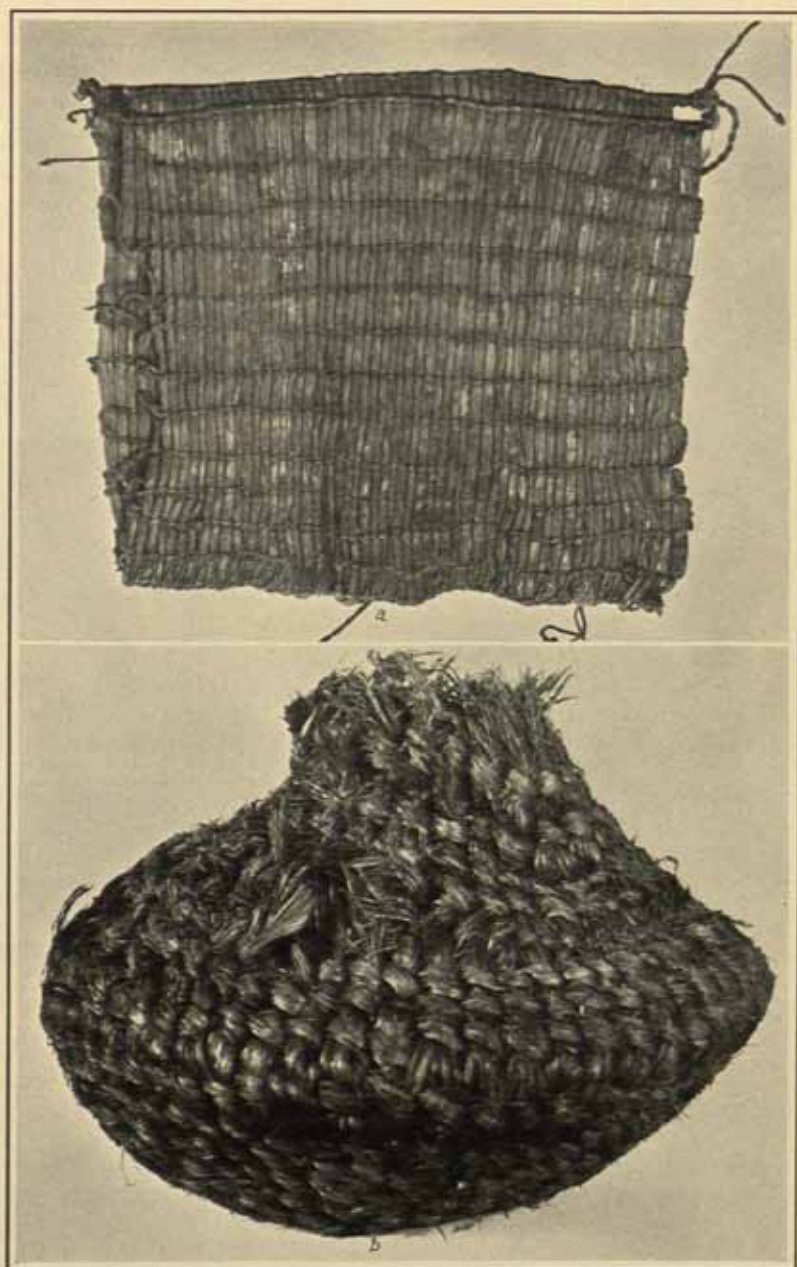
A specimen from Site 27 consists of two such mats tied together by the ends of their top cords with a square knot at one end and a half bow knot at the other (Plate 41, a). Each mat is 11 inches wide and 9 inches in depth. The lower edge is finished in a peculiar manner, namely, by looping a string over the last and next to last woof elements between two warps, then carrying it diagonally over to between the next pair of warps, and so on. The tendency of the last woof to slip off the ends of the warps is thereby counteracted. Each mat has a string 1 foot long, tied in the middle around a woof by a square knot, the two ends hanging loose. The situation of these strings is on the inner faces of the mats as found, in the one case, 4 inches from the end and $3\frac{1}{2}$ from the bottom, in the other $2\frac{1}{2}$ inches from the corresponding end and 2 inches from the bottom. The only explanation of the function of these strings which suggests itself is that the mats were used singly to wrap up something and were fastened with the strings.

Three fragmentary single specimens (Sites 13 and 7) were rather larger, perhaps 15 inches in width with the twined elements 3 inches apart. In one, the ends of the vertical elements were twisted into the last row of the binding. In another, two strips of tule, twisted together and doubled over the top as usual, form the vertical elements, making four strands in all in each bundle. Two specimens from Site 30, represented by lower corners only, may have conformed to the dimensions of the small mat, though the elements of one are rather coarser. These are both very effectively finished by carrying the ends of each vertical bundle over and catching them between the next bundle in the last row of twined-weaving.

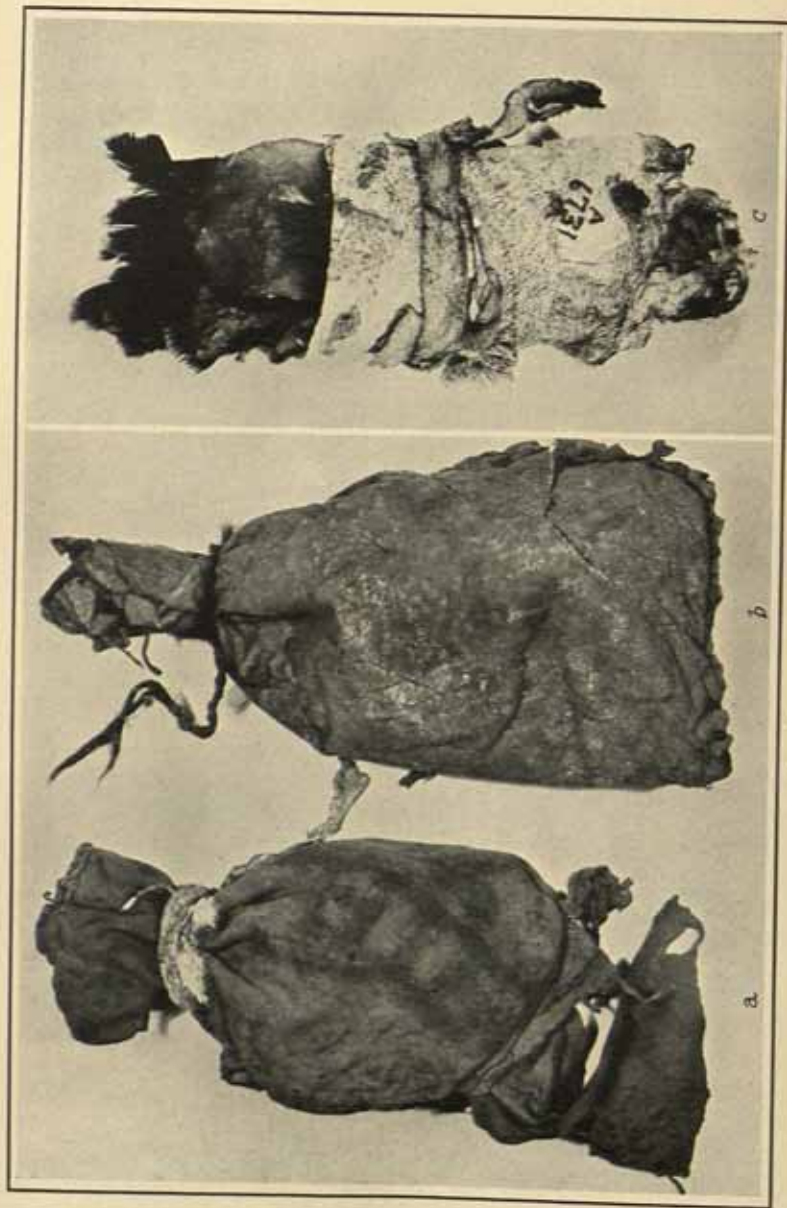
These mats are all smaller than those of Cave du Pont and must have served some specialized function. They are not skirts, for, if used singly they would naturally be provided with a long string, and if used in pairs, tied after the manner of the pair found together, the maximum waistline would be about 24 inches.

BASKETRY

Baskets were of common occurrence, being represented in our collection by four whole specimens and a number of fragments. Neither the Cliff-dweller ring basket nor the twined or wicker



TWINED-WOVEN TECHNIQUE: PAIR OF TULE MATS AND BARK BAG



SKIN BAGS AND MEDICINE BUNDLE

baskets of Lovelock Cave appear. Two varieties of coiled technique are employed. The first is the familiar rod-and-bundle technique, but differs from the Basket-maker practice and agrees with Judd's specimens¹ in having but one rod. The rod is not a whole twig, but is split, giving a flat under surface. The bundle is regularly of yucca fibre. In the second type of weave, which is also represented in western Utah, the bundle is dispensed with, and each stitch goes over and under two rods. This is really a very similar technique, for if we consider the bundles as metamorphosed into rods and the stitch passing under instead of through the lower bundle, the actual rods being mere fillers, the two methods become identical.

The rod-and-bundle weave is the more common. A large carrying basket from Site 13, 24 inches in diameter and 18 inches high, is of typical Basket-maker shape. The specimen lacks its bottom and is so weather-beaten that it is impossible to tell if it bore any decoration when new. Other material is fragmentary, but seems to be largely from shallow, tray-like baskets (Plate 39, b). One such basket was about 15 inches in diameter. A flat tray 6 inches in diameter, from Site 13, is perhaps the bottom of a large basket revamped. A buckskin thong is worked through it near the edge in such a way as to present, on either side, a decagon with alternate sides removed (Plate 39, d). The bottom shows much wear. In all, there are eleven baskets of this weave represented in the collection. The weave is in all cases close to five coils to the inch.

One two-rod basket was found at Site 13 (Plate 39, a), one at Site 11 (Plate 39, c), and fragments of two others at Site 11, these being nested with a third of rod-and-bundle weave. These were all high-sided baskets of rather small size (6 and 6½ inches in diameter, 2½ and 2⅓ inches high). The coils run seven and eight to the inch. A miniature tray basket, 1¾ inch in diameter, was found at Site 27.

While none of our baskets were decorated, a remarkable find of eight nested baskets decorated in black and red was made by Earl Buhinnon of Torrey. The fact that in these specimens, as in the nest found by us, both the rod-and-bundle and the two-rod technique are represented, is strongly corroborative of their genuineness.

¹ Judd, 1926, *Archaeological Observations North of the Rio Colorado*, p. 148.

A problematical type of basketry object is represented by one fragment from Site 5 (Plate 36, a) and two from Site 27. In each case the specimen consists of a section of yucca leaf splint wrapped with another splint about three-sixteenths of an inch wide. As the wrapping passes over the foundation it is split in a plane parallel to the surface for a distance of a quarter-inch. These split sections project below the foundation and wrapping to form a sort of fringe. The longest fragment is $5\frac{1}{4}$ inches long and bears no evidence as to how it was incorporated into any complete object.

In its shapes and manner of weaving, the basketry of this district shows a strong general resemblance to early Southwestern basketry, while sharing certain peculiar features with the basketry of western Utah alone.

CEREMONIAL AND PROBLEMATICAL OBJECTS

The contents of Pothole 5, Site 21, appear, both from their nature and from the cave with which they were stowed away, to be ceremonial material. They comprise a pair of young mountain sheep horns, 8 inches in length; a leg-of-mutton shaped strip of wolverine fur in beautiful condition, 8 inches long, with thread holes on the long side and a 3-inch piece of apocynum string at the small end; and a ball of white paint. A small rubbing stone with white and blue paint on it was found at the same site.

The bag from Site 28 is made of very well dressed, soft hide, and is 9 inches long by 6 inches broad (Plate 42, a). The body of the bag is made of a single piece of buckskin sewn along the bottom and up one side with sinew. The irregular edges of the material have been gathered up and sewn in a sort of pleat, giving a bunched and uneven appearance to the side of the bag. The top was originally provided with an edging, perhaps intended for a drawstring, made in the following manner: holes were pierced at intervals of about a half-inch around the neck of the bag, a thin strip of buckskin was looped through these holes and over the top of the bag between the holes, and another strip carried around the outside through the loops thus formed. The artisan, however, became weary in well doing when he had done about two-thirds of the edging and it was never completed, the bag when found being tied farther down by a long strip of sheep hide. (A second

possible explanation is that the material had formed part of another object prior to use in this bag.) From the bottom of the bag depends an irregular piece of buckskin, 8 inches long, caught up in the bottom seam. This shows evidences of prior use elsewhere in the form of stitch holes, worn places and greasy stains, and seems hardly suitable for ornamental use. Inside the bag were 19 horny coverings of deer hoofs with holes in the tips; 1019 juniper seeds, nearly all of which had small holes drilled in the large end; a few of the outer husks of the berries; a 4-inch bone awl, well polished (Plate 35, a, 3); and an implement $3\frac{1}{2}$ inches long, made from the base of a deer or small elk horn (Plate 29, a, 2). These two implements were stained with a pitchy substance. The significance of these objects is probably as follows: the hoofs and seeds were to be made into a necklace. The smaller ends of the seeds could not be drilled and were doubtless to be cut off with a flint, at least one seed having been so cut, probably by way of experiment, to form a complete bead. The holes were made with the awl. At first it seemed likely that the horn implement was used with the awl in some way, but it shows no gouges or scratches, nor is the base of the awl adapted to use with a pusher. It seems most probable that it was used to macerate and remove the husks surrounding the seeds, as it is well suited to such a motion and this would account for the pitchy stains.¹ Those in the groove of the awl doubtless came from the interior of the seeds.

Reference may be made here to the bag containing beans from Site 27, which was made in the same manner, of a thinner skin, but is much neater in appearance, the sides having been neatly squared off before sewing (Plate 42, b). The sewing is with apocynum string. The bag is 12 inches long by $6\frac{1}{2}$ inches wide at the bottom, narrowing somewhat toward the top. A hole at the bend has been patched with a disk of skin three-quarters of an inch in diameter. The neck is tied with human hair loosely twisted into a string.

The medicine bundle from Site 25 consists of a long strip of mountain sheep hide, 3 inches broad, rolled up and tied round with two narrow strips of the same material (Plate 42, c). In its folds are fifteen brown and white wing coverts of hawk or eagle,

¹ Quite similar implements are figured in Jeançon, 1923, *Excavations in the Chama Valley, New Mexico*, Plate 26, c-e.

the large tanged knife already described (Plate 32, a, 1), and a thin quartz blade of the large "leaf-shaped" type (Plate 32, d, 1), the tips of the feathers and the bases of the knives protruding somewhat from the bundle.

Also non-utilitarian in character were two plumes consisting of brown and white coverts from some hawk, inserted in short lengths of cane (Site 13). Red feathers from the wing of the flicker, often found in Basket-maker sites, were encountered in the rubbish at Sites, 5, 11, 13, 19, 21, and 31.

At Site 27, ends of two strips of buckskin were found, one of which had a tiny fragment of a red flicker feather bound to the end with sinew, while the other had a bit of white down secured in the same manner.

A curious object from Site 11 consists of a split end of a corn-cob $2\frac{1}{4}$ inches long, on the flat side of which is a flat pebble covered with a strip of buckskin, the whole kept together by a rather dubious arrangement of strings (Plate 29, a, 1). This would appear to be a buffer, perhaps for bone ornaments. True, the strings are so disposed that any very vigorous attrition would wear them through, but the whole affair seems to have been thrown together on the spur of the moment.

Corn-cobs with sticks inserted into their butts and sticks with a cob at either end are frequent in all cave sites.

We may conclude our catalogue in Pepysian fashion with torches of tightly rolled cedar bark from Sites 13 and 27, and two pillows from Site 13 composed of the still fragrant ends of pine boughs padded with grass.

SUMMARY AND CONCLUSIONS

The Fremont drainage was the seat in Pueblo II times of a primitive, peripheral culture, of which the outstanding original features were a primitive type of moccasin and elaborate clay figurines. Although the culture was partly and perhaps predominantly agricultural, the inhabitants of the Fremont region were also dependent in good part on the game supply. The small granaries apart from any dwellings show that the people moved about, in all probability living on the flats in the summer and cultivating corn, and in the winter camping in sheltered canyons

around the mountains and devoting themselves to hunting. The few caves were extensively used for dwellings, but were not improved except by the construction of potholes and cists, while adobe or wooden structures were built in the open. In its general features, the culture remained at the Basket-maker III level, as shown by the pottery, the figurines, the absence of cotton and turkeys, the twined-woven mats, the fur cloth, the relative abundance of coiled basketry and absence of plaited basketry, the various forms of snares and traps, and the general shape of the anthropomorphic pictographs. The twined-woven bag technique, however, was lacking. Only in a few characteristics — the bow and arrow, mountain sheep pictographs, stone drills, and possibly head deformation — does the culture show traits in common with the early Pueblo culture with which it had contacts. Finally, in its time lag, in the modifications of its Southwestern traits (for example: pottery, basketry, mats, figures), and, most strikingly, in the substitution of moccasins for sandals, the Fremont culture shows that it is not an integral part of the main stream of Southwestern development.

The Fremont culture is too definite and too well developed in certain directions to be confined to a single small drainage. As to its southern extension, Mr. Scott's reconnaissance shows that such sites as exist on the Escalante are chiefly masonry granaries, a feature alien to the Fremont, but the culture may yet be found there. Farther south and east, its progress was blocked by the Colorado River. To the west, the Beaver-Paragonah culture was in full sway. Accordingly, it is not surprising to find the Fremont culture extending to the northeast along the Green River as far as Nine Mile Canyon, or even as far as Vernal, where Mr. Jeançon describes pictographs similar to those at Fruita.

So far as they can be evaluated, the influences which moulded the Fremont culture appear to have been Southwestern. The buffalo was known to the Fremonters but played a small part in their economy, and there is little evidence that they were much affected by Plains culture. Nor, while the finding of a Fremont moccasin at Lovelock Cave is interesting, can we find any close connection with the primitive, non-agricultural cultures of the Great Basin. Basketry and chipped implements, for example, are quite different. Such traits in common as fur cloth, twined mat-

ting, and the trap made of two sticks are doubtless survivals from the Basket-maker I period.

In view of the situation at Pueblo Grande de Nevada¹ and elsewhere, we are not particularly surprised to find no evidences of Pueblo I culture in the Fremont. On the other hand, it is rather surprising, after the evidently close relations between the Fremont and the Southwest in Basket-maker III times, that the later Puebloan developments in architecture and ceramics made so little headway. The originality shown in many details of their culture makes it difficult to think of the Fremonters as merely a backward Southwestern tribe. In any event, the absence of the superficially impressive features of Southwestern culture, archaeologically durable houses and colored pottery, does not necessarily indicate that they were not, on the whole, as well fed, clothed, housed, and generally comfortable as their Pueblo II contemporaries.

TABLE TO SHOW DISTRIBUTION OF
SIGNIFICANT TRAITS

In order to give an idea of the correlation of the most distinctive or significant traits of material culture, the occurrence of twelve selected traits at the eight principal Fremont sites at which specimens were found is shown below in tabular form:

<i>Site No.</i>	5	7	8	11	13	21	27	31
Plain ware.....	x	x	x	x	x	x	x	x
Crisscross scoring or embossing on jar neck.....	x	x		x			x	
Black-on-white or Corrugated ware....		x	x	x			x	
Clay image.....	x	x	x		x		x	x
Buffalo hide used or buffalo shown in pictograph.....				x	x		x	x
Moccasin.....	x			x	x		x	
Fur-string.....			x	x	x		x	
Bundle of tapered snares.....			x	x		x		
Twined-woven mat.....		x		x	x	x	x	x
Two-rod basketry.....				x	x			
Rod-and-bundle basketry.....			x	x	x	x	x	x
Horned dancer pictograph.....	x		x	x			x	x

¹ Harrington, 1927, *A Primitive Pueblo City in Nevada*.

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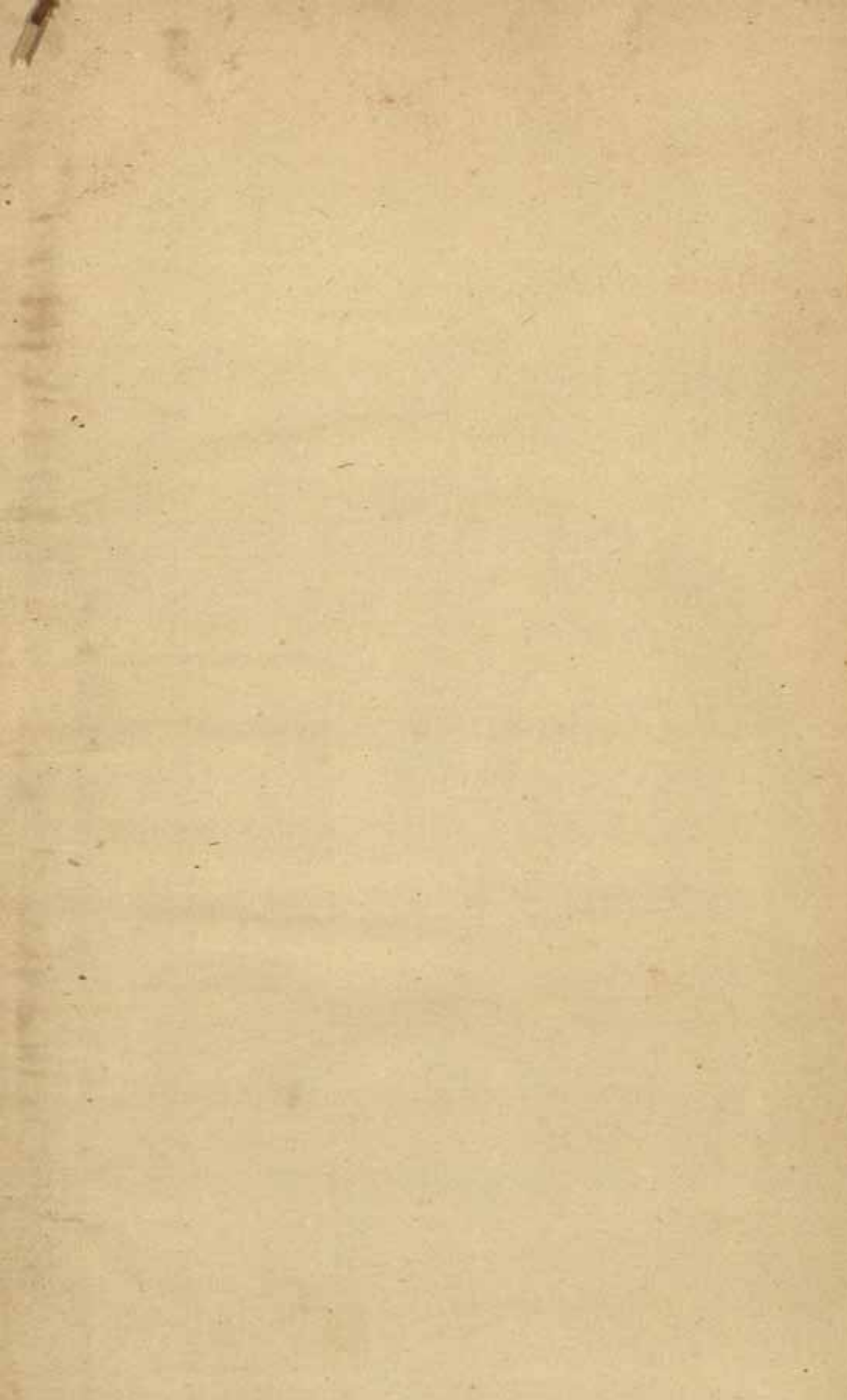
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