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TWO SUMMERS' WORK IN PUEBLO RUINS

BY

JESSE WALTER FEWKES

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# TWO SUMMERS' WORK IN PUEBLO RUINS

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By JESSE WALTER FEWKES

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## SUMMER OF 1896

### GENERAL OUTLINE

The following report embodies the results of archeological field work for the Bureau of American Ethnology in the summer of 1896.<sup>a</sup>

The author was fortunate in having as his assistant Dr Walter Hough, of the National Museum, who, at his suggestion, took up in addition a study of Hopi ethnobotany, the results of which study have already been published.<sup>b</sup>

A week after his departure from Washington on May 30 the author began excavations at a ruin called Homolobi, near Winslow, Arizona, where he worked continuously until the close of June. During July and a part of August he excavated ruins at the mouth of Cheylon fork, on the Little Colorado river, and at Chaves pass.<sup>c</sup>

The short distance of Homolobi and the Cheylon ruin from Winslow allowed him to make daily trips from that town to the ruins, where the workmen were encamped. At the close of each day's work the objects found on that day were carried to the hotel, where they were catalogued and packed for shipment. Even with this precaution some of the specimens were appropriated by visitors attracted by the beauty of certain of the pottery objects. While archeological work in the vicinity of a town has advantages so far as the practical work of boxing and shipping are concerned, it has many disadvantages, one of the least of which is that just mentioned.

The considerable distance of the Chaves pass ruins from a town necessitated a camp at the diggings, which was far from a hardship, considering the beautiful forests and the fine water near the ruins. A camp was made at Old Shumopovi during a short stay at this ruin.

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<sup>a</sup> A preliminary report on the field work of this year may be found in the Annual Report of the Smithsonian Institution for 1896.

<sup>b</sup> American Anthropologist, May, 1897.

<sup>c</sup> This report was written and transmitted for publication in 1898. Since that time there has been considerable archeological activity in Arizona, and several collections have been made in the region, even in the ruins here considered. Certain specimens in these collections add important data to the discussion of the culture and migrations of the people who once inhabited this part of the Territory.

The objective material collected numbered 1,875 entries in the National Museum catalog, but since many of these entries include several objects, the actual number of specimens obtained was somewhat larger. The specimens were collected from the following localities:

Homolobi.....	700
Cheylon fork (Hopi name, Cakwabayaki).....	635
Chaves pass (Hopi name, Teübkwitcalobi).....	284
Shumopovi.....	108
Various other ruins.....	97
	1,824

Other specimens were obtained from various ruins on the Little Colorado, and from Mishongnovi, Awatobi, Sikyatki, and Old Walpi.

By far the greatest number of specimens collected were objects of a mortuary nature from the cemeteries. Although many of these were broken in getting them out of the ground, it is estimated that over one-half were entire, and fully two-thirds of the remainder have been so well repaired that they answer all the purposes of the student. The breakage was in part due to the inexperience of the workmen, but most of the vases, bowls, and the like were fractured by the earth, logs, or stones thrown on them in the graves when they were buried. Each bowl appeared to have formerly contained mortuary offerings of some kind, as food, paints, or prayer-sticks, and it was not rare to find food bowls piled up in nests one within another. There is no conclusive evidence that any large number of vessels were broken by design when interred.

At the close of the archeological work on the ruins mentioned, the author witnessed the Flute ceremony at Mishongnovi, and the Snake dances at Oraibi, Shipanlovi, and Shumopovi. Some of his observations on the latter have been published in the Sixteenth Annual Report of the Bureau of American Ethnology, and a short description of the Mishongnovi Flute altars, observed in 1896, appeared in the Journal of American Folk-Lore. The author also made a few studies of the Walpi Flute observance, which supplemented those already published elsewhere, and enabled him to prepare an extended memoir on this important ceremonial as performed on the East mesa.<sup>b</sup>

On his return to the railroad, after the close of the summer's work, the author visited Zuñi to prospect for ruins in anticipation of future exploration, and made a flying trip to the pueblos Isleta, Sandia, and Tesuki. A small collection of ethnological objects was made at these pueblos, and other specimens were purchased at Santa Fe: these, consisting of old paintings on skin from ancient pueblo missions, have been presented to the National Museum. It is believed that there is considerable material in the hands of traders or others in the Southwest, illustrative of the early mission period, which ought to find a

<sup>a</sup> Besides the 1,824 specimens catalogued in the field 51 additional objects were entered in the National Museum catalog.

<sup>b</sup> See Nineteenth Annual Report of the Bureau of American Ethnology, 1900, part 2, p. 952-1011.



permanent home in the National Museum. Some of these objects are very old, and show a mingling of Pueblo and Christian symbolism which is highly instructive, but in the rapid extinction of old manners and customs they are being replaced by more modern objects, and will soon disappear completely. Their preservation might well occupy the attention not only of the ethnologist but also of the historian.

Although the visit to Pueblo Sandia was a short one, of the nature of a reconnaissance, it was full of interest. For some unknown reason this pueblo seems to have been overlooked by most ethnological students of the pueblos, but to one interested in the Hopi Indians, Sandia presents many highly instructive problems. It is peopled by descendants of the people of Payüpki, now a ruin on the Middle mesa, and no doubt the Sandians have legends of the former home of their ancestors in Tusayan.<sup>a</sup>

Sandia has a large kiva, not unlike those in other Rio Grande pueblos, where old rites are undoubtedly still perpetuated. It would be interesting to know something of the nature of these ceremonies, in order to compare them with those of the Tusayan ritual.

The author hoped that he would be able to find some ruins in the immediate neighborhood of Holbrook, Arizona, and he visited the mesa north of the town with that thought in mind; but he was disappointed, although evidences of temporary camps and a few pictographs were discovered. He heard, however, of ruins at Carrizo, and saw a few beautiful specimens of stone objects from that locality. The trip from Navajo Springs to Zuñi failed to reveal any considerable ruins along that trail, but the examination was a superficial one. There are several large ruins not far from the Navajo railroad station, which were not examined.<sup>b</sup>

There are small ruins on some of the hills of the bad lands of the petrified forests<sup>c</sup> near Holbrook. One or two of these are of considerable size, and many objects indicative of former visitants or occupants were found on the ground about them. The author succeeded in discovering a single grave in one of the mounds, and excavated from it a few fragments of pottery, but these objects did not occur in sufficient quantities to justify extended work. Not far from Adamana station, on the Atlantic and Pacific railroad, there is a large ruin on a hill, which visitors to the petrified forest have no doubt noticed. This ruin is of considerable size, and promises a rich yield of archeological material should reasonable excavations be made outside its walls.

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<sup>a</sup> On a map by Menchero the site of Payüpki is called "Mesa de las Tiguas," indicating that it was peopled by Tiwas. Some of the Hopis say that relatives of the Asa clan once lived there.

<sup>b</sup> Some of these ruins were specially studied in the summer of 1897, and will be described later in an account of the operations of that year.

<sup>c</sup> This remarkable collection of fossil trees is about 15 miles from Holbrook, and may be called one of the wonders of Arizona. There are in reality three petrified forests, or three places where the bad lands are eroded sufficiently to lay bare the huge fossil trees which they cover. The signs of former habitation observed in the section nearest Holbrook show comparatively late occupation.

## RUINS ON THE LITTLE COLORADO RIVER

## GENERAL FEATURES

The plains and mesas bordering the Little Colorado river and its tributaries were sites of populous pueblos in prehistoric times. There remain many descendants of this former population who now inhabit pueblos distant from that stream. The Zuñis alone still live on the bank of one of its tributaries, and from the source of the river to its mouth the ancient pueblos have long since been deserted. It is asserted by certain Tusayan clans that their ancestors formerly inhabited the pueblos now in ruins on this river, and traditionists have names for these villages. The plan of the present expedition was to explore ancient ruins claimed by the traditionists of the Patki, Patuñ, and Piba people as a former home of their families, in order to determine the truth of their legends and to gather what archeological data there were bearing on the prehistoric migrations of the people who inhabited the western section of the pueblo area.

The ruins along the Little Colorado do not differ greatly in general character from those in the vicinity of the inhabited Hopi pueblos. They are situated both in the river valley and on bordering mesas, and, owing to the open character of the country, are mostly of the village type. Some of the tributaries of the Little Colorado in the Mogollon mountains are said to be overlooked by cliff houses, several of which, in Clear creek canyon, still remain well preserved, according to report; but these ruins have not been investigated.

Drifting sand has buried most of the ruins of the valley so deeply that the walls of few of them remain standing above ground. As a rule they are built on natural mounds, which, near Cheylon fork, have a gravelly character.

There is little to guide one in a determination of the probable age of the ruins. No evidences of Spanish influence were detected in the excavations, but this does not, of course, necessarily mean that the pueblos were not inhabited contemporaneously with, or long after, the advent of the Spaniards.

It is instructive to determine the probable causes of the evacuation of these river villages by ancestral Hopi clans. Among other influences, the following may be mentioned. In the legends concerning the forays of the Apaches it is always recounted that they attacked the Hopi pueblos from the south. Although these vigorous nomadic people originally came from the north, they seem to have early taken possession of the portion of Arizona between modern Tusayan and the southern boundaries of the Territory, raiding as they wished the Pima settlements on the south, and the Hopi on the north. The exposed pueblos along the Little Colorado were poorly adapted for defense, and this may have led to their abandonment.

Some years ago two Mormon towns were built not far from the present site of Winslow, and contiguous to Homolobi. These towns, Brigham and Sunset, were prosperous for many years, and their inhabitants cultivated extensive farms, which were irrigated from tributaries of the Little Colorado. The remains of one of their acequias can still be seen skirting the river side of Homolobi, and many of the stones for the walls of the towns are said to have been obtained from the Indian pueblo. The Mormon town is itself now a picturesque ruin, having

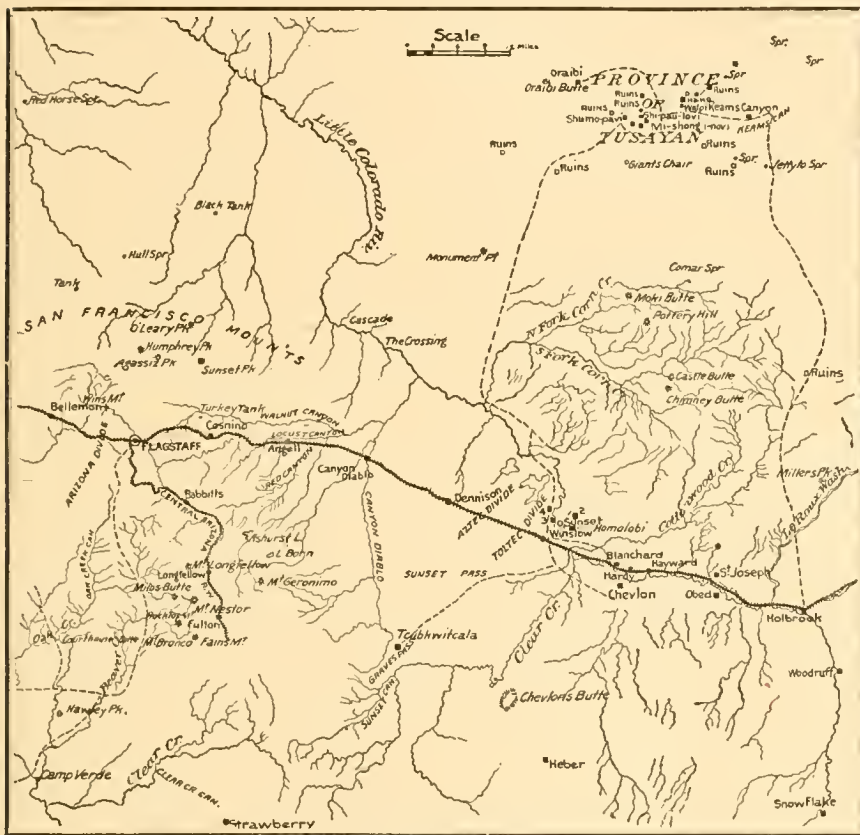


FIG. 1. Map of Ancient Tusayan.  
(Itinerary indicated by dotted lines.)

been gradually abandoned. One reason for the desertion of Sunset is said to have been the alkalinity of the soil, which irrigation had developed. If this explanation accounts for the failure of the Mormon farmers, it might also apply to their Hopi predecessors. The failure of crops may have led the Indians to seek other localities better suited for farming. However that may be, at the present time, 1896, the river valley opposite Homolobi has been turned into a profitable farm by a Winslow farmer, and when the author worked at

Homolobi this farm was green with alfalfa and various market vegetables.

A failure of the rain and the corn crop is distinctly mentioned as one of the causes which led the Patki and other southern Hopi clans to leave their settlements along the Little Colorado, but it is also stated that they were afflicted by a kind of gnat or sand flea in some of their earlier halting places. Possibly their dwellings became so infected with vermin as to lead to their abandonment.<sup>a</sup>

The Little Colorado river was dry during the work at Homolobi, and was crossed and recrossed almost anywhere, the sole obstruction being the steep banks, which were several feet high. Late in the summer, however, it became a raging torrent, impassable save in one or two places, and even these were dangerous on account of the many quicksands. It is not improbable that the great freshets of the river may have had an important influence in the abandonment of the second ruin of the Homolobi group, one side of which is completely worn away, although of course it is not unlikely that this happened after its abandonment. Evidence of similar erosion is also apparent on the river side of ruin 1 of the Homolobi group; cemeteries on that side, if they ever existed, have long since disappeared.

#### RUINS NEAR WINSLOW

As has been noted, the Hopis say that the ancestors of the Patki or Water-house<sup>b</sup> people lived in the far south. This tradition is very definite, and it even declares that they once inhabited a pueblo called Homolobi, stating that the position of this ancestral dwelling was near where the railroad crosses the Little Colorado, not far from the town called Winslow. With this exact statement as a guide the author went immediately to that town, having made arrangements with some Hopi workmen to join him there.

The ruins on the Little Colorado near Winslow were identified as the Homolobi group by Mr. Cosmos Mindeleff, who mentions 10 ruined pueblos in this immediate vicinity, but his reference to them is brief, and includes no attempt at description. The best-informed inhabitants of Winslow were ignorant of the existence of ruins near their village, and but for the confidence he had in the legends of the Hopis the author also would have doubted their existence.

The site of Homolobi was found to be exactly where the Hopi stories placed it, and archeological results confirmed the identification. The author found not only Homolobi, but also three other ruins in the immediate neighborhood of Winslow, and before a month had passed demon-

<sup>a</sup>The trail from Beaver Head in the Verde valley to Flagstaff, especially not far from Rattlesnake Tanks, has a very bad reputation for the small gnat, which gives much annoyance to travelers.

<sup>b</sup>The name Water-house means cloud, and the members of this clan are called both the rain and the cloud people.

strated that this was one of the richest fields in Arizona for archeological work, although previous to this visit not a single specimen had been described from the region.

It was also the author's desire to see how the ruins of the Little Colorado south of Tusayan were connected with those on the banks of its tributary, the Zuñi river, higher up the watershed. For that purpose he examined somewhat in detail a ruin opposite the station Hardy, on the Atlantic and Pacific railroad, near where Cheylon creek empties into the Little Colorado river. This ruin will be called in this report the Cheylon ruin. Its Hopi name is Cakwabaiyaki.

The objects exhumed from the cemeteries of the Cheylon ruin have close likenesses to those of ancient Zuñi ruins, as well as to those of Homolobi, which is claimed by the Hopis. A logical interpretation of these resemblances would seem to be that the culture differentiation of the two peoples was not as wide in ancient times as it is at present. The inhabitants of the villages of the Little Colorado and its tributary, the Zuñi river, were formerly closely related, and, no doubt, when these villages were deserted, some of the clans went to Zuñi and others to the Hopi pueblos. In subsequent times greater differentiation took place, which led to the present conditions.

It was also desirable to push the examination of the ruins of this drainage area as far south as possible, for which reason two ruins in Chaves pass, about 30 miles south of Winslow, were investigated. This was the southern limit of field work in 1896, and in the last month of the summer the author followed the trail north to connect the Homolobi ruins with those of the Hopi reservation.

We have good evidences from historical and legendary sources that there were inhabited pueblos between Zuñi and Awatobi as late as the middle of the seventeenth century. One of these, that of the Capias (Teipiya, according to the Hopis), is distinctly mentioned as west and south of Zuñi. It is not probable that all clans of the Patki people had wholly deserted Homolobi in the sixteenth century, and they may have been dwelling there as late as 1700. It is as yet an unanswered question whether any one of the ruins which were excavated in 1896 is Teipiya, which, according to the Hopis, the Zuñis declare was midway between Awatobi and Zuñi.

#### THE HOMOLOBI GROUP

##### LOCATION

There are four ruins near Winslow, which may be called the Homolobi group and are provisionally numbered 1, 2, 3, and 4. Of these, ruin 1, true Homolobi, yielded the best archeological results, and was nearest to the town, being about 3 miles away. More excavations were attempted at that place than at all the others. The ruin numbered 2 is about three miles farther down the river and more distant

from it, but is on the same side. Ruin 3 lies on the left bank of the river, about midway between the first and second, and ruin 4 is a few miles beyond on the same side, somewhat removed from the river. All of these ruins are thus within a radius of 6 miles of the town of Winslow.

#### FORMER INHABITANTS

Several Hopi clans, belonging to groups called the Water-house, the Squash, and the Rabbit, are said to have lived in these settlements along the Little Colorado, near Winslow. Among the clans of the first-named group may be mentioned the Corn, Agave, Rain-cloud, Lightning, and various others whose totems are aquatic animals. A list of them follows:

Patki	Water-house
Kañ	Corn
Omanwù	Rain-cloud
Tañaka	Rainbow
Talawipiki	Lightning
Kwan	Agave
Sivwapi	Bigelovia graveolens
Pawik	Aquatic animals (Duck)
Pakwa	Frog
Pavatiya	Small aquatic animals, Tadpole (pakwa, frog; tiyo, young)

The prominent chiefs of Walpi who belong to the Patki or Water-house people are Supela, Kwateakwa, Sikwistiwa, and Kwaa. Anawita of Sichumovi is also a member of the family. The legends of Homolobi were told to the author by the last mentioned, but Supela and the others have much lore concerning this group of ruins which has never been published.

The Patuñ or Squash people, now extinct on the East mesa, are also said to have lived at Homolobi, and they are reputed to have settled at Teukubi on the Middle mesa, and the Tawa or Sun people, who are associated with the Pakab or Reed clans, once lived with the Rain-cloud and Squash people in the Homolobi settlements.

There is evidence from the present Hopi ritual that the Patki, Patuñ, Tawa, and Piba (Rabbit) families, among others, lived at Homolobi. For instance, it is stated that the following clans introduced the societies and ceremonies mentioned, with their fetishes, into the modern system:

Clans	Ceremonies	Societies
Patki	{Soyaluña } {Palūlukōñti}	{Kwakwantú } {Lalakoñtú }
Piba	New-fire	Tataukyamú
Patuñ	New-fire	Wūwūcimtú

This statement is supported by the facts that the chief of the Kwakwantú, the great warrior society,<sup>a</sup> is Anawita, and that Supela is one

<sup>a</sup>Kwahu, eagle; kwan, agave.

of the chiefs in Soyaluña. The Sun priest, Kwateakwa, takes a prominent part in the screen drama of Palülüköñti. The Kwakwantû, Eagle-agave people, are distinctly southern, coming from the region in Arizona where the great cactus or agave grows, and an examination of details of the ceremonies mentioned shows an instructive likeness to Mexican rituals. In both Soyaluña<sup>a</sup> and Palülüköñti the effigies of the Plumed Snake play important parts, and this conception is distinctly a Mexican one, recalling Quetzaleatl. It is for those ceremonies in which there is the closest likeness to Nahuatl rites that southern origin is claimed by the chiefs and other participators.

#### RUIN 1

As has been stated, the nearest of the Homolobi ruins to Winslow—the one which was chosen for extensive excavations—is about 3 miles distant on the right bank of the river, and about the same distance from where the river is bridged by the Atlantic and Pacific Railroad. At that point there are several small knolls separated by level spaces which might once have been cultivated fields. Between the site of the ruin and the river bank there is a small grove of cottonwood trees, the bases of which are evidently at times flooded by the overflow of the stream.

The river takes a general northwest course from the railroad crossing, and is bordered with cottonwoods. On either side the banks are low and sandy, frequently caving in, rendering it treacherous to approach at certain seasons of the year.

The neighboring plains are parched and dry in the spring and early summer, and violent sandstorms sweep over them, oftentimes so dense as to obscure all outlook. At these times work along archeological lines is very disagreeable, and life in the village is far from pleasant.

When approached from Winslow the ruin is indicated by a number of low mounds without standing walls, and when it was first visited there was little to indicate that it was the site of a former pueblo, save many fragments of pottery strewn over the surface. The indications that Homolobi would be a profitable field for archeological investigation were very small.

The excavation of ruin 1 of the Homolobi group began about the first day of June, when a force of 5 Mexicans was employed to open the mounds at the northeast angle. The results of the work were not very satisfactory. They betrayed the fact that Homolobi was a pueblo of small size and of irregularly rectangular shape, with its highest walls on the northeast side. Considerable broken pottery, some stone implements, and other objects were obtained, but all the evidences appeared to indicate that the more valuable specimens were removed when the pueblo was abandoned.

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<sup>a</sup>An illustrated account of this winter solstice ceremony may be found in the *American Anthropologist*, v. 11, March and April, 1898.

The workmen penetrated to the lower floor, and found that the pueblo was two stories high at this point. The rooms were large and the beams of the flooring were well preserved. The floors of the rooms were large, flat stones; the lower chambers were nicely paved. The walls were made of stone masonry, nicely plastered, and in some instances blackened by smoke. In one of the largest of these rooms the floor stones were in two cases found to be perforated by round holes about the size of a sipapú in modern kivas. These slabs are in many respects similar to those found in graves outside the walls of the pueblo.

Two human skulls, one of which indicated an old person, and several human bones were found on the floor of chambers in the northeast part of the ruin, and were supposed to represent intramural

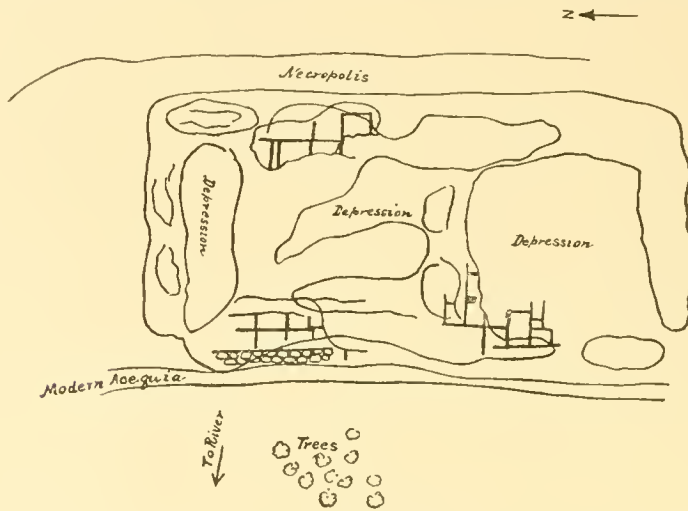


FIG. 2. Ruin 1, Homolobi.

burials. No pottery, however, was found in the vicinity of these skeletons, which fact would seem to indicate that they were not buried with customary mortuary offerings.

Continued work on the side of the ruin toward the river revealed the fact that this part had been worn away by the overflow of the stream, and a section had been cut through it in digging an irrigating ditch which formerly supplied the plains around Sunset with water.

The osteological collection from Homolobi was very large. Early in his excavations the author was surprised at the number of animal bones which were thrown out by the workmen, especially after they had penetrated to some distance below the surface. There appears no better explanation for the existence of these bones than that they were remains of animals domesticated or used as food. These bones were carefully gathered, and have been identified by Mr F. A. Lucas, of the National Museum; a complete list of species found at Homolobi is published in this report, page 110.



The occurrence of a skull of the domesticated dog in one of the graves at the Chaves pass ruin is significant, showing that this animal was known to the ancients, and probably utilized by them. The fact that this dog was the broad-faced variety is particularly instructive. It was not apparently a domesticated coyote or a mongrel like those which now are so common in some of the pueblos. Mr Lucas has published the following account<sup>a</sup> of this specimen:

Among the many objects obtained by Dr Fewkes last summer from the ruined pueblo of Chaves pass, Arizona, is the cranium of a domesticated dog found in a grave with a human skeleton. Although the mere fact of a dog being discovered under such circumstances is in itself interesting, it is not at first sight remarkable, since it is well known that in America, as elsewhere, the dog was domesticated at an early date, and Clavijero mentions an ancient dog, which he calls "a quadruped of the country of Cibola, similar in form to a mastiff, which the Indians employ to carry burdens." Aside from the fact that this is the first dog's cranium discovered by Dr Fewkes, there are some points of special interest in the present case. Most of the Indian dogs are more or less wolfish in their aspect and have long skulls, with comparatively low foreheads, thus showing a small degree of specialization in the way of breed, and this is true of such of the mummied dogs of Egypt as I have seen. The cranium of the Chaves dog, on the contrary, is of the broad-faced type, with high forehead, and, curiously enough, is precisely similar in size and proportions to the cranium of an Eskimo dog from Cumberland sound, the resemblance extending to the peculiar concavity and squareness of the nasal region. While this is an interesting coincidence, it is not brought forward as implying community of origin, but as instancing long domestication in order that so well-marked a breed could be established. A curious confirmation of the early origin of this breed was received from San Marcos, Texas, where, in excavating for ponds at the station of the United States Fish Commission, a human skeleton and bones of other animals were found in a layer containing many flint implements, overlaid by two feet of black soil. The bones were those of existing species, including teeth of several bison, and there was also a fragment of a dog's skull similar in size and proportions to that obtained at Chaves pass. Owing to the circumstances under which the bones were exhumed, it is not known whether or not the dog and man were found together. While none of the bones were mineralized, the condition under which they were found and the character of the human cranium showed them to be of very considerable age.

Dr Fewkes states that the skulls of carnivores are used in Hopi religious ceremonies, and that the skull, paws, etc., are regarded as powerful fetishes of warriors and cherished by them with much care. It is customary to bury a priest's fetishes with him, and there is little doubt that the dog's cranium from Chaves pass was a fetish of the man in whose grave it was found. As Dr Fewkes believes that the people of the Chaves pass ruin formerly lived far south, in contact with Nahuatl peoples, it can readily be seen how a dog's skull came to be part of the ceremonial outfit of the priest in whose grave it was found.

The numerous turkey bones which were found do not necessarily mean that this bird was used as food by the ancient sedentary peoples of Arizona. We are told by the historian of Coronado's expedition that the Pueblos had domesticated fowls, but these were probably turkeys from which, as at present, were obtained feathers used in

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<sup>a</sup> Science, n. s., v. 5, 1897, p. 544.

ceremonial practices. It would hardly seem possible that birds whose feathers were thus used would be eaten, although parallels to such a usage occur in the religious rites of many peoples. We know that their bones were made into needles and bodkins, and there is every probability that the wild turkey's flesh was eaten.<sup>a</sup>

Because of the poor results of the early excavations at Homolobi the author determined to abandon the work at this ruin. A search for the burial places was not successful, although he carefully examined the sandy hillocks a few hundred feet away, expecting that they would be found there if anywhere. Meanwhile a half dozen Hopi Indians who had been sent for came to Winslow, and the author set them at work, having discharged the Mexicans. On the first day they discovered the cemeteries of Homolobi, after which it was only a question of time before a large collection was obtained.<sup>b</sup>

The burial places at Homolobi were close to the outer wall of the pueblo, so near to it in fact that the skeletons in some instances touched the outer face of the wall. These places of burial were literally "under the ladders" of the town, if we believe, as we legitimately may, that the inhabitants formerly mounted to the house tops by ladders.

The outer slope of the mound was thus found to be crowded with the dead, and with them were multitudes of mortuary pottery offerings of all kinds. These cemeteries were found on the east<sup>c</sup> side, opposite the river bank, and although it is possible that in ancient times burials may have been made on the side of the mound toward the river, if they ever were there the overflow of the stream has washed them away or covered them up.

The burial places were sometimes recognized by flat stones set on edge projecting above the surface of the soil. These stones had often fallen in over the grave, and were sometimes buried many feet below the surface. In many of these there was a small, round hole about the size of a broom handle; in others this hole was large and square. In one or two instances traces of pigment were detected on these burial stones, but in the majority the figures were not legible. The reason assigned by some of the Hopi workmen for these perforations was for the escape of the soul; others regarded them as symbols of the sipapû, openings in the kiva floors which they closely resemble. In the pavement of one of the larger rooms which was excavated two slabs were found, one of which was perforated with a single

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<sup>a</sup> The eagles which are kept in the Moki towns to-day for the feathers used in ceremonies are buried at death in certain cemeteries with ceremonies of a simple character.

<sup>b</sup> In the winter of 1897 Dr G. A. Dorsey, of the Field Columbian Museum, made some archeological studies of Homolobi, and he informs the author that he found many interments with beautiful mortuary pottery not far from the trenches made in 1896. Others have dug many specimens from the same ruin.

<sup>c</sup> While as a general thing the cemeteries to the east of a ruin are the largest, places of burial are not confined to that side of a ruin.

hole, and the other, which was broken, had a hole in the middle and a round notch on the broken edge, as though there had once been a perforation at that place.

#### RUIN 2

Ruin 2<sup>a</sup> of the Homolobi group, unlike ruin 1, is situated on top of a hill with a wide outlook. This is a much larger ruin than 1, and the walls standing above ground are in a better state of preservation. No very extensive excavations were undertaken in this ruin, but a few graves were found some distance from the walls near the foot of the hill on which the pueblo was built. Several graves were indicated by upright slabs of stone set on edge in the soil, and from them a dozen or more mortuary vessels were excavated. The pottery was like that of ruin 1 in general character, yellow and brown ware predominating.

From the great size of this ruin the author suspects that if it were carefully excavated a rich collection might be found, but work upon it would be difficult, as it is situated quite a distance from water, and there are other practical difficulties, some of which, however, might be easily overcome.

A number of bowls were found on the sides of the mesa on which this ruin stands, but these appear to indicate isolated burials; the cemetery was not discovered, and consequently the number of mortuary objects from the ruin was small.

#### RUIN 3

Ruin 3 of the Homolobi group is very small, and is situated so near the present bed of the river that a portion of it has been worn away by the water.

One of the most interesting features of this ruin is the use of blocks of adobe instead of stone in some of the partitions of the rooms. The situation of this ancient dwelling was such that stone was not easily obtained, and consequently, as so often happens elsewhere in the Southwest, adobe was utilized as a building material.

Farther down the Little Colorado the author found in the ruins on the plains which border the river indications that the ancient houses were made of adobe alone, a fact readily explained by the absence of suitable stone on the site of the habitations.

No other ancient Tusayan pueblo where adobe was used for the construction of houses is known, and for the most part to-day the building material is rock from the formation most convenient to the pueblo.<sup>b</sup>

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<sup>a</sup>This ruin, like ruin 1, was called Homolobi, and it is probable that the name is applied at the present time to the whole cluster of ruins near Winslow. As different phratries are reputed to have lived in this neighborhood, it may be possible to connect the several ruins with individual families.

<sup>b</sup>There are adobe walls built out from the old mission at Awatobi.

Very little in the line of exploration of ruin 3 was attempted, as only a single visit was made to it. The pottery fragments were identical in character with those from the other Homolobi ruins, and the size of the mound shows that it was a small settlement. The stream has encroached on the foundations of the ancient town to such an extent that the cemeteries on this side have been obliterated. The surrounding plain was evidently cultivated, for remnants of old ditches can be seen in the neighborhood, though they were difficult to trace on account of frequent changes in the neighboring stream.

One of the most interesting and exceptional objects taken from this ruin was a bone implement apparently made from the leg bone of an antelope. The blunt end of this object was carved in imitation of an animal, possibly a bear, the head, body, and legs being well represented.

#### RUIN 4

Ruin 4 of the Homolobi group is one of the most picturesque in this region, and has many resemblances to Shipaulovi, on the Middle mesa of Tusayan. It resembles a castle perched on the pinnacle of a butte, which is steep on all sides. Its height is possibly 100 feet from the plain, and it has a wide outlook across the valley of the Little Colorado. The top of the mesa is small and appears to have been covered with house walls built of stone, fragments of which have fallen down the steep sides of the mesa.

The general ground plan is roughly rectangular, apparently with a central court, and the indications are that the houses were not more than one or two stories high.

The débris at the base of the cliffs is full of fragments of pottery resembling that of ruin 1, and here undoubtedly we must look for the cemeteries, as there is no sign of a burial place on the top of the mesa. Near the foot of the mesa, and half way up its sides, bordering the rough trail by which one can now ascend to the former site of the pueblo, there are many large bowlders, most of which are covered with pictographs pecked in the surface of the rock. These pictographs closely resemble those found almost universally in the western section of the pueblo area, and bear every evidence of being very ancient. Many of them were almost illegible, possibly from age, while others were fresh, suggesting more recent work. There are no painted pictographs, suggestive of the Apaches or other Indian tribes.

No excavations were attempted at ruin 4, and the author's visit there was a short one. Although the ruin is not quite as large as ruin 1, the abundance of pottery fragments gave promise that it would be a fruitful field for archeological studies.

#### THE CHEVLON RUIN (CAKWABAIYAKI)

Cheylon creek is a small stream of water which empties into the Little Colorado from its left bank about opposite the station called Hardy, on the Atlantic and Pacific railroad. It is possibly 15 miles

east of Winslow, with which it communicates by a tolerably good wagon road. About 2 miles south of Hardy, near the Esperanza ranch, the creek makes a graceful curve, west of which there rises a low mound—the site of Cakwabaiyaki or Blue Running Water pueblo.

The country at this point is barren and sandy, with gravelly hills, and with rock jutting above its surface. There are no trees and only a few scrubby bushes of characteristic Arizona vegetation. The banks of Chevlon creek at this point are low, and in places there are numerous sand dunes. There is always water in the bed of the stream, but in the dry season much of it is lost when it gets to the thirsty sands of the Little Colorado valley. It is not potable, however, and animals do not drink it eagerly. Fishes and turtles in considerable numbers inhabit this stream.

The road from Winslow to the Chevlon ruin crosses the railroad in the suburbs of the town, following the plain to Salt slough, a putrid water hole, by whose alkaline waters many animals have been poisoned. From there the road leads to Clear creek, a beautiful stream which has been dammed to supply water for the town. A fine bridge has been built over Clear creek, and the water at that point is very deep. The banks are high and canyon-like, and the spot is one of the most picturesque near Winslow. From this stream our Indian workmen obtained many turtles, which they highly prize, and they make frequent pilgrimages to it from Walpi to get water to use in their ceremonies. Not far from the Clear creek bridge there are evidences of a former population, and the broken-down walls of houses crown some of the adjacent hillocks. There are likewise many ancient pictographs in this vicinity. Higher up Clear creek valley, where it is dry and is called Clear creek canyon—a place visited on the way to Sunset pass—there are many evidences of former human occupation and abundant pictographs, some of which are of considerable interest.

There are likewise said to be mounds similar to those at Homolobi on the banks of both Chevlon and Clear creeks, and there is little doubt that this is true—at all events as regards the former stream. Portions of canyons along the upper course of Clear creek were examined and numerous pictographs were found on their walls. There were also evidences of former habitations.

It must have been not far from Chevlon ruin where Sitgreaves and his party camped on October 2, 1851, but in his narrative he does not mention the ruin, though the short notice of camp number 9 corresponds with the locality in other respects. He says (page 7):

The river [Little Colorado] here receives a tributary known among trappers as Chevelon's fork, from one of that name who died upon its banks from eating some poisonous root. Their confluence produces an intricate labyrinth of sloughs, in which we became involved and were forced to encamp, not finding an outlet until late in the day. In several places veins of fibrous gypsum (selenite) were seen, looking like the ice crystals that burst open the ground in spring.<sup>a</sup>

<sup>a</sup> Report of an expedition down the Zuñi and Colorado rivers, Senate Document 59, Thirty-second Congress, second session, 1853.

This description may well apply to the mouth of the Cheylon in the month of August, when heavy rains are common, but in June the Little Colorado was repeatedly crossed near this point with the greatest ease, there being only a small rivulet to ford. Later, however, the river became a raging torrent, as the author found in attempting to ford it on the trip to the Tusayan villages in July.

The burials at Cheylon resemble those at Homolobi, and are similarly situated with relation to the ruin. Like those of the first ruin of Homolobi, interments were found in the largest number just outside the outer walls of the pueblo, and at different depths. The configuration of the site of the ruin naturally introduced some modifications in the character of the burials. The drifting sand has buried them somewhat deeper at Cheylon than at Homolobi.

No evidence of the cremation of the dead was discovered in the Cheylon ruin, at Homolobi, or in the ruins at Chaves pass. The dead in these three ruins were as a rule extended at full length, and not, as at Awatobi, placed in a sitting position.

#### THE CHAVES PASS RUIN (TCÜBKWITCALOBI)

Looking southward from Winslow one can see in the distance a high range of mountains which separates the valley of the Little Colorado river from that of the tributaries of the Salt and the Gila. This range is broken at one point by a pass through which, in old times, there was a trail used by Indians in trading excursions and migrations. It is called Chaves pass, from an old Arizonan named Chaves who was killed by Apaches near by. A small wooden cross in the open plain at the entrance of the pass is said to mark his burial place, and there are many other unmarked graves of white men who have lost their lives in this neighborhood.

By taking the road south from Winslow one passes over a hilly country continually rising, with Cheylon butte far to the left, and, skirting Clear creek, follows it to Sunset pass, which is clearly visible from Winslow. Beyond Sunset pass, where dwarf cedars afford a refreshing change from the treeless wastes about Winslow, the road, still rising, enters a well-wooded country between Sunset and Chaves passes. The road now becomes rougher, rising rapidly, with tall pines on all sides, until it passes an old well near the remains of a deserted cabin. This well is situated in Chaves pass, and there the road divides, one division continuing to Mormon lake and Rattlesnake tanks, where there is said to be a ruin of considerable size, and ultimately to the Verde valley, the ruins in which are numerous and extensive, the other to the Tonto basin.

Two ruins lie on the hills above the pass; one, the smaller, is the first approached on the right-hand side; the other is so placed as to force the traveler out of his way, the road winding about it. Both

are elevated above the trail through the pass, and from their house tops the observer can look across the valley, in which flows the Little Colorado, to the Hopi buttes, far to the north.

Their name, Teübkwitealobi, is derived from teübio, antelope, kwiteala, notch, and obi, locative. The Navaho name Jettipehika has the same meaning. Both names were due to the fact that the pueblo lay in mountains where no short time ago antelope were abundant.

During his stay in Winslow the author heard much about the ruins in Chaves pass and often gazed at the distant southern mountains, which particularly interested him as the possible gateway to Palatk-wabi, the Red land of the South. Chaves pass was fascinating in its archeological possibilities, for it was one of the few breaks in the rugged Mogollones through which ancient migrations could have been made. Accordingly, after examining the ruin at the mouth of Cheylon fork, the author outfitted for a reconnoissance of the ruins which he expected to find in the pass.

It need hardly be said that this was virgin ground for archeological work. No one, so far as is known, has ever mentioned these aboriginal habitations, which is not strange, considering the great number of undescribed ruins in this part of Arizona. Ruins at this point were especially interesting from the fact of their elevation and their position almost on the crest of the watershed of two great valleys, the Little Colorado and Gila, both of which were sites of large populations in prehistoric times. It is highly important to discover whether they furnish a connecting link between the two regions. There can be little doubt that the trail through the pass is an old one, and that it was used in the migrations of Indians.

The two ruins at Chaves pass were built of the lava rock so abundant in this region. The larger must have been a pueblo of considerable size, and covers an area much larger than any of the Homolobi group except ruin 2. The elevation on which it is built is considerably longer than wide, sloping abruptly, but is easy of access on all sides. The ruin is apparently of the rectangular type, with inclosed courts. It is composed of two house clusters connected by a range of rooms one and two series deep. Its rooms are square, and their outlines can be readily traced, though they are much obscured by fallen walls. In general type there is a close resemblance between the Chaves pass and Verde valley ruins.

Some attention was given to excavations in the rooms of both of the ruins, but the limited work there was not rewarded with great success. The walls of the rooms were built of blocks of lava rock, which had tumbled into the inclosures, and it was necessary to remove these before the floors were reached. Very little sand had drifted into the rooms on account of their elevated site, and the outlines of the rooms and the contours of the walls could be readily traced. No

rooms could be identified as kivas, and the plastering was, as a rule, worn from the standing walls.

The burials at Chaves pass differ considerably from those at Homolobi and Cheylon. It was found that flat stones with perforations were not used in covering the burial cysts, but that logs—accessible in this wooded region—were employed. The bodies of the dead were extended at full length, and stones were laid at the head and feet. Upon these stones a number of logs were placed parallel with the bodies, and on either end of these logs there were other stones, generally boulders, to hold them down. The body was thus covered with a rude floor, over which soil is now found.

The depth of burial varied considerably, and it was not rare to find bodies 10 feet below the surface. The weight of soil above the logs had been so great, however, that they were pressed down upon the mortuary bowls, and many of these fragile objects were thus broken into fragments.

Thirty-one skulls in good preservation were taken from the cemeteries at Chaves pass. These are numbered in the National Museum catalog from 157669 to 157699, inclusive; but a large number of skulls and skeletons were abandoned, as they were in too poor a state of preservation for craniometric study. The facial bones of several crania from Chaves pass were stained green with carbonate of copper, and there were traces of black pigment on others.

The situation of the ruins at Chaves pass, which are, as has been stated, practically on the trail from the Little Colorado valley to the Verde, naturally leads to a comparison of the pottery objects from the two localities. Fortunately, a considerable collection of Verde valley pottery made by Dr Palmer is now in the Smithsonian Institution, and affords abundant material for a comparative study. There is so marked a similarity between the ancient pottery from Chaves pass and that from the Verde ruins, which in turn is related to that of the Gila-Salado basin, that it almost amounts to identity. It would be impossible from the character and color, as well as from the decoration of the mortuary ware from these two regions, to distinguish them. The same red ware with rude geometric decorations exists in both valleys. There is no doubt that the ancient people of the Verde valley were closely related to the builders of Casa Grande and the ancient dwellings near Tempe.<sup>a</sup>

#### RUINS BETWEEN WINSLOW AND THE HOPI PUEBLOS

Under this heading are included the remains of habitations on the banks of the Little Colorado and its tributaries which were visited on trips from Winslow to Tusayan. The author followed the river for many miles in order to avoid the Moqui butte, and while he did not

<sup>a</sup>The ruins in the upper Gila valley, called Pueblo Viejo, were found in explorations in 1897 to be of the same character as those of Chaves pass and Verde valley.



go as far down as Voltz crossing, he forded the river only a few miles above that place.

The hills bounding the valley retreat a considerable distance from the banks of the river in that section of its course, and the road winds through a level plain destitute of rocks suitable for building purposes. At certain points, however, the author passed low mounds, not accurately mapped, upon which were scattered fragments of pottery, most of which was of rough manufacture. These mounds may have been sites of small adobe buildings which have weathered away, leaving only piles of soil. He attempted no excavations and found no standing walls of adobe or stone, but the presence of fragments of pottery in quantity would seem to indicate former habitation.

It would be instructive to dig into one of these mounds, which are undoubtedly artificial in character, in order definitely to determine their character, which it must be confessed is now highly problematic.

Although the cavate ruins near Flagstaff and the ruins near the Black falls were not carefully examined until 1900, they are described here for comparative purposes.

#### CAVATE RUINS NEAR FLAGSTAFF

The following account of these ruins and of those near Black falls was published in the *American Anthropologist* in 1900 (volume 2, page 423):

Sitgreaves, in 1852, seems to have been the first writer to refer to the ruins about Flagstaff and along the Little Colorado. He figures one of the ruined pueblos near the cascades or falls,<sup>a</sup> a ruin of the same general character as those near Black falls, which he probably did not visit. Major Powell, in 1885, visited and later described<sup>b</sup> the cliff houses, the cavate rooms of the volcanic cones, and several pueblo ruins north and northeast of Flagstaff. He did not visit the Black falls ruins, which are undoubtedly similar to some of those which he describes. Since Powell's description the literature of the Flagstaff ruins has been confined mostly to popular newspaper articles, archeologists seeming to have paid little attention to this neighborhood.

The cavate rooms near Flagstaff are excavated in the lava, or volcanic breccia, and may be classified as (1) cavate rooms with vertical entrances, and (2) cavate rooms with lateral entrances. The former are well illustrated by the "Old caves," 9 miles east of Flagstaff; the latter by the "New caves," 12 miles from the same place, in the same direction, and by cavate rooms half a mile west of Turkey tanks. These two types of cavate rooms are similar, and their former inhabitants were apparently of the same culture. Major Powell learned from the Indians of Cataract canyon that the ancestors of the Havasupais occupied these cavate houses, and he states that "they doubt-

<sup>a</sup>Probably the "cascades" were the Grand falls, miles above the Black falls.

<sup>b</sup>See Seventh Annual Report of the Bureau of Ethnology, 1891.

less lived on the north, east, and south of San Francisco mountain at the time this country was discovered by the Spaniards, and they subsequently left their cliff and cavate dwellings and moved into Cataract canyon, where they now live."

The fragments of pottery seen about the entrances to these caves are identical with those found near the pueblo ruins in the neighborhood, and there is no doubt that the cave inhabitants had burrowed in the lava as the most practical means of constructing habitations in this neighborhood. Free walls are found in combination with the caves, but these walls have no distinctive characteristics, save that they are built of lava. This would indicate that the builders simply utilized readily available building material and took advantage of peculiar geological conditions.

#### OLD CAVES

The "Old caves" lie near the top of Old Cave mountain, about 9 miles northeast of Flagstaff, and cover an area of about 5 acres. On the top of this height there is a level space which was surrounded by a rough wall made of volcanic breccia, from which a good view can be had of the surrounding country. The caves are found on the southern slope, and were excavated in a conglomerate of cinders or volcanic breccia which bears every evidence of having been erupted from a crater or blowhole (plate 1). Clambering over the rough lava blocks, one finds everywhere on the surface the remains of walls indicating former rooms. In places there are level spaces which seem to have been plazas, and the entrances into the subterranean rooms often open vertically from these levels. At other points it would seem as if the walls formed complete rectangles, but there is no apparent evidence that they had roofs, which, however, may have existed in former times. In fact, the Old caves show combinations of underground cavate rooms with free walls above, and when inhabited the settlement must have looked like a collection of low one-story rooms continuous for several hundred feet. We may therefore call this cluster of cavate rooms a pueblo in which each room above ground had a corresponding subterranean chamber hewn out of volcanic breccia.

One of the best-preserved and most characteristic rooms of the old caves, with a vertical entrance, is shown in the accompanying plan (figure 3). It will be seen that there are two subterranean rooms, A and B, each of which is entered by an opening in the roof, indicated by a dotted line. Room A measures 12 feet each way, and the entrance measures about 6 feet. This entrance has a square enlargement, or chimney, on one side, which extends to the floor of the room and has perpendicular, regular walls.

At one corner of room A there has been hewn out of the lava a small recess (E), the floor of which is lower than that of the room. There is also a small recess (F) at one side of the chimney.

Room B is larger than room A, being about 16 feet square. It communicates with room A by a broken doorway, and has an opening through the roof. The floor is somewhat lower than that of A. A recess (D) on one side of this room also communicates with the outside by a small opening which bears the same relation to room B that the flue F does to room A.

Room C is an oblong, irregular, subterranean chamber, 5 by 7 feet, with passageways into rooms A and B. The opening into A is almost perfectly square, that into B less regular. Its floor is several feet lower than the floors of the two other large rooms in this cluster. There are evidences of clay plastering in several places, and appar-

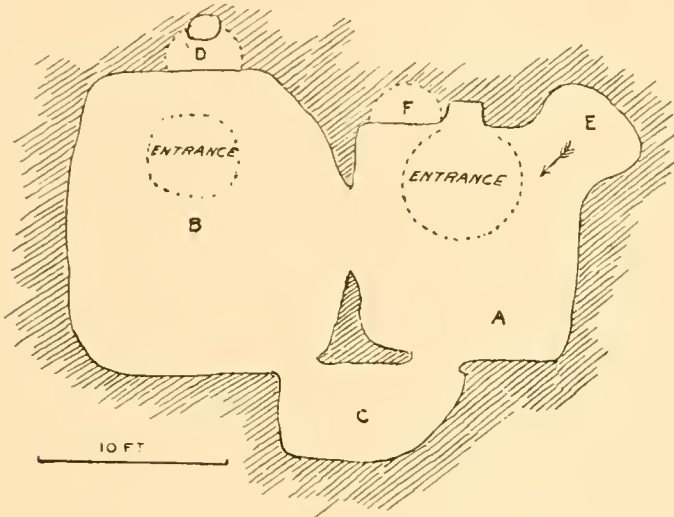


FIG. 3. Plan of an "Old cave" dwelling.

ently the floor, walls, passageways, and possibly the roof, were smoothly finished. The plastering has, however, fallen, exposing the rough lava corners.

#### NEW CAVES

The mountain in which the New caves occur is about 3 miles west of Turkey tanks, or about 12 miles east of Flagstaff. This height is interesting from a geological point of view, it being a section of the rim of an old crater, as may be seen from its summit. The remaining portion of the crater rim, that on the eastern side, has been eroded into hills, the relation of which to the crater is recognized only by their positions. The highest part of the rim, that in which the caves are found, is the western wall of the crater, which, with an adjacent southern section, forms a crescent connected by a ridge of less altitude. The more northern of these elevations is the higher, and the cavate rooms occur on its eastern side.

From the west the ascent to the mountain, though steep, is not difficult, the trail passing stunted cedars growing on a mass of cinders. In the depression between the two hills which form the crescent we find rows of volcanic breccia fragments arranged in rectangular and other forms, suggesting a reservoir. From this point the ascent becomes more difficult, and as one reaches the top of the higher hill he finds himself on the rim of a former crater. On the east the rim rises almost perpendicularly, and its walls on that side are outcroppings of exceedingly rough cinder conglomerate. In this almost perpendicular wall, facing what may have been the middle of the former crater, tier upon tier of cavate rooms (plates II, III), irregularly arranged and very difficult of approach, have been excavated. The crest of this, as well as of the adjacent lower section of the crater rim, is capped by artificial walls of considerable height, indicating former houses. The whole aspect of the place is one of desolation, and the lava appears as if it had been molten but a few generations ago. It may have been great stress of danger which drove the aborigines to seek homes in this forbidding locality.

#### TURKEY TANK CAVES

About half a mile west of Turkey tanks (about 15 miles east of Flagstaff) there is a collection of cavate rooms with lateral entrances arranged in tiers. These caves, although not so numerous as the New caves, are comparatively well preserved. They are situated a short distance to the left of the road from Flagstaff on the uplifted outcrop of what appears to be an old volcanic blowhole, and are confined to the northern side of the depression which marks the former place of eruption (see plate IV).

The outcrop on this side of the depression is composed of alternate layers of hard lava and volcanic breccia. The former would tend to resist any working with primitive implements, but the latter could readily be excavated with stone tools. The average thickness of the layers is about 8 feet. By the excavation of the breccia the layer of harder lava above it has been undermined and has now fallen in places, filling the rooms or closing their entrances so that the form and dimensions are no longer determinable. As the layers are uplifted, vertical entrances into these cavate chambers are absent, the doorways entering horizontally from the side of the cliff. There are at least three tiers of these rooms, corresponding with the strata of volcanic breccia.

In some of these cavate rooms there is a combination of stone walls and excavated chambers, the rooms having been separated laterally by a plastered wall of small bowlders brought from the bottom of the adjacent depression. Apparently, also, walls formerly existed in front of the entrances to the caves, but of these the greater part have fallen, and their outlines are difficult to trace except in small sections.

Entering by a side opening, one passes into a subterranean room (plate v) 12 by 10 feet and 6 feet high, the walls and floor of which are partly plastered. This room has five smaller rooms leading from it, which will be called B, C, D, E, and F. They average about 5 feet in diameter, and have their floors depressed about a foot below that of the main room, A. The entrances into these lateral rooms, especially that into D, are carefully made and almost square, and when plastered, as there is good evidence that they once were, made good doorways. In fact, although the walls of most of these cavate chambers are now very rough, and the rooms seemingly desolate as places of habitation, they must once have been comfortable abodes, for the plastering made the finish almost as smooth as that of any wall which could be constructed.

Several of the rooms in which the plastering still remains have ledges and cubby-holes in which the household utensils were doubtless kept (plate vi). The similarity of these cavate chambers to those excavated in volcanic tufa in Verde Valley is apparent. The material in which they occur is different, but the plans of the rooms are almost identical. Whatever peoples inhabited the cavate dwellings of the cinder cones near Flagstaff and the tufa mesas of the Verde, their culture was not radically different.

#### RUINS NEAR BLACK FALLS OF THE LITTLE COLORADO

##### LOCATION AND PREVIOUS EXPLORATION

It has long been known that the banks of the Little Colorado and neighboring mesas were sites of ancient dwellings, but exploration has been confined mostly to the upper part of the river and its tributaries. The numerous ruins along the stream from Grand falls to its confluence with Rio Colorado have been wholly neglected, but there is little doubt that future excavation will be rewarded with many novelties.

The Black falls ruins have been known for several years to local amateur archeologists, and a considerable collection of ancient objects has been taken from them by Mr Benjamin Doney, of Flagstaff. Under his guidance several well-known residents of that town, among whom may be mentioned Dr Robinson and Mr Jack, have visited and photographed them.<sup>a</sup> Herders and cowboys are acquainted with the ruins, and the former have cleared some of the rooms for use in winter.

The geological features of the region in which these three groups of ruins occur are instructive, but for present purposes one or two simple statements about them will suffice. The two well-marked formations—lava and sandstone—have affected the appearance of the ruins.

<sup>a</sup>The author was guided to these ruins by Mr Doney. He is indebted to Dr Robinson and Mr Reed for kodak photographs, and to Mr Jack for measurements of several rooms.

The black lava covers the red sandstone, forming great mesas or isolated buttes, the summits of which are crowned with ruins. The lava ruins have low, rough walls, in which adobe mortar was not detected. The red sandstone formed a more tractable material, and the buildings constructed of it show fine masonry with adobe mortar. These ruins ordinarily stand on the brinks of small canyons eroded in the sandstone, on isolated blocks of the same stone, or on ridges left by erosion. If these lava and red sandstone ruins were found in different localities they might be regarded as products of different peoples, but their existence side by side in this region shows that the slight differences in their architecture were due simply to the building materials employed. The irregular forms of the lava blocks made it impossible to construct from them the fine rectilinear walls which were possible with the well-squared blocks of sandstone. The erosion of the lava produces a coal-black, porous sand, which as a rule covers the finer red soil derived from the sandstone. This soil, drifting into pockets or depressions in the surface rocks, afforded burial places for the inhabitants of the villages.

This region has few trees; there are no pines, and only a few cedars. It is the same sagebrush country which we find near the upper Little Colorado at Holbrook and Winslow.

The region is arid; it now has few springs, those which were used in ancient times having probably been filled by drifting sand.<sup>a</sup> Volcanic agencies have left their mark on the whole region, causing in places deep fissures in the rocks, into some of which a strong current of air continually passes, and from one of which emerges a roar as though of subterranean currents of water. One of the largest of these fissures is about 2 miles from the Tuba road, on the way to the ruins called group A; others are found in the rocks near ruins G and U of this cluster, where their depth has not been determined. These crevasses, which are no unusual feature in the geology of this region, vary in breadth from a few inches to many hundred feet, and from a hundred yards to miles in length. When very broad they form canyons which end abruptly or merge into "washes" as the configuration of the country may dictate.

#### GENERAL FEATURES

The ruins near Black falls are as a rule rectangular in form, with similarly shaped rooms of one or more stories. Curved walls are rare, although in some instances the shape of the ruin follows the curvature of the mesa on which it stands. As has been stated, the ruins are built of both sandstone and lava, and the two varieties are found in close proximity, sometimes within a few hundred feet of

<sup>a</sup> The author does not share a common belief that when these now ruined structures were inhabited the precipitation was greater. In an arid region springs are rapidly filled by drifting sand if not dug out repeatedly. The Hopis are obliged to clean out some of their largest springs annually.

each other. The character of the sandstone of the region is such that when the stone is fractured slabs are produced which make possible the construction of excellent walls. Blocks of lava, however, have no flat faces, and their use as building material results in poor masonry, for the adobe mortar readily washes from the joints and the walls soon fall. It is rare to find houses built of lava which now stand many stories high. The best rooms constructed of lava contain also sandstone slabs, which have strengthened their walls, as in the "Citadel" of the Black falls ruins, where blocks of sandstone were also used as lintels. None of the walls show evidence that the building stones were dressed after being quarried.

The sites of these ruins are ordinarily elevated, and it is not uncommon to find an entire mesa top either covered with rooms or surrounded by a wall.

The highest walls of these pueblos were as a rule situated on the north and west sides, the pueblos being terraced on the south and east. This arrangement was apparently adopted to secure sunny exposure.

The ground-floor rooms had no lateral external entrances, but where there were several chambers side by side they communicated with each other by doorways. In the case of two or three story houses, it is probable that the ground floor was used for storage and was entered from the roof. This is an architectural feature still retained in the old Hopi houses, but it has been somewhat masked by modern buildings erected in front of them. The old houses of Walpi, Sichumovi, and Hano had ground floors which were entered from the roofs, to which one mounted by ladders, while entrance to the second story was gained by means of a side doorway from the roof of the first. Many of these old rooms are still to be seen at Walpi, especially around the plaza, and there are one or two examples in the villages of Sichumovi and Hano.<sup>a</sup> The oldest houses of Tusayan never had lateral entrances from the ground floor, but when the first story was occupied it was provided with a hatchway in the roof. This type of room, however, is rapidly disappearing, the majority of ground-floor rooms on the East mesa now being provided with doorways in the walls. On the Middle mesa and at Oraibi the number of ground-floor rooms entered by a side door is still smaller than on the East mesa. It may safely be laid down as a rule that whenever in the Hopi pueblos one finds rooms on the ground floor entered by lateral doors, the construction is new.<sup>b</sup>

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<sup>a</sup>A good example of the ancient houses of Walpi, in which the lower story serves as a dwelling room at certain times, is Saliko's home, near the Snake rock, and the row of rooms from Honsi's house to the Moñ kiva. The Flute house is also a fine example of this type. In Sichumovi the house of Pütce illustrates this ancient type, and there are several examples of it in Hano, of which Kalacai's house is a good one.

<sup>b</sup>The author will consider this architectural likeness of the ground rooms of the ancient ruins to old Hopi houses in his final article on the Black falls ruins, where plans will be given illustrating the relation of the ground-floor rooms with lateral doors to the old rooms on the East mesa. The ruins near Black falls have their ground-floor rooms like the old rooms of the Hopi pueblos.

In many of the ruins there are found at the base of the mesa on the south and east sides rooms of a single story which, from their position, we may designate basal rooms. They are now covered with débris, but were once protected by the overhanging edge of the mesa, suggesting cliff houses, of which they may be a survival. These basal structures may have been used as granaries, but in none of them were remains of roofs found.

With the exception of ruin A, group B, most of the ruins show little evidence of long occupancy: few logs or beams remain in them, there are no extensive deposits of débris, and there is a lack of large quantities of pottery fragments such as are usually found about pueblos which have been occupied for many generations. The general indication is that these buildings were inhabited in comparatively modern times.

None of the rooms show marks of surface plastering, except those of group B, where it is confined to the interior of the walls, as is the case with the older Hopi buildings.

The size of the rooms is much greater than is common in very ancient ruins. No kivas are found, and it is believed that the religious ceremonies were held in the ordinary domiciles. No building had a roof intact, but in many instances the remains of the roofs and floors of the upper rooms were found in the chambers below.

The fact that wooden beams occur so abundantly in ruin A, group B, implies that it was either the last pueblo to be abandoned in this neighborhood or that the beams were taken from the others to it, and when it was deserted its inhabitants moved too far away to carry heavy objects with them. Some of the timbers in the modern Hopi houses are said to have been dragged from the Little Colorado, possibly from old ruins.

#### GROUP A

Group A includes a cluster of ruins which as a rule are small and have a general similarity in construction. It is situated about 15 miles west of Little Colorado river. Following the road from Flagstaff to Tuba to within about 11 miles of Tauner's crossing, after passing Deadman's flat the visitor turns to the right, and, proceeding 4 miles eastward, finds himself in the midst of the group. There are no trails or wagon tracks from the well-traveled Tuba road to group A, but the country is so level that one can readily go overland to almost any point. A castellated, truncated lava cone, the "Citadel" of the group, can be seen soon after one leaves the Tuba road, and this prominent landmark gives the general direction of the ruins among which it is situated. From the top of this citadel all the ruins of group A, with one or two exceptions, are visible, and the visitor is advised to inspect it first in order to determine the position of the surrounding ruins (see plate VII).



## THE CITADEL

The walls of the Citadel (figure 4) are constructed of blocks of lava and sandstone, and cover the top of a truncated elevation. They are arranged about a level central court or plaza, the surrounding walls of which are best preserved on the western side. The hill on which the citadel is built bears evidence of having once been a volcanic cone, and was an advantageous place of refuge for the inhabitants of the neighboring houses, as it had a commanding position, was difficult of access, and was well fortified. As some of the structures were of two stories, they appear to have been permanently inhabited.



FIG. 4. The Citadel, group A.

Twenty-three small ruins were counted from this elevated position (see plate VII). For convenience of description these may be designated A, B, C, etc.

## RUIN A

Ruin A of group A is situated at the base of the truncated mesa of the Citadel. It is built of red sandstone, with a few courses of lava blocks, is 50 feet long by 12 feet wide, and contains five rooms arranged side by side. Although the house was evidently never more than one story high, the many fallen building stones would seem to indicate that its walls were once considerably higher than at present. Few floor beams or rafters were detected.

Near this ruin, at the base of the hill, are four walled inclosures, one above another, suggesting terraced gardens. Their low walls are composed of alternate rows of lava and sandstone. Near these former gardens is a depression which may once have been a reservoir. This ruin is the only one visited which was not built on an elevated mesa at or near the edge of a canyon.

#### RUINS B, C, AND D

There are remains of three houses, built of lava and sandstone blocks, on a small lava hill a few hundred feet north of the Citadel. On the same elevation there is a circular wall which may have served as a fortification. Most of the walls of the ruins have fallen, and it is almost impossible to determine the relationship of the former rooms. There are also some small ruins on a lava hill near the elevation on which B, C, and D are situated.

#### RUINS E AND F

A considerable distance from the last-mentioned cluster, but in the same direction from the Citadel, there are situated two conspicuous ruins visible from a considerable distance. One of these, on the top of a lava mesa, is built of the same material of which the mesa is composed; the other, situated at its base, is constructed of red sandstone. Near the latter, on a lava mesa, there are many pictographs, representing spirals, frogs, snakes, and unknown figures. There is much broken pottery near ruin F.

#### RUINS G, H, I, AND J

These ruins, especially G, H, and J (plates VIII-XI), are constructed of limestone, and are situated on the brink of a canyon, at the bottom of which, near ruin G, are mounds indicating the site of I. The walls of G, H, and J are well preserved, and show some of the best aboriginal masonry in Arizona.

Ruin G (plate VIII) had two rooms with walls rising 20 feet from the rim of the canyon. The lower courses of the walls are much larger than the upper, as is true of others in this neighborhood. The level of the floors is indicated by courses of larger stones.

Ruin J (plates X, XI, figure 5) is the best preserved of all the ruins in group A, and presents exceptional features. It is situated on the left wall of a canyon which is about 40 feet deep and equally wide. It deepens and widens east of the ruin, and then narrows, forming a natural corral inclosed by cliffs. Eight good rooms were noted in that part of the ruin situated on the top of the canyon wall, and in the canyon below it there were several semicircular basal rooms, some of which were sheltered by an overhanging cliff. Similarly sheltered rooms are found in many of the ruins in this neighborhood, but nowhere else are they so well preserved. There are no beams in

place, but their former positions are shown in many walls by openings, indicating that when inhabited the pueblo had two, possibly three, stories. An inclosure which may have been a ninth room is so filled with fallen walls that the details of its construction or size could not be determined.

As none of the rooms have external lateral openings on a level with the foundations, it is naturally supposed that all were entered by means of ladders and hatchways. There are a modern doorway and fireplace in one room, evidently of later construction than the walls.

Perhaps the most problematic structures in this ruin are the small cysts in the canyon walls east of the entrance. A thin layer of softer rock has so weathered as to leave a horizontal crevice which at intervals is divided by stones set on edge into receptacles a foot or so deep. They were formerly closed by flat slabs of stone, only two of which now remain in place. These cysts were nicely plastered, and the slabs which closed them were luted in place with adobe. Nothing was found in them to indicate their use, whether as burial

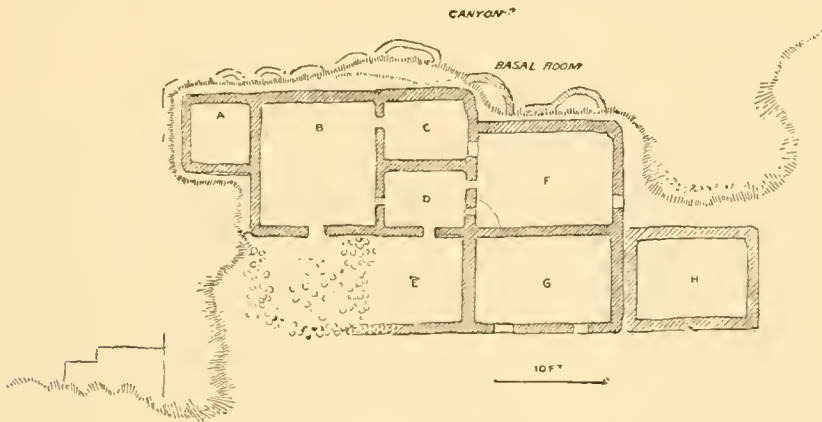


FIG. 5. Plan of ruin J, group A.

places for the dead or as bins for the storage of corn. Their number was considerable, but they were so small that their capacity could scarcely have been more than a few bushels. This is the only ruin in which such inclosures were found, and no theory is advanced as to their former use.

#### RUIN K

Ruin K, which evidently formerly contained several rooms, is divided into two sections and is situated on a high lava mesa difficult of approach. The walls of the larger section inclose three well-preserved rooms, and still rise to a height of about 8 feet. Five feet above the base the red sandstone blocks of which the walls are built are replaced by a course of stone of lighter color, which forms a horizontal band around the ruin. The second section consists of a low, rough wall built along the edge of the cliff, inclosing a level space in

front of the first section. There are isolated rooms in this inclosure, and a depression which may have been a reservoir. This ruin, like many others, consisted of dwellings and a fort for protection. There are instructive pictographs on the rocks near by.

#### RUIN L

At the base of the mesa on which the last-mentioned ruin stands is a ruin of red sandstone with five rooms and a foundation of unusual shape. A huge rock, cubical in form, has fallen a few yards from its former position in the bluff. Ruin L is built on the top of this detached block, and its fairly well preserved walls are separated



FIG. 6. Section A, ruin A, group B.

from the bluff on all sides by a wide crevice. From a distance the ruin appears to be perched on the bluff, but closer observation shows its separation from the latter by an impassable natural moat.

#### RUIN M

This is an oblong ruin rising from the side of a deep, narrow canyon, with walls consisting of alternating courses of large and small blocks of red sandstone. Some of the walls have fallen, but sections fully 10 feet high still remain in place. There are evidences of five rooms, each two stories high, but most of the chambers are

filled with fallen stones. The cemetery of this pueblo lies west of the ruin, where there are also remains of walls.

Small ruins may be seen near the road from group A to group B, a few miles to the left. Their walls are in good condition, but no peculiar features were observed.

## GROUP B

## RUIN A

The largest of all the ruins in the Black falls cluster, and one which bears evidence of having been inhabited for a considerable time, lies about 35 miles northeast of Flagstaff and about 8 miles from the Little Colorado. This structure is built on a ridge of sandstone extending in a northeast-southwest direction, and consists of two large buildings of moderate elevation (plates XII-XVI, figure 6). On each side the ridge slopes gradually to a depression, the talus on the

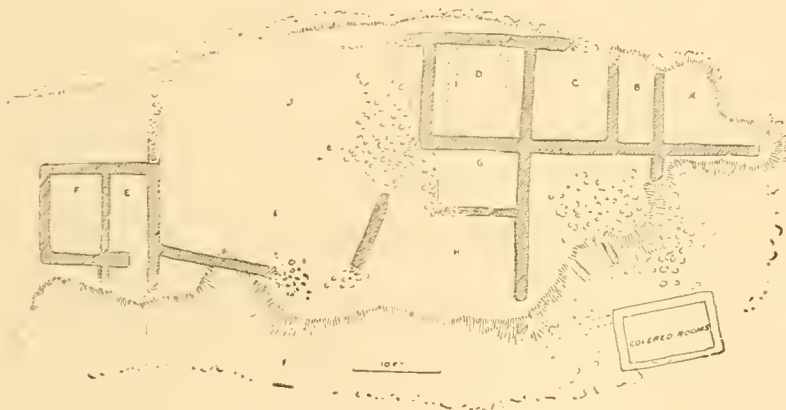


FIG. 7. Plan of section A, ruin A, group B.

east covering a series of rooms, while on the west side, where the slope is more abrupt, no rooms were discovered. The ruin is divided into two sections connected by rows of one-story rooms, the walls of which have fallen. Remains of a great number of roof and floor beams are still scattered throughout the débris. These beams are larger than those in any other ruin of the same size known to the author.

It is difficult to determine the original number of rooms in the first section of this ruin, as the tops of the walls have fallen, filling the chambers with débris. How many basal rooms were buried in the talus of fallen walls at the base of the mesa on the eastern side could not be discovered. Room A of this section (see figure 7) is elevated on a rocky base about 10 feet high. The chamber is small, and its walls have fallen on two sides. The débris has been cleared out of this room by Mr Doney, who found in it the desiccated remains of an infant wrapped in four well-preserved cotton blankets.

Room B is a small, narrow chamber with good walls on three sides, but the fourth wall, which was situated on the edge of the mesa, has fallen over the brink.

The ground-floor chamber of room C is formed by a gap in the mesa, from which a large cubical block has fallen. The walls of this chamber are the natural rock, to the surface of which adhere fragments of plastering. The beams of the floor of an upper room still rest on the edge of the gap, as in some of the kivas of Walpi to-day, especially those on the eastern edge of the mesa. These are built in a depression, the solid rock forming the walls on three sides, the fourth wall being of masonry.

Room D is buried under débris, and the broken beams, which have pressed down on a plastered banquette, are still visible. The reeds, straw, and impressed clay which once formed a floor may be seen in section.

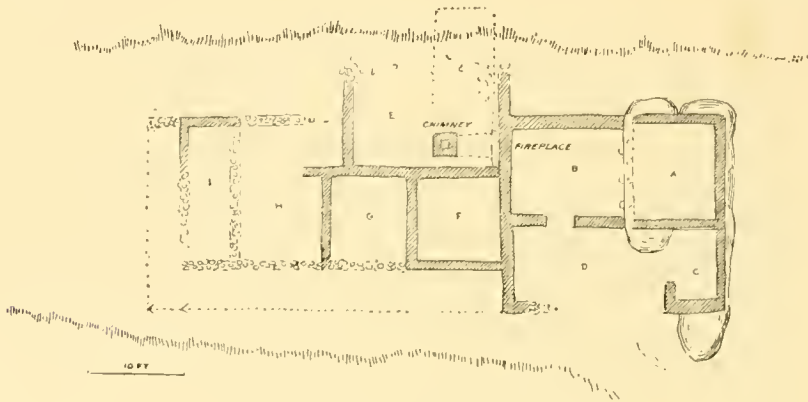


FIG. 8. Plan of section B, ruin A, group B.

Room E has two stories, and the floor beams and rafters are still in place but buried under débris. A high wall extends from the eastern wall of room E, crossing a depression in the cliff, which is bridged by logs serving as its foundation.

It seems within the bounds of probability that there were 30 rooms in the first section of ruin A, group B, including the basal rooms now deep beneath the fallen walls of the higher portion of the ruin. On the supposition that half of these were uninhabited, and that there were four persons to each room in the remainder, the first section of the ruin would have housed a population of 60. This, however, on the basis of the present population of Walpi, as compared with the number of rooms in the pueblo, is a rather low estimate. Considering the population of the second section as about the same as that of the first section, and that of the connecting rooms as about 30, the approximate population of the pueblos would have been 150. Estimated on the basis of that of Walpi, the population would be 200.

The rooms of the second section (figure 8), several of which are well preserved, are lower than those of the first section, and the detritus has covered the base so completely that the mesa is inconspicuous. Room A (plate XIV) is nearly square and is built on two rectangular rocks, the top of which forms the floor. One of these rocks forms a side of the lower story of the adjoining room B, which is in the best condition of any in this section. The walls of this room are well preserved, and it was occupied as a habitation by a herder a few winters ago. There is a lateral doorway through the wall on one side, and in one corner is a fireplace communicating with a chimney, which will later be described. This room is 12 feet 4 inches long by 9 feet 7 inches wide. In the second section many walls are still standing high above their foundations, indicating rooms now filled with fallen débris, in which beams, fragments of pottery, and other objects may be seen. Ten large rooms were counted, several of which had two stories. As has been stated, there were apparently basal rooms on the eastern side. The entire section is about 60 feet long.

A chimney-like structure (plate XV) is one of the most conspicuous objects in this part of the ruin. It rises from the mass of débris covering room E and communicates with the fireplace in room B, but a vertical line from its top is 7 feet 10 inches from the nearest wall of the room in which the fireplace is situated. Whether this chimney is aboriginal or not, or whether it is a chimney at all, are open questions. Excepting its state of preservation and fine masonry, no evidence was found that it is of more recent date than the walls of the rooms. If it is an aboriginal chimney, which is doubtful, its structure is unique. It may be a ventilator, comparable with the chimney-like structures described by Mindeleff in the kivas of Canyon de Chelly.

One of the finest reservoirs (plate XVI *a*) which the author has seen in connection with a ruin was discovered near the bottom of the elevation on which ruin A of group B is situated. This reservoir is circular in shape, 50 feet in diameter, and carefully walled. It lies south of the second section of the group, and apparently had a break in the wall in line with the depression east of the ruin. It appears to belong to the same type as those reservoirs on the East mesa of the Hopis in which snow and rain are collected for future use.

There are instructive petroglyphs near ruin A, group B. A number of rock etchings observed in a small canyon about a mile from the ruin were pecked in a perpendicular wall, protected by the overhanging rim of the canyon. These petroglyphs were evidently made by the former inhabitants of this region, as one of the best examples shows the same design as that figured on pottery from the neighboring ruin. There were likewise butterfly, sheep or antelope, and other figures.

It would be quite impossible in this preliminary notice to give a complete account of the archeologic objects which Mr Doney has taken from this ruin, but even a preliminary sketch would be incom-

plete without some reference to them. One of the most important objects is the desiccated body of an infant wrapped in coarse cotton cloth, allusion to which has already been made. This bundle was inclosed in three small cotton kilts which were later washed and found to be "as good as new." At the foot of the infant was a desiccated parrot (?), some of the brilliant plumage of which is still to be seen. This bird has a prayer stick tied to one leg, which makes reasonable the belief that it was a ceremonial object. Another interesting specimen in the Doney collection is the dried body of a dog, which was found in one of the deep clefts in the rock near one of the ruins. This dog has a head similar to that found by the writer in the Chaves pass ruin. There are also several fragments of beautiful cotton cloth and netting. Some of the specimens are embroidered, others are painted with circles and other geometric designs. A heavy wooden club, several planting sticks, and other wooden objects are to be seen in Mr Doney's collection. There are also many cigarette canes, some with woven handles, as well as seeds of cotton, squash, gourd, and corn, and many objects of shell, as finklers, ornaments, rings, and bracelets. One of the best *Haliotis* shells the author has ever seen from a ruin was found in one of the graves.

There are also many large turquoise ornaments, some an inch or an inch and a half square. The many metates are made of lava, and are deeply worn, as if from long use. A copper bell from a grave near ruin A is a remarkable specimen. It has the same form as the bells from Arizona ruins, which the author has elsewhere described, but on one side are ridges indicating eyes, nose, and mouth, apparently made of strips of metal soldered or brazed to the surface. It is not believed that this bell was the product of the former occupants of these now ruined structures; more probably it was obtained by them through barter.

#### RUIN B

Across the depression north of ruin A, beyond the reservoir and on top of a mesa, there is a rectangular ruin consisting of two sections connected by low, parallel walls, which inclose a rectangular plaza. It appears that each section was composed of two single-story rooms. No beams or other evidences of roofing are now visible, but a considerable quantity of masonry has fallen into the inclosures. From the base of the mesa to the ruin an old trail can be traced by rows of stones on the eastern side, and on the same side there are likewise remnants of rooms. Graves were found among the rocks at the base of the mesa.

#### RUIN C

About half a mile north of ruin A of group B there is a fortified mesa with several rooms, some of which had two stories. The surface of this mesa is flat, the rim is round, the sides are perpendicular, but



of moderate elevation. Most of the walls built on the rim, continuous with the mesa sides, have fallen, but sections of the houses 10 feet high still remain, and the roof beams and wattling may be seen in place in one or two rooms.

There are some fragments of broken metates made of lava, many potsherds, and a considerable pile of débris at the base of the mesa. Ruin A can be seen from the highest point, and the distant ruin A of group c is plainly visible. The cemetery is on the east side, among the rocks at the base of the mesa.



FIG. 9. Ruin A, group c, from the south.

GROUP C

RUIN A

This ruin, which lies 40 miles by road from Flagstaff and 5 miles due west of Black falls, is one of the most impressive masses of aboriginal masonry in this section (plates XVII-XIX, figure 9). It is visible for many miles, and from a distance resembles an old castle as it looms from the north end of an isolated, oblong, red-sandstone mesa rising 15 feet above the plain. The south end of the mesa is higher than the north extremity, and on its rim appears to have been built a low wall inclosing a plaza. Standing walls cover about one-half the surface of the mesa. On its east side, about midway of its

length, there is a gap with perpendicular walls extending about 14 feet into the side and almost bisecting it.

The following measurements of ruin A, group C, were made by Mr Jack, who has kindly placed them at the author's disposal:

The longer axis of the mesa bears north  $10^{\circ}$  east (the bearing was obtained by using the face of the eastern wall of the highest building). The width of the mesa at the middle point, measured from the rim of the overhanging cliffs, is about 65 feet. The height of the tallest wall of room A is 19 feet above its foundation, on top of the mesa, which is about 15 feet high. The inside measurements of the same room are: Top of mesa to probable position of first floor, 7 feet 6 inches; first floor to probable position of second floor, 8 feet; bench on which the floor beams of the second floor rest to the top of the

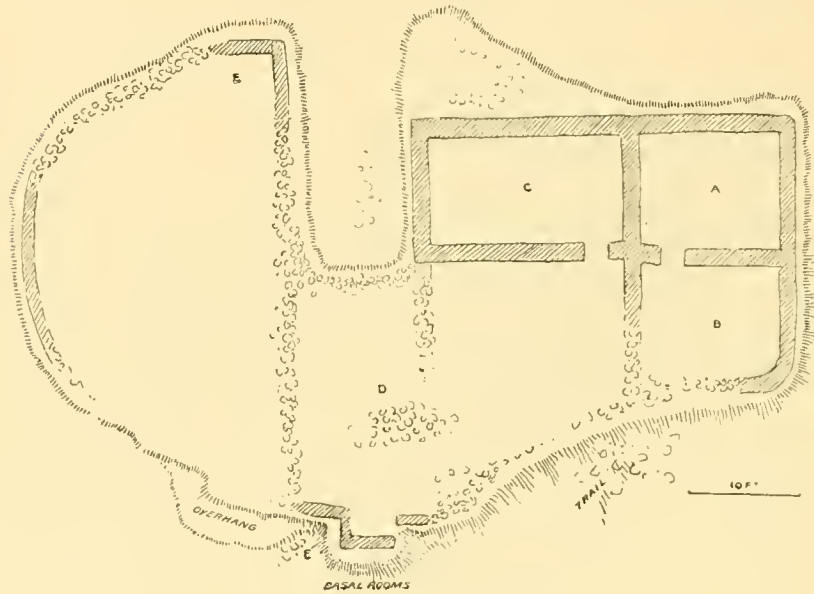


FIG. 10. Plan of ruin A, group C.

wall, 3 feet. It may reasonably be concluded that the third story was as high as either of the other two, or about 7 feet 6 inches, which would make the original height of the wall about 23 feet.

The inside horizontal measurements of the north and south walls of room A are not the same. The former is 11 feet 4 inches, the latter 9 feet 9 inches. The east and west walls are 12 feet long. Room C is 17 feet 9 inches long by 9 feet 7 inches wide.

Although the standing walls of this ruin are the best preserved of any of those examined, no wooden beams were found in place, nor were there remnants of the flooring or other débris in the rooms themselves. This absence is explained by the supposition that at the time of the abandonment of the settlement, or later, the woodwork was carried away for use in new habitations. Possibly they were taken to

ruin A of group B. There is good evidence that this ruin once had large floor beams, as is indicated by openings in the walls in which they rested.

Examination of the ground plan (figure 10) shows that the whole surface of the mesa was once covered with rooms, the walls of which still extend to its edge. The highest walls, those which surrounded room A, are three stories. The two outside walls rise directly from the edge of the perpendicular cliff. There are several small openings at various levels, and holes in which rested the great beams that once supported the flooring are readily seen. At the corners of the rooms the masonry of the second story is bonded to that of the first and third, imparting solidity and strength to the high walls. There is no entrance or passageway between rooms A and C, but access was had to room A from room B. Room B is almost perfectly inclosed by standing walls, formerly two stories high. The wall on the north side has been overturned, and the many stones which have fallen at the base make an entrance at this point possible. As is shown by the depressions in the walls, this structure once had two large beams in the roof of the first story, but they have disappeared. Room C has one story: its walls are complete on all sides, and there is an interior entrance into room D, and an exterior passageway. Rooms A, B, and C are conspicuous from a distance and form the greater part of the ruin. At intervals on the rim of the mesa other walls are found, some sections of which are 4 or 5 feet high. It is difficult to trace the walls of the rooms designated D and E. This ruin also has cave rooms at the south base of the mesa, which recall those of the other ruins in the Black falls cluster.

Plate XVII shows ruin A, group C, from the east. The tall, square tower on the left of the plate incloses room A, and the lower wall extending to the gap is the side of room C. The fragments of masonry on the right of the gap are all that remain of the walls of room E. The mounds on the mesa to the right of the last are remnants of an encircling wall and of rooms which once surrounded the open space on the end of the mesa. On this side of the mesa the upper part overhangs the lower, forming a cave, but no indication of rooms was detected here.

The wall on the edge of the mesa which shows at the left of plate XVIII is a part of room D, and at the bottom of the cliff at this point can be seen the walls of the basal rooms built at right angles to the cliffs. These are also shown in plate XIX.

The cemetery is about 100 yards east of the ruin and is small in extent. The mortuary objects found in a single grave opened will give an idea of the burial deposits. The graves are oval, and consist of cysts made of slabs of stone set on end and covered with other flat stones. The upright stones were cemented together with adobe, the covering slabs being apparently luted to the edges of the uprights. These burial cysts were commodious, and in the one uncovered the

body, which was that of a woman, lay on one side, at full length, with the head at the wider end. To the right of the hips were found a decorated food bowl in which was a smaller bowl, a large and beautifully decorated vase, and a second small food bowl. On the left arm was an armet made of a *Pectunculus* shell identical with those found in the ruins of Homolohi. On the breast there was a remnant of a wooden prayer stick painted green. Near the mastoid processes were square ear pendants made of lignite covered with a turquoise mosaic surrounding a central red stone. These are beautiful specimens of turquoise mosaic, far superior to those now in use in the Hopi pueblos. The skeleton was in a very poor state of preservation, probably because of the character of the soil, which is a cinder sand through which water readily percolates. There is a general similarity in the texture and decoration of the four pieces of pottery found in this grave. They belong to the black-and-white variety and have geometrical ornamentation.

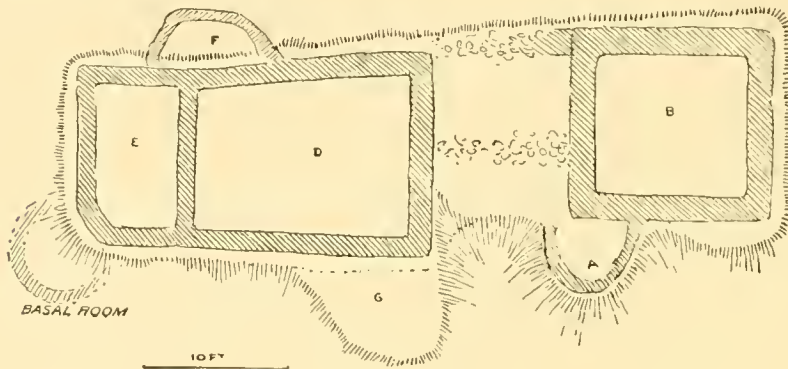


FIG. 11. Plan of ruin B, group c.

#### RUIN B

About 2 miles from the large ruin just described, to the left of the road to Schültze's spring, is a small red-sandstone ruin standing on an isolated bluff. This ruin covers the top of the mesa, and is conspicuous for some distance. The rim of the mesa overhangs in places, as the lower strata are much eroded, and the ruin can be entered at only one point. All the rooms of this ruin are single storied, and most of the walls are high, though there is a considerable quantity of fallen stone in the rooms and at the base of the mesa.

Room A (see figure 11) is a semicircular inclosure most of the walls of which have fallen. It is perched over a projecting table or platform, the rim of which the wall covers. The ground plan of room B is nearly square; the walls are well preserved and rise directly from the edge of the mesa, which is steep on three sides. The interval between rooms B and D is strewn with stones, but traces of low walls can be seen. One of these walls is on the edge of the steep mesa; the

other, parallel with it, almost divides the space in halves. This is the part of the ruin which one enters first after climbing up the talus of fallen rocks. Room D is large, with well-preserved walls 4 or 5 feet high, and with a projecting platform on one side, on which only obscure indications of artificial structures may be detected.

Room F is rather small, with walls built over a projecting platform, resembling from below a bow window. Room E is well constructed; it contains considerable débris, and its sides are continuous with the perpendicular wall of the mesa. At the base of the eliff, just below room E, there is a low, almost circular wall, forming an inclosure somewhat similar to the basal rooms of some of the ruins already described. Although in general its architecture does not differ from that of many other rectangular ruins previously discussed, the overhanging platform gives a unique appearance to the structure. About 300 feet eastward were noted the edges of flat stones which indicate burial cysts. The whole length of this ruin is 46 feet, and the width, including the projections at F and G, 21 feet. The sizes of different rooms measured were:

Room B, 10 feet 8 inches by 9 feet 10 inches.

Room D, 15 feet 4 inches by 10 feet 5 inches.

Room E, 10 feet by 5 feet 10 inches.

The following bearings were taken from this ruin:

Group C, ruin A, bears north 12° east.

Mount Agassiz bears south 48° west.

Schültze's spring bears south 50° west.

#### RUINS NEAR HONANI'S HOUSE AT BURRO SPRING

The Hopi Indian Honani declared that there was a large ruin on the mesa not far from his house at Burro spring. This ruin, however, was not visited, as Honani was away when the author passed through that country. There is a legend that some of the clans of Shumopovi once lived at this point, which is apparently on the line of migration from the ruins on the Little Colorado to the Middle mesa of Tusayan.<sup>a</sup> Honani is a prominent man in Shumopovi, which fact may account for his occupation of land near the Burro spring.

The preceding description will give a general idea of the ruins in this section. It is not possible to compare them with the ruins of Homolobi, where most of the walls have disappeared or have so fallen as to render the original plan unrecognizable. The difference in building material employed in the construction of the pueblos on Cheylon fork of Little Colorado river must have imparted a somewhat different character to the buildings erected there, but there is

<sup>a</sup>The simple existence of a permanent spring of potable water in this part of Arizona may be taken as indicative of ruins in its immediate vicinity, and when such a spring lies on or near an old trail of migration, evidence of former settlements can not be difficult to find. Both Big Burro and Little Burro springs lie on the pathway of migrations of the southern Hopi clans in their journey from Homolobi, and were halting places for longer or shorter periods.

some likeness between the ruins at Chaves pass and the lava ruins near Black falls. In this connection it may be stated that there is also a large ruin near Homolobi built of lava blocks on a lava mesa.

The racial and clan kinship of the former inhabitants of these pueblos is somewhat problematic, but it is quite likely that the people were akin to the Hopis. This is shown not only by the character of the houses, but also by the pottery and various other objects found near them. Both legendary and archeological evidences point to the conclusion that the people who once inhabited the pueblos near Black falls came from the north, and were related to those who once lived in cliff houses and other habitations on the Rio Colorado and its tributary, the San Juan. Hopi legends say that the Snake clans formerly lived at Tokonabi, on the Rio Colorado, and that they migrated southward and built a pueblo about 50 miles west of the present Hopi towns, which they called Wukoki. This pueblo, it is said, still has high-standing walls. The direction and distance of the Black falls ruins from Walpi correspond pretty closely with those given in the legend, and while it may not be possible to identify any single ruin of this cluster as Wukoki, the traditional Wukoki of Hopi legend is not far from Black falls. The tradition that the inhabitants of these ruins came from the north is supported by the close resemblance in character and decoration between their pottery and that of the San Juan ruins.

It might naturally be supposed that there would be a close likeness between the pottery of the Black falls ruins and that of Homolobi, and that kinship once existed between the inhabitants of these pueblos on the same river. Close study, however, shows marked differences, and the author is led to the belief that while both were pueblo people, and, therefore, similar in culture, the clans which inhabited Homolobi were not the same as those which lived in the Black falls villages. The clans which lived at Homolobi came from the far south, through Chaves pass, while those at Wukoki came from the opposite direction. Both evidently sought refuge in the Hopi pueblos, where their descendants now live together. The clans from Homolobi were the Patki, Patuñ, and Tabo (Piba), whose route to the Hopi towns was by a trail which extends directly north past the "Giant's chair." The clans from Wukoki were the Teña and others who migrated almost eastward when they sought their home in Tusayan.

## OBJECTS FROM THE LITTLE COLORADO RUINS

### POTTERY

#### GENERAL FEATURES

The mortuary pottery from the three ruins, Homolobi, Cheylon, and Chaves pass, is distinctive and typical, with general resemblances to that from other localities. As a rule it is more varied in character than that from the true Tusayan ruins, Shumopovi, Awatobi,

and Sikyatki, though its decoration has many likenesses to that on the pottery from these ruins. It has seemed best to discuss the ceramic ware of these three localities together, but in so doing it is thought necessary to mention the particular place from which each specimen was obtained.<sup>a</sup>

It has been shown in an account of the pottery of Sikyatki, where conclusions were drawn from a large collection, that there was not a single piece of glazed pottery found in that ruin. At Awatobi few such fragments were found, but in the Homolobi and Cheylon ruins there were many glazed bowls, pots, and jars.

The question whether the ancient Pueblos glazed their ware has been answered in both the affirmative and negative, and this difference, no doubt, is due to the want of a good definition of the term glaze. Some of the bowls found at Homolobi and Cheylon have a black vitreous covering resisting a knife point, but which is not the gloss derived from polishing the vessel, but apparently from some salt used in the preparation of the black pigment with which the ware is painted. This glaze, however, has not been detected on any colors but black and green, or on any ware except the red, which is so abundant in both the ruins here described.

It is hardly necessary to consider at any great length the various forms of ancient pottery obtained in 1896, for this would simply duplicate work already published in the author's account of Sikyatki. Moreover, the question of variety of forms has already been amply discussed by others. The mode of manufacture, technic, coloration, and like questions were the first to attract attention of students, and, while by no means exhaustively presented, are treated more extensively than the character and meaning of the decoration. A few types present the various forms of pottery from the ancient ruins, and for a study of form alone the material in our museums is ample. With derivation of symbols, however, the problem is very different, for in a collection of thousands of specimens we rarely find two in which the ornamentation is the same. In a general way it may be said that certain decorative types are followed, but the variations are so many that in attempting to present an adequate idea of ancient ceramic ornamentation it is necessary to describe almost every specimen. Manifestly that would be impossible, and as we need classification in this department of study, the following is proposed.

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<sup>a</sup> Unfortunately for close study of the lesson taught by Pueblo pottery regarding the migration of the ancient people of Arizona, the ruin from which ancient Tusayan ware was collected is not mentioned in early writings on old Pueblo pottery. Thus, we find specimens from Awatobi, Canyon de Chelly, and Sikyatki given one locality, "Tusayan," and modern Tanoan pottery made at Hano by colonists from the Rio Grande bearing the same indefinite description. Almost all the modern pottery from "Tusayan" in the National Museum is intrusive in that province, and is practically modified Tanoan.

## CLASSIFICATION BY COLOR AND SURFACE FINISH

The classification of pottery objects by color and surface finish leads us to refer them to the following groups: 1, Coarse unpolished ware, undecorated; 2, coarse unpolished ware, decorated; 3, polished ware, undecorated; and polished ware, decorated, which may be again divided into: 4, red and brown ware; 5, yellow ware; 6, black ware; 7, black and white ware; 8, red and black ware; 9, red, black, and white ware; 10, white and green ware.

## COARSE UNPOLISHED WARE

Although a large collection of coarse ware was made in the excavations, the forms obtained varied little from those described from Awatobi and Sikyatki. Of more than usual interest were specimens of coiled-ware bowls, the interiors of which were black and glazed. These are represented by several specimens from the Chaves pass ruins.

There is but one specimen of rough ware the exterior of which was decorated (see figure 17).<sup>a</sup> The rudeness of the design on this object is no doubt in part due to the character of the ware. As we go south the number of these specimens of rude coiled ware with external decoration increases. They are not found in ruins near the inhabited Hopi pueblos, are represented by a few specimens at Homolobi, increase in number at Cheylon, and are well represented in ruins on the northern foothills of the White mountains.

## UNDECORATED POLISHED WARE

While in a few cases polished ware was undecorated, this was exceptional, and only a few specimens were found, which all came from one excavation. In certain instances there was evidently formerly an ornamentation on some of these which had been obliterated; on others no sign of decoration could be discovered. The polished undecorated ware was ordinarily red, but there were likewise specimens of white and black undecorated ware.

## DECORATED POLISHED WARE

## RED AND BROWN WARE

Red and brown ware is distinctively characteristic of the ruins found along the Little Colorado, and of those south of this river to the border of Mexico. The decorations on this ware (plate XXVI) found along the Colorado river are much more complicated than those of southern Arizona, where plain red ware is almost universal. In both regions the color is no doubt due to the composition of the available clay, and to changes in firing. Bricks made from this clay at the

<sup>a</sup>A large number of these vessels were found in the more southern ruins excavated in 1897, especially that near Snowflake, Arizona, where the largest collections were made that year. As this pottery will be discussed at length in the report for that year, it is barely mentioned in this section of the memoir.



present time have much the same texture and color as the ancient vessels—probably for the same reason.

#### YELLOW WARE

The fine yellow ware which is characteristic of the old ruins near the inhabited Hopi pueblos is not found in the Little Colorado ruins. There are many pieces (plates XXVII, XXVIII) which approach it in color, but for the most part they lack that fine gloss which distinguishes ceramic objects of Sikyatki, Old Shumopovi, and other Hopi ruins. While this difference may be in part ascribed to the chemical components of the clay, the skill of the potter must also be given due credit. While yellow ware was sparingly made in the southern pueblos, it reached its highest development in the villages which are nearest the modern Hopi.

In the decline of pottery making the fine old yellow ware has greatly deteriorated, and, although clever Hano artists copy it with some success, they have never been able to equal the finest specimens which the author has dug out of Sikyatki sand hills.

#### BLACK WARE

The Santa Clara pueblo Indians of New Mexico, as is well known, make a characteristic black ware. The author has thus far failed to find any specimens of this ware in Tusayan, but in the ruins of Homolobi, Cheylon, and Chaves pass several food basins were found the interiors of which were blackened and apparently glazed in the same manner as is the Santa Clara pottery. In no instance, however, was the external surface thus blackened. Some of these food basins with black interior were of coiled ware; others were of smooth ware, but all were destitute of other decoration.

#### BLACK AND WHITE WARE

The so-called black and white ware is found almost universally in cliff houses throughout the Southwest, and has been thought to be characteristic of this kind of dwelling. In his excavations at Sikyatki, however, the author found several pieces, and the same kind was also taken from the older quarter of the ruin of Awatobi. Several beautiful pieces of black and white ware, with decorations which are identical with those of pottery from Colorado cliff houses, were taken from the burial places at Old Shumopovi. In the Homolobi and Cheylon ruins a number of most interesting bowls, vases, and dippers of this kind of ware (plate XX) were exhumed, and the same style of ware occurred at Chaves pass. It appears, therefore, that black and white ware is not uncommon in ruins of pueblos in the plains as well as in cliff houses, which is but one of many evidences of the similarities in culture of the peoples inhabiting these two kinds of ancient dwellings. The author was at one time disposed to regard these pieces as heirlooms, but the considerable number of specimens

found would seem to indicate contemporary habitation of the villages and cliff houses from which they have been taken.

No specimen of the black and white ware in the collection is decorated with designs representing human beings or animals, and even pictures of birds, so abundant on other colored ware, are wanting. The designs are purely geometrical figures, which are ordinarily regarded as the most ancient style of ornamentation. These geometrical figures, however, are very complicated—as a rule far superior to similar decorations on other colored ware. They duplicate for the most part the patterns on black and white ware from the cliff dwellings of southern Colorado and western New Mexico, the headwaters of the Salado and Gila rivers.

Among the specimens of black and white ware there are several dippers made of a very fine paste almost as compactly hardened as rock. All of these, with one exception, were broken, and the single unbroken specimen, one of the most beautiful in the whole collection, disappeared from the table in the National Museum after it had been seen and admired by many visitors. The author much regrets the loss of this beautiful object, especially after it had been brought safely to the National Museum.

While black and white ware is abundant in the cliff houses of the San Juan, it is relatively as abundant in the houses of the plains in some parts of New Mexico, as may be seen in the great collections made in recent times in the Tularosa valley.

#### RED AND BLACK WARE

A majority of the ceramic objects from the three ruins investigated in 1896 were red with black decorations. This variety was so abundant that it may well be styled the characteristic pottery of the Little Colorado and its tributaries. Black and red ware is found in the ruins near the Zuñi river, an affluent of the Little Colorado, and is also found in ruins widely distant from the Colorado, but we are justified in regarding this combination of colors as distinctive of the Colorado drainage area. Some of the best specimens of the glazed ware well represented in the collections of 1896 are of these two colors, the black designs being almost always glazed.

The red color is due to the clay, since bricks made at Winslow have practically the same color. The many specimens of red and black pottery with marginal lines in white on the black form a transition from this variety into the next, in which, however, the white is more prominent.

#### RED, BLACK, AND WHITE WARE

The type of ancient pottery included in the above designation (plates XXI, XXII) is, as far as research has thus far gone, peculiar to the Little Colorado ruins. No specimen of it has yet been figured (1896), and there are no examples of it in the different museums with which the author is familiar.

The three distinctive colors are red, black, and white—the latter forming not simply bordering lines in the designs, but being used as a slip to cover a considerable surface of the object decorated. While specimens of this kind of pottery do not occur in ruins near the inhabited Hopi pueblos, it is probable that the modern use of a white slip by potters in those villages is a lineal descendant of the ancient method of decoration.<sup>a</sup>

This colored ware is not found in ruins south of the Mogollon mountains, but is confined to the Little Colorado river and its southern tributaries.

#### WHITE AND GREEN WARE

A limited number of pottery objects of light color, with dark-green glazed geometrical figures, were found in the Little Colorado ruins (see plate XLII*b*). This kind of ware appears to be rare in the Hopi country, ancient and modern, but whether it is indigenous or intrusive the author has been unable to discover.

#### CLASSIFICATION BY FORM

The various forms of pottery are determined largely by the uses for which it is intended. They may be classified as follows: 1, food bowls; 2, vases; 3, jars; 4, ladles; 5, mugs or dippers; 6, canteens; 7, cups; 8, animal-shaped vessels; 9, slipper-shaped vessels.

#### FOOD BOWLS

The food basins (plates XXIII–XXIX) exceed in number all other forms of pottery, and as a rule have the same shapes as those from Sikyatki and Awatobi, described in the report on those ruins.<sup>b</sup> The basins are ornamented on the interior with symbolic designs, in which geometrical figures predominate.

There is a much larger proportion of designs encircling the exterior of the ware in the Little Colorado pottery than in that of Sikyatki, and curved lines are also more common. Some of the food bowls made of red ware are very large, but from their fragile nature and size the majority of these were broken.

#### VASES AND JARS

The collection of vases was very large, but the pieces are, as a rule, smaller than those previously described from Sikyatki. Some of the forms of these vases may be seen in the accompanying plates (XXX–XXXV). The majority are globular, with a slight neck, but there are several in which the neck is elongated.

<sup>a</sup> The use of a white slip is a marked feature of the pottery now manufactured at the East mesa of Tusayan. This appears to have been introduced after the fall of Sikyatki, for the fine yellow ware of this pueblo shows no white superficial covering.

<sup>b</sup> Seventeenth Annual Report of the Bureau of American Ethnology, 1898, pt. 2.

The designs on vases are usually geometrical; animal and human figures are wanting. Some of these vases are very small, having evidently been used for pigments or condiments. The lip is sometimes decorated with parallel marks, but with one exception the interior is destitute of ornamentation. A single specimen had an



FIG. 12. Ladle with divided handle, from Cheylon (number 157051).

indented or concave base, to secure stability, but in the majority the base is rounded.

The distinction between vases and jars is more or less arbitrary, the latter having, as a rule, a smaller orifice.

## LADLES

Many ladles were found in 1896, the general forms of which were in no respect peculiar. The most striking variations are in the form of the handles. They are usually decorated on the interiors, and generally with geometrical patterns.



FIG. 13. Ladle with figure on handle, from Cheylon (number 157306).

Figure 12 shows a ladle with a double handle—a rare form. Figure 13 is a ladle with its handle decorated with a human figure. The evidences of wear on the edge of this ladle are pronounced, showing that it was probably used in dipping food from bowls or vases. In modern times gourd ladles are generally used for drinking purposes.

Many ladle handles broken from their bowls occur in all the excavations, and from the appearance of the broken end it is evident that the handle was made separate from the bowl and was later joined to it. A conical projection from the side of the bowl was inserted into a cavity of the handle, which is sometimes hollow throughout, and was then luted in place before firing. Several ladle handles were perforated, and in one specimen there were small pebbles which rattled when the ladle was shaken.

The extremity of the ladle handle was at times fashioned into a rude image, recalling the clown priests' heads so common on modern clay ladles. The ladle with hollow handle opening at one end into the bowl, which is so commonly made in modern times by the Pueblo potters,<sup>a</sup> has not yet been found in the ancient habitations of Arizona.

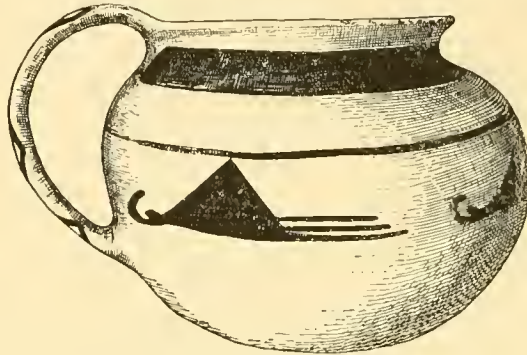


FIG. 14. Cup with bird designs.

#### CANTEENS

The canteens by means of which the ancients carried drinking water were shaped somewhat like the modern canteen, but were more flattened, and generally decorated. While canteens of this shape from old Tusayan ruins are known, they have not yet been excavated from any of the Little Colorado ruins.

The second kind of canteen, of which several were found, has a very different form and probably a different use. While the former was generally borne on the back, the second was carried in the hand. It has an oval or globular form, with a handle which is hollow, having an opening midway in its length. It is possible that this form of canteen (plate XXXVI *b*) was used to carry water for ceremonial purposes from a spring to the ceremonial chambers, or possibly from the houses to the fields. These canteens are of small capacity, and are generally ornamented exteriorly with complicated designs.

<sup>a</sup>These forms of drinking ladles, made of clay or gourds, are used in the following way: The water is dipped up in the bowl and the end of the handle is put in the mouth. A proper slant to the bowl allows the liquid to pass through the handle into the mouth. The ancient ladles were not used in this way, but were used as dippers are to-day.

## CUPS

The antiquity of the cup form of household utensil has been questioned, but from these excavations there seems no reason to doubt that this form was made in prehistoric times. Numerous specimens (figures 14-19) were found at Homolobi, Cheylon, and Chaves pass, and the material of which they are made differs in no respect from that of other vessels.

A very fine specimen of coiled ware (figure 15) had a handle made of two coils of clay artistically twisted together. There were a few specimens of cups with flat bottoms, but the majority were in



FIG. 15. Dipper from Homolobi (number 156891).



FIG. 16. Mug from Homolobi (number 156891).

the form of small vases with rounded base. The decoration of the cups was external; the interior was smooth, without figures. Geometrical figures predominated in ornamentation. Several specimens bore evidences of considerable use, the rims being in some cases much worn. One of the best of these cups, with handle made of two coils, is shown in figure 16.

The bowl-shaped cup shown in figure 17 is made of rough

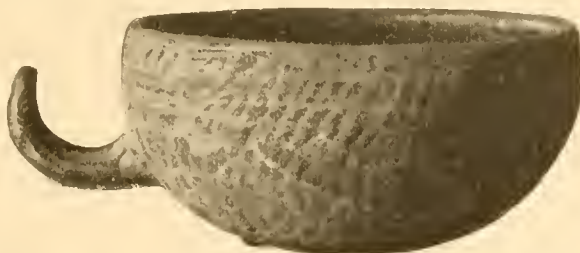


FIG. 17. Cup, rough ware, decorated, from Cheylon (number 157035).

A number of vase-form vessels with handles connect the true mugs with vases. The general form of these is the same, but the position

of the handles varies. In figure 18 the handle extends from the lip of the vessel to near the equator, while in figure 19 it is smaller, and placed just below the neck of the vase. In figure 17 the handle is confined to the equatorial region.



FIG. 18. Mug.

There were several specimens of a mug form in which the body is trifold. These forms were probably used for pigments or condiments, and were of rough ware, or were polished and sparingly decorated.

The external decoration of these eups varies in character as widely as does their form; but in plate XXXIV the reader will find some of the designs, which are practically the same as those on the inside of certain food bowls from the same ruins.



FIG. 19. Mug from Cheylon (number 157294).

#### ANIMAL FORMS

Pottery objects in the forms of birds, though common among the ceramic productions of certain modern pueblos, are rarely found in ancient ruins. The excavations made in 1896 brought several specimens of these to light, one of the best of which was from Cheylon (figure 20). In this specimen we have a well-made head recalling that of a duck, and three knobs representing the tail and wings. Interesting in connection with this specimen is the presence of triangular designs with terraced figures painted on the sides.

It may be supposed that the vase (figure 21), with four knobs



arranged at equal intervals about the equator, is a highly conventionalized bird vase in which the head, wings, and tail are represented by knobs or rounded elevations. Figure 20 has on one of the knobs a head with goggle eyes and teeth, recalling a bird figure which is not



FIG. 20. Duck-shaped vessel from Cheylon (number 157018).

an anomalous form in southwestern pictography. In view of the identification of the terraced figures with wings, the decoration on the equator of this bird-*effigy* vase are highly suggestive.

A second bird-form vase is shown in figure 22, in which the vessel



FIG. 21. Jar with four knobs, from Homolobi (number 158354).

is elongated and has a round head projecting at one end, with a beak like that of a parrot. The eyes project from the head, and there is an opening for a mouth. On the side of the body there are parallel lines representing feathers painted in red and black. The tail is broken.

A third kind of bird-form vase is more globular in shape, with head appended to the rim. The wings and tail are represented by figures drawn on each side of this vase, and eyes are painted on the sides of the head. The strange raised S-shaped bodies on the sides of this vase are of unknown meaning, but they suggest legs. A view of



FIG. 22. Bird-shaped vessel from Cheylon (number 157909).

this vase from one side is shown in figure 23. The length of the appendages represented in relief on this vessel suggests some long-legged wading bird, possibly a crane.

Plate XXXVI *a* shows a conventional effigy bowl in which the rim is modified to represent the head, tail, and wings of a bird.

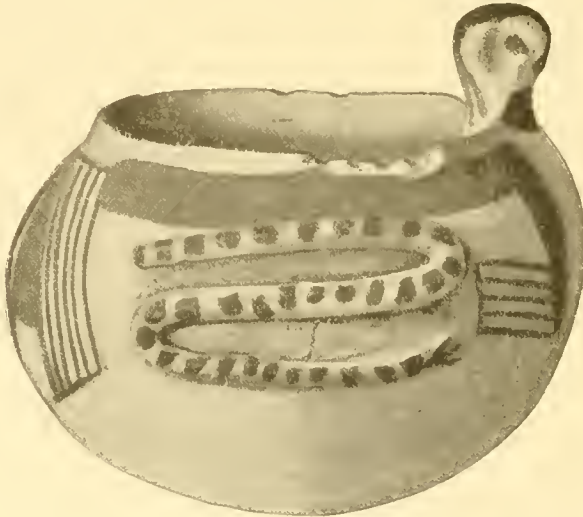


FIG. 23. Bird-snake vase from Cheylon (number 157311).

The preceding forms, representing all effigy objects which were found in the excavations, naturally lead to a consideration of the great difference in the ceramic technic of northern and southern Arizona and New Mexico. As we go south there is an ever-increasing tendency to combine relief with pictorial decoration; effigy vases, including those in the form of men and animals, increase in number, until

in Mexico relief decoration becomes the essential feature. In its earliest development the head is raised in relief, while arms and legs are indicated by ridges, as in a figure from the Nantacks, considered later in this article. In the Gila valley, clay reliefs of the human figure on a jar or vase were attempted—a thing unknown in ancient Tusayan.

#### SLIPPER-SHAPED VESSELS

Several rough-ware jars in the form of slippers were found in the ruins excavated in 1896. From the fact that many of these were blackened with soot, it is conjectured that they were formerly used for cooking vessels, and it is probable that they were made in that peculiar form in order that they might be used like Dutch ovens and coals of fire might more readily be heaped over them. Many of these slipper-shaped jars had one or more handles placed on the necks or prolongations of the rims.

These jars were always made of rough ware, and were never painted, as is the case with similarly formed vessels from the Gila river and its northern tributaries. They vary in length from a few inches to a foot or a foot and a half.

#### DECORATIVE DESIGNS

##### GENERAL CHARACTER

The great value of collections of pottery from the Southwest, especially from the ruins in Arizona, is to be found in the symbolic decoration and its interpretation. The collections in 1896 were especially instructive on account of the new localities from which they were made and of the new symbols depicted. As is universally the case, avian figures are the most common and the most elaborately conventionalized. There are one or two instructive reptilian designs.

A study of the decoration on the pottery of the Homolobi, Cheylon, and Chaves pass ruins shows that the proportion of geometrical to animal designs is much larger than at the Sikyatki or Shumopovi. In the few instances where animals and human beings are depicted the execution of the designs is ruder. This preponderance of geometrical over animal figures recalls conditions characteristic of white and black ware ornamentation. The predominance of animal pictographs on pueblo pottery in ancient times appears especially characteristic of Tusayan.

The most novel results obtained from a study of the collections of pottery were contributions to a knowledge of ancient pictography.<sup>a</sup>

Even a superficial comparison of the pictography of the Little Colorado pottery with that of the Sikyatki ware shows how inferior the

<sup>a</sup>The majority of forms of ancient Tusayan ware are well known to archeologists through the Keam collection, some of the more striking specimens of which have been figured by Mr Holmes in previous reports of the Bureau of Ethnology.

former is to the latter. A deeper study confirms this conclusion. Nowhere in the pueblo region has the ceramic art reached the high position it attained in Tusayan in prehistoric times. This development may be due in part to the character of the material used, but it is mainly owing to the artistic instinct of the ancient Hopis.

In both the character of the paleography and the texture the ware of the Little Colorado ruins is more like Zuñi than Hopi work. The ancient pueblos on the Zuñi river, a tributary of the Little Colorado, closely resemble those about Winslow and at the mouth of Cheylon fork, but their pottery is as a rule inferior.

#### HUMAN FIGURES

Pictures of human beings were very rarely found in the excavations at the Little Colorado ruins. This rarity conforms with results from other ruins, described by other archeologists, so that the author suspects that delineations of the human figure, of which several were found at Sikyatki, indicate a late stage in the evolution of pottery decoration in ancient pueblos. The drawings of human beings which have been found are for the most part of the rudest possible character, showing no elaboration such as would be expected if they had been used many generations for decoration.

But a single complete figure of a human being on pottery was exhumed in 1896, and that was on the handle of a ladle from Cheylon. The specimen (figure 13) represents a woman with left arm lifted high above the head. It has been identified as the figure of a woman from the presence of the characteristic coiffure of



FIG. 24. Footprints on inside of a vase from Homolobi (number 156690).

maidens, to which the author has called attention in his account of designs from Sikyatki. The end of the handle of this ladle turns at right angles, and suggests an explanation for numerous clay objects of like shape which have been found elsewhere.

Among human figures, however, may be mentioned the unique ornamentation on the inside of the vase from Homolobi (see figure 24), where we have on one edge the representation of the head, neck, and extended arms, one of which carries a rattle, the other a spear. A line of footprints extends across the inner surface of this vase, and the body and legs are represented on the opposite side. It will be noticed that the portions of the human figure represented at the two ends of the line of footprints are complementary; the head and arms appear at the bottom, the body and legs at the top. It would seem that



FIG. 25. Quadruped figure on food bowl from Chaves pass (number 157570).

the artist intended to represent the tracks of a seated figure at the bottom of the line of footprints, the marks being paired at that point.

The inside of the food bowl shown in plate XXVII *b* is decorated with a human face, in which eyes and mouth are represented. Above the head is a crescentic figure in white, resembling the moon, into the concave side of which project four pairs of tubercles from the top of the head. This is one of the few specimens from Homolobi in which a human face is depicted.

#### QUADRUPED FIGURES

There were a few pictographs of four-legged animals, two of which are identified as mammalian forms. Mythical lizards and batrachians are represented, but no complete picture of any reptile was found which could be identified.

One of the most interesting pictures of mammalian animals occurs on a broken food basin from Chaves pass. This specimen (figure 25) represents an animal with long claws, a tail reaching above the body to the head, two triangular ears, and an arrow-shaped tongue. It is one of the few figures in which the intestinal tract is represented, and it has two eyes on one side of the head.

The design on the food bowl shown in figure 26 represents a four-footed animal which was identified by one of the Hopis as a bison, and the hump on the back certainly suggests this animal. This figure, like the preceding, has two eyes on one side of the head, but, unlike it, has the four legs all depicted in the same plane. The



FIG. 26. Quadruped figure on food bowl from Cheylon (number 157102).

geometrical figures below this quadruped are of unknown meaning. The bowl is of red ware, with black and white decoration, and is one of the finest of this kind from the Cheylon ruin.

As a rule, vases are ornamented on the equator, and it rarely happens that any design is found on the bottom. The specimen shown in figure 27, however, has a design in that region resembling a paw of some animal, possibly a bear or badger. The form and character of ware which distinguish this specimen are likewise highly instructive.

## BIRD FIGURES

The majority of the animal figures on specimens from the three southern ruins represented birds, many of which were highly conventionalized. While there were many objects of pottery adorned with feathers, this style of decoration was not as common or as varied as at Shumopovi, Sikyatki, Awatobi, or other ruins on the Hopi reservation. The conventional forms of feathers so common on the decorated pottery of Sikyatki are not found in the designs ornamenting the pottery of the Little Colorado ruins, but seem to be confined to the pueblos of the present Hopi reservation. Thus, not a single specimen of the conventional feather figured on the "butterfly vase" shown in plate CXXV of the Seventeenth Annual Report of the Bureau of American Ethnology, part 2 (and also plate XL, Smithsonian Report, 1895), was found on any vessel from Homolobi, Cheylon, or Chaves pass.<sup>a</sup>



FIG. 27. Vase with bear's paw design (number 157187).

The peculiar symbol of the breath feather (Seventeenth Annual Report of the Bureau of American Ethnology, plates CXXXVIII *b* and CXLI *c, d*) also appears to be limited to objects from ruins near the inhabited Hopi pueblos. On none of the many figures of birds shown in the Little Colorado pottery have we any such complicated symbols appended to wing or tail. The figures of birds from Shumopovi resemble those from Sikyatki, but no pottery from a Little Colorado ruin is found decorated with the conventional figure of the feather so constant in the ancient ruins above mentioned.

It will be noticed in the figures of birds from Homolobi and Cheylon that the posterior end of the body has a triangular form which apparently represents the tail. At one side of this triangular figure are many short parallel lines, evidently intended to represent the tips of the tail feathers, well brought out in the bird figures.

The design shown in figure 28 represents two birds, above which are emblematic rain-cloud symbols with parallel lines representing

<sup>a</sup> Consult The Feather Symbol in Ancient Hopi Designs, *American Anthropologist*, v. 11, n. 1, January, 1898.

falling rain. The figures of these two birds are decidedly Egyptian in form. Their beaks are turned in the same direction, and both have two eyes on one side of the head. The wings are of special interest to students of Hopi symbolism, for they are represented by triangles—which is often the case in ancient Tusayan pictures of mythic birds. This bowl, found at Cheylon, is of the red ware characteristic of the Little Colorado ruins. The triangles at the lower ends of the bird figures are tails, and the short parallel knobs represent the tips of the tail feathers. This is important to



FIG. 28. Mythic bird figures and rain-cloud symbols on food bowl from Cheylon (number 157221).

remember in the study of symbolism, for we sometimes find the same symbols depicted alone on a vase (see figure 36).

No specimen from the Little Colorado ruins has a diametrical line representing a "sky band" to which hangs the conventional figure of a bird—a design so common in the best Sikyatki ware. A good example of this ornamentation is shown in a food bowl from Shumopovi (see figure 73, page 117). We miss also the star design and the trifold cross so commonly associated in Tusayan ware with the bird symbols.



Attention is called to the form of the tail of the two birds in figure 28 and to the triangular designs called feathers seen in the same figure. It seems not improbable that in the conventionalization of bird figures the design representing a bird may be reduced to two triangles, making an hourglass-shaped figure. Suppose, for instance, wings and head be omitted in figure 28, the tail and body would then be two triangles joined at the apices.

The design on a vase from Homolobi shown in figure 29 represents four birds, each one of which



FIG. 29. Vase with four bird figures, from Homolobi (number 156676).



FIG. 30. Mythic bird figure on food bowl from Chaves pass (number 157543).

has a crested head of feathers and widespread wings of triangular form. The body is continued into two triangular extensions, as is

the case in so many bird figures, and the tail feathers are indicated by short, stumpy, parallel lines attached to one side of a triangle. The middle of the body is represented by a lozenge-shaped figure, in the center of which is a dot. Trifid triangular designs alternate with the bird figures, and the bird figures are arranged as though moving in a sinistral circuit.

The figure of a bird on a food bowl from Chaves pass (figure 30) is characteristic. This represents a toothed bird, a conception often repeated in the ancient pueblo pictography. Both eyes are on one side of the head, which is rounded posteriorly and prolonged into an upper and lower dentate beak. The triangular wings are terraced or

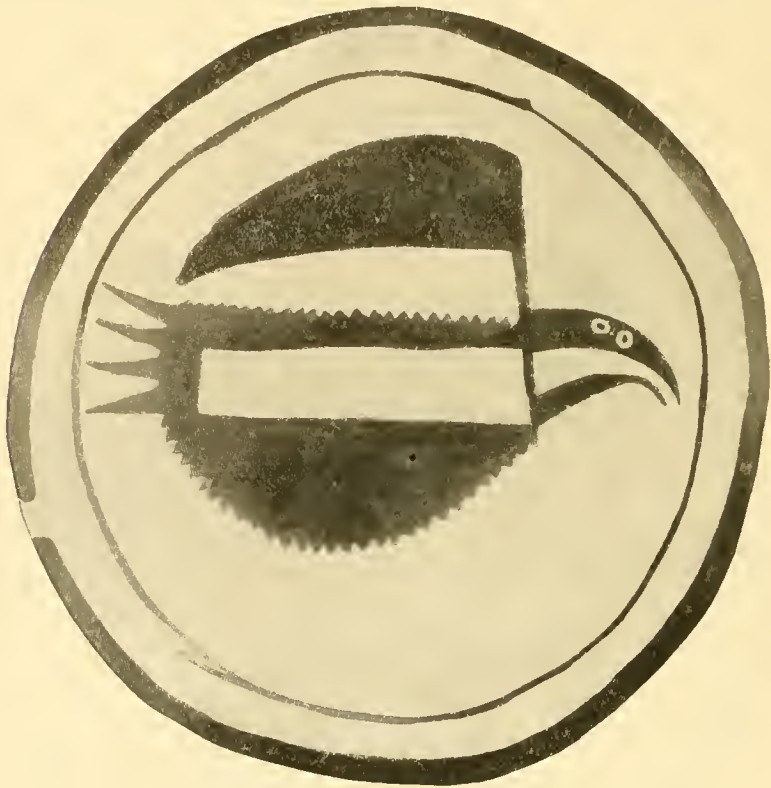


FIG. 31. Bird design on food bowl from Homolobi (number 156903).

notched on one edge, and the tail is triangular, with short, white appendages representing feathers. Although a simple figure, this is one of the most instructive bird designs in the collection. The conception of a toothed bird is certainly remarkable, but we find it still current in the Walpi ritual, where it is personated, as in the so-called Natackas which appear in the Powamú, or Bean-planting, a ceremony when the fields are prepared for planting.

The figure of a bird represented on a food bowl from Homolobi shown in figure 31 is different from any elsewhere collected. Par-

ticularly interesting is the drawing of the wing and the shape of the body, which is bordered by small triangles. Both eyes are represented on one side of the head, and the tail feathers, four in number, are represented in a vertical plane.

The food bowl shown in figure 32, from Homolobi, is decorated on the interior with a design representing the head, neck, and legs of a mythic bird. There are two eyes on one side of the head, and the tongue has a tip like an arrowhead. The wings bear triangular appendages representing feathers. The talons recall those of the



FIG. 32. Bird figure on food bowl from Homolobi (number 156870).

“unknown reptile” from Sikyatki, figured in plate LXII of a preliminary report on that ruin.<sup>a</sup> We have in this figure a representation of both wings in the same plane, a constant feature in Pueblo drawing. There is also a view of a body cavity, which is not rare in modern Pueblo figures of animals.

One of the most striking pictures of birds is that depicted on the interior of the food bowl from Cheylon, shown in figure 33. The

<sup>a</sup>Annual Report of the Smithsonian Institution for 1895.

most remarkable of all the appendages are those on the tail, the meaning of which the author can not interpret. It was sometimes customary to equip a bird figure with a long snout in which were teeth, and this conception persists among the Hopis, as has been noted above. It is interesting to note that in this figure, as in the majority of bird figures from the Little Colorado ruins, the tail is represented by a triangle, and the tail feathers or their tips by three parallel lines.

The interior of the food bowl shown in figure 34 is decorated with a bird design which exhibits some of the notable violations of perspective common in ancient Tusayan art. We here find wings, legs,



FIG. 33. Mythic bird figure on food bowl from Cheylon (number 157264).

and tail feathers shown on the same plane, notwithstanding that a side view was intended.

The indication of the claws by crescents in this figure is interesting. The same method is adopted in another bird figure, in which there are in each foot two short parallel lines. This method is likewise used in one of the designs from Sikyatki which was identified as representing an unknown reptile.<sup>a</sup> There is some doubt whether this figure represents a lizard or a bird, for a considerable part of the body is posterior to the appendages. If we consider the posterior

<sup>a</sup> Seventeenth Annual Report Bureau of American Ethnology, pt. 2, 1898, figure 269.

appendages as a pair of legs, they bend the wrong way, unless the whole portion from the angle to the claws is regarded as foot. This is not an avian feature, but the presence of semicircles and triangles on the body is characteristic of bird symbolism.

In studying the different figures of reptiles from ancient pottery the author finds no other in which the feet have this form—which occurs in undoubted bird figures from Homolobi and Cheylon. It might therefore be concluded that the Sikyatki figure was wrongly identified and should be called a bird. There are, however, almost fatal objections to this identification. The most striking of these is the



FIG. 34. Bird figure on food bowl from Cheylon (number 157084).

elongated form of the body. The anterior appendage, which is identified as a leg, can hardly be homologized with a wing, although it must be confessed that the parallel lines may be feathers.

The reexamination of the figure in the light shed on the subject by the bird figures from Homolobi reveals that it has both bird and reptilian features, and that the former predominate.

Two raptorial birds are painted on the food bowl shown in figure 35, on opposite sides of terraced figures which recall cloud symbols. The birds are shown in profile, with both eyes on one side of the head

and tail feathers thrown out of perspective. Wings are not represented, and the body is covered with cross-hatched lines. In a bowl from Shumopovi we likewise find two birds represented from a different point of view, and also terraced figures which have been interpreted as rain-cloud symbols.

The triangular designs on the vase shown in figure 36 are interpreted as feathers, or rather as the tails of birds with appended feathers. The reason for the interpretation is to be found in the study of the bodies of birds as represented in the Little Colorado pottery. The author has elsewhere shown several instances in Sikyatki



FIG. 35. Food bowl with bird designs.

pottery where symbolic feathers are represented as tied about the neck of small vases, and even at the present day certain gourds in which sacred water is brought from springs in kiva ceremonials have feathers tied in this position. The triangle, as a feather symbol, is still found in certain altar pictures—as the snake-lightning designs in sand of the Antelope altars. It is interesting to notice that these feather symbols have parallel white lines on one side.

The only other symbol with which these triangular figures on the Homolohi vase could be identified are triangular rain clouds, the short parallel lines representing falling rain. These symbols would

also be appropriate on this small vase, but there is more likelihood that the triangles in this instance are feather symbols.

#### INSECT FIGURES

In an account of the insects used in pottery decoration at Sikyatki attention was called to the use of the moth or butterfly and the dragon fly. Both of these forms occur on pottery from the ruins along the Little Colorado, and their symbolism appears to be the same in all the ruins in Arizona thus far studied. The butterfly is commonly indicated by a triangular figure, which often becomes highly conventionalized, as in plate XXV*b*.



FIG. 36. Vase with bird symbols, from Homolobi (number 153880).

#### ARACHNID FIGURES

The spider plays an important part in Pueblo mythology, and the so-called Spider woman is often mentioned in connection with the Sun and the war god.

The design on the food bowl from Homolobi shown in figure 37 represents a spider, and a figure of the sun on the outside of this bowl recalls the legend of the Spider woman who married the Sun. The association of these two symbols on an ancient vessel shows the antiquity of this well-known legend.

There are appended to the cephalothorax of this animal four pairs of legs, which number distinguishes arachnids from insects; there are two jaws at the anterior and a feather at the posterior extremity.

The figure of the sun on the exterior of this food bowl is a simple ring surrounding a white zone, in the interior of which is a black spot. The four peripherally placed sets of three parallel lines are supposed to represent eagle feathers, a constant feature in sun emblems, or red horsehair, symbolizing the rays of the sun. The sand picture of the sun in the Powalawü, a ceremony preceding the

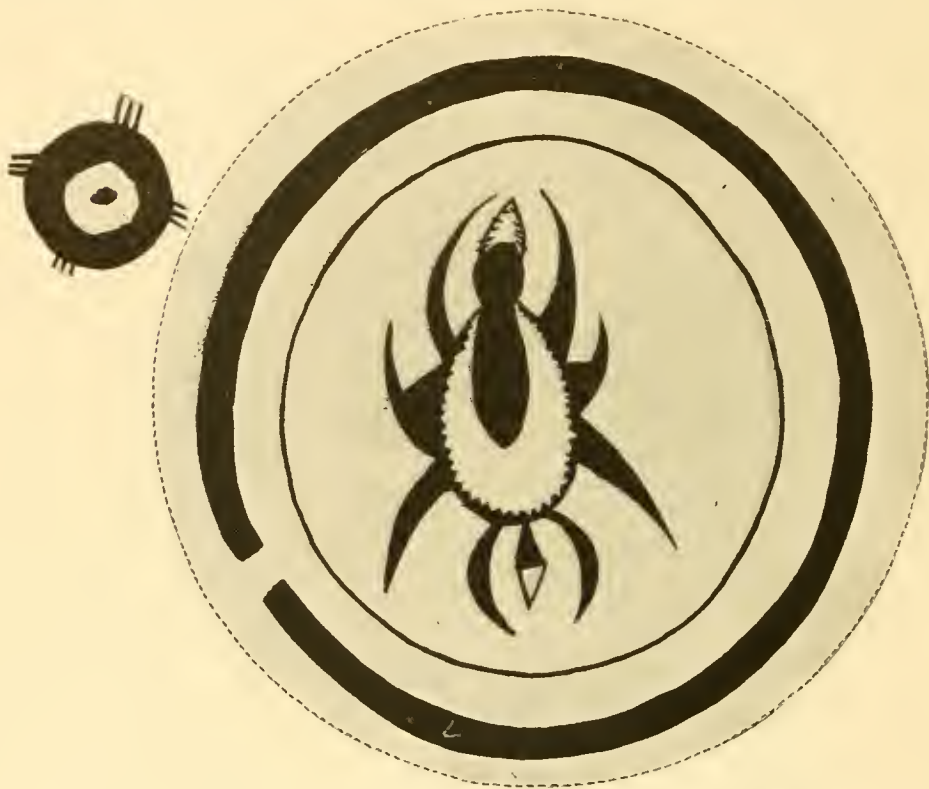


FIG. 37. Spider and sun emblem on food bowl from Homolobi (number 156888).

Powamü in February, as made in Oraibi, is identical with the design on this food basin.

Kokyan wüqti, or as she is generally called, Kokyan mama, the Spider maid, was the parthenogenetic mother or grandmother of the twin war gods, Püükoñ hoyá and Palüña hoyá. As she was supposed to have been impregnated by a sun's ray or a drop of water falling upon her, the sun is therefore called the father of the twins.

In various current legends the Spider woman is represented as one who can change her form at will, acting as mentor to the hero Püükoñ,



generally perching on his ear, and whispering her promptings from that position. She assumes several rôles and is designated by many attributal names. She is sometimes called "creator," but is an earth goddess or mother rather than an artificer of nature.

#### GEOMETRICAL DESIGNS

The wealth of geometrical ornamentation (plates XXVIII, XXIX) in Pueblo pottery decoration has attracted the attention of many stu-

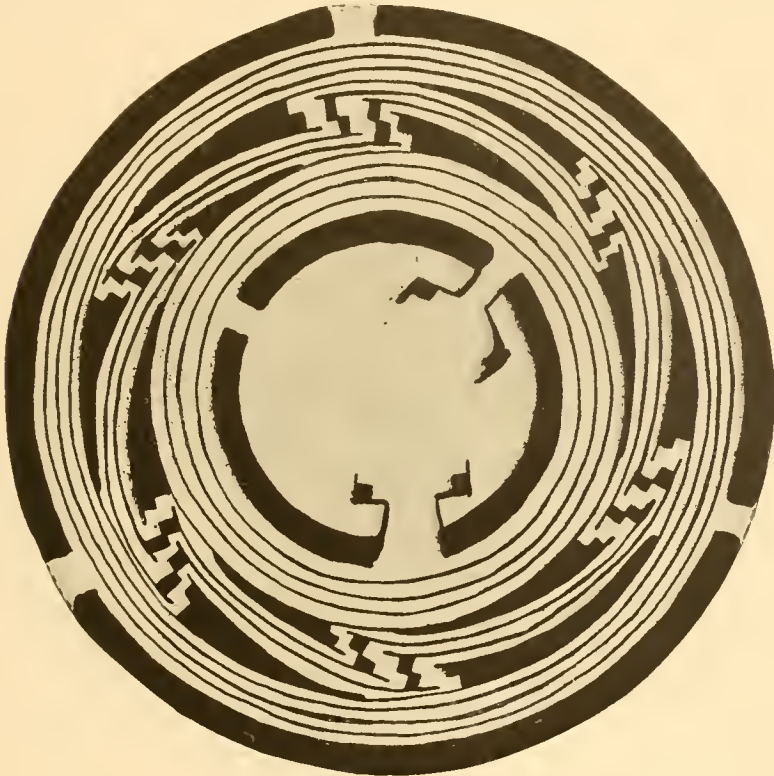


FIG. 38. Three lines of life. Design on food bowl from Cheylon (number 156138)

dents, and a large literature has accumulated on that subject. This form of decoration is the simplest in motive, the most widely spread over the pueblo area, and also probably the most ancient. Its relations to decoration of textile art products are pointed out by several writers, and there are many evidences of the evolution of complicated geometrical figures from simple forms. There are also evidences of their origin by conventionalization of more elaborate patterns through symbolism.

The design on the food basin shown in figure 38 is unique and highly instructive in one important feature. Encircling bands or lines on specimens of ancient pottery are ordinarily broken at one point, as

can readily be seen by an examination of figures in the report on Sikyatki pottery, as well as in the present memoir. The design before us has three breaks in these encircling bands. The break in the interior band is complicated by the addition of well-known terraced figures. By modification in form and by the interlocking of these appendages we pass easily to some of the most complicated geometrical patterns of Pueblo pottery.

A modification of the broken line about a vase appears in the specimen shown in plate XXXVIc. In this instance we find the band continued into two narrow extensions, which interlock but do not

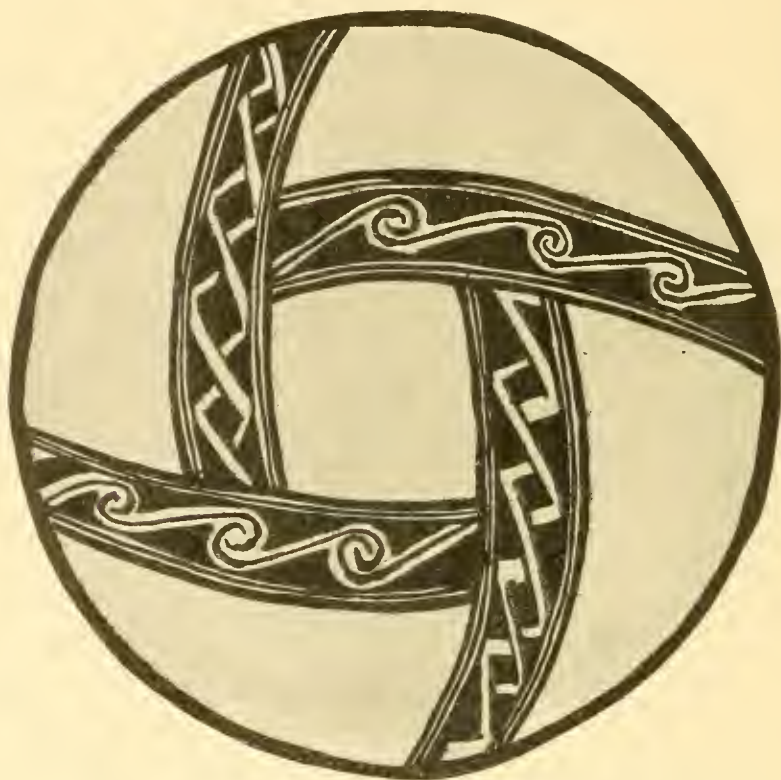


FIG. 39. Geometrical designs on a food bowl from Chaves pass (number 157539).

join. The figure which is thus formed is a common one in geometrical ornamentation, as may be seen by an examination of the many beautiful pieces of pottery obtained from the ruins in all parts of Arizona.

Not less instructive than the last-mentioned in a study of geometrical ornamentation is the design in figure 39. The spiral figures on two of the bands show a modification of the broken lines which are characteristic, and the S-shaped ornaments on one of the other bands are common on ancient pueblo ware.

A combination of oblique lines and fret, shown in figure 40, is the most unusual design in the collections which it has been the author's fortune thus far to examine. The same design is worked in a basket from the same ruin (figure 63).

The design figured on the interior of the food bowl shown in figure 41 is unique, reminding one of a swastika with arms split into two parts. We recognize in it the familiar

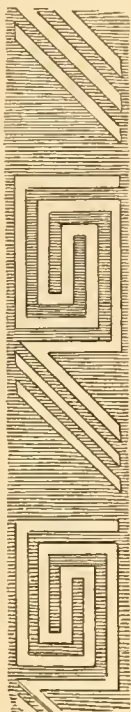


FIG. 40. Broken fret on food bowl from Cheylon (number 157895).

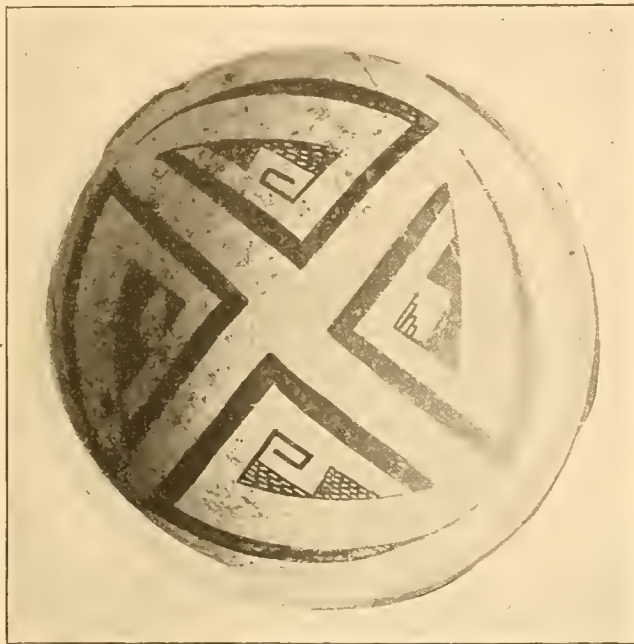


FIG. 41. Food bowl with geometrical patterns (number 156425).

triangle and crook, but the long scythe-like projections on the periphery of the design are rarely found in ancient pottery decoration.

The decoration of another food bowl from Homolobi is likewise unique, but it is formed of familiar decorative designs arranged in an irregular manner.

#### ORNAMENTS

##### MOSAICS

The ancient pueblo peoples of Arizona were adepts in making mosaic, some examples of which rival in excellence the work of a similar kind in old Mexico. The author's explorations in 1896 revealed different kinds of this craft, several of which are unique. The southernmost ruin, that in Chaves pass, yielded the most beautiful specimen, but those found at Cheylon were almost as fine, and the variety was greater.

In the course of excavation there were found in the soil, near a buried body, a large number of accurately squared turquoises which were so small that they could hardly have served for ornament alone, and with them were found worked shells covered with a tenacious pitch. In one of these collections there are several larger fragments, evidently turquoise ear pendants. Later excavations explained the character of these turquoises, for they were found to be duplicated in specimens of fine mosaic ware.



FIG. 42. Mosaic gorget from Chaves pass (number 157850). Length about 2 inches.

It is well known that Hopi women at the present day wear ear pendants made of square wooden plates, upon which are cemented rude mosaics of turquoise. The modern work of this kind is comparatively coarse, and evidently is made of old turquoises, some of which are perforated and were formerly used as beads. The turquoise stones employed are not accurately fitted, and the black gum in which they are embedded shows between the stones. The ancient work (plate XLIV) is much finer and more beautiful than the modern.

Specimen 159850 is a turquoise mosaic set on wood, but it was so broken that it was impossible to tell what its form was.

The specimen shown in figure 42 is an elongated gorget of wood with shell and turquoise incrustation; it was found at the Cheylon ruin, and is one of the most beautiful of prehistoric mosaics. Figure 43 shows a pear-shaped pendant made of bone with turquoise mosaic on one side and incised chevrons on the opposite. It is perforated at the blunter end as though for suspension. The specimen was taken from the Cheylon ruin, and is unique. The collection contains also a number of fragments of turquoise and other stone mosaics, and of catlinite and turquoise embedded in gum on wood. These were from the Cheylon ruin. Many other square turquoises, evidently formerly parts of a mosaic, were collected at the same ruin.

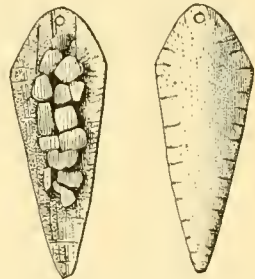


FIG. 43. Bone ear pendants from Cheylon (number 157852). Length about 2 inches

The specimen shown in figure 43 was found near the mastoid process of the skull of a woman. It was evidently an ear pendant, one attached to the ear by a string. Two other specimens of bone incrustated with stone mosaic were found at Cheylon.

One of the most beautiful examples of mosaic was a worked shell of *Pectunculus giganteus* covered with turquoise stones embedded in pitch. It was found on the sternum of a skeleton from Chaves pass, and was buried several feet below the surface of the ground. Plate XLIV shows two views of this unique and precious specimen, one from above and one from the umbo of the shell. In the former

a median rectangular fragment of red jasper is shown, and in the latter appears the hole by which the ornament was formerly suspended. The latter likewise shows legs, suggesting a frog, turtle, or toad. The arrangement of the lines of turquoise on the opposite rim, obscurely seen in the upper view, has been regarded as representing the hind legs of the same animal. The technic of this mosaic recalls work of the same general character on dirk handles and masks from Mexico.

Several additional specimens of similar stone mosaic on shells were found, but these were much broken and impossible of restoration. The mosaic frog was broken when found, but the anterior end was entire and still clinging to the shell when dug from the ground.

A summary of the specimens of mosaic collected is given with their catalogue numbers in the following list:

Number	Article
(1740)	Squared fragments of turquoise formerly incrustated on shell
157849	Square lignite pendant for ear, with turquoise in each corner and middle
159850	Pendant of wood incrustated with stones
157852	Pyriiform ear pendant of bone, with turquoise incrustation
158068	Fragments of a mosaic of turquoise and other stones
157848	Fragments of stone mosaic on wood
157932	Fragments of stone mosaic on wood
157851	Mosaic frog, toad, or turtle

#### LIGNITE ORNAMENTS

One of the common uses of lignite was that of ornament. The specimen represented in figure 44 is a square ear pendant, taken from near the mastoid process of a human skull in the Cheylon cemetery. It is made of lignite, nicely polished and accurately squared. In each corner and in the middle on one face irregular turquoises are set in depressions, while on the obverse, near the middle, there is an eyelet in the substance of the pendant. The button-shaped gorget shown in figure 45, unfortunately broken, was flat on one side, and convex on the opposite, which was smoothly polished. The striae across the flat side suggest the polishing stone, and the perforations point to suspension by a string or thong. This is one of the best formed lignite buttons in the collection, but ruder forms have been taken from other ruins.



FIG. 44. Lignite ear pendant from Cheylon (number 157849). Natural size.

Unworked fragments of lignite are rare, and the material appears to have been brought to Cheylon from some distance, although it is common in the rocks near the modern Hopi villages.

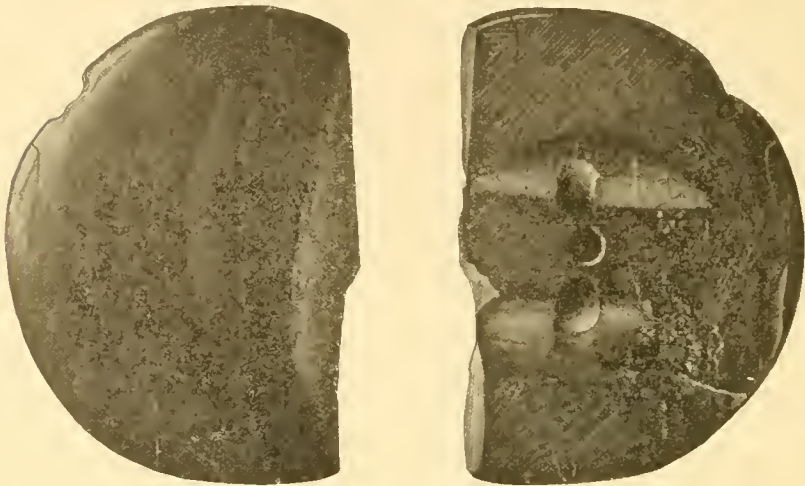


FIG. 45. Lignite gorget. Slightly reduced.

#### SHELL ORNAMENTS

The collections made in the summer of 1896 were particularly rich in ornaments made from marine shells. The largest number of these were found in the ruins at Cheylon and Chaves pass, although a considerable number of specimens were collected from the ruins of the Homolohi group.

The shells used in making these ornaments belong to the Pacific coast fauna, and no doubt came through barter to the people who once inhabited the towns of the Little Colorado, for it is well known that there was a considerable trade in early times in these shells, and long trips were taken by the Pueblo Indians for trade purposes.

The intercourse of northern and southern peoples of Arizona through trading expeditions continued to quite recent times, but judging from the number of specimens which were found in the ruins it must have been considerably greater in prehistoric times than it is at present. In fact, much of the decline in this traffic is probably to be traced to the modification of the southern Arizonian aborigines and the introduction of new ornaments by the whites.

One of the most highly prized of these marine shells was a species

of *Pectunculus*,<sup>a</sup> which was worked in many shapes, or preserved in practically the same form as when taken from the sea. A number of these were very fresh looking; others were more or less decayed.

Some of the most characteristic specimens are shells with round holes in the middle. It would appear that these are ornaments; and as one of these objects was found near the wrist bone of a man it was judged to be a wristlet. It is suggestive that these perforated shells were generally found in pairs, as though belonging to some dual organ.

Five specimens of perforated *Pectunculus* shells were found at Chaves pass (one of them a fragment smeared with gum), and the same number at Homolobi.

*Pectunculus* shells were worked into armlets, or large rings,<sup>b</sup> by cutting out the whole middle of the shell, leaving the rim, which was ground to a smooth surface. The umbo was carved into a shell-shaped elevation, and the surface was often incised with characteristic designs. The following specimens were found:

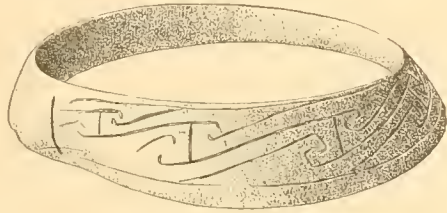


FIG. 46. Incised armlet from Cheylon (number 157843). Diameter about 3½ inches.

Number	Locality and description
157824	Chaves pass: 3 specimens
157659	Chaves pass: 2 specimens
157704	Chaves pass: found on a humerus
157295	Cheylon: with inserted turquoise
157843	Cheylon: with incised design
156760	Homolobi: 2 specimens
157902	Homolobi: fragments

There are also several fragments from an unknown locality.

As a rule, the surface of these armlets is smooth and without ornament, but one specimen (figure 46) was beautifully decorated with a characteristic incised fret covering the whole outer surface. The design consisted of a series of lines interlocking at extremities, though not joining. This figure is one of the simple forms of a characteristic decorative motive widespread over the whole pueblo area. In its simplest expression it appears as two crescents turned in opposite directions, with the two horns adjacent. It is thus painted on the breasts of certain kateinas (personations of supernatural beings), and

<sup>a</sup> The following specimens were taken from Homolobi, Cheylon, and Chaves pass: Number of specimens, 114; incrustated with stone mosaic, 1; incrustated with pitch, 1; armlet, incised, 1; armlet, inlaid with turquoise, 1; armlets, not ornamented, 10 (many additional fragments); wristlets, 44 (many additional fragments); finger rings, 30 (many additional fragments); fragments incrustated on wood, 2; carved in imitation of frog, 1; shells not worked, 3; shells with medial perforation, 20.

<sup>b</sup> Popularly but erroneously called "earrings."

on shields, or is cut in pictographs. But it is in decoration of pottery that this simple form reaches its highest modification and complication, and it is remarkable how many complex figures can be reduced to this simple type. The horns of the two crescents may elongate and develop into square frets or spiral extensions, and these in turn may be continued into triangular appendages with dentate or serrate margins. They may become terraced figures, their edges so closely approximated as to be separated by zigzag intervals, which in all cases are but the space left by the break. With all these modifications, no matter how complicated, the motive can be reduced to the two horns of adjacent crescents opening toward each other, but not joining. The break is comparable to that in encircling bands drawn on pueblo pottery, called the broken lines or "lines of life." Consider such a line about a vase, bowl, or jar to be broken at several points, or, as the author found in several instances, to have three breaks, and the ends so extended as to overlap the intervals either above or below; modify the extremities thus extended into terraced figures, spirals, or

frets, and we have some of the developments of this most characteristic of all motives in the geometrical designs of decorated Pueblo pottery. This broken line, with its modifications, is used almost universally as a decorative motive by Pueblo potters, ancient and modern, whether living in pueblos, cliffs, or caves. The design on the

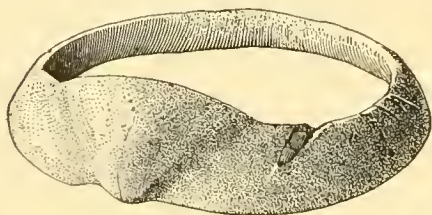


FIG. 47. Armlet with inlaid turquoise, from Cheylon (number 157295). Diameter about 3½ inches.

armlet shown in the figure is a modification of the same motive.

A single specimen of armlet, shown in figure 47, has a turquoise set in the outer surface near the edge. The stone was probably fastened there with pitch, the armlet being the only specimen of shell inlaid with turquoise in the collection.

The wristlets were made of the same genus as were the armlets, but from smaller specimens. A number of these ornaments were found in some instances encircling the radius and ulna. The majority were from Chaves pass. Twenty-nine complete specimens were secured here, together with many fragments, and one specimen was found at Homolobi.

Bracelets made of this shell are smaller, slighter, as a rule less carefully worked, but more abundant than the armlets. The majority are perforated at the umbo, but the valves are so ground down that there remains no space for the heart-shaped elevation; indeed, the thickness of the shell would not admit of it. Like the armlets, they are sometimes found free in a grave, as though cast there as a votive offering, but there can be no doubt that they were bracelets, for in



more than one instance the author has taken them from the bones of the arm. Similar specimens often have been described as ear pendants, and they may in some instances have served for this purpose, but all of these objects found in the Little Colorado river graves were bracelets.

A number of finger rings made from small specimens of *Pectunculus* were found at Chaves pass.

Two fragments of *Pectunculus* were fashioned in the shape of gorgets. One of these, from Cheylon, was perforated with two holes; the other was crescentic, with a single perforation. The latter was found in a grave at Cheylon.

Unworked specimens of *Pectunculus* were not numerous, but three were found at the Chaves pass ruins, and one at Cheylon. In this connection may likewise be mentioned a clay imitation of a *Pectunculus* shell from Kisakobi, the site of old Walpi.

Two specimens from Chaves pass were smeared with a tenacious pitch and probably formerly incrustated with turquoise, squared fragments of which were found near by.

Three species of *Conus* (*C. fergusonii*, *C. princeps*, and *C. regularis*) were found in prehistoric graves. These were favorite shells for the manufacture of rattles, and they are still used for that purpose by the Hopis. The spire was ground away on a plane at right angles to the lip, making a conical object perforated at the apex. The larger specimens (see figure 48) were probably tied to a short crook, and were used as rattles with which to beat time to the sacred songs. Smaller specimens, found in great numbers on some of the skeletons, served as tinklers, and were apparently tied to garments of the deceased in much the same fashion that the tin cones are appended to the kilts of Snake priests in the Snake dance.

The number of specimens of *Conus*, especially of *Conus princeps*, was large, and the majority were found at the ruin in Chaves pass. One of the best preserved of the specimens is shown in figure 48. This was probably a part of an ancient rattle, and the cut shows the hole which formerly served as the place of suspension. Several of the smaller specimens were found near the pelvis of a skeleton, as though they were formerly tied to kilts, as is suggested above.

A single specimen of the *Turritella* shell was found at the Cheylon ruin, but with the exception of a perforation near the lip it was not worked. At the present day *Turritella* is so highly esteemed that specimens of it are attached by a string to several of the *tiponis*, or *palladia*, of religious societies.

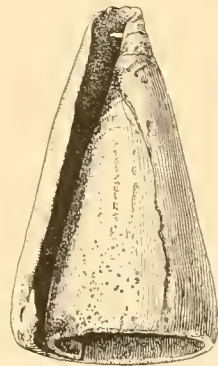


FIG. 48. Shell used for rattle, from Cheylon (number 157847).

Haliotis shells were prized by the ancient Hopi pueblos, and are still highly regarded and used for decoration among the modern Tusayan Indians. Three specimens were found at Chaves pass. These were entire, though very much eroded, when they were dug out of the earth. They were the largest and most beautiful specimens of Haliotis which the author has seen from ancient Arizona ruins. Several fragments of this shell were found, all apparently worked, two being perforated for suspension.

A Strombus shell from the Chevlon ruin has a ring of pigment about the umbo, but one from Chaves pass is undecorated.

FIG. 49. Shell ornament from Homolobi (number 156391).

One of the most highly prized for ornamental purposes of all Pacific coast shells was *Cardium*, which made its way by barter in prehistoric times throughout all the New Mexican and Arizonan pueblos.

Figure 50, from Chaves pass, was a nicely carved imitation of a toad or frog. A somewhat smaller shell carving in the form of a frog is figured by Holmes in a former report of the Bureau of American Ethnology.

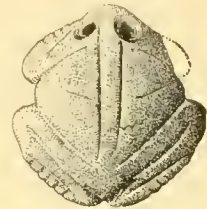


FIG. 50. Shell frog from Chevlon (number 157833). Length about  $1\frac{1}{2}$  inches.

The fragment of a shell which the author is unable to identify was found at the Chevlon ruin (figure 51). The figure was elongated, with two lateral extensions arranged in pairs on each side, and suggested a highly conventionalized animal.

The author has no suggestion to make in regard to its former use, and only two specimens of shell carved in this shape were found by him.



FIG. 51. Shell object from Chevlon (number 157251).

Besides these more common shells, many specimens of *Melongena patula*, *Oliva angulata*, and *Oliva biplicata* or *hiatula* were obtained.

The crescentic shell ornament shown in figure 52, which was evidently hung to some part of the body by the hole midway in its length, may have been a gorget, or possibly a pendant for a necklace. Its form is unique.

In addition to the specimens of sea shells which preserved enough of their natural form to render identification possible, the author collected many



FIG. 52. Shell gorget from Chevlon (number 157850.)

fragments of unknown relationship. It is probable that the majority of these belong to some one of the species already mentioned. Of unidentified fragments perhaps the most numerous were shell

beads, of which there were many hundreds. Some of these were large and of coarse make, but others were so minute that it remains a marvel how they could have been manufactured with the rude implements a stone-age people had at its control. In some instances the perforations were but a trifle larger than the diameter of a fine needle, with rim not over a sixteenth of an inch wide. The thickness of these beads was not greater than that of paper.

All the species of shells which were found in ruins belong to the molluscan fauna of the Pacific, and are still used for ceremonial or ornamental purposes in modern Hopi pueblos. A majority of these have been collected in cliff houses and cavate dwellings, and likewise occur in even greater numbers in the ruins along the Gila and Salado rivers in southern Arizona. Not a single specimen was found which could be traced to the Atlantic watershed, but the source of all was the Pacific ocean, or, what is practically for our purposes the same, the gulf of California. Still more significant is the fact that the art upon them—the symbolism with which they are decorated—is identical with that on the pottery of the ancient sedentary people of southern Arizona.

It may be said that the simple existence of these shells in the ruins from the Gila valley to modern Tusayan can be explained on the theory of barter, and that their distribution does not prove racial kinship of former owners is self-evident. The theory that the same symbolism and treatment of the material originated independently can not be seriously urged in this case. While there is no proof one way or the other that these shells were worked by the people who lived in the ancient ruins, it is probable that the ancestors of the Hopis may have brought them in their migrations from the south. That the culture came to Tusayan from the south appears probable, and Hopi traditionalists claim that not only their culture, but also the ancestors of certain component clans of their people came from that direction into Tusayan. So far as archeological researches bearing on this problem are concerned, they verify the claim that the remote ancestors of the Patki people of Tusayan formerly inhabited the Gila-Salado drainage area, and were closely allied to the Pimas, or some other tribe of that slope.

#### BONE IMPLEMENTS

The collection of bone implements was large and varied in character. In the specimens from Chaves pass, where, from the nature of the country, antelope were abundant, we find a large number of bone implements made of the leg bones of the Cervidæ (see figure 53), but in the ruins of the Little Colorado, that is, Homolobi and Cheylon, bird bones commonly formed the material from which they were made, and few large bone awls were found.

The only specimen of a carved-bone implement is shown in figure 54. It was made from the bone of a deer or antelope, and has a quadruped carved on one end, the head and legs being well represented. The specimen is one of the few found at the small ruin of the Homolobi group near the bank of the Little Colorado, about four miles from Winslow.

The general form of one of the small bone awls is shown in the



FIG. 53. Bone awl from Chaves pass (number 158047).

accompanying cut, figure 53. As a rule, the bone of which they are made is so worked that the rounded end fits the palm of the hand and the sharpened extremity is continued to a needle-like point. These awls are made of the bones of different animals, of which the turkey is the most popular. They were probably used in ancient times in sewing or darning fabrics, possibly in weaving. The modern



FIG. 54. Carved bone awl from Homolobi (number 157866)

Hopis used a few years ago in weaving a bone awl not very unlike that figured above, but of late they have adopted an iron implement.

At Chaves pass seven small bone awls were found, at Homolobi five, and at Cheylon four.

Sixteen needle-like bone implements with eyes were found at Homolobi; fifteen were obtained at Chaves pass, and three at Cheylon.



FIG. 55. Bone implement from Chaves pass (number 157867).

Another bone implement that was common at the Chaves pass ruins was shaped like a bodkin. Thirteen specimens were found.

A number of bone tubes, some of which were perforated and others not, were found in the excavations. Some of these tubes had holes in the sides, diametrically opposite, and were identified as bird whistles. One of these resembles the whistle still used in ceremonials connected with making medicine in the modern Tusayan rites.

Five specimens of small half-tubes showed evidence of having been attached in pairs, as the marking of the binding string on the bone is still visible. These were probably whistles, the noise being made by a thin edge.

There are several bone tubes which resemble "bone implements" found by Nordenskiöld in the cliff houses of the Mesa Verde, where they are considered "beads made of the humerus of a large bird, probably the turkey."<sup>a</sup> Possibly the tubes from Chaves pass may likewise be beads, which, however, is not the case with the Mesa Verde specimens. In the account of the excavations at Sikyatki similar bone beads, found about the neck of one of the skeletons, are mentioned.

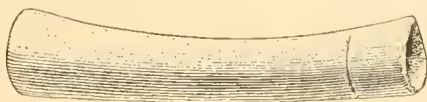


FIG. 55. Bone tube from Homolobi (number 154898).

Sixteen of these bone tube-like objects were secured at Homolobi, three at Chaves pass, and one at Cheylon.

In addition to the common forms of implements already described, many other specimens were obtained. Some of these were too fragmentary to make possible an identification of their former uses. Of these miscellaneous bone implements, eighteen complete specimens and several fragments were secured from the ruins at Homolobi. A very few objects were found at Chaves pass and Cheylon.

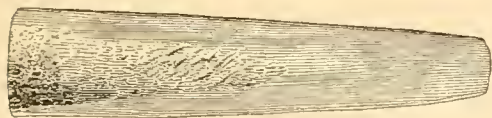


FIG. 57. Stick used by stick swallower, from Cheylon (number 154076).

The specimen shown in figure 57 is one of the most interesting bone objects in the collection. It is made from a deer or antelope leg bone, is flat on one side and rounded on the opposite, and tapers to a sharp edge at one extremity. It was affirmed by one of the workmen employed by the author that this is the shaft of one of the sticks used by the stick swallowers in their ceremonies.

#### TURTLE CARAPACES

Near one of the skeletons in the cemetery at Cheylon were found two circular objects made of the carapace of a turtle belonging to the genus *Chrysemis*, but not the indigenous species. One of these was perforated (see figure 58) and the other was not, but when found both were in four fragments—not broken, but having fallen apart at the sutures. The faces were ground smooth and the whole form had been considerably changed. These disks may have been spindle whorls.

<sup>a</sup>The Cliff Dwellers of the Mesa Verde, Stockholm, 1893, pl. XL, fig. 22.

## HORN OBJECTS

Two fragments of bone or horn for which the author is unable to assign any use were dug up at Chaves pass. One of these was perforated, and had a number of indentations on the edge imparting to it the appearance of a fire board. It may have been used in kindling fires.

Two fragments of deer horn were found in one grave. These were more or less worn, and one of the Hopis is responsible for the information that chips of similar horns are at the present day drunk with water as a medicine. "The deer," he says, "has a good heart."

## PIGMENTS

The custom of placing a small earthen vessel with different colored pigments with the dead was practiced by the people of Chaves pass, Cheylon ruin, Homolobi, and Old Shumopovi. The pigments used were the same as those now employed, and had apparently the same ceremonial significance. As these substances are now highly prized, and as there is every reason to suppose that they were regarded in the same way in ancient times, the burial of pigments with the dead may have been of the nature of a sacrifice.



FIG. 58. Disk of turtle shell, from Cheylon (number 157841). Diameter nearly 3 inches.

Some of the modern Shumopovi Indians begged for fragments of green carbonate of copper which were found in the graves of their ancestors, for use in painting their

ceremonial objects and for other purposes.

Specimens of red paint (sesquioxide of iron), blue paint (azurite), green paint (carbonate of copper), and white paint (kaolin) were found at the various ruins visited. Some were ground, while others were in lumps occasionally in the form of a cylinder or disk.

In his account of the ruins of Sikyatki the author called attention to objects in the forms of disks, cylinders, and the like, which were found in cemeteries of that ancient pueblo. Their uses were said to be problematic and he now has to record the finding of other objects of the same nature and form which are equally enigmatic (figure 59). One of these from Homolobi is a hemispherical fragment of kaolin,

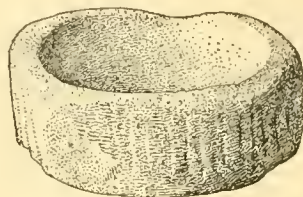


FIG. 59. Kaolin cup from Chaves pass (number 157928).

recalling those exhumed from Sikyatki; there was also a cylindrical object of the same material from the Cheylon ruin, but the most exceptional specimen was a disk-formed object of kaolin with a depression in one side, resembling a small mortar. These various forms into which the easily cut kaolin is worked would seem to have served some important office, the nature of which is unknown to the author. Kaolin at the present day is used for whitening cotton blankets, sashes, and kilts, and for painting the bodies and limbs of those who participate in sacred festivals. Possibly some of these fragments are simply pigments.

#### CLOTH

Considering the number of graves opened in the course of the excavations, it is remarkable that so few specimens of cloth were found. This may be ascribed, not to the poverty of the inhabitants of the ancient villages in woven fabrics, but to the rapidity with which cloth decays in the moist soil. One or two of the specimens which were found were preserved by the copper carbonate with which they were

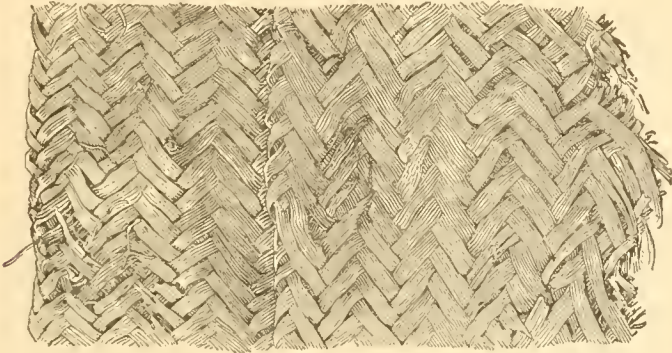


FIG. 60. Matting from Cheylon (number 157912). About 5 by 2½ inches.

in contact, but the fragments were small and the manner of weaving difficult to discover. From one of the specimens it appears that the hair of some animal was used, and there is no doubt from others that yucca fiber was extensively employed. The impression of string was observed on several sticks, but the string itself was too much decayed for identification.

Two fragments were discovered at Homolobi and one at Chaves pass.

#### MATTING

It appears that the bodies of the dead, especially at the Cheylon ruin, were wrapped in matting, fragments of which were in many instances well preserved. This matting was a loosely woven fabric, made of vegetable fiber which the author is unable to identify, and

was most abundant in the Cheylon ruin. It does not appear to be common in the interments at Chaves pass, and was only sparingly found at Homolobi.

In the accompanying cut (figure 60) a portion of one of the best specimens of this matting is shown as a type. The specimen from which this fragment was taken is large, ample enough to cover the head and parts of the shoulders.

#### BASKETRY

The specimens of basketry found in the ancient burial places were of two kinds, one corresponding with that now made at Oraibi and

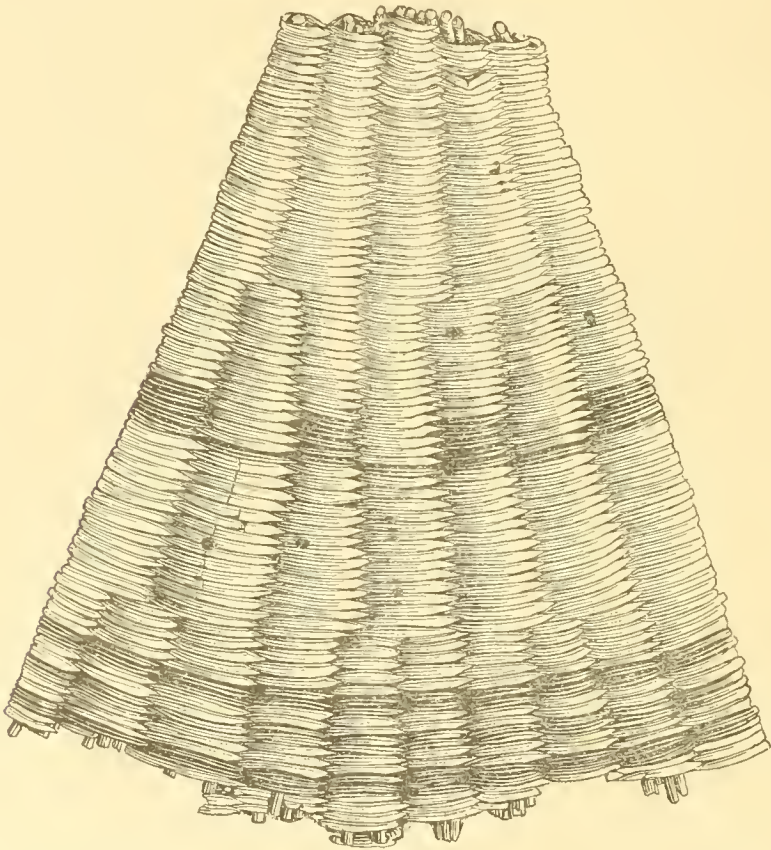


FIG. 61. Basketry of Oraibi type, from Cheylon (number 157918). Length about 5 inches.

another similar to the basketry of the Middle mesa. It was the custom to bury these objects with the dead, as is still a common usage in Tusayan, as receptacles for food and as other mortuary offerings. These baskets were ornamented with woven patterns, and in some instances were covered with a thick layer of green, blue, or red paint. In form they were generally plaque-like, but one of the specimens



which was almost entire was deeper and basket-like. All were browned with age, and the majority of specimens were fragmentary.

One of the best specimens of the Oraibi style of basketry is shown in figure 61, which represents a sector of a plaque in which the colors are still preserved. The manner of plaiting this basket is the same as that practiced at the Hopi pueblo, as is shown by the accompanying cut, figure 62.

The inhabitants of ancient Cheylon were familiar with the method of making basketry by coiling, as at the Middle mesa of the Hopis to-day. There are many specimens of this ancient coiled basketry in the collection, but the specimen shown in figure 63 is one of the most perfect found. The design is the same as that shown on some of the ceramic objects.

One specimen of coiled ware and two fragments were found at Chaves pass, and twelve specimens of coiled ware and two of the Oraibi pattern at Cheylon.

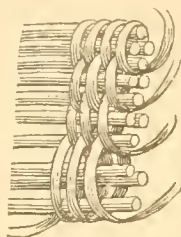


FIG. 62. Basketry of Oraibi type, showing manner of plaiting.

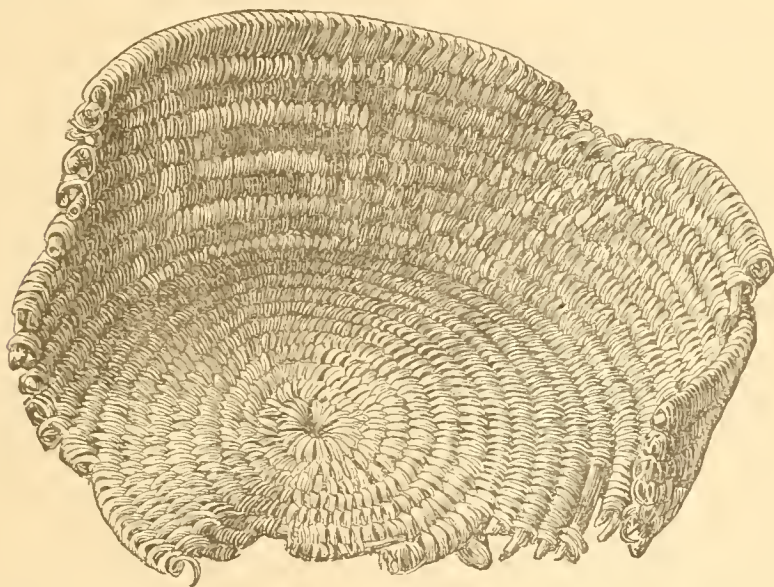


FIG. 63. Basketry of coiled type, from Cheylon (number 157915). Diameter about 5 inches.

#### PRAYER-STICKS

Several forms of prayer-sticks, or pahos, were collected from the different ruins in 1896, but the majority were so decayed that their original forms were unrecognizable.

Small prayer-sticks painted green were found at Shumopovi, and these were apparently not unlike those now used in the neighboring pueblo.

The pahos from Chaves pass were painted bright blue, the pigment used being azurite. These had a single stick as long as the arm, between a half inch and an inch in diameter, and were apparently laid by the side of the body when buried, in some instances resting on the left arm. So thoroughly decayed, however, was the wood of which they were made that it was difficult to take an unbroken specimen from the earth.

An unusual form of paho was found in a grave at Chaves pass. It consisted of a wooden disk with a short handle, and was not unlike a hand mirror. The whole object was painted green, with an obscure figure in red on one face. The disk was perforated in the middle, and there were markings or impressions of feathers on the green pigment with which it was painted. In one of the graves a spheroidal wooden object was found, with daubs of pigment upon it, which recalls the squash pahos found in the Awatobi shrine, and has likenesses to the modern prayer eagle eggs made of wood, such as can be found in a shrine at Türkinobi, near Walpi.

The pahos from Homolobi and Cheylon are small, and as a rule are painted green with copper carbonate. They were neither as finely made nor as complicated as those of Sikyatki, where the best ancient prayer-sticks yet found have been obtained. In the Chaves pass graves the prayer-stick was very long and painted blue with azurite or green with carbonate of copper.

The most interesting and exceptional form of prayer-stick collected in 1896 was that obtained at Cheylon. It was disk-like in form, had an attachment at one end or on the rim, and was painted green and decorated with red designs. The author has found no similar prayer-stick in use in any Hopi ceremonial which he has witnessed.

#### BOW AND ARROWS

Almost a complete bow and several fragments of arrows or reeds were dug out of a grave at the Cheylon ruin. These were taken from the same place as the gaming reeds about to be mentioned. The association of gaming implements and the weapons of a warrior in the same grave is highly suggestive.

#### GAMING CANES

One of the mortuary bowls excavated from the Cheylon cemetery contained five half canes (figure 64) which recall those used in the Zuñi game known as sholiwe.<sup>a</sup> These reeds are not, however, marked as are those now used at Zuñi, and differ from those found on a bowl from Shumopovi (figure 74). The author believes, however, that the game in which they were employed was practically the same.

<sup>a</sup>See Owens's figure of sholiwe reeds in *Popular Science Monthly*, May, 1891. According to Owens, four pieces of reed are employed in this game by the Zuñis. The manner of throwing the reeds is clearly indicated by this author.

One or two food bowls were found in which figures of these gaming reeds are painted on the inside of the bowl, as is mentioned later in this report.

#### SEEDS

Many of the food basins contained seeds of maize or squash, and ears of maize from which the kernels had decayed were found in several bowls.

The ears or cobs show that the maize was a small variety, like that found in cliff houses and still cultivated by the modern Hopi farmers. The occurrence of squash seeds in some of the mortuary bowls is important, indicating the ancient use of this vegetable for food. It may, in this connection, be borne in mind that one of the southern clans of the Hopi Indians was called the Patuñ or Squash family, which is still represented at Oraibi and the Middle mesa, although it is extinct at Walpi. Numerous other small seeds too shriveled for identification were found in the mortuary offerings in the cemeteries of Homolobi and Cheylon.

It would seem from the nature of a matrix in which they were inclosed that they had been boiled or cooked in some way.

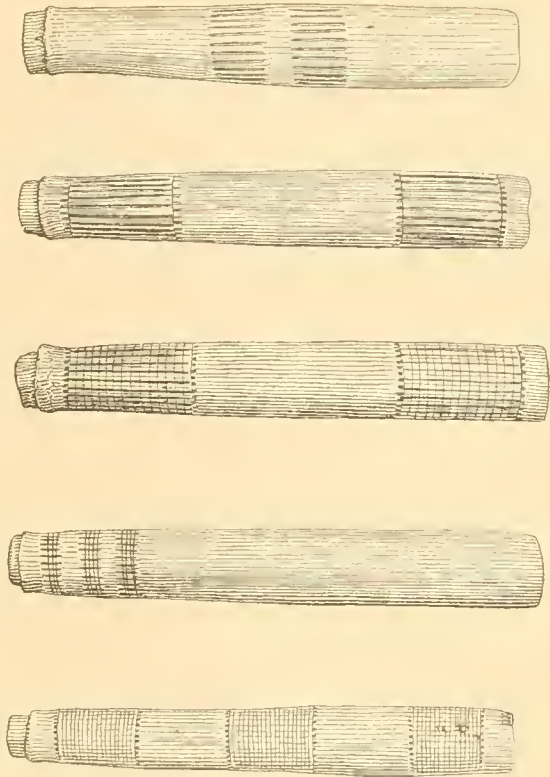


FIG. 64. Gaming canes from Cheylon (number 158030). Length about  $3\frac{1}{2}$  inches.

#### FOOD

Almost every bowl found in the cemeteries contained fragments of what appeared to have been food, but in most instances this was too much destroyed to be identified. It was ordinarily in the form of a thin film coating the interior of the bowl, and was penetrated by roots which had found their way from the surface of the ground. There is little doubt that in some instances this food was one of the many kinds of corn bread so common among the modern Hopis.

## STONE IMPLEMENTS

In the type "pounding stones" are included stone implements, ordinarily of small and medium sizes, showing marks of battering at one or both ends. Apparently they were not attached to a handle, and the indication is that they were simply held in the hand when in use. With these pounders various substances were bruised, pigments were ground, hide was made more pliable, and similar processes

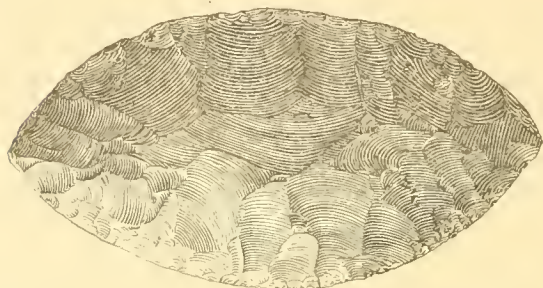


FIG. 65. Stone implement from Homolobi (number 157895). Length about 6½ inches.

were effected. Any rounded stone convenient to handle appears to have been taken for this purpose. At Homolobi thirteen stone objects were found which were doubtless used as pounding implements, at Chaves pass four, and at Cheylon two.

Stone axes were even more common. At Homolobi twenty-four specimens were found, at Cheylon two.

Several weapons made of a black stone, one of which is shown in figure 65, were collected at Homolobi. These were evidently either celts or spearheads, for there was no sign of hafting or of polishing, and marks of fracture were apparent.

The specimen represented in figure 66 is of white stone, possibly aragonite; it was the only weapon of this material which was found. The shape is regular and the surface smooth, and there is a groove for a handle. It has four grooves cut on one edge and incised crosses,

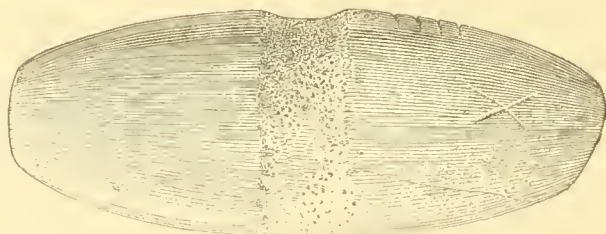


FIG. 66. Stone ax from Homolobi (number 157024). Length about 7 inches.

two in number, one of which is shown in the cut. No indication of a handle accompanied this implement, which leads the author to suppose that that part was of wood, which had long ago decayed.

There were several stone implements with a cutting edge on one side which were probably used as knives. These are sometimes curved, but generally straight. The best stone knives are two from the Cheylon ruin.

Several of these knife-like objects had dentate edges, as though used for saws.

The author has elsewhere noted the frequency with which fragments of obsidian, and chips from the same, occur in ancient Pueblo graves, or on the surface of mounds, indicating ruins. The three sites of explorations in 1896 were not exceptional in this particular, and a somewhat limited amount of material of this nature was collected at Homolobi, Chevlon, and Chaves pass. This material was prized in ancient times for arrow points, spearheads, and knives, and the sharp edges of many of the chips were probably used for cutting.

Arrow points were found in large numbers at the various ruins visited on the Little Colorado.

The present Hopi Indians use a grooved stone for polishing arrows. These stones are ordinarily of a coarse sandstone, which acts as a file on the wooden object rubbed back and forth in the groove. Similar polishing stones are very common in ruins, assuming a number of shapes, and made of several different kinds of rock—as sandstone, lava, slate, and even clay. It is probable that these stones were used for the same purpose as those employed in the modern kivas, as their form has not changed from ancient times.

The differences in the polishing stones from the ruins at Homolobi, Chevlon, and Chaves pass were not very great, as the simplicity of the implement admits of but few varieties. Those from Chaves pass were made of lava, which occurs only rarely in the other two ruins. There were double- as well as single-grooved polishing stones, and shallow- and deep-grooved ones. It is possible that some of the perforated stones may have been used as polishers for arrows in much the same way as the modern grooved stones are employed. One of these arrow polishers had the shape of an animal, and was narrowed to a head at one end. On this end was cut a mouth and two depressions in the proper positions for eyes. The surface of the stone on the side opposite that occupied by the groove was flat and smooth, so that the object could be firmly placed when in use.

It appears to have been a mortuary custom among the people who lived in the ancient pueblos along the Little Colorado to deposit with women and girls at death a metate and its grinder. These were ordinarily reversed when buried, as though symbolic of the death of the one who formerly used them. In one of the Homolobi graves three of these metates with their corresponding hand stones were found, and these were added to the collection. They were made of rocks of different degrees of smoothness, and were evidently formerly used in grinding corn in the same way as in modern Hopi pueblos. The maize was bruised and roughly ground on one of these stones, then it was passed to a finer-grained one, and ultimately to the finest of all. These metates were much worn, showing long and constant use.

Many large and very heavy metates made of lava rock were found at Chaves pass, but these were not brought to the railroad. Several of these were worn so deep in one face as to form troughs. If there were no other evidence of long occupation of this ruin the deeply worn metates would furnish it. These metates were bulky, and were quarried in the bad lands of the vicinity of the old pueblo. It is instructive to note that metates, rather than smaller and more portable stone objects, show the influence of geological environment, for as a rule their size requires that they be made of the rock contiguous to the ruin. Sandstone metates are commonest in the valley ruins, lava in those built of lava rocks. The same is true of the stones of which the walls of the ancient habitations were constructed.

The material of the grinding stones is the same as that of the metates. They are for the most part simple elongated slabs, sometimes with depressions along the sides to enable the manipulator to obtain a stronger hold. Like metates they show the effect of wear on one face, being generally rounded on the upper surface. Several of these stones are double faced, or when seen in profile they are triangular. These specimens, which are of softer and finer rock than the others, were undoubtedly used in the last stage of grinding the kernels of corn into fine meal. Ten of these meal grinders were found at Homolobi and Cheylon.

Stone implements of mushroom form are among the interesting objects obtained in our excavations. These are well adapted for paint or pigment grinders.

The mortars in which paint is ground are ordinarily small stone slabs with a depression in one face. These are sometimes rectangular in form, often circular, and the depth of the depression varies, being frequently very slight. The same variety of paint mortars is in use to-day, and many of these stone objects now used in the kivas are no doubt very ancient. The small stones with one flattened face were doubtless used as grinders; in some instances they are much worn. The list of paint mortars includes two from Homolobi and three from Cheylon.

#### STONE SLABS

The use of slats or slabs of stone decorated with figures painted in various pigments has been described in accounts of several Hopi altars. One of the most remarkable of these is probably the stone called the *Hokona mana*, or Butterfly virgin, which is used in the construction of the Antelope altar at Walpi. Two flat rectangular stones stand back of the sand picture of the Antelope priesthood in the Snake rites at Shumopovi, while the use of similar stones in the various Flute altars may be seen by consulting articles on these rites.

Of a similar nature, no doubt, is the painted stone slab shown in plate XLVI, found in a grave at the Cheylon ruin. This object, which is much larger than any of those which have been mentioned, is painted

on both sides with highly suggestive designs of a symbolic nature. The decoration on one side is almost wholly obliterated, but on one corner we detect clearly the modern symbols of the dragon fly. The pigments with which this stone is painted were easily washed off, and this accounts for the loss of the decoration on the surface which was uppermost as it lay in the grave over the body. The design on the other face, however, is more distinct. It consists of three triangular figures inclosed in a border, recalling a sand mosaic such as is used in modern presentations of the Hopi ritual. Two colors, black and white, are readily detected in the border—the black outside the white. The field inclosed by this border is yellow, and the three triangular figures are black, with inclosed rectangles, which are white. At the apex of each triangle there is a rude figure of a bird painted red, in which the head, body, and two tail feathers are well differentiated.

The whole character of the design on this stone calls to mind the decorations on the walls of a kiva of a cliff dwelling of the Mesa Verde, described by Nordenskiöld, and figured in his beautiful memoir. In the designs on the kiva wall of "ruin 9" we find groups of three triangles arranged around the whole estufa at intervals on the upper margin of a dado, and each of these triangles is surrounded by a row of dots. The field on which they are painted is yellow, and the triangles and dots are red or reddish brown. On a wall of Spruce Tree house Nordenskiöld found a similar dado with triangular designs, and it is interesting to note that in the figure of this ornamentation which he gives rude drawings of birds appear in close proximity to the triangles.

The interpretation of these figures must be more or less hypothetical. The custom of ornamenting house walls with a series of triangles on the upper margin of a dado is still observed in the modern Hopi villages, where, however, the position of the triangular designs is reversed as compared with that of those on this stone slab.

The triangle is a symbol of the moth or butterfly, which, while appropriate on women's blankets or house walls, would hardly appear to have special significance on the slab in question. Still, as has been pointed out, one of the most venerated objects on the Antelope altar has the figure of a butterfly upon it.

Much more likely is it that these three triangular figures surmounted by birds are rain-cloud symbols, and that this slab of stone was formerly used in a ceremonial which had for its object rain making, and to this conclusion the dragon-fly symbols on the reverse side also point. This stone is an altar slab with rain-cloud symbols.

In the Cheylon ruin the author found several flat stones, one of considerable size, which were marked with blackened circles. The largest of these, fully 3 feet square, was not brought to Washington, and the photograph which was made of it soon after it was

removed from the grave was a failure. These circles, apparently made by smoke, are of unknown origin and use. On the largest stone they are arranged in two rows, four in each row, the peripheries touching. The stones were inverted when found, and occurred in the cemetery at Chevlon only.

Many graves at Chevlon and Homolobi were, as has been stated, indicated by upright stones or flat slabs of rock. As the digging went below the surface it was sometimes found that the skeleton was covered by a similar flat rock, and in a limited number of cases these rocks were perforated. The holes were sometimes not larger than a broom handle, often capacious enough to permit the insertion of the arm, and in one instance a foot or more across. Oval, round, and rectangular orifices were found, and in several cases a considerable amount of labor must have been expended in making them.

Slabs with the smaller circular holes were also found in the floor of a room where there was an intermural burial. Explanations more or less fanciful have been suggested for these perforated stones, one of which was that the rock had been placed above the body and the hole in it was for the escape of the soul or breath-body. The slabs were found above the bodies of several deceased Homolobeans, and the modern Hopi interpretation of the perforation is offered for what it is worth.

#### DISKS

Small disks were found in all the ruins which were studied, and while these had like forms they were made of various substances, as of stone, pottery, and shell. They are generally circular in form, rarely perforated, and often ground on their edges. The unperforated specimens are supposed to have been formerly used to cover a hole in a jar in much the same way as similar fragments are now used in flower-pots. The perforated specimens were probably used in much the same way as wooden disks are employed in modern pueblos, as parts of drills for perforating stones, shells, or other hard substances. The specimens of this problematic group of objects, and the localities from which they were gathered, are mentioned in the appended list.

Number	Locality and material
158056	Chaves pass; stone
157706	Chaves pass; red pottery
158079	Chaves pass; red pottery
158078	Chevlon; red pottery
158080	Chevlon; red pottery
157963	Chevlon; stone
156480	Homolobi; pottery
157965	Kisakobi; pottery
158093	Little Colorado ruins
158164	Jeditoh; shell
158165	Jeditoh; shell
158060	Chaves pass; galena
158095	Chevlon; wood



## FETISHES

The number of graves in which smooth, waterworn stones, quartz crystals, and fossil cephalopods occur in other ruins has been noted in the account of Awatobi and Sikyatki. A considerable number of these objects were found in the Little Colorado ruins; the fossils included a tooth and remains of several crinoids and of an ammonite.

Similar objects are still used in Hopi ceremonies, and it is well to call attention to the fact that some of the priests begged the author to give them these ancient objects that they might use them in the preparation of medicine and in other sacred or ceremonial ways.

Some of the smooth stones may have been used in polishing pottery, but this can hardly be said of the quartz crystals and the botryoidal specimens.

Fossil cephalopods, called *koaitcoko*, although very common in the rock strata underlying the modern pueblos, are sometimes looked upon by the Hopis with great reverence, and are used in several modern ceremonies. One of the best-known instances is in the *tiponi* of the *Lalakoñti*, described in an account of the unwrapping of that *palladium*, as follows:<sup>a</sup>

The chief priestesses and *Kwateakwa* then untied the bundles upon the altar. They first unwrapped the buckskin thong which bound one of them and took from the top a large number of sticks of different lengths, to each of which numerous feathers were tied. In the midst of these sticks there was an ear of popcorn surrounded by a mat made of eight black feather-sticks tied together. This mat, surrounding the corn, rested upon a cloth. Removing this cloth from the cradle, there appeared below it a nicely folded piece of buckskin painted on the border, with the rain-cloud ornaments painted black, the falling rain being represented by fringes. Within this skin there were many breath-feathers and a single reed,<sup>b</sup> to which feathers were tied. Below the buckskin there were many bean and melon seeds. Within the bundle of breath-feathers there was a fossil shell, fragments of another, and the piñon branch. The basket itself, which forms the cradle, was made of a continuous coil of wickerwork, rectangular in shape.

When the priestess had undone this bundle, the contents of which were considered so sacred that we were not allowed to touch them, she carefully repacked it. She first put in the seeds of beans, corn, and melons, and then a number of breath-feathers. She sprinkled these with metallic iron dust [micaceous hematite] and added a piñon branch (pine needle). On these she placed the cloth in which the fossil shell was tied and the reed with its feathers. Above this she tied around the ear of corn the old prayer-sticks, to which she added a new one which she had prepared. The black sticks were said to be old men and the seeds to be food. The fossils, which are called *koaitcoko*,<sup>c</sup> were found later to be one of the numerous cephalopod fossils abundant in certain places. It was said that these sacred specimens came up from the under world. The contents of each bundle were substantially the same.

It will be seen from this quotation from a description written in 1892 that one of the most sacred objects in the bundles before the *redos*

<sup>a</sup> The *Lalakoñti*: A Tusayan Ceremony, in the *American Anthropologist*, v. 5, p. 121, April, 1892.

<sup>b</sup> This resembled the so-called reed cigarettes used in other ceremonies.

<sup>c</sup> The same name was given for the whole bundle.

of the Lalakoñti altar was a fossil cephalopod, which, so far as could be judged, was of the same species as some of those taken from the Little Colorado ruins in 1896 and from Sikyatki in 1895.

The ceremonial use of fetish stones in modern Hopi rites has been described by the author in several publications, from which the following quotation<sup>a</sup> is taken as one of the most complete:

Saliko brought from her house six ears of corn, a crenellate vessel [medicine bowl], and another bag of fetishes. \* \* \* Saliko took a handful of meal from a tray at the poñya [altar], prayed upon it, and then, kneeling about 4 feet in front of the altar, sprinkled intersecting lines. She placed the crenellate vessel in the center, and then arranged ears of corn upon the lines, beginning at the northwest, where she placed a yellow ear, followed by a blue, red, white, black, and an ear of sweet corn, as shown in the diagram. From her bag she took out six smooth waterworn pebbles, the largest of which was 1½ inches by three-fourths of an inch in size, and placed them close beside the ears of corn. Beginning at the yellow ear, she laid down by it a piece of opaque quartz with a smoky iron streak; at the blue, a piece of the same with a faint bluish tinge; at the red, a piece with a reddish tinge; at the white, a piece of translucent quartz; at the black, a piece of shining black iron ore, and at the last, a crystal of bluish quartz.

Less detailed is the author's description of the use of these rock crystals in another Hopi ceremony:<sup>b</sup>

The priest, Ametola, first made a bed of fine field sand on the floor, and then rapidly traced on the sand three cross-lines of meal, corresponding to the six primary directions. Over their junction he placed a medicine bowl, but not that before the altar. Around the bowl he laid, at the ends of the lines of meal, six ears of corn, with points directed toward the bowl. Beside each ear of corn he placed an aspergill and a rock crystal. Within the bowl he dropped several rock crystals and a little honey.

In the Naacnaiya, or New-fire ceremony, smooth pebbles and quartz crystals likewise play important parts in making medicine:

He placed the first group of six skins upon the meal lines, as indicated in the diagram. He then arranged the ears of corn upon the skins, and close beside them he placed the six pebbles (each having some requisite peculiarity, but no opportunity offered to examine them closely), and finally another set of six skins was deposited upon the right of those first laid down. . . .

Eight songs were sung while he was placing these objects, and during the singing of another group of eight songs the asperser laid the pebbles in the nakwipi [medicine bowl], and then rested the ears on end within it. He then slightly dipped the tail or the distinctively colored end of each bird skin and each feather tip into the water, afterward laying it down in the place from which he had taken it. He also sprinkled pollen in the bowl, and aspersed to the six directions with each ear of corn as he took it out and laid it in its former place. The song was an hour and a half long, and just as it closed the asperser took from one of the chief's bags a quartz crystal. Sucking it, he passed it to a young man sitting near, stitching a kilt, who went up the ladder and reflected a ray of sunlight into the nakwipi, and afterward the crystal was put into the liquid. <sup>c</sup>

In the Niman Kateina (festival celebrating the departure of the kateinas) we find these crystals and medicine stones likewise used

<sup>a</sup> American Anthropologist, v. 5, p. 221, July, 1892.

<sup>b</sup> American Anthropologist, v. 5, p. 117, April, 1892.

<sup>c</sup> Journal of American Folklore, v. 5, p. 192-193.

in mixing the charm liquid, as the author has elsewhere described as follows:<sup>a</sup>

Upon the ears of corn were then laid the nakwiowa, small quartz crystals, elongated, black, pipestem bodies and shell beads. One or two of these were placed on the end of each ear of corn at a point nearest the nakwipi, one behind the other. Two similar quartz crystals were placed in the nakwipi. These sacred stones were laid on the corn in the same order as above mentioned for the ears of corn and aspergills. Intiwa's assistant then took a quartz crystal, one of the nakwiowa, and, standing on the lower round of the ladder leading out of the kiva, held it in the direct rays of the sun and threw the reflection into the water contained in the nakwipi. This ceremony, by which a ray of light from the sun (Dawa) is introduced, was observed in silence. . . . After several strains of this and other similar songs had been sung, Intiwa's associate took up the ear of corn on the north side of the bowl, held its end over the nakwipi, and, pouring water (liquid) from a small spherical gourd upon it, washed off the medicine stones into the nakwipi with great solemnity. . . . After the washing of these stones into the liquid, a song with quicker time and more rapid motion of the rattles was taken up and continued for some minutes.

The above quotations from descriptions of ceremonies, and others which might be mentioned, show how often small waterworn pebbles, or quartz crystals, are used in making charm liquid or "medicine" by the modern Hopi Indians, and the same kind of stones discovered in ancient graves probably had a similar use among the ancients. Indeed, one of the quartz crystals from a grave was appropriated for his altar by a Shumopovi priest.

The use of two small stone cylinders, one of lava (number 157984) and the other of a light gray stone (number 157983) each having a pit or depression in the end, is problematic. Similar shaped stones are sometimes used in modern Hopi ceremonies to indicate the zenith.

Among the fetishes found in Homolobi graves may be mentioned a rude bird made of unburnt clay,<sup>b</sup> the only specimen of animal effigy which was found in all the excavations in 1896. On the surface of one of the mounds of the smaller ruin at Chaves pass, however, the author picked up a small imitation of some unknown animal, which was rudely carved, and reminded him of the so-called "hunting stones," or fetishes, of the Zuñis.

The occurrence of rude effigies of animals in prehistoric Arizonian graves may possibly be interpreted as substitutional sacrifices, and if this interpretation is correct, it would seem that in ancient times birds, which are now represented by effigies, were sacrificed. It is much more likely, however, that these images represent animals which the ancient worshipers desired, and that they were forms of prayer by signatures. Small figurines of domestic animals are made for this purpose at the present day by the Hopi priests.

<sup>a</sup>Journal of American Ethnology and Archaeology, v. 2, 1892, p. 75, 76, 77.

<sup>b</sup>This effigy is very unlike the burnt clay imitations of birds which have been described in the author's account of the ruin Awatobi. It is very rudely made, simply pressed into shape by the fingers, and is without decoration. The Awatobi clay birds are probably used as pendants, while that found at Homolobi appears to be simply a mortuary offering.

## HUMAN CRANIA

A particularly fine collection of crania was obtained in 1896 from Cheylon and Chaves pass. One specimen from the latter place had the facial and frontal bones stained green.

## ANIMAL REMAINS

Although the prehistoric Pueblos of Arizona and New Mexico apparently had no sheep, horses, or cattle, they domesticated several animals, and used many more for food. The bones of these animals occur both in houses and graves—more abundantly in the former, especially in the Homolobi ruins, where the author made a considerable collection of them. They have been identified by Mr F. A. Lucas, of the National Museum, and are as follows:

- Canis familiaris*, domesticated dog; a cranium of the broad-skulled Eskimo type.
- Canis frustror*, coyote; probably jaw and leg bones.
- Felis concolor*, puma; jaw of young.
- Lynx rufus*, wild cat; jaw.
- Taxidea berlandieri*, badger; two claws.
- Cariacus macrotis*, mule deer; leg bones, antlers, and part of jaw.
- Antilocapra americanus*, antelope; leg bones, part of jaw, and horns.
- Castor canadensis*, beaver; collar bone.
- Lepus texianus griseus*, jack rabbit (many specimens).
- Lepus arizonae minor*, small rabbit (many specimens).
- Cynomys*, prairie dog; skull and odd bones.
- Ovis canadensis*, mountain sheep.
- Spermophilus*, ground squirrel; tooth.
- Thomomys*, gopher; skull.
- Corvus corax sinuatus*, raven; wing bone.
- Bubo virginianus*, great horned owl; tarsus.
- Aquila chrysaetos*, golden eagle; claw.
- Buteo borealis*, red-tailed hawk; wing bones.
- Cathartes aura*, turkey buzzard; wing bones.
- Meleagris gallopavo mexicana*, turkey (many specimens—some of young).
- Grus mexicanus*, sandhill crane; wing bones.
- Anas* sp., duck; part of sternum.
- Phalacrocorax* sp., cormorant; 1 bone.

## MISCELLANEOUS OBJECTS

The manner of building the roofs and floors in the Homolobi ruins was practically the same as in the modern Tusayan pueblos. A large number of rafters were taken out of the walls, many of which were in place, while some had fallen in, broken by superimposed weight. In several instances these beams were well preserved; in others they were much decayed. Several fragments of the clay with which the roofs were covered were collected, and in one impressions of reeds were evident.

Asbestos appears to have been considerably prized by the inhabi-

tants of the Chaves pass ruins, and a single specimen was added to the author's collection from these ancient towns.

A few fragments of a bird's egg, too broken to be accurately identified, were collected in a grave at Homolobi. This was possibly an eagle's egg, and it may be mentioned that in certain Hopi ceremonials at the present day imitations of eagles' eggs made of wood are at times placed in modern shrines. The author has no knowledge, however, of a modern mortuary use of birds' eggs, but suspects that the egg of the turkey, which we know was domesticated by the ancient pueblo people, may have been eaten by them. If this supposition be well founded, the fragment of birds' eggs in a grave at Homolobi may be a remnant of food offerings.

A single specimen of galena was taken from a grave at Chaves pass. This mineral was probably used as a pigment, but it is not common, and is not used by the modern Hopis in painting the body or any of their ceremonial paraphernalia.

A small copper bell was found in a grave at Chaves pass. This object is shown in figure 67, from two faces. It was apparently formed of beaten native copper, but the eyelet would seem to indicate a knowledge of soldering. One side was so broken that a small spherical body which served as a clapper could be easily seen. The metal was much corroded, but not so much as to prevent the bell emitting a sound when shaken.

Among other miscellaneous objects taken by the author were a fragment of potter's clay from Homolobi, a sulphur nodule and several dried lizard tails from Chaves pass, a fragment of asphalt and some perforated cedar berries from Cheylon.

Several rectangular fragments of red pipe clay, one of which was perforated as though for suspension, were found at Homolobi.

The object of the large and small rectangular or trapezoidal plates of mica and selenite found at Homolobi and at Cheylon, in graves and elsewhere, was not wholly clear. No specimen, however, was brought back from Chaves pass, and no natural deposits of selenite were noticed in the latter locality.



FIG. 67. Copper bell from Chaves pass. Diameter about  $\frac{1}{2}$  inch.

## RUINS OF OLD SHUMOPOVI

### GENERAL FEATURES

Although in the report of the author's excavations at Awatobi and Sikyatki, in 1895, an extended account has been given of the archeology of pueblos near the East mesa, no work was done on the numerous ruins at Oraibi and the Middle mesa. The author was particularly anxious to compare pottery from some of these ruins with the beautiful series which had been collected in 1895 at Sikyatki, espe-

cially as numerous specimens had been sold to traders from Old Shumopovi, and almost all of these were identical with those from the East mesa.

There is evidence that Shumopovi was one of the oldest settlements on the Middle mesa, but the legends of this pueblo have never been carefully studied, and the component clans are practically unknown. The pueblo stood in the foothills near a spring when the Spaniards first came into the country, and its name can easily be recognized in Espejo's list of Hopi towns at the end of the sixteenth century.

There is a uniformity in statements that the founder of Oraibi, Mateito, lived in Shumopovi before he sought the cave where he lived when Oraibi was built, and probably Shipaulovi was founded by clans from it in the eighteenth century. The size of the old ruin shows that in ancient times it had a large population.

The record of work at Old Shumopovi can be given in a few lines. For several years it has been known that a wealth of beautiful pottery lies buried in the cemeteries of that ruin (plate LI). That the number of objects destined to be removed from this place is large is probable from the great size of the cemeteries and the small portion of them which has yet been dug over. The author therefore began work with high hopes of a great harvest. About twenty Indian workmen from the East mesa and a few from Shumopovi were employed as excavators, and in the first two days of work they took out of the burial places over one hundred specimens.

On the evening of the second day the chief of Shumopovi, Nacihiptewa, went to the camp of the workmen and forbade them to continue the work. It seems that the chiefs of the three villages, Mishongnovi, Shipaulovi, and Shumopovi, had assembled in council on the night of the author's arrival and decided that his work should not go on. For some reason they had not communicated their wishes to the author, but went directly to the Indians, working on their feelings and threatening them with trouble if they continued excavating. As soon as the author learned of the objection he immediately called a council of the chiefs at his camp, and learned from Nacihiptewa that he did not wish the work to go on, fearing that it would cause great winds which would drive away the rain clouds. The author respected his wishes and ceased work at Shumopovi, discharging his workmen. Had he been able to complete the work at this ruin there is little doubt that over a thousand bowls could have been taken from the burial places of that ancient pueblo.

It would appear from the examination of the Shumopovi cemeteries that they were distributed among the foothills east of the main spring of the present town. From the quantities of broken pottery in this region, it is evident that their extent was very considerable. In some instances burial places were separated a considerable distance from the ruins of the pueblo, in others they were quite near the foundation of the walls.

A small cemetery was discovered about a quarter of a mile east of the ruins, where there is a patch of sand in which grow a few dwarf peach trees. The author camped at this point, which was as near as he could approach the ruin with his wagon, and immediately after his arrival a family of Shumopovi people came down from the mesa and began to hoe the squash plants which grew there—an act which was interpreted to mean possession. The Snake chief of Shumopovi had a brush house, called a kisi, overlooking his farm, on a small hillock near this burial place.

The ancient pueblo can be traced for several hundred feet, but its old walls have been buried or leveled, and very few evidences of its architectural plan can be made out by superficial studies. The mounds of the old site are covered with fragments of pottery of the finest character, beautifully ornamented,<sup>a</sup> with the characteristic Sikyatki symbol

#### POTTERY FROM THE RUINS

##### GENERAL FEATURES AND FORM

A superficial examination of the pottery of this old pueblo shows what a more intimate study demonstrates—that it is very similar to that from ruins near the East mesa, and that it differs from that of the Little Colorado pueblos. The majority of the pieces belong to the fine yellow ware (plates XLVIII, L), smoothly polished and elaborately decorated. There are a few examples of red and black ware and one or two specimens of black and white ware (plate XLIX), but the yellow ware predominates, as it does at Sikyatki. This is undoubtedly due to the chemical constituents of the clay used in its manufacture. There are no specimens of red, black, and white ware, and no black and no glazed varieties.

The resemblance, which amounts almost to an identity, in the character of the pottery of Sikyatki and Old Shumopovi, as well as the similarity in the symbolism, adds weight to the belief that these pueblos were inhabited synchronously.

There is no essential difference in the shapes of the pottery from this ruin and of that from the pueblos on the Little Colorado, where food bowls, vases, jars, ladles, and dippers are represented. In plate LI two of the best specimens are figured, but there are many others in the collection of equal beauty which have not been reproduced.

There were two specimens of food bowls from Shumopovi with snouts, one of which is shown in the accompanying cut (figure 68). This form appears to be rare, and has not yet been found in the ruins along the Little Colorado river.

<sup>a</sup>A very fine collection of mortuary pottery was made at Shumopovi by Mr T. V. Keam, after the author was obliged to abandon work there. Many of these pieces are now in the Field Columbian Museum at Chicago, which purchased the collection.

## DECORATION

The picture writing on Shumopovi ware closely resembles that on the ware of the ruins near the East mesa, and though from the limited examination which was possible on account of the size of the collection

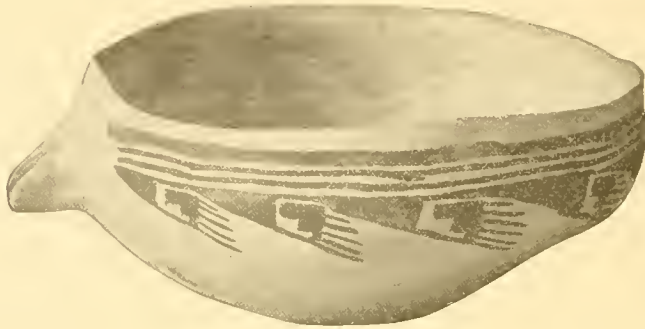


FIG. 68. Bowl with snout, from Shumopovi (number 157817).

few new forms were found, the author is able to add some instructive pictures to those already known from this region. On the whole, Old Shumopovi pictography is like that of Sikyatki and Awatobi, and differs from that of Homolobi. The geometrical figures do not widely



FIG. 69. Plumed Snake. Design on food bowl from Shumopovi (number 157799).

differ from those of other pueblo regions in Arizona north of the Mogollones, and are of the same type as those of Chaves pass, Chevlon, and Homolobi.



Plate LI shows the face of a masked dancer, the treatment of the left eye of which resembles that of this organ in certain Zuñi masks.

The only figure of a reptile which was found at Shumopovi was drawn on the inside of a food bowl (see figure 69). This figure is so different from any representation of the Plumed Snake that the author has hesitated to refer it to this mythic being. The feathers on the head, if such they be, are two semicircular bodies, and the tongue is represented by a line with arrowpoint termination. The eyes are both on one side of the head, and the lines on the head and body are incised, making designs which are highly successful from a decorative point of view. The bowl is a small one, and is made of the fine yellow ware characteristic of ancient Tusayan ruins.

An examination of bird figures from Shumopovi shows a marked

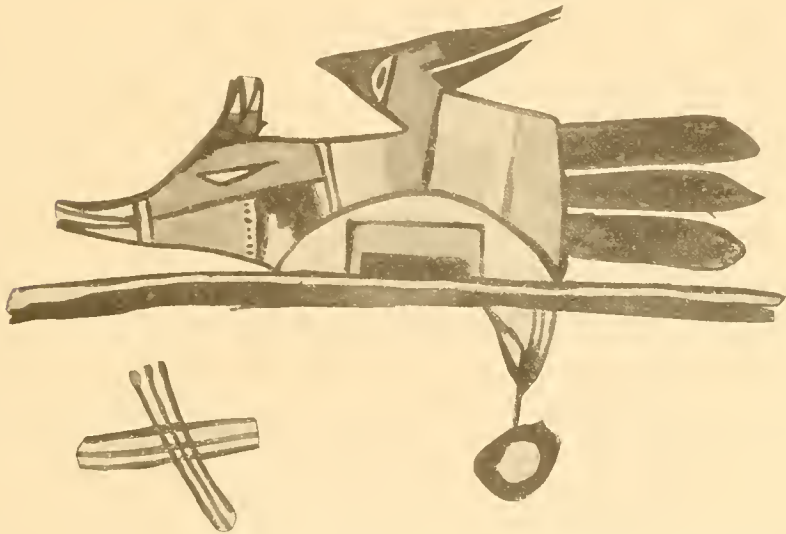


FIG. 70. Mythic bird and game of chance. Design on food bowl from Shumopovi (number 157714).

difference from those of the ruins on the Little Colorado and a close likeness to those of Sikyatki and other ruins near the East mesa. Specimens were found with the peculiar conventionalized form of the "breath feather" so constant in the collections made in 1895, and there were fine specimens of the sky band and the dependent bird. The design represented on the food bowl shown in figure 70 is very instructive. From a comparison with other figures of Kwataka the author is led to refer this figure to the mythic bird-man god. The head represented in profile has two triangular feathers, and on the throat and breast appear the terraced designs so often found in bird symbols. The feathers of the wing are triangular. There are reasons of a comparative nature which lead the author to believe that the band on which the bird rests represents the sky band, and the ring represents

either the earth or the sun. The position of the three tail feathers in this drawing is thoroughly characteristic of ancient pueblo art. Instead of being drawn in a horizontal plane, as they naturally would be in a side view of the bird, they appear in a vertical plane, as often occurs in these figures. This characteristic arrangement of the tail feathers is common in the decoration of modern vases from Acoma, where the bird is a constant ornament. It may also be seen in the avian figures which decorate many of the ancient bowls, vases, and jars from Sikyatki and Awatobi. The terraced figures on the under side of the head are of frequent occurrence in bird designs. The three cross lines occur on several Sikyatki bowls and represent stars.

The design on the food bowl from the ruin of old Shumopovi, shown in figure 71, represents a bird god, as is shown by the three tail feathers and the triangular wings. The head takes the form and bears the symbolism of that of a masked kateina still personated in Tusayan. The horn on the left side of the head terminates in a conventional figure of a feather, and the design on the right-hand side is a symbol of the squash flower. On the face is the terraced symbol of a rain cloud, still used in modern Hopi symbolism and very common in ancient bird figures. Within this terraced figure are represented the dragon fly, rainbow, and falling rain. It will be noticed that each of the two exterior tail feathers bears two smaller white lines. Similar symbols characterize the figures of the war god, and are said to indicate the hawk. There are legends extant that these are markings made by the claws of some animal in its struggles. They are



FIG. 71. Bird design on food bowl from Shumopovi (number 157795).

found on the cheeks of idols of the war god in several pueblos, as Sia, Zuñi, and those of Tusayan.

The avian figure on the food bowl shown in figure 72 represents a raptorial bird with extended wing. The homology of the two long bodies dependent from the breast is apparent when we compare them with the symbolic feather on Sikyatki pottery. They represent the breast feathers of the eagle; the symbol is still preserved in modern Hopi ceramics, but, so far as is known, has not yet been found on pottery from the Little Colorado ruins.

Both eyes are represented on one side of the head, and the beak is

curved like that of raptorial birds, which are so common in the decoration of Homolobi ware. This figure also shows a very common vio-



FIG. 72. Mythic bird design on food bowl from Shumopovi (number 157134).

lation of perspective among ancient and modern Hopi artists, for the tail feathers are turned from the natural horizontal to a vertical plane.

The design shown in figure 73 represents a bird in which the curved

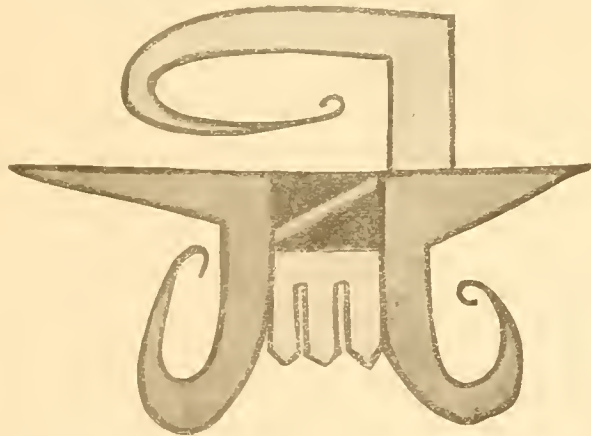


FIG. 73. Symbolic bird design on food bowl from Shumopovi (number 157771).

body above is the head, the two lateral triangles the wings, and the three pointed bodies the three tail feathers. The two curved bodies,

one on each side of the tail, are backward extensions of the bodies which assume different forms in as many different representations.

This is a form of bird symbolism unknown in pictography from the Little Colorado ruins, but very common, in many variations, at Sikyatki. Its reduction to bird symbolism may be readily followed by a comparison with the series given in the report on the field work of 1895.<sup>a</sup>



FIG. 74. Gambling canes and bird. Design on food bowl from Shumopovi (number 157735).

The food bowl shown in figure 74 is a beautiful specimen of yellow ware, decorated on the interior with two figures, one representing a bird and the other four canes used in a game still played in modern pueblos. The bird figure evidently represents the Heart-of-the-sky god, whose symbol is a star, which is represented on the head of this divinity in designs from Sikyatki figured in the account of the expedition of 1895. The wings and tail feathers, three in number, are easily recognized.

The four gaming canes are marked in different ways, and correspond with the four cardinal points. Their markings are, however,

<sup>a</sup>Seventeenth Annual Report of the Bureau of American Ethnology, pt. 2, 1895.

different from those on a set of these canes taken from the ruin at the mouth of the Cheylon fork, to which reference has already been made.

These canes, corresponding in a general way with those used in Zuñi in the game toshalewa, are rarely employed at the East mesa, but the occurrence of figures of them in old Tusayan ruins indicates the age of this game in the pueblo area. While the markings on these objects are not the same as those on the Zuñi, the variations are no greater than would be expected, considering the ruin in which they were found. The general character of the game was evidently very similar.

## SUMMER OF 1897

### INTRODUCTION

In continuation of the field work in Arizona in 1896, the results of which have been given in the preceding pages, the author again visited this Territory in 1897, remaining about three months, from June 25 to September 30.

He was accompanied, as in 1896, by Dr Walter Hough, of the National Museum, who rendered most valuable aid, and also by Mr F. W. Hodge, of the Bureau of American Ethnology, who joined the party at the close of July, remaining with it during the visit to the Hopi Snake dances in the following month.

He was aided also by Mr Frank Zuck, of Holbrook, Arizona, and a number of young men from Taylor and Snowflake who were employed at Four-mile ruin as laborers. In the Pueblo Viejo Mexican workmen were relied on, all of whom performed their duties very satisfactorily.

The collection obtained in 1897 was smaller than that made in previous years, but it was more varied and more instructive in its bearings on questions of the migrations of the prehistoric people of Arizona than any other thus far made. The ethnological side of the work was not neglected. Dr Hough continued his studies of ethnology inaugurated in the previous years, and has already published the new material obtained by him in the *American Anthropologist*.<sup>a</sup>

As the author visited Tusayan at the time of the Snake dances, he made new observations of the Mishongnovi variant of this ceremony. A record of his studies of this subject is found in the Nineteenth Annual Report of the Bureau of American Ethnology, with accounts of the Flute dance at the same pueblo, compiled from notes made in 1896.

On his return from the Southwest the author prepared a preliminary account of the archeological work, and it was published with illustrations in the Smithsonian Report for 1897. This account was limited, and contains only the more salient results of the work. The present report is intended to be more complete, but is by no means exhaustive.

The primary aim of the expedition was the collecting of specimens. To accomplish this the author was obliged, because of limited forces, to spend much of his energy, to the neglect of other lines of investi-

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<sup>a</sup> V. 8, May, 1897.

gation. The collections of 1897 number a few short of 1,000 entries in the catalog of the National Museum. In gathering this material the greatest care was taken to label it properly. Neglect of this obvious duty has destroyed much of the intrinsic value of many collections, and has led to errors in conclusions which might readily have been avoided.

The present report completes the record of notes and other data bearing on the collections made in the three years during which the author has had the honor to direct field work in the Southwest for the Smithsonian Institution. There are many obscure points touched upon which would be greatly illuminated were it possible to continue this line of investigation. So closely connected, however, are the archeological and ethnological problems of the Southwest that the former can not be exhaustively treated while the latter are so imperfectly solved.

#### PLAN OF THE EXPEDITION

The summer's field work of 1896 verified by archeological evidences the truth of the statements of the Hopis that some of their clans once lived at Homolobi on the banks of the Little Colorado, not far from Winslow, Arizona. It was desirable to study several other ruins on this river or its tributaries, and to compare objects indicative of the culture of their ancient people with those of this undoubted home of early Hopi clans. The author therefore examined ruins near Pinedale, on a small southern tributary of this stream near its source in the foothills of the White mountains. While employed at this ruin he heard of an extensive, undescribed ruin near the Mormon town Snowflake, situated on the same stream as Pinedale, but farther north. These ruins at Pinedale and Snowflake are almost on the meridian of modern Walpi and the mouth of the San Pedro river in the Gila valley.

There is historical evidence that at one time the Hopis used a southern trail from their pueblo to the Gila, penetrating to the rancherias of the San Pedro, and that this trail was rendered impassable by the incursions of hostile Apaches in comparatively late historical times. An examination of old pueblos situated on or near this trail was believed to have considerable importance in connection with legends and with historical evidences that it was used by pueblo peoples.

Having studied the archeology of the ruins on southern tributaries of the Little Colorado, the author made his way south of the White mountains to that part of the Gila valley which is locally known as Pueblo Viejo, an archeologically uninvestigated region which was formerly densely populated and extensively farmed. He desired to discover the relationship of the former people of this valley with those of the Little Colorado, as well as with those of the Gila and Salado rivers, near Tempe and Phoenix. He likewise wished to

trace the similarities, if any, of the art remains of these ancient farmers with those of peoples who once lived on the Little Colorado and its southern tributaries—what resemblances there were in implements, pottery, and other art products, and what likeness in manners and customs, as indicated by archeological data.

One of the most important objects of the expedition was to add to the sum of available paleogeographical material from different sections of the valley drained by the Little Colorado river. Although the amount of this material now in museums is large, an increase of it was considered desirable. It has been pointed out elsewhere that pictures on old pottery are objective expressions of religious symbolism, and that they should be treated as such. Each ruin has its characteristic designs, and there are features peculiar to certain localities. An interpretation of this highly interesting pictography can be facilitated by the discovery of new pictures, and the more numerous the localities from which it is obtained the more important will be its teaching. A discovery of the geographical limits of the same symbolism is important, and its connection with the migration of certain clans is significant.

The influence of environment on ancient pottery is a subject of no less interest than that of its symbolism. As we pass, in the Southwest, from one locality to another, the ingredients of the clay from which pottery is made change, and the action of fire upon these components leads to modifications in their colors when they are used in decoration. It would be instructive to follow these changes in their many modifications and determine what relations exist between the distribution of various clays and different colored pottery. This would require a collection of ceramic wares from many localities. We can rely only in part on classifications of pottery based on colors as indicative of kinship. People of different stocks make pottery of the same colors when they use the same or similar clays. Decorations of the same kind, or an identical symbolism, are a much more trustworthy basis of classification, although not always reliable.

The ruins studied in 1897 were chosen with a view of obtaining comparative data concerning pottery and its decoration from localities in different latitudes of Arizona as nearly as possible on the same meridian as those studied in previous years.

The investigations at Kintiel were especially directed toward the future plotting of an archeological meridian through Zuñi as a basis of comparison with the Tusayan zone, in which Walpi is situated.

It is possible for the expert student of modern pueblo pottery to determine at a glance the pueblo in which any piece was made. Thus, no specialist would mistake a Zuñi vase for one from Acoma or confound a Tusayan food bowl with one from Laguna or Santa Clara. This exact knowledge has become possible from the fact that our museums are rich in modern ware and familiarity with its char-



acteristics is possible; but an ability to identify modern pueblo pottery by its symbolism is of little help in the determination of ancient ware from the several localities. To determine whether an ancient vessel came from near Zuñi or from the neighborhood of Walpi we must study typical collections of ancient ware. From investigations thus far conducted the author is able to distinguish ancient Hopi from ancient Zuñi pottery, but the geographical limits of each are unknown to him and he is wholly unable to distinguish ancient Jemez ware from that of Acoma, Sia, or Cochiti. For a provisional classification the author has divided the pueblo area into a number of parallel zones extending north and south. Tusayan lies in one of these zones, Kintiel and Zuñi in another. Whatever zones it may be necessary to make to facilitate the study of ancient pottery of the eastern pueblos does not concern the present report, but it is worthy of note that thus far ancient material from them is so limited that even a provisional determination of these areas is premature.

The author has collected no legends of the Hopi Indians which refer in any way to the ruins excavated in 1897, and he believes it is to the Zuñis rather than to the Hopis that we should look for traditional accounts of them which may still survive. Nor has he found any historical reference to old houses on the Little Colorado river, although Four-mile ruin is situated west of Zuñi, and may have been one of the pueblos of the Cípias, a sedentary tribe mentioned by Spanish writers in the seventeenth century. Though this name is said still to survive in Zuñi legends, the author has thus far failed to elicit any information in Hopi stories regarding the ancient Cípias<sup>a</sup> (see page 23).

The pueblos in the region south of Holbrook are too far east to be referred to the Patki and other clans which claim Homolobi as their former home; and their surroundings do not in any way agree with the current Hopi account of Palatkwabi, the "Old Red land," or the "Giant Cactus country." It is always to the mountains south of Winslow that the old men of the Patki clan point when they tell of the place of origin of their forefathers. It is instructive to remember that the invasion of the Apaches, directed against the modern Hopi pueblos, was always from the south, while that of the Utes was from the north. The earliest historical account of the contact of the Apaches with the Hopis indicates that these Athapasean nomads shut the latter off from their southern kindred by occupying the trails to the Gila and causing Homolobi to be abandoned, and then pressed north against the modern towns.

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<sup>a</sup>The Hopi name of the modern pueblo Isheta is Teipiya.

## KINTIEL

## THE RUIN AND ITS CEMETERIES

Up to within a few years, especially since the American occupation, a ruin called Pueblo Grande has been designated on most maps of Arizona and New Mexico. This pueblo lies about 25 miles north of the railroad station of Navajo, and ten years ago it was one of the best ruins of the Southwest, approaching in the perfection of preservation the famous ruins of the Chaco canyon. To the Navajos who range that region the ruin is known as Kintiel, or Broad house. On the author's first visit to it, ten years ago, the walls stood higher than a man's head, and the rooms were probably in about the condition in which they were shortly after its abandonment. At present very little of the ancient walls remains, for they have been torn down by a trader, who has used the stones of which they were made in building a house and store in about the center of the ruin. In fact, where the foundations of the walls of this fine ruin once stood, nothing now remains but a trench, for the lower courses of stones, being the largest, were sought out for building material in preference to the smaller stones which were placed upon them.

The documentary history of Kintiel is a short chapter. Early Spanish accounts do not mention the place, and the Spanish name Pueblo Grande appears only on later maps of the country. There is said, however, to be a legend concerning it among the present Zuñis, which is mentioned in the Fourth Annual Report of the director of the Bureau of American Ethnology (1883):

Pending the arrival of goods at Moki, he [Mr Cushing] returned across the country to Zuñi, a measure . . . enabling him to observe more minutely than on former occasions the annual sun ceremonial. En route he discovered two ruins, apparently before unvisited, both, according to Zuñi tradition, belonging to the Hlé-etákwe, or the northwestern migration of the Bear, Crane, Frog, Deer, Yellow-wood, and other gentes of the ancestral pueblo. One of these was the outlying structure of K'in'ik'el, called by the Navajo Zinnijinné and by the Zuñi Héshotapáthltáie.

It is interesting to note that all the above-mentioned Zuñi clans have or had representatives in the Hopi pueblos, and that at least three of them, viz, Bear, Deer, and Yellow-wood, which is probably the Hopi Kokop clan, are reputed by the Walpi traditionalists to have come into Tusayan from the East. Whether or not these families of eastern origin are descendants from Kintiel people is impossible to say, on account of the author's unfamiliarity with the migration legends of these particular clans. It is instructive to learn that with the exception possibly of the Frog clan no Patki or Rain-cloud people have yet been mentioned from Kintiel, nor do any of the traditions of the Patki people mention Kintiel as their former home.

No further mention of these ruins is known to the author until the description by Victor Mindeleff, in his very important account of Tusayan and Cibolan architecture, published in the Eighth Annual Report of the Bureau of American Ethnology.

Fortunately for science, Mr Cosmos Mindeleff camped at Kintiel ruin before its destruction and made excellent photographs and plans of the ruin. He likewise conducted limited excavations, which were later recorded in a report of the Bureau of American Ethnology.

Recognizing, on his arrival at Kintiel, that it would be impossible to add much to what had been recorded in regard to a ruin so mutilated as Kintiel now is, the author naturally sought to learn what he could from excavations. The results were somewhat disappointing, and, as compared with the collections made at other ruins, only a few specimens were obtained from this large pueblo.

There is one feature in the architecture of the walls of Kintiel which seems worthy of special notice, a feature which Nordenskiöld recognized in Mesa Verde ruins, and which the author has described in the round house near Montzeimer's ranch,<sup>a</sup> viz, the difference in size of the building stones in the walls and foundations. The largest stones occur at the base, or in the lower courses, the smaller in the more elevated portions of the walls. This arrangement has a wide distribution in other parts of the Southwest.

The nearest point on the railroad to Kintiel is the station Navajo, from which there is a good road to the ruin. This road passes in sight of several small mounds with indications of former houses, and not far from Navajo station there are several ruins, some of considerable size, but all in a poor state of preservation. All of these are here referred to Zuñi rather than Hopi clans, for the fragments of pottery which were collected on them resemble the pottery of ancient Zuñi ruins.

The exact lines of demarcation between ancient Zuñi and Hopi ruined pueblos will probably be impossible to find, mainly because there is little doubt that the distinctive features between Zuñi and Walpi, so marked in modern times, did not exist in ancient times. Clans from certain pueblos now in ruins in this region sought union with the population of Zuñi; others went to modern Tusayan and were incorporated into the population of the villages there. Other families drifted out of Zuñi and founded pueblos of their own or halted in their migration from Cibola to Tusayan and erected pueblos which were abandoned after a few years or generations.

Kintiel may be classified as a circular ruin (see plate LIII). This form is unlike that of any Tusayan ruin, with possibly the exception of the two mounds called Küküteomo, above Sikyatki. Round ruins are foreign to the Hopi country and are absent from all the portion of Arizona south of the present inhabited pueblos of the Hopi reser-

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<sup>a</sup> *Journal of American Ethnology and Archaeology*, v. 1. 1891, p. 127.

vation. The same may be said of round rooms or kivas. When, however, we enter the Zuñi belt, which extends from the San Juan and Mancos canyon cliff houses south through Zuñi, we find both circular and rectangular ruins, with circular rooms especially noticeable in the cliff houses. Kintiel is one of these, and architecturally, therefore, belongs to the Zuñi series, as its geographical position and pottery clearly indicate.

Kintiel is not, however, perfectly round, but is broader than long, assuming a shape comparable with that of a moth with extended wings. The two sides were built on sloping land, and between them there runs a depression corresponding to the body of the insect of our comparison. This median depression is at right angles to the broadest part of the ruin, and in it is the spring which furnished the water supply. The present occupant of the ruin, an Indian trader, has erected his buildings within the inclosure of the ruin near this depression, and has dug out the ancient spring, which furnishes abundant water for his purposes. In excavating this spring he found the inclosing walls still intact, with a flight of stone steps by which the ancients once descended to the water. Notwithstanding sanitary objections to such a position for the spring, especially when the population of the surrounding houses was large, from a defensive point of view it was perfect. The violation of sanitary laws among the modern pueblo peoples implies that among the ancients there was little regard paid to health in the choice of a water supply, and little care in keeping the water pure.

Extensive excavations at Kintiel revealed a cemetery on the eastern side of the northern section. The burials were made close up to the outer walls of the buildings, as at Homolobi, but no uniformity in the orientation of the bodies was noted. No undoubted evidences of cremation were detected, and all skeletons exhumed were from suburban cemeteries. A limited number of specimens of mortuary pottery was obtained in the neighborhood of these skeletons. Many of these specimens were broken, but others were whole and in good condition.

The author is inclined to regard Kintiel as a comparatively modern pueblo, one of many which were founded later than the earliest Spanish invasions. One reason which led to this conclusion is the fine preservation of the buildings. Up to within a decade they had not the appearance of antiquity which old ruins always show, nor are there now any large refuse heaps or pottery burning places, which so often indicate great age, about it. The few graves in the cemeteries and the distance apart of those which do exist may be regarded as negative evidence of limited value, for it may be said that we may not have happened upon the populous graveyards. Yet much more earth was moved in the excavations than at Homolobi, and only a tenth as many interments were brought to light, and the natural inference is that the pueblo was not old. Nothing, however, indicative of white men's

influence was found in the ruin. Although it may have been inhabited since the discovery of Arizona, there is no evidence that Spaniard or American ever visited it while inhabited.

There is a close resemblance between Kintiel, as it was ten years ago, and the Pueblo Bonito and other great houses of the Chaco canyon, and from its general appearance as compared with these the author believes that it is of about the same age.

There is a Navaho tradition that at least one of the Chaco ruins was built by Zuñi clans, which would indicate a reason for the similarity in the construction of Kintiel or Pueblo Grande and its namesake in the above canyon.<sup>a</sup> Kintiel also resembles architecturally the well-preserved Zuñi ruins at Archeotekopa, which is described elsewhere,<sup>b</sup> but we need much more information about these interesting ruins, especially about their pottery and the Zuñi legends concerning them, before it is possible to form any trustworthy conclusions.

Kintiel is situated on the Leroux wash,<sup>c</sup> which flows north of Holbrook, and turning south empties into the Little Colorado west of the town. The wagon road goes from Holbrook past the X ranch up the wash to the ruin of Kintiel. There is a ruin of some size at Tanner's spring, from which place the author has seen several fine specimens of pottery. As these fragments closely resemble the Kintiel pottery, it is probable that the ruins belonged to the same or to closely related people.

There is also a ruin of some size near Hubbell's store, at the Pueblo Granado, about the same distance north of Kintiel that Navajo station is south of it. Pottery from this ruin is ancient, much older than that from Kintiel. West of this ruin, at Eighteen-mile spring, there is a circular ruin which must also be referred to the Zuñi belt. The author has been told that there is a Spanish inscription of the seventeenth century not far from this spring, but he has never seen it.

The number of rooms at Kintiel would lead to the belief that the population was large, certainly reaching into the hundreds. There were evidently several clans living there, and at the lowest estimate we are justified in believing that 300 people found shelter within its walls. Probably the population was nearer 500 souls, or about the same number that formerly lived at Sikyatki.

A small stone inclosure, apparently a shrine, was found a few feet from the outer wall of Kintiel, on the south side. Its contents were carefully gathered together and added to the collection. The objects found in this inclosure consisted of a number of curiously formed stones and concretions, any one of which might, from its odd shape, be regarded as a fetish. Several of these stones were rudely worked into

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<sup>a</sup>The name Kintiel, or Broad House, is applied by the Navahos to at least two circular pueblo ruins in the Southwest. One of these is in the Chaco canyon, and is said also to have been constructed by the Zuñis.

<sup>b</sup>Journal of American Ethnology and Archæology, v. 1, 1891, p. 122.

<sup>c</sup>Named from the famous guide and trapper Leroux, whose knowledge of the Southwest was of such great value to early explorations in this region.

animal shapes, with head, eyes, and mouth represented. Similar collections of stones are common near the approaches to the modern Hopi towns and are ordinarily called shrines of the god of death, Masauü. It is customary for a Hopi Indian, on approaching the pueblo, to throw on these piles any small stone he may have found, and in much the same way, no doubt, the pile of stones found at Kintiel was formed, for this same custom of casting stones in a pile exists at Zuñi, the pueblo to whose people those of Kintiel were allied.

Just south of the two standing sections of wall there was a cluster of stone cists, probably ancient ovens. They varied in size from 1 foot or 2 feet square to larger dimensions—6 by 3 feet. Charred wood and ashes were found in some of these, and the bounding stones showed the action of fire. These structures reminded one of the suburban, communal ovens, which have been described<sup>a</sup> in the Zuñi ruin, Heshotauthla. The communal ovens at the latter ruin, like those at Kintiel, are situated just outside the walls of the pueblo, but unlike them they are, as a rule, round, and of equal size. It would appear that cooking was done in these ovens rather than in the dwelling houses. The Hopi food called pikame, made for ceremonial feasts, is still cooked outside the dwellings, and the Zuñis likewise have ovens separated from their houses, as is common in Mexican towns in the Southwest.

The cemeteries east of Kintiel revealed many skeletons in fair preservation, and it was noticed that those near the surface were mostly of infants, the adults, as a rule, being found deeper. The first skeleton excavated was that of an infant buried under a flat stone 2 feet below the surface. The grave had mortuary objects in the form of a few miniature rough bowls and a small jar of coiled ware. As the excavations penetrated deeper, there were found many fragments of pottery, broken ladle handles, ashes, and other indications that this was the dump place of the neighboring pueblo, the outer wall of which was 50 feet away.

One of the most instructive burials at Kintiel was found in the east cemetery. This was interpreted as a secondary interment. It consisted of human bones stripped of flesh and deposited in the earth with customary mortuary vessels. The reason for the belief that these bones were not covered with flesh when the bowls were placed upon them is that their position was not that which they would have had if articulated. The femurs were placed in the reverse of the natural position, and a humerus was found crossing the femur. No skull or pelvis was found in the grave. A flat earthen disk was luted to the neck of a vase placed on the bones, and there was a food bowl near by.

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<sup>a</sup>Journal of American Ethnology and Archeology, vol. 1, 1891, p. 133.

## POTTERY FROM THE RUIN

## GENERAL FEATURES AND FORM

The pottery from this ruin belongs essentially to the Zuñi type, and is very different from that of the Tusayan series. It is, as a rule, of coarse texture, and decorated with rude symbols. We miss in it the fine yellow ware for which Tusayan is famous, and find in its place abundant red pottery, with a comparatively large proportion of black and white. The decorative designs are mainly geometrical, and picture writing is very limited in quantity. The decoration is essentially different from that of Sikyatki, and resembles closely that of Heshotauthla and Halona, two ruins near Zuñi pueblo.

The greater the number of ancient Zuñi pottery objects which were examined, the stronger became the belief that the ancient potters of this region were inferior to the ancient Hopis in their ceramic productions. Modern Zuñi ware is certainly as fine as modern Hopi, and, a priori, the author sees no reason why the older pottery of one region should be inferior to that of the other. He formerly supposed that this inferiority was due mainly to imperfect collections and that the best examples of ancient Zuñi ware were still under ground, so that the known specimens gave an imperfect idea of what other and larger collections might reveal.

While these earlier conclusions may be verified by later studies, the author now inclines to the belief that the Zuñis never advanced to the same perfection in the ceramic art as did the Hopis. It must be confessed, however, that pottery has been taken from the cliff houses north of Zuñi which is as fine as the Tusayan ware, and if this excellent pottery is classified as Zuñi ware, an unfavorable criticism is not just. So far as texture is concerned, the Tusayan ware is superior to all others in the Southwest, with the exception of the black and white ware of cliff dwellers. In the character of designs the superiority is even greater. In the evolution of Pueblo decoration the development of ornamentation advances from geometrical patterns to rude picture writing, and, as a rule, the pottery on which the former predominate is inferior to that on which the latter is most prominent. Not that we should regard this a hard and fast law without exception; the cleverest potters often adorn their wares with simplest patterns; but in a ruin where most of the pottery is decorated with geometrical figures, and the few existing pictures of animals—as birds, reptiles, or human beings—are rudely made, the artistic development is inferior to that where the conditions are reversed.

Judged by the criterion of designs, Tusayan decoration of ceramic ware shows a superiority over all others in the pueblo area, as anyone will confess who impartially examines large collections from different areas of the Southwest.

It would appear, too, that this high development was autochthonous,

and originated within the limited area in the midst of which the present Hopi villages are situated, where not only the decoration, but also the ware itself is superior. Strangely enough, the more ancient the ruin is, the better is the pottery. This may have a bearing on certain theories regarding the ancestors of the Hopis, for we have been accustomed to hear them spoken of as rude Shoshoneans

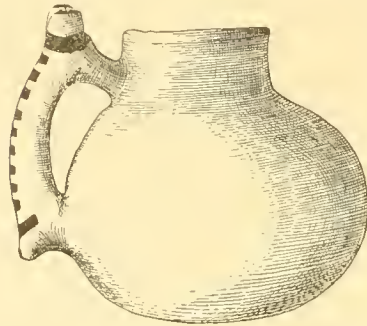


FIG. 75. Dipper with decorated handle, from Kintiel.

akin to some of the lowest tribes of the Rocky mountains, who have adopted a pueblo life after they came into the pueblo area. The author's researches show that only a small part of them claim to have sprung from the north, but from whatever source they came, and whether they adopted the pueblo life after their arrival or not, they reached a higher culture, judged by artistic excellence of pottery, than any other pueblo people.

Some of the specimens of coiled ware from Kintiel are remarkably fine. One of the best is almost black, as though discolored by constant use in the fire, and was evidently a cooking pot.

The accompanying figure (75) of a dipper from Kintiel might readily be mistaken for a like object from the cliff houses of the Mancos canyon. It is a common form of black and white ware almost universal throughout the Southwest.

The forms of pottery from Kintiel are not exceptional, for all the types which were found there occur elsewhere. The rough ware, universal in the pueblo area, is abundant in the Kintiel graves, and leads all others in number of specimens (see figure 76). This is in marked contrast to collections from Sikyatki and the Little Colorado ruins, where smooth decorated ware predominated.



FIG. 76. Coiled vase from Kintiel (number 176910).

There were comparatively few food vessels, and no large vases were obtained. Cups, ladles, vases, and slipper jars were the most common pottery forms. A three-lobed cup of red ware was dug out of the eastern cemetery. This form is exceptional in the pueblo ruins which the author had previously examined, but beautiful specimens have been found at Homolobi and Cheylon.



The amphora form of globular vessel is rare in Southwestern ruins, but is represented by a single specimen (figure 77) from Kintiel. This vessel is of black and white ware, and the design on the equatorial region is characteristic.

A very good specimen of globular form (figure 78) was found at Kintiel. This was made of black and white ware, and is one of the finest specimens in the collection.

All these examples are white ware decorated with figures in black, and the white is a slip rubbed over coarser clay. In firing, since the contraction and expansion of this

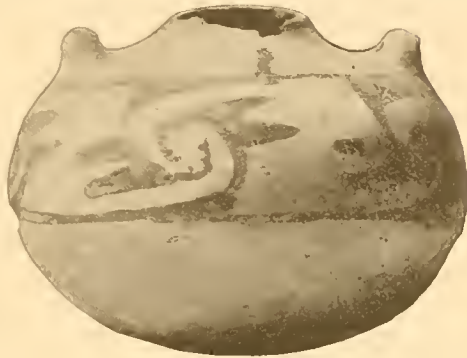


FIG. 77. Two-handled bowl from Kintiel (number 176936).

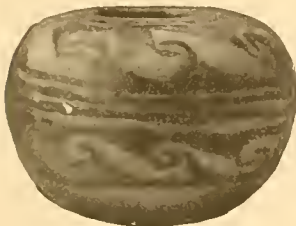


FIG. 78. Globular bowl from Kintiel.

slip is not the same as that of the base on which it is laid, we find a crackled surface unknown in true ancient Hopi pottery.

Many of the ladle handles were perforated with rows of holes; several were decorated with alternate parallel and longitudinal bands, a type of ornamentation which is found as far south as the northern border of Old Mexico and has been recorded from Mexican ruins in Chihuahua.

Several fragments of the necks of vases with pits or depressions were found. Some of these pits resembled small cups, but the author believes the depressions are finger holds, by which the vessel was carried. Fragments with similar depressions are found elsewhere in the Southwestern ruins, and there are one or two complete vases with the same finger holds, in which there can be no doubt of their use.

#### DECORATION

The limited number of specimens of pottery from the ruin makes it necessary to speak of this aspect of the subject in a very general way.

There is little similarity of picture design between these specimens and those of modern Zuñi which have been examined, save in geometrical patterns; so that the author is led to suggest a theory to account for this fact, similar to that which he has elsewhere advanced to explain the change in symbolism in Hopi pottery. The differences



FIG. 79. Handle of dipper from Kintiel.

between modern and ancient Hopi ceramic designs are due to the advent of new clans as colonists, for these new arrivals introduced their strange cultus, of which, up to that time, the Hopis were ignorant.

Possibly a similar explanation may account for some of the designs on modern Zuñi pottery. Modern vessels from these two regions bear, however, widely different decorations. The many likenesses between ancient Zuñi ware and that of Kintiel are the main reasons for his association of the two, but these similarities are mainly in geometrical patterns.



FIG. 80. Frog design on bowl from Kintiel.

One or two specimens of pottery from Kintiel had handles decorated with the forms of animals, and one of these, of black and white ware, was particularly well made (see figure 79). The intention was evidently to represent some many-legged animal, combining painting with sculpture.

A knob on one vase has been identified as a representation of the head of an antelope. This is an unusual form of decoration.

The modification of the handle of a dipper into an animal form is not rare in ancient pueblo pottery, and the author has seen specimens in which a mammal, possibly a bear, was represented in that way. In modern pueblo pottery, animal forms are very common, and they are especially abundant in modern Zuñi ware, as an examination of the rich collection in the National Museum will demonstrate. This method of ornamentation is not very common in pottery from ancient or modern Hopi towns, though the Hopi priests called "mudheads" or "clowns" are often represented on the handles of ladles, and in the large collections from Sikyatki not a single specimen adorned in this manner can be found.

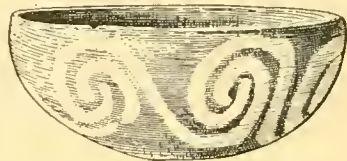


FIG. 81. Food bowl from Kintiel.



FIG. 82. Bird design on food bowl from Kintiel.

One of the vessels from Kintiel was decorated on the interior with what seems to be a figure of a lizard or tailed batrachian (see figure 80). The design is simple, and is not unlike figures which are found as pictographs in the Canyon de Chelly and elsewhere in the Southwest.

The decoration on the exterior of the food basin shown in figure 81 is highly characteristic and markedly different from that on Sikyatki pottery. In this specimen the design on the exterior consists of a number of interlocked S-shaped figures, which are likewise found on the pottery of the Little Colorado ruins. The external decorations on the food basins from Sikyatki are, as a rule, rectilinear, and curved figures are rare or unknown. A very much mutilated figure of a bird which decorates a bowl is shown in figure 82.

The accompanying illustration (figure 83) gives a good idea of a Kintiel mug of black and white ware and the calcareous incrustation with which the majority of these ancient vessels was covered. This mug is decorated with geometrical patterns, the nature of which may be seen in the illustration. Like many others from Kintiel, it was covered with a calcareous deposit, which can readily be removed by washing.



FIG. 83. Cup from Kintiel (number 176811).

One of the best specimens of white ware from Kintiel is shown in figure 84. The striking feature of this dipper is the form of the handle, which is made in imitation of the head of some animal. There were several specimens of bowls and other vessels with heads of animals, a feature also common in Tusayan ceramics.

#### MISCELLANEOUS OBJECTS FROM THE RUIN

The stone objects from Kintiel are in no respect peculiar, and consist of mauls, hammers, axes, spearheads, and arrow points.

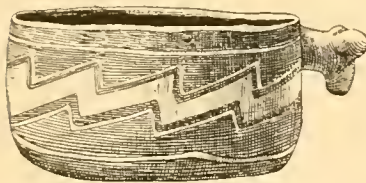


FIG. 84. Dipper from Kintiel.

A small slab of stone had three cavities, arranged in a triangular form, in one surface. There were several clay disks, some with a central hole, others imperforate. Rectangular gorgets of red stone were perforated at one side as if for suspension. There is also a tubular pipe of red stone in the collection.

Symmetrical spherical stone balls, ranging in size from a marble to a baseball, were picked up on the surface.

No prayer sticks were found in the graves, but in one of the food basins there was a collection of several hundred short sections of wood about the size of a small lead pencil, and beveled at both ends. These were about an inch long, reminding one of sticks called the "frog spawn," wooden symbolic objects made in the Walpi Flute and Snake ceremonials.

Bone objects—awls, needles, bodkins, and the like—were numerous. Bone tubes of different sizes were likewise found, and a small bone gouge accompanied one of the skeletons.

Fifteen well-preserved human skulls, excavated from the Kintiel cemetery, were brought to Washington.

#### KINNA ZINDE

If we compare the Zuñian and Tusayan meridian zones of ruins architecturally, we find that they closely resemble each other, or, if there is any one feature which distinguishes them as groups, it is the predominance in the former of circular ruins. Circular ruins are absent in the Tusayan series, while more than a third of the Zuñi series of ruins are round, oval, circular, or semicircular—rectangular and round combined. The cause of this predominance is unknown, for the explanations which have been advanced to account for round ruins in the Zuñi belt would seem to be equally applicable to the Tusayan belt, where round ruins are absent.

Not far from Kintiel there is a small, well-preserved ancient house called by the Navahos Kinna Zinde. This ruin is in a good state of preservation, the stone walls rising high above the foundations.

As seen from one side Kinna Zinde looks like a round tower, such as are found elsewhere in the Zuñi belt of ruins. A closer examination, however, reveals the fact that only one end of this ruin is round, the remainder being rectangular.

The ruin is situated on a slight elevation overlooking a fertile plain. Flooring indicative of two stories is visible, and the poles of an old ladder by which there was formerly communication from one story to another are still in place. These poles were notched for the insertion of rungs.

The author was struck with the scarcity of pottery fragments and other refuse in the neighborhood, and it was concluded that this building had not been inhabited for any considerable time. It showed no signs of age, and probably was contemporary with Kintiel, which is a few miles away. Kinna Zinde was possibly only a summer farm home, peopled by farmers from Kintiel, comparable with Pescado or Ojo Caliente on the Zuñi reservation. In winter the inhabitants retired to Kintiel, and in summer they used Kinna Zinde as a protected outlook over their farms. Its position was well chosen for this purpose, and it was abandoned at about the same time as Kintiel.

#### RUINS NEAR HOLBROOK

There are few remains of ancient pueblos near Holbrook, Arizona, and the Hopi trail from that town to Jeditoh valley is not known to pass any considerable ruin. The author has always been astonished that the fine spring at Bitarhütee, the Red cliffs, about 40 miles from Holbrook, on the road to the Hopi towns, appears never to have

furnished water to a neighboring pueblo.<sup>a</sup> When the Hopis went back and forth to the Little Colorado, in ancient times, before Holbrook was built, they took the shorter route to Homolobi. That in their communication with Zuñi they did not use this trail to the river is evident, for the Zuñi trail strikes the railroad far to the east.

Both Hopis and Zuñis in their intercommunication used the trail through Kintiel, because there was nothing to invite them any other way. The gateway of modern Tusayan to the southern settlements was past Big and Little Burro springs, from Homolobi, and if we follow that trail we pass many ruins, for the simple reason that it is the ancient route of migration. Pueblo Indians, in their journeys, go from pueblo to pueblo, stopping for entertainment, so wherever we find an ancient trail, there we may expect to find at intervals the ruins of old villages.

#### OBJECTS FROM WOODRUFF BUTTE

One of the most conspicuous mountains south of Holbrook, visible for some distance along the railroad, is a conical butte called the Pieta mountain or Woodruff butte. It was not the author's good fortune to visit its summit, but he obtained by purchase a few specimens from that place.

The most interesting of these were two small stone fetishes or

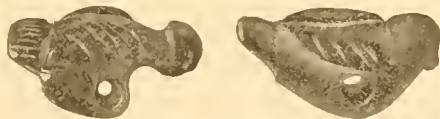


FIG. 85. Stone birds from Woodruff butte (number 177898).

bird effigies (see figure 85); there were also some pendants, a few beads, and other ornaments. The bird effigies were very skillfully carved of stone, and were perforated, evidently for suspension. They may have served as fetishes, for they closely resemble similar carved objects which are commonly sold at Zuñi.

#### ANCIENT HABITATIONS IN THE PETRIFIED FOREST

Learning that there were evidences of ruins in the famous petrified forest of Arizona, near Holbrook, the author made two visits to it and examined a number of ancient mounds within its area. None of the ruins which were seen gave evidence of large size or of a considerable population. Many fragments of pottery resembling ancient Zuñi ware were found, and a few stone implements and metates were picked up on the surface of the ground, but the number was too small to encourage extended excavations in any of the small ruined house clusters which exist in this locality.

An Indian burial was found on the highest point of one of those strange hillocks of the "bad lands" in which the forest is situated,

<sup>a</sup>The reader is reminded that this report was written in 1898. Dr Hough's important discoveries in this region were made in 1901 (see Report of the U. S. National Museum for 1901, p. 279-385).

but the skeleton was too poorly preserved to add to the collections. There is a large ruin near Adamana station, and others in the Petrified Forest reservation.

### FOUR-MILE RUIN

#### GENERAL PLAN

This ruin is situated 4 miles from Snowflake, and about 2 miles from Taylor, Arizona, and is one of the largest in the vicinity. It had never been visited prior to the author's work there in 1897, and no specimens from this locality are known besides those which he collected.

The ruin is situated on a bluff overlooking a tributary of the Little



FIG. 86. View of Four-mile ruin from river bed.

Colorado called Pinedale creek. One end of the ancient pueblo overlooks the stream; the other extends along a low crest at right angles to its banks. On the northern and southern sides there are narrow plains, that on the south being apparently composed of alluvium brought down and deposited by the stream, or washed from higher neighboring hills by torrents of rain, which are often very violent in this region. The general form of the ruin is irregularly rectangular, with no well-defined evidences of a central plaza in the western part. The eastern region, however, has a flat top with scattered rooms, and was evidently well situated for ceremonial dances or other gatherings.

The larger population lived in the western part of Four-mile ruin, and probably the eastern region was not permanently inhabited.

In this part of the ancient village there were remnants of circular rows of stones, which suggested shrines, and certain piles of refuse composed in part of ashes, as though remains of fuel used in firing pottery. The eastern quarter of the town does not appear to have had an inclosing wall, and no signs of kivas or ceremonial chambers were detected. It was the only flat place near the pueblo at all suited for sacred dances, and it probably was used for that purpose.

The accompanying cut, figure 86, shows the appearance of Four-mile ruin from the bed of the stream, and gives a fair idea of the bluff upon which the mounds are situated. The north cemetery is situated at the left of the highest point, and the camp of our party is seen at the extreme right.

#### A ROOM IN THE RUIN

In order to study the architecture of the rooms of Four-mile ruin, earth was removed from one of the best preserved and its dimensions were carefully ascertained. This room had in the past been washed out by torrents of water, and was on that account easy to clear. It was situated on the north side of the highest mound, near the line of separation between east and west portions of the ruin.

The floor was found about 7 feet below the surface. It was paved with large flat stones, nicely fitted to each other, and apparently set in adobe. On the east side there was a raised banquette extending across, and corresponding in a general way with the spectator's section of a Tusayan kiva. It resembled even more closely the raised floor which the author has elsewhere described in the cavate rooms of Verde valley and the cliff-house rooms of the Red Rock country in the same valley.

About midway in the length of the raised portion, near the remaining floor of the room, there was a small crypt or inclosure formed of flat stones set on edge, and similar in form and position to those found in the kivas of the cliff palace of the Mesa Verde. The author has seen a like structure in San Juan pueblo on the upper Rio Grande. In the floor itself there was a depression lined with stone slabs, which may have been a fireplace. The top of the banquette was made of smoothly worn flat stones, and its side was plastered. Several very finely drilled holes penetrated the flags covering the floor and banquette, the arrangement of which is shown in plate LVIII. These were about the same size (that of a broom handle) as the symbolic opening called the sipapû in the floor of a Hopî kiva,<sup>a</sup> and when the first one was found the author was inclined to interpret it in the same way. The subsequent discovery of many others left him in doubt as to their proper interpretation.

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<sup>a</sup>The sipapû of a kiva is symbolic of the opening in the earth through which races, in earliest times, are said to have emerged from the under world.

The structure of the walls was interesting. They were made of adobe, but at regular intervals the much decayed remnants of upright posts were found embedded in them. These posts (figure 87) are thought to be comparable with similar logs used in the construction of the adobe walls of houses in the Gila valley, as described in a subsequent account of the architecture of the buildings of the Pueblo Viejo (page 177). There were no lateral windows in this room, and the entrance was probably from the roof, no remains of which were, however, discovered.

In order to determine the number of superimposed rooms in the highest part of Four-mile ruin, the author followed the walls down



FIG. 87. Upright posts in wall at Four-mile ruin.

from the surface of the main mound, penetrating through two floors before he came to the lowest, which rested on the undisturbed soil. It may, therefore, be concluded that the pueblo in this part had an altitude of three stories, and it is probable that there was still a fourth above, the remains of the walls of which the author was unable to trace. There were no walls standing above the ground at any point on the mounds, and the general appearance of the ruin is that of great age.

As a rule, the oldest ruined pueblos in the open plain are destitute of walls standing above ground; those with high walls are more mod-



ern. This is not a universal law, but it can be relied on with fair certainty. Ruins on hilltops have, as a rule, higher walls above ground than those in the plains, even when they are of equal age. Cliff houses, on account of their sheltered position, preserve their standing walls longer than any other type. No doubt one reason why pueblos of the plain, especially such as those in the valley of the Little Colorado, so seldom have free walls above ground, is their burial by the dense sand storms which sweep over them, especially in the spring months. The destructive rains in time wash through their roofs, and water, making its way into the joints of the upper layers of the walls, causes them to topple over, forming débris at their base. These forces take time, but, except in those ruins which have walls wholly of stone, the most ancient are reduced to simple mounds penetrated by house walls which never rise above the surface of the ground.

#### SUBURBAN OVENS

In searching for the north cemetery the author began a trench just outside of the bounding wall, and on excavating a few feet below the surface found several cysts like those at Kintiel, which were filled with ashes and charred wood. These are interpreted as suburban ovens. Similar structures were found at Cheylon in 1896, and it is not improbable that they will later be found in many other ruins of the Little Colorado river.

Many authors have referred to the absence of fireplaces in ancient pueblo rooms, and the existence of chimneys in prehistoric times has not yet been proved. The discovery of suburban ovens indicates that cooking was done in the open, just as is the case with certain kinds of food in modern pueblos.

#### CEMETERIES

It was with considerable difficulty that the author was able to find the burial places of this pueblo, and some time was consumed in the search. In the ruin at Homolobi and on Cheylon creek the interments were discovered just outside the outer walls of the pueblo, and it was natural to look in these places for burials at Four-mile ruin. Extensive trenches failed, however, to reveal any indication of the dead in this part of the mounds. No burials were found close under the walls.

In the course of an examination of the level region some distance north of the mounds, near the river bank, the author unexpectedly discovered a human bone projecting from the soil. This indication was sufficient, and systematic work in the vicinity brought to light many skeletons and mortuary objects.

There can not be a doubt that in the time which has elapsed since the burials were made the stream has encroached upon this ceme-

tery, washing away the superficial soil and leaving a great number of small boulders. Digging among these stones was very difficult, and many of the burial objects of pottery were broken in extracting them from the earth. This part of the stream bed is not flooded except at times of freshets, and it is covered with a scanty vegetation, composed mainly of small clumps of sage brushes. This vegetation gave indication of the existence of graves, for a skeleton was found under almost every bush, often buried less than a foot below the surface.

A second larger cemetery was found on the opposite side of the ruin at about the same distance from the houses as was the first. The burials at this place were very deep, but the soil was a sandy alluvium in which the pottery was better preserved. As far down as the soil was penetrated skeletons and pottery were found. The greatest difficulty in getting them was due to the caving in of the embankments. Most of the finest specimens were obtained at this point, but the supply was by no means exhausted.

The bodies were buried extended at full length, and with no effort at a common orientation. Most of the skeletons were poorly preserved, even the larger bones crumbling as they were removed from the graves. A number of perfect skulls, including those of adults and children, male and female, were, however, obtained from both cemeteries. No evidence was noticed of an attempt to cover the bodies with logs, as was done at the Chaves pass ruins, or with flat stones, as was so common at Homolobi. No fragment of a wrapping of mats or basketry was found.

A cooking pot found in this cemetery contained a lump of clay, rib bones of some mammal, a stone polisher, and many cedar twigs. Within this bowl were two smaller vessels turned upside down.

Most of the pottery found in the cemeteries of Four-mile ruin was covered with a tenacious, white, calcareous deposit, which was easily removed by washing.

## COLLECTIONS

### POTTERY

#### PRINCIPAL TYPES

The pottery of Four-mile ruin is essentially the same as that found at Homolobi and Cheylon in 1896, and consists of about the same proportion of decorated and of rough, coiled ware, the former predominating.

The rough ware differs but little from that of the pueblos already mentioned, but there is a great increase in the number of specimens of this ware with a smooth blackened interior. The percentage of this kind of pottery increases as we go south from the ruins about the inhabited villages of the Hopis, and is greatest in the ruins on the Gila-Salado watershed. The blackened interior resembles the black

ware of Santa Clara pueblo, but no vessel was found at Four-mile ruin whose exterior was of this color.

One of the kinds of rough ware which is well represented at Four-mile ruin is that decorated on the exterior with geometrical patterns (see figure 88). The pigment was applied to the rough outer surface of the coils. Commonly, however, the interior was smooth and blackened, as with certain other rough-ware vessels. The predominating color of pottery from this ruin was red, and almost all forms were made in this color. It is the characteristic color of pottery in the Little Colorado ruins, and is found as far south as Pinedale, reappearing again in the Gila basin.

Bowls of red ware with black decorations having a margin of white occur in many of the Little Colorado ruins. Fine vases of these colors, in which white predominates, especially around the neck, are characteristic of ruins in this valley; the author has found no record of them in the neighborhood of the Hopi towns, or south of the Mogollones. A representative specimen of this type is figured in the author's preliminary report for 1896. This ware is not as fine as the characteristic cream and yellow ware of Sikyatki, but is often made of a finely ground clay sufficiently well burned in firing to give fine specimens.



FIG. 88. Ornamented rough bowl from Four-mile ruin (number 177148).

#### GILA TYPE

The characteristic pottery of the Gila valley is a brownish ware, ornamented with red, and is very easy to identify. A specimen of this ware has been figured in color in a preliminary report for 1897. As far as is known, this kind of ware is generally confined to the Gila-Salt river basin. In the excavations of the cemeteries at Four-mile ruin two specimens of this peculiar ware were discovered, but the author does not regard the adventitious occurrence of these specimens, so different from the others in the same ruin, as anything more than examples of intrusion, and believes that they were brought there from a distance. As a rule, there is considerable similarity in the coarse types of pottery from Four-mile ruin and from Pueblo Viejo, the upper part of the Gila valley, which the author has not regarded as illustrating a theory of transportation of specimens; but the sporadic appearance of a prominent type of Gila pottery so different from the others appears to him to demand such an explanation. We may suppose that these specimens went over the watershed of the Gila and Little Colorado in the packs of traders, or possibly were carried by migratory clans. They were not manufactured by the people in whose cemeteries they were found.

## FORMS

There is nothing peculiar in the forms which the pottery from this ruin assumes, though there were a few specimens different from any yet obtained from the Southwest. One of the most beautiful of these was a globular vessel of red ware, with a graceful neck and symmetrical handle. The ornamentation on this vessel was black and glazed, the design representing a highly conventionalized bird. This specimen was perfect, with the exception of a small chip in the lip of the orifice. Although a long search for the missing fragment was made it could not be found.

An oval vessel with a hollow handle with external opening recalls similar objects called canteens in other reports. They were doubtless used for transportation of water, and may be classified as a ceremonial type of pottery.

An unusual form, seen in figure 89, is shaped like a saucer, and is



FIG. 89. Small saucer from Four-mile ruin (number 17731).

decorated exteriorly with an artistic arrangement of triangles in black, bordered with white lines.

Food bowls predominated in the collection, and the majority of the vases were small.

## DECORATION

The contribution of the picture writing on pottery from this ruin is highly instructive, and connects the people of Four-mile ruin with those of Homolobi and Cheylon. As on the pottery from the latter ruins, bird figures are particularly abundant, but there are representations of human beings, mammals, reptiles, and insects.

While, however, there is a general similarity between the ceramic pictures of this ruin and those of the pueblos mentioned above, this resemblance does not extend into details, and the same may be said with regard to other pueblo paleography. The picture writing of each pueblo has an individuality which seems to indicate that it was

independently developed, adapting certain general forms or patterns to special ideals. The causes of this divergence in the designs on ancient pottery are no more comprehensible than the differences in the decoration of modern pottery in two different pueblos. Why, for instance, should the symbolism of Walpi differ so markedly from that of Zuñi, when there are so many points in common between the rituals of the two pueblos? The differences in the pueblos are mainly due to their clan composition, to the relative prominence of different families in them.

#### HUMAN FIGURES

The student of the modern Hopi ritual is familiar with the use of helmets in ceremonial dances, and the author has pointed out the limitation of those helmets to the rites from the advent of the *kateinas* at the winter solstice to the *Niman*, their departure in July. *Kateina* dancers among the Hopis are masked, and they are the only masked dancers in the calendar. Studies of the ancient pictography from *Sikyatki* have not revealed a single figure wearing a mask; but the majority of the human figures on modern pottery wear masks or ceremonial helmets. The interpretation which is advanced for this fact is that the ancients in *Tusayan* were not familiar with masked figures, not having them in their rites, but that in the growth of the ritual new clans, in modern times, introduced masked *kateinas*, and consequently modern potters now make figures of them on their pottery. The logical conclusion would be that, if we find in any ruin a picture of a masked personage, the inhabitants of that pueblo must have seen a *kateina*. One of the pictures found on a bowl from *Four-mile* ruin leads to the belief that *kateinas* were known in that pueblo, for it represents a masked dancer (see figure 90).

The design may be interpreted as follows: The figure is evidently intended to be a drawing of a human being. The head has the form of a mask, in which are slits for eyes; the knobs represent feathers. The three semicircular figures on the lower end of the body resemble rain-cloud symbols, and the double row of rectangles with inclosed dots recall the symbol at present used by the Hopis to represent an ear of maize.

There is little doubt that the figure shown in plate XXIV represents a human being. All parts except the head are recognizable, and as we know from another specimen that ancient Pueblo artists could represent a human head very cleverly, we are called upon to explain why they substituted for a head the strange device which is found here. The possible explanation is that it represents a mask. The designer intended to figure a masked human being or *kateina*. Now, different *kateinas* are distinguished by symbols drawn on their masks or helmets, consequently the next step is to compare the helmet of the masked figure from the *Four-mile* ruin with those known in the Hopi system.

The author finds one highly suggestive appendage to the head—the radiating crest resembles the feathers in figures of a mythical conception called Shalako. We have here a picture with a helmet adorned with a crest of feathers, recalling a Shalako, which is a Zuñi as well as a Hopi conception, derived in Tusayan and Zuñi from the same source, or from some of the ruins along the tributaries of the Little Colorado. The logical conclusion would be that the people of Four-mile ruin likewise recognized this being.

Apropos of the possibility, revealed by this picture of a masked



FIG. 90. Human figure on food bowl from Four-mile ruin (number 177061).

dancer, that masked or kateina dances were once celebrated at Four-mile ruin, attention is called to the short distance of this ruin from a legendary home of the kateinas near St John, New Mexico.<sup>a</sup> Both Hopi and Zuñi legends regarding the ancient home of these beings cluster so definitely about a ruin near this town that we may suppose that the former inhabitants of that mythical place possessed a knowledge of the cult. To the lake near by both Zuñis and Hopis

<sup>a</sup> Kothualewü of the Zuñi legends; Winema of the Hopi. It would be a most instructive work from a mytho-archeological point of view to investigate the antiquities in the neighborhood of St John, especially near the lake so often mentioned in legends.

make pilgrimages for sacred water; here, likewise, they carry prayer plumes. The locality is sacred to the priests of the kateina cult in both pueblos. The logical implication is that some of their ancestors once lived there.

The distance of the Four-mile ruin from this place so closely connected with the kateina cult is not as great by many miles as between it and Walpi, not much greater than between it and Zuñi; so that it is certainly not improbable that the cult which has made its influence felt on these modern pueblos should have been practiced in the pueblo now called Four-mile ruin.

Another picture of a human face, body, and arms is also instructive. The head of this figure (see plate XXV *a*) is unlike any other, but the appendages are closely paralleled in figures on certain ancient vessels from Oraibi. The mouth is represented by a triangle, as is also the case in modern Hopi pictures of the sun god. The arms to the elbows are raised to a level with the head, which is circular, with two large eyes. The two appendages shaped like quadrants are supposed to represent feathers. The bowl on which this picture occurs is broken, but it is one of the most beautiful specimens of red ware in the collection.

A rude figure of a quadruped decorated one of the largest food bowls found at Four-mile ruin. Designs of this kind are common in pictographs, but are rarely present in pottery decoration. It has been suggested that this figure was intended to represent a dance figure, and that the caudal appendage shows the fox skin which is at present almost universally worn by participants in the sacred dances. It is a widespread belief among the pueblo people that in early times, more especially when the human race inhabited the under worlds, human beings had tails.<sup>a</sup> Perhaps the ancient potter had this myth in mind when some of the human figures represented on old pottery were painted.

#### QUADRUPED FIGURES

One of the best examples of picture writing from Four-mile ruin occurs on a vessel of fine chestnut ware not unlike that of Sikyatki. The author formerly regarded this as a picture of a reptile, or possibly of a horned toad, but there are reasons for identifying it as a quadruped, possibly the raccoon.

The general form of this figure is shown in plate LX *b*. The head has a triangular appendage, the throat is spotted, and the jaws are armed with teeth. Two eyes are placed on one side of the head, as is often the case in Pueblo drawings of animals. The body is crossed by parallel and zigzag lines, and in places is decorated with crosses and dots.

The quadruped figures on the exterior of bowls are mentioned later.

<sup>a</sup> Many ancient legends refer to the caudal appendages of men in very ancient times, and it is sometimes stated that their tails were cut off by a cultus hero. These traditions are not confined to the Hopis, but are reported from other pueblos.

## BIRD FIGURES

Figures of birds predominate in the pictography of all the ancient pueblo ruins which have been studied. This is true no less of Four-mile ruin than of those lower down on the Little Colorado river. In their delineations of bird figures, however, the artists took strange liberties with nature, representing birds unknown to students of ornithology. One of the most interesting of these from Four-mile ruin was a toothed bird drawn on the interior of a food basin. That



FIG. 91. Bird design on food bowl from Four-mile ruin (number 177203).

this picture was intended to represent a bird would seem to be shown by the representation of wings and tail, though but for the latter organ it might be suggested with some justice that a bat was intended.

In all these representations of mythical animals the imagination had full sway. It was not the bird with which the artist was familiar through observation, but a monstrous creation of fancy, distorted by imaginations—real only in legends—that the potter painted on her vessels. Hence, we can not hope to identify them, unless we are familiar with the mythology of the painters, much of which has



perished. The comparatively large number of bird figures on the ancient pottery indicates a rich pantheon of bird gods, and it is instructive to note, in passing, that perscunations of birds play important parts in the modern ceremonies which have been introduced into Tusayan from the south.

One of the best figures of a bird found at Four-mile ruin is shown in figure 91. The various organs can be recognized without a detailed description, but the form of the wings is somewhat different from that thus far shown in pictographs.

In the next design (figure 92) we have at opposite angles of a rectangular figure representations of birds, alternating with triangles drawn on the remaining angles in a characteristic Zuñi and Hopi manner. This is one of the few figures in which birds are represented by triangles.

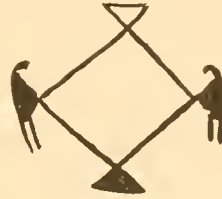


FIG. 92. Bird design on food bowl from Four-mile ruin.

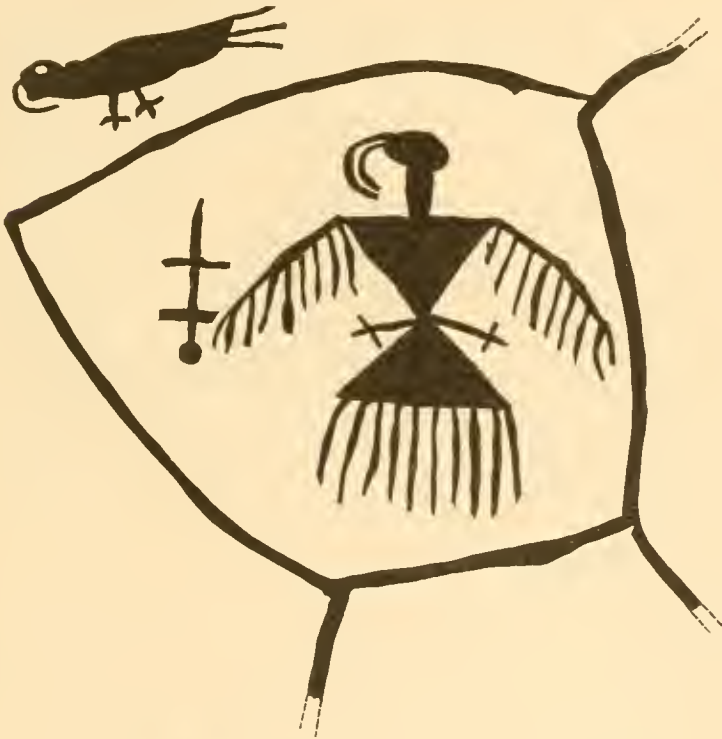


FIG. 93. Bird designs on food bowl from Four-mile ruin (number 177170).

The bird design reproduced in figure 93 shows a long curved snout, and parallel lines representing feathers on tail and wings. The two legs are thrown out of perspective, but so closely do they resemble

those of some other bird figures that there can be little doubt of their homology. In the same inclosure in which the bird is depicted there is also a figure of a dragon fly, and outside the inclosure is a picture of another bird. This is one of the most interesting avian pictures from Four-mile ruin. The representation of tail feathers by parallel lines in this figure is corroborative of the same interpretation of parallel lines elsewhere shown on ancient Pueblo pottery. The form of the head and the long curved beak is common in several other pictures of birds, and an effigy vase with beak of a like structure is described from Cheylon ruin in the report of the expedition of 1896.



FIG. 94. Bird design on food bowl from Four-mile ruin (number 177173).

A very highly conventionalized bird figure is shown in figure 94, where the different parts are represented by geometrical lines.

#### BUTTERFLY FIGURES

A large and beautiful food bowl of red ware (plate XXV *b*) found at Four-mile ruin, had an unusual design representing a moth or butterfly, probably the latter, depicted on one segment of the interior. In this design (figure 95) two eyes are represented on one side of the head, there is a coiled antenna, and the body and the border of the wings are marked with rows of dots. These dots are common features in butterfly figures, as may be seen in modern drawings of this insect among the Hopis.

## FEATHER DECORATION

Representations of the feather, often highly conventionalized, are very common in the designs on ancient Hopi pottery, and, as the author has shown in a previous article, different kinds of feathers have characteristic forms. These designs have been detected thus far in the ruins about the inhabited Hopi villages, at Sikyatki, Shumopovi, and Kusakobi or old Walpi. They have not been found, with one exception, in the ruins along the Little Colorado river, though

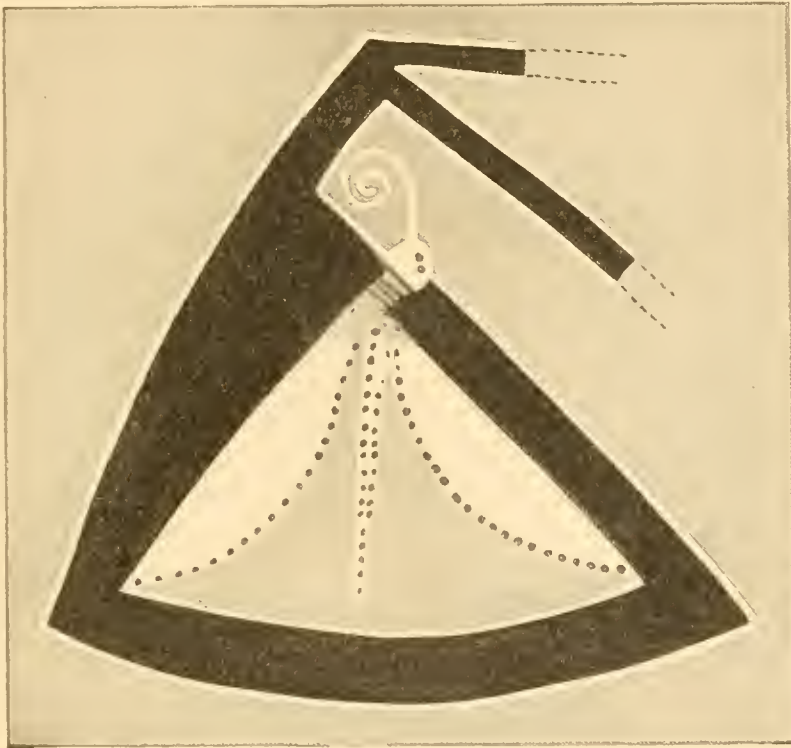


FIG. 95. Butterfly design on food bowl from Four-mile ruin (number 177110).

the author has been able to examine much larger collections from this region than from either Shumopovi or Kusakobi.

One of the feather symbols was shown to be the triangle, a form of which is still preserved in the decoration of modern ceremonial paraphernalia. This type of feather design seems to be common in the Little Colorado pottery, but is more difficult to recognize and is also less common here than it is in the highly instructive symbolism of Tusayan.

## GEOMETRICAL FIGURES

There were many specimens of pottery from Four-mile ruin decorated with the various geometrical figures so common on all ancient Pueblo ware of northern and central Arizona. The types were terrace figures, spirals, frets, bands, dots, bars, and zigzags. The proportion of geometrical figures, as compared with representations of animals, was large. As we investigate ruins more and more distant from those about the Hopi villages, this proportion increases; and if we considered geometrical motives as older and simpler than



FIG. 96. Sun emblem on food bowl from Four-mile ruin (number 177058).

figures of animals, it would seem that pottery ornamentation reached a higher development in Tusayan, where drawings of animals and human forms predominate.

The geometrical figures on the outside of food bowls from the ruins on the southern affluents of the Little Colorado are more elaborate than those on the northern (see plate LXIII). Modifications of the broken line, either in spirals, frets, or bands, are common features of the ruins in both regions.

An instructive piece of pottery from Four-mile ruin was a small food bowl ornamented on the interior with a ring (see figure 96), from which radiated serrated bars, the significance of which is unknown.

In the rich collection of Sikyatki pottery the author found a larger food bowl, the interior of which was also decorated with a ring, and to this ring undoubted feather symbols were added. It may be sug-



FIG. 97. Bowl with double spiral design, from Four-mile ruin (number 177102).

gested, therefore, that the serrated appendages to the ring in the above-mentioned specimen may likewise be conventionalized feathers, and there are other grounds for interpreting them in this way.



FIG. 98. Decorated vase from Four-mile ruin (number 177234).

The small food bowl shown in figure 97 is ornamented with an exceptional design, a spiral enlarging from the center to the rim of the bowl. This bowl is interesting as the only one of a pronounced heart shape. This form of spiral is instructive, showing the break in the line so characteristic of ancient Pueblo designs.

The decoration shown in the accompanying cut (figure 98) is peculiar, but effective. The two vertical lines on the neck are repeated on the opposite side. Similar markings are found on vases, food bowls, dippers, and ladles in all Tusayan ruins, and represent feathers.

The design shown in the next cut, figure 99, is unique among all forms of ornamentation known, and its meaning is incomprehensible to the author.

One of the most characteristic designs, with a spiral motive, is shown in plate LXIV, which is typical of many figures on Four-mile ruin pottery. This design is characteristic of the Little Colorado river ruins, especially on the red ware so common in them.

The general character of the geometrical ornamentation of food bowls may be seen in plates XL-XLII, LXIII.



FIG. 99. Unknown design on food bowl from Four-mile ruin (number 177126).

#### EXTERNAL ORNAMENTATION ON FOOD BOWLS

In his account of the ceramic objects found at Sikyatki the author has figured some of the more prominent designs from the exterior of food bowls and has attempted a discussion of their significance. In the abundant material collected from that ruin no specimen was found with figures of animals, with the exception of a highly conventionalized bird. Spiral designs were very rare, the main forms being rectangular geometrical designs with added feathers. In two instances

there were human hands or animal paws. A dot with parallel or slightly radiating lines was a common feature, and the ornamentation was, as a rule, confined to zones or limited to one point on the rim.

The external decoration on food bowls from the Four-mile ruin differs greatly from that of the Sikyatki collection. Both rectangular and spiral designs occur, and several specimens have figures of mammals and birds.

As a rule, the external decoration is continuous on the outside of the food bowl, and is not, as is generally the case at Sikyatki, confined to one portion. Some of the typical forms of external decoration are shown in plate LXIII.

In the account of the pottery from Sikyatki attention is called to the predominance of straight lines and rectangular figures on the



FIG. 100. Bear design on exterior of food bowl from Four-mile ruin (number 176999).

exteriors of the food bowls. Curved lines, and especially spirals, were practically absent in this decoration. This is also true of the collection of food vessels from Shumopovi, where a considerable number were obtained in 1896. Another peculiarity of the external ornamentation of Sikyatki pottery is a design in which we have a dot from which extend short parallel or slightly divergent lines; these have been interpreted as representing a *nakwakwoei* or feathered prayer string.

The external designs on food bowls from the Little Colorado ruins have a large proportion of spirals, and thus far there have not been found the dot and appended parallel lines mentioned above. It seems, therefore, not improbable that this particular form of the feather is peculiar to ruins in the immediate vicinity of the present Hopi pueblos.

On one of the food bowls from Four-mile ruin there was a representation of a large mammal which calls to mind a bear (see figure 100). This is the only instance known to the author of a representation of this animal on the outside of food vessels.

Pictures of birds are found on the outside of several bowls. One of the most exceptional of these is the "twin-bird" design (figure 101),

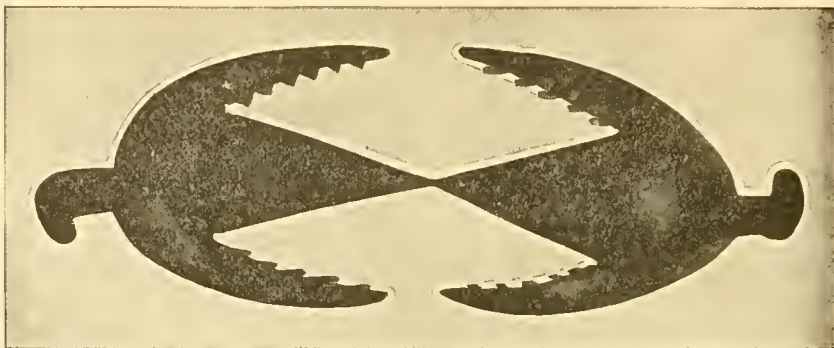


FIG. 101. Twin bird design on exterior of food bowl from Pinedale (number 176888).

which represents two birds attached by their tails. These peculiar forms are likewise found at Pinedale and other ruins high up in the White Mountain reservation.

The figure of the bird shown in figure 102 is found on the exterior of a food bowl from Four-mile ruin, and is one of the few bird draw-

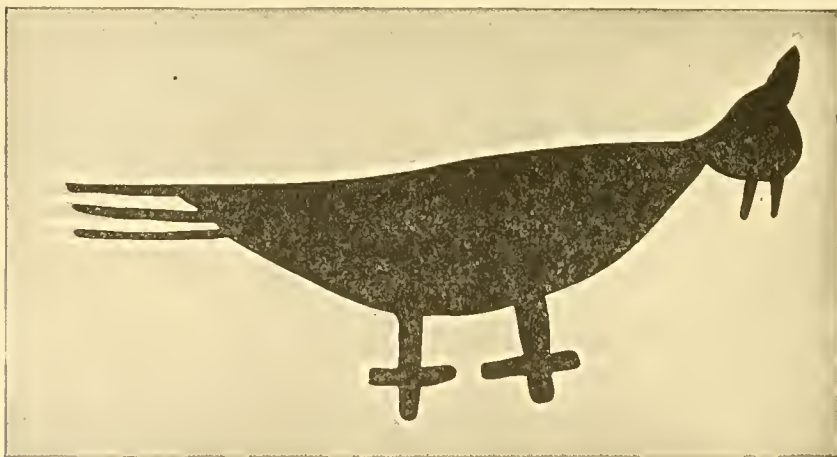


FIG. 102. Bird design on exterior of food bowl from Four-mile ruin (number 177378).

ings from the outside of a bowl. The manner of representing the claws is one often adopted in avian figures. Parallel lines, for tail feathers, are repeatedly found in Southwestern pictography.

On one of the food bowls we find the accompanying symbol (figure 103), which reminds one of the modern rain cloud, so prominent in Hopi symbolism. It has, however, resemblances to the paw



of the bear or badger, and from the fact that a mammal identified as a bear is found on the exterior of the bowl illustrated above (figure 100), it is probable that this symbol likewise should be referred to that animal.

The very chaste form of geometrical decoration shown in figure 104

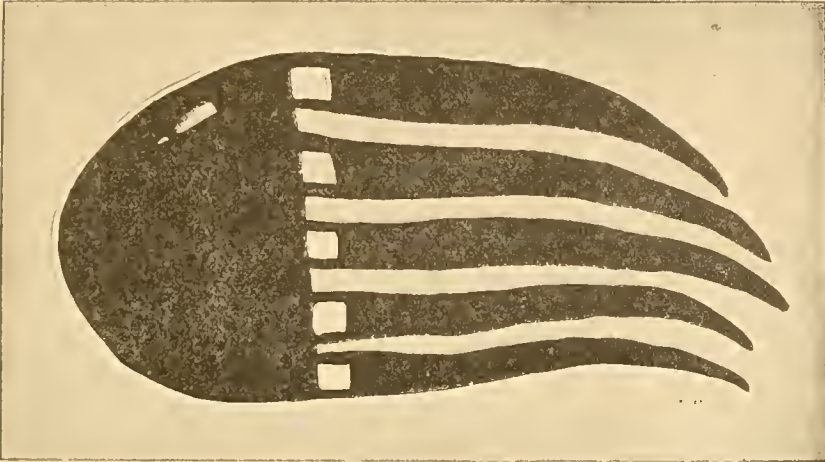


FIG. 103. Bear's paw design on exterior of food bowl from Four-mile ruin (number 177277).

was found on the outside of a food bowl from Four-mile ruin. It is a composition of triangles, T-shaped figures, and terraced designs, arranged on a shaded rectangle.

#### RAIN-CLOUD DESIGNS

Three types of rain-cloud symbols are used in the modern Hopi ritual. These are the rectangle, the semicircle, and the triangle. The two former are ordinarily triune. We have either three semicir-



FIG. 104. Geometrical design on exterior of food bowl from Four-mile ruin (number 177000).

cles or three rectangles combined, the latter appearing as a stepped figure. The number of components may be multiplied, in which case we find many semicircles approximated, their shapes somewhat modified by the juxtaposition, or many rectangles combined, forming terraces.

It is easy to mention instances of rectangular rain-cloud symbols represented in the modern ceremonial paraphernalia. We find them carved into tablets on the heads of many dolls and idols. The Humis kateina dancers wear them on their helmets. They are painted on the uprights of altars, woven into baskets, and embroidered on sacred dance kilts.

This terrace form occurs as a rain-cloud symbol on several bowls from the ancient ruin of Sikyatki. It is also found on mortuary stone slabs at the same ruin. The four sides of the ancient shrine in the Awatobi kiva had rectangular rain-cloud symbols of different color, showing that this form was recognized in this pueblo. The author has elsewhere pointed out its existence in the Homolobi ruin, and now the same type is reported from Four-mile ruin. While, as a general thing, this form is the predominating type of rain-cloud symbol used in the kateina celebrations, it is not confined to them, but is also found in the Flute ceremonies and elsewhere.

The semicircular type of rain-cloud symbol is no less common than the rectangular in the modern decorations, and, while most abundant in ceremonials which occur between the departure of the kateinas and their advent, it is not wholly absent in the masked dances. This form has not yet been found on ancient Hopi pottery—which fact leads to a belief that it is of late introduction. It is, however, very conspicuous in the ceremonials introduced into Tusayan by the Patki or Rain-cloud people, and it is a significant fact that the totemic signatures of members of this family have the same form. A ready explanation of the existence of this motive in Walpi would be that the southern clans introduced it, and its occurrence in the Snake ceremony would be interpreted as an example of intrusion.

The semicircular type of rain-cloud symbols is not considered a development of the rectangular, or vice versa; but it is thought to be a new symbol of foreign origin, the rectangular being the older in this particular locality.

The triangular rain-cloud symbol is less common in modern designs, and is rare or unknown in ruins near the modern towns. The majority of examples of it come from the Little Colorado ruins, but it occurs on some of the idols used in Walpi at the present day.

A food bowl decorated with triangles arranged in such way and with such an association that they may be interpreted as rain-cloud symbols was found at Sikyatki, but this interpretation is doubtful. Another bowl from Shumopovi admits of the same interpretation.

A symbol of the rain cloud among the people of the pueblo—now a ruin—at the mouth of Cheylon fork, was a triangle inclosing a rectangle. These symbols were found on a stone slab excavated from that ruin in 1896, and were figured in reports of the work accomplished in that year (see plate XLVI). A beautiful large food vessel

dug out of the north cemetery at Four-mile ruin, shown in figure 105, is decorated with triangles which are also supposed to be rain-cloud symbols. Above them is a semicircular band which is identified as a representation of the rainbow.

An example of the triangular form of symbol representing the rain cloud is found on one of the effigies of the Flute altar, and is figured in an account of the Walpi Flute observance.<sup>a</sup> Many of the rattles used in kateina dances have on each of their flattened sides four tri-



FIG. 105. Cloud emblem on food bowl from Four-mile ruin (number 157352).

angles united at one angle, and with parallel lines representing falling rain on the sides opposite their union. These figures have a distant resemblance to feather symbols, as may be seen by comparison with some of the bird designs from Cheylon ruin.

It will be seen from the foregoing account that there are three types of rain-cloud symbols in use in the modern Hopi ritual, the semicircle, rectangle, and triangle.

In the same way it can be shown that there are at least two types

<sup>a</sup>Journal of American Folk-Lore, v. 8, n. 27, pl. 11, fig. 1.

of sun symbols, and there are other instances which might be mentioned of two or more symbols representing the same thing. This duplication is explained by the composite nature of the tribe, one family adding one type, another a second, and so on. In the amalgamation of the clans each of these symbols becomes no longer limited to the family which brought it to the pueblo. While the semicircular rain-cloud symbol predominates, the survivals of the triangular and rectangular are numerous and suggestive.

The oldest form in Tusayan, so far as archeology teaches, is the rectangular, but the triangular is possibly equally ancient in the ruins along the Little Colorado.

#### CHARACTER AND TREATMENT OF MORTUARY POTTERY

It must be confessed that the pottery now placed over the dead is of poor quality and scanty in quantity, as compared with that used by the ancients for that purpose. The fine ware rarely serves this purpose, but is retained in the household. It may be interesting to note that among the modern Hopis special pottery objects are not manufactured for mortuary purposes, and the same is true of ancient burials. In the latter many of these objects show manifest signs of former use in the household.

To what extent the survivors of the deceased purposely broke mortuary vessels, nicked fragments from them when they were deposited in the graves, or in other ways symbolically "killed" them, it is very difficult to say. Many mortuary vessels have been found which were as perfect as when made; others were undoubtedly purposely broken before they were deposited with the dead. The great pressure of the earth above them doubtless fractured the largest number, and many were broken while being extracted from the soil. There is no direct evidence that mortuary pottery was ever to any great extent purposely broken before it was deposited in the cemeteries of Four-mile ruin.

#### POTTER'S OUTFIT

One of the bodies exhumed from the northern cemetery was accompanied by a potter's "outfit," consisting of the different ingredients used in making pottery and of smooth stones and other implements with which it was made. In other ruins the author has found masses of potter's clay such as are used by the potter, but nowhere as complete a collection of clays, pigments, and the like as in this grave.

The objects were:

1. Knife made of a rib, for cutting clay
2. Knife made of a rib, for cutting clay
3. Stone for rubbing, stained green
4. White clay
5. Yellow clay
6. Greenish clay
7. Micaceous hematite

## STONE IMPLEMENTS

Comparatively few stone implements were collected at Four-mile ruin, and they were, for the most part, so similar to those from other Little Colorado ruins that much space need not be here devoted to them.

There were found several serrated stone implements which seem worthy of special mention. They are made of hard stone, chipped to a sharp, toothed edge. The use of an implement of this kind is obvious; for with it, as with a file, a number of mechanical operations, such as sawing, filing, and scraping, are possible. Specimens of this form occur at almost every large ruin at which the author has worked in the last two years, and many of them were picked up from the surface of the ground.

The number of small stones showing pecking or artificial working which can be found at a Southwestern ruin is much larger than the proportion in collections would seem to indicate. From their great weight, as well as their numbers, the majority have to be left behind, and as a rule those which are destitute of a special form are rejected.

It was apparently the Indian custom to pick up any stone near at hand, to use it for pounding or other purposes as long as needed, and then to cast it away. It thus happens that innumerable stones slightly pecked on one or all sides, but without the form of any implement, are very numerous upon the mounds of almost every ruin.

The burials in the north cemetery were deep, and there was evidence that a considerable quantity of soil had been deposited over them, having been washed down from neighboring mounds. A few feet below the present surface of the ground in this superimposed soil the stone object shown in figure 106 was found, the probable use of which was a subject of some speculation. Having occasion later to open a room in the mounds above the point where this stone was discovered, the author found on the floor, several feet below the surface of the soil which filled the room, other specimens having the same general shape and character. In a gully between the room and the cemetery there was still another of these objects—making in all seven specimens.

The localities in which these stones were found indicated that they all belonged together, and that the two found outside the room had been separated from the others and had been rolled down the sides of the mounds, perhaps by the water, the course of which is marked by deep gullies in their sides. The forms of all these stones are much the same, irregular, ovate, with one flat side, and truncated at one pole. They were evidently fashioned with care, and, as the rock is hard, they must have been made with considerable difficulty. All had a small pit or depression on the flat side near the rounded pole.

Several suggestions were made by members of the party regarding the possible use of these stones, of which the following seemed to be

the best: That these stones are simply supports for rods used in weaving girdles, especially the great white sashes worn by kateinas. Identical supports for rods of this kind are used at the present day for the same purpose.

The frequency with which stones used for grinding corn are found in graves may be explained by their prominence in the life of the women, in whose graves they generally occur. These utensils are ordinarily found in a reversed position near the middle of the body. The custom of burying metates in graves is known from the ceme-



FIG. 106. Stone used in belt frame, from Four-mile ruin.

teries at Sikyatki, Homolobi, Chevlon, Chaves pass, and Four-mile. A doubtful instance occurred in the Kintiel burial ground, where a metate was found in the graveyard, but not near any skeleton.

#### STONE SLABS

The presence of stone slabs, some of which are of considerable size, has been recorded in several ruins of New Mexico and Arizona, and these objects were also found at Sikyatki, Homolobi, and Kintiel. Several of these specimens were collected at Four-mile ruin. Many of the perforated stones were extracted from the floors of the kivas,

others, generally with an orifice of larger size, from the soil covering the rooms.

It has been suggested that some of these perforated stones were formerly built into walls of rooms to partially close the passageway,



FIG. 107. Stone slab from Four-mile ruin.

but their presence in graves is not readily explained by this theory. Their fashioning demanded considerable labor, and the author recalls one of these perforated stones where the edge had been worked smooth with great care.

In his report on the operations in 1896 at Homolobi and the Cheylon ruin, the author called attention to the presence in graves of stone slabs on which figures of rain clouds were depicted, and in the excavations at Sikyatki he found similarly decorated stone objects. The practice of burying stone slabs ornamented with rain-cloud symbols was not unknown at Four-mile ruin, as one of the objects from graves at that place attests. This specimen has a rectangular form and is decorated with a terraced rain cloud painted in black outline on one side. It is possible that the grave from which this slab was taken was that of a priest, and that this object was formerly used in ceremonies, as is the case with certain altar paraphernalia of the same character in the modern ritual of the Hopi Indians. The representation of the rain cloud on a mortuary stone slab is the expression of the idea that the dead become rain makers or rain gods. This form of ancestor worship is a highly modified one, which can be directly traced to the arid environment in which the ancient people lived, and their status as agriculturists, which made rain a prime necessity to them.



FIG. 108. Copper bell from Four-mile ruin (number 177804).

This slab was likewise decorated with a row of triangular markings, and had perforations at the corners. A second slab, of less regular form, was likewise found at Four-mile ruin, but upon it the terraced rain-cloud figures were not as distinctly drawn as on the preceding. There was also found a stone slab with rectangular figure of unknown meaning drawn upon it with black pigment. A stone slab somewhat like this was found at Sikyatki in 1895.

While strolling over the mounds the author found a slab of stone of unknown use (figure 107). It was set upright and photographed. The object was about 4 feet long and about 8 inches wide, tapering slightly, and smooth on all sides. This slab had without doubt been worked into a regular form, and was a lintel of a doorway or some other part of a house.

#### COPPER BELL

The occurrence of bells made of copper has been recorded from several ruins in Arizona. The specimen obtained at Four-mile ruin (figure 108) is in no respect different from those previously mentioned, and belongs to the type constantly found in the Gila valley and in old Mexico. From the limited number of these bells in Arizonian ruins very meager conclusions can be drawn, but the author supposes that they were introduced from the south, rather than that they were manufactured by the former inhabitants of the ruined pueblo. There are indications of great antiquity in some ruins where they have been found.



The bell was taken from the hand of a skeleton exhumed from the cemetery north of the pueblo. It was much corroded, and broken on one side, and the small stone which served as a clapper had become firmly fixed to the inner wall by the corrosion of the copper.

#### PRAYER-STICKS

No fragments of mortuary prayer sticks were found in the cemeteries at Four-mile ruin, but this negative evidence does not prove that they were not in use among the inhabitants. The soil is so moist that there is doubt if these wooden objects would last long in it, though their preservation in the Cheylon ruin, where somewhat similar conditions prevail, shows that their absence at Four-mile ruin may furnish positive proof that they were not used in burial.

#### GOURD RATTLES

One of the instructive objects taken from the north cemetery at Four-mile ruin was a rattle made of a small gourd. This rattle had an oval shape, and was decorated with red and green paint, on which was the impression of feathers. The handle, which was broken from the rattle, was not found. The occurrence of this gourd rattle, identical with those still used in Pueblo ceremonies, gives archeological evidence of its use in ancient times, probably as an accompaniment to songs in religious rites.

#### ORNAMENTS

Although fully as many skeletons were exhumed from Four-mile ruin as from some others, the small number of marine shells, as compared with those found at Homolobi and Chaves pass, was noticeable. Though the ruin is situated in a latitude south of Chaves, only a few fragments of shell were found there, while there were several hundred specimens from the latter ruin. This can be explained only by the theory that the Chaves pass and Homolobi people had more marine shells than those of Four-mile ruin, that they were in more direct contact with the ocean, or with people who obtained them from the sea by barter or otherwise, thus indicating a direct relationship between them and peoples of the south. The ancient trade in sea shells was along the Gila river, up its northern tributaries, and across the Mogollones to the Little Colorado river. Chaves pass was in the direct line of this trade; Four-mile ruin was not, and the scarcity of sea shells in the latter locality is explained by its distance from the sea and the difficulty in reaching tribes nearer the Gulf of California.

The scarcity of beads and turquoise ornaments in the collections of 1897 was in marked contrast with the wealth of these objects at Homolobi and Cheylon. While this rarity may be in part due to the limited amount of soil removed in the work, it must also be remembered that the pueblos which were excavated in 1897 were smaller.

## BONE IMPLEMENTS

The bone implements found at Four-mile ruin were similar to those collected in 1896 at Chaves pass. They consisted of awls, needles, and bodkins, many of which were made from the wing and leg bones of the wild turkey or the tibiae of antelopes. There were also larger implements made of the bones of antelope and deer.

## ANIMAL REMAINS

A large collection of animal bones was obtained from the rooms at Four-mile ruin, but they have not yet been identified.

## RUINS NEAR FOUR-MILE RUIN

Within a radius of a few miles of Snowflake there are several ruins, some of which are of considerable size. The ruin near Shumway is one of the largest of these, and would well repay extensive excavations. There are ruins on the opposite side of the creek from Four-mile ruin, but these are smaller, and the elevations on which they stand have been diminished by deposition of the soil by the stream about their bases. The cemeteries have been so deeply buried under the accumulated earth that extensive excavation would be necessary to lay bare the objects which they contain, and, as the mounds themselves are small, the author did not attempt this work. The collections made at Four-mile ruin will undoubtedly serve as typical of those which could be taken from adjacent mounds, as the people of this whole neighborhood were probably in about the same stage of culture.

## RUINS AT PINEDALE

## THE BUILDINGS

The road leading south from Holbrook to Fort Apache, in the White mountains, divides just beyond Taylor, and one division continues to a small settlement among the pines, which is called Pinedale. This is a beautiful place to camp, surrounded by high trees, is well watered, and in places has fertile stretches of land suitable for farms. Two extensive ruins reported to me from that locality by Mr Frank Zuck, of Holbrook, promised interesting results if proper excavations were made in or near them.

Accordingly, work was begun, with 5 Mexican laborers, near the middle of July, and extensive excavations were made in the larger ruin. The results were not as satisfactory as had been hoped, but several important facts were brought out by the attempt. A small collection rewarded the work at this place.

The two Pinedale ruins lie on either side of the road just beyond the church of the town, and a few hundred feet from the new stone schoolhouse, one of the best in this part of Arizona.

Of these two ruins, that on the left of the road is the remains of a pueblo of compact form, with a central plaza obscurely indicated. From the general appearance of the ruins it is judged that the pueblo was at least several stories high, but no sign of wall was seen above ground.

The ruin to the right of the road covered more ground than the other. It was of rectangular form and apparently single storied. This ruin was evidently an ancient one, and many tall, fine trees were found growing from the soil in the rooms. The walls, however, had so fallen in that there were not more than traces of houses to be seen marking the former extent of the ruin. There was no evidence at any point that the rooms ever had more than a single story; and evidences of the gateways entering the ancient plaza were sought in vain.

The relationship of these two Pinedale ruins to each other appears to be as follows: The compact ruin on the left side of the road apparently contained the greater part of the population, while the rectangular building served as a place of refuge, for which its mode of construction made it admirably suited. If the theory is a correct one, it is probable that the rectangular portion was of later date than the compact one, and this is also indicated by its general appearance.

At various localities in the Southwest are found in close proximity ruins of buildings which apparently have a somewhat similar relationship. Thus in the Tsegi canyon one sometimes finds extensive ruins at the base of a cliff, and in the caverns above inaccessible cliff houses. Another very good illustration can be seen near Ramah, not far from Zuñi, where there is a fine rectangular ruin on the hilltop and the remains of an extensive pueblo at the base of the same elevation. The more inaccessible of these buildings was probably a place of refuge for the inhabitants of the more exposed pueblos in the plain and their contiguity made access from one to another easy. The same explanation may also be suggested for fortified hilltops near ruins, so well illustrated in so-called trincheras of the Verde valley.

In localities like that of Pinedale, where there were no adjacent caverns or hilltops convenient for fortification, a special building was erected for defense and refuge. This method was adopted in the Buena Vista ruin, situated in the Pueblo Viejo, to which reference will be made later.

It would appear that a specially erected building for refuge and another for habitation is a far less practical arrangement for defense than a combination of both in one. This has led to the building of habitations on inaccessible heights, in caves, or on mesa tops, or to the construction of the pueblo in such a form as to make it easy of defense. Thus, the houses are so placed that the highest wall is on the outside, where it sometimes rises to the altitude of several stories, sloping toward the middle of the town. Entrance into such a walled

town might be either by ladders, which could be drawn on the roofs, or through breaks in the walls or gateways.

The circular form of building would be a natural evolution of this form of a fortified pueblo, a survival of a plan of encampment adopted by nomadic Indians, as others have pointed out. No doubt sociological and other reasons also played a part in the circular arrangement of houses inhabited by different clans, but the principal cause was the need of defense.

#### COLLECTIONS

From one of the cemeteries of the larger Pinedale ruin several skeletons were exhumed. It was situated close to the outer wall, as at Homolobi and Cheylon, and the skeletons were accompanied with mortuary pottery. There was no good evidence that the ancients in this pueblo burned their dead, and logs or stones were not found over them as at Chaves pass. This was surprising in so well wooded a region. The bodies were not, apparently, wrapped in matting.

The pottery is essentially the same as that taken from ruins farther down on the Little Colorado, and the decorative symbols are much the same as at Four-mile ruin. With the exception of a picture of a bird on the interior of a food bowl, and several more conventionalized bird designs on the exterior of another, no animal pictures were found. The majority of the decorations were of the geometrical type. Rough ware and decorated pottery occurred in about equal proportions. One of the most beautiful specimens of red ware obtained in 1897 was exhumed at Pinedale. The decorations, both interior and exterior, were well made and the ware itself was of the finest type. Mr Zuck discovered this cemetery of the ancient Pinedale ruin in the year 1896, and removed from it several vessels which will compare well with any yet found in the Little Colorado basin. There is evidence, therefore, that as we leave the river the pottery does not deteriorate.

Several forms of bone implements were obtained from the excavations at Pinedale ruin. These came chiefly from the former dwelling rooms, and were rarely found in the cemeteries. They consist of awls, bodkins,

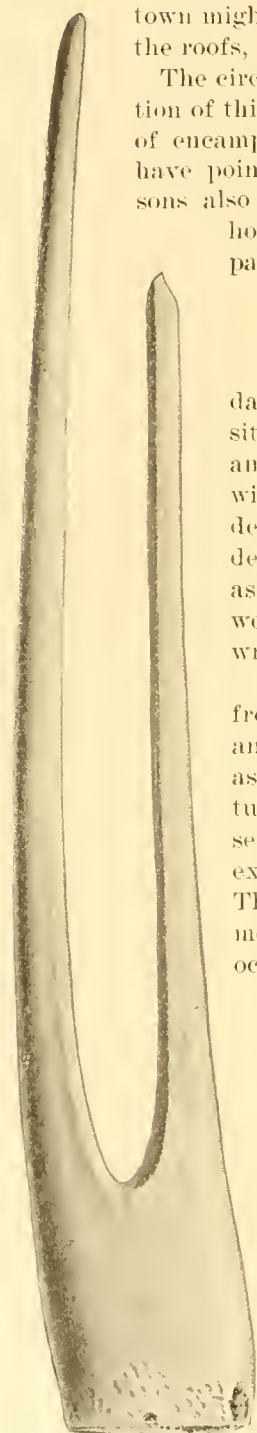


FIG. 109. Bone implement from Pinedale ruin (number 176964).

pins, needles, and pointed implements used in weaving and sewing. The largest specimens were made from the bones of deer and antelope<sup>a</sup>; the smaller, for the most part, from bones of rabbits and birds.

A bone implement was found in Pinedale ruin cemetery for the use of which there is no satisfactory explanation. It is made from a human arm bone, cut off a short distance from the trochanter. There can be no doubt that the cut is artificial, as the marks of a primitive instrument are visible, while there was evidently an effort to polish or otherwise work the surface of a similar specimen. The majority of these bone objects were made of the humerus of the wild turkey, one only being made of a human bone.

One of the most exceptional bone objects found at Pinedale was an implement with two long prongs, unfortunately broken at the end (see figure 109).

A shallow house-burial in one of the rooms of the ruin to the right of the Pinedale road contained calcined bones, evidently human, a copper buckle, and a few army buttons showing the action of fire. This was evidently an intrusive burial, much later than the others, and there is reason to believe that it was made long after the room in which it was found had been deserted, though there was no way of telling whether the fragments of the skeleton were those of an Indian or white man.

The tall trees growing from the débris filling the rooms of the rectangular ruin at Pinedale show that the pueblo was of great age. Fortunately, one of these had been sawn down, revealing the number of rings indicative of its age. Though it was not possible to count these with certainty, over 100 concentric layers could be made out without difficulty. In the room where these metallic objects were found grew one of the largest of the trees.

A considerable collection of crania was made at Pinedale, as at Kintiel and Four-mile ruins.

#### STOTT RANCH RUIN

During the troubles in the Tonto basin a few years ago, a party from the basin visited a ranch owned by a man named Stott, a few miles west of Pinedale, and hanged him for alleged horse stealing. The ruin called by his name is a few rods from his cabin, now deserted. It is a fine ruin situated in a beautiful park of lofty pine trees, and offers opportunities for archeological study, but is inconvenient for extensive work on account of its distance from a base of supplies, the nearest place, Pinedale, affording only a limited supply of provisions. In general character this ruin resembles those near Pinedale, and the few fragments of pottery which were picked up on the surface are identical with those from Four-mile ruin, near Snowflake. A mile or

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<sup>a</sup>The pueblos near haunts of deer and antelope have a larger proportion of bones of these animals; those in the plain have more bones of rabbits and birds. The fauna of the region is accurately reflected in the bones found in its ruins.

more southwest of this ruin there is still another, much smaller, crowning a hill top, with evidences of a considerable former population. Many fragments of pottery were strewn over the surface of the ground, and a few foundation walls were traced, especially on the highest point of the hill, but none of these rose above the surface of the mounds. The general character of all these ruins is the same as that of the Little Colorado series.

### RUINS IN PUEBLO VIEJO

#### THE VALLEY AND ITS HISTORY—GENERAL FEATURES OF THE RUINS

It will be seen by an examination of a map of Arizona that the ruins at Pinedale and Stott's ranch are very near the sources of some of the southern tributaries of the Little Colorado. They are situated high up on the northern foothills of the mountain area, the White mountains, which high lands constitute the watershed between the Gila and Little Colorado drainage areas. Although the distance is, comparatively speaking, short in a direct line from the sources of the tributaries of these two rivers, the intervening country is very broken and in places is impassable. It is especially desirable from an ethnological point of view to examine whatever ruins may exist in that region, since they may be regarded as frontier settlements of ancient peoples which, with many points in common, have many differences; but the author did not find it possible to do this.

It was, however, possible to take up the problem whether there is a close likeness between the ancient culture of the Upper Gila and that of the people who lived near Phoenix and Tempe. The author went around the White mountains, via the Southern Pacific railroad, and approached the Gila from the south. The section of this valley chosen for archeological study is almost directly south of Pinedale, and is locally known as Pueblo Viejo.

The name Pueblo Viejo is given to a portion of the valley of the Gila from Pima to San José, between Mount Graham and the Bonita mountains, forming the greater part of Graham county, Arizona.

This valley was traversed by the "Army of the West" in 1847, and the attention of Americans was first called to it by the reports of Emory and Johnston, in their "Notes on a Military Reconnaissance," published by Congress shortly afterward. These reports mention the antiquities of the valley, and have remained for fifty years the only available accounts of them. These authors refer to and figure some of the characteristic fragments of pottery, and speak of circular ruins. No remains of circular buildings can now be detected, and the author has grave doubts that the circular form of buildings ever existed in this region. The circular structures were more likely reservoirs.

This valley was probably known to Spanish explorers as far back as the seventeenth, and possibly the sixteenth, century. The com-

monly accepted route of Coronado would have led him to cross the Gila not far from the mouth of its tributary, the San Pedro, where there was a trail to Moqui, and probably also to Zuñi. If, however, as is urged by Dellenbaugh, he took a still more easterly route, and Cibola was situated near the Florida mountains and not at Zuñi, Pueblo Viejo and the Gila river are far to the west of his route.

Documentary history of the Pueblo Viejo in the seventeenth century is practically wanting. None of the great Spanish explorers passed through the valley in this epoch, when the region was entered along the Rio Grande by way of El Paso del Norte.

In the first decade of the eighteenth century there were apparently no rancherías in the Pueblo Viejo valley. The accounts of the several expeditions of Garcés, and contemporary maps, give no indication of inhabited rancherías east of the mouth of the San Pedro, and no mention is made in the diary of this devoted priest of people other than Apaches living on the upper Gila. But the existence of ruins near the mouth of the San Pedro is noted, though it is highly probable that they became such long before that time.

With the advent of Apaches the population of Pueblo Viejo retreated to the west, abandoning their farms one after another, until they came to the Aravapa canyon. Here they may have intermarried with other stocks, and the Sobaipuris of the early years of the eighteenth century probably contained some of their descendants. They or other survivors never returned to their old homes in the rich plains they had abandoned.

Pueblo Viejo was apparently uninhabited by Mexicans or sedentary Indians at the time of the passage of the Army of the West, and the mounds indicating former houses were frequently noticed at that time. Their age was even then a subject of comment.

The appearance of Pueblo Viejo at this time was probably not unlike that of those sections which are not now farmed. A dense growth of mesquite and cactus covered a sandy soil, which in the dry season turned to dust, covering the traveler or hovering in clouds behind him. Most of the larger specimens of mesquite and other trees have long ago been cut down, but the great growth which this tree may have reached can be judged from a few survivors. In places along the bank of the Gila there were clumps of cottonwood trees, some of which even now present a delightful sight to the weary traveler. In the rainy season the river overflowed its banks, flooding the neighboring valley for miles. The river, although fordable in the dry season, was so swollen after rains in the mountains as to be impassable.

The scenic beauties of the valley have not changed since the Indians lived on the Gila banks. The lofty Graham mountain, the black sides of which glisten with streams of water, is a beautiful sight from almost any part of the middle region of the valley. It

is covered in places with tall pines and other trees, and is a grateful place of resort in the hot summer days. The still more picturesque Bonita mountains, with their serrated summits, hem the valley on the opposite side, and north of these is a broken country, almost impassable, yet with ruined cliff houses and other evidences of a former occupation.

The many ruins in the Pueblo Viejo are all of the same type, viz, clusters of rancherías with a central building which may have served as a citadel for defense. Whether any special building was set aside for a ceremonial room or temple is an unanswered question, but there is some evidence that the central building may have sometimes served for that purpose.

Although a number of clusters of mounds were found in Pueblo Viejo, there were two which were specially examined—that at Solomonville, called Epley's ruin, and that at Buena Vista, a short distance higher up the river than San Jose. The limited time which could be spent in this region made the trip scarcely more than a reconnoissance, which it is hoped at some later day to follow up with systematic exploration.

#### DISTRIBUTION OF RUINS IN PUEBLO VIEJO

In ancient times, when the valley was populated by a sedentary, agricultural race, aboriginal dwellings were thickly scattered over the plain between the left bank of the Gila and the Graham or Pinaleno mountains. These dwellings were high up on the neighboring foothills as well as in the level plain, adjoining the river. In places houses were clustered together, forming a village, but the majority were isolated, dotting the whole valley. A compact, communal town of the pueblo type, such as is met north of the Apache reservation, was not found, and even when the population was concentrated the villages were composed of many clusters of small houses, separated from each other. As a rule, however, in such a cluster one central structure was much larger than the remainder. This centrally placed building, which is shown in the plan of the Buena Vista ruin (plate LXVI), resembles a type common in the Gila, Salado, and Verde valleys, where we find a central house surrounded by many mounds, indicating that a suburban population was settled about it.

The majority of the clusters of mounds which were examined were situated in the plain not far from the river. This choice was evidently advantageous for an agricultural life, and the want of compactness in the houses would seem to indicate that the farmers had not yet been harried and driven to seek shelter from marauding nomad tribes in walled pueblos.



## EPLEY'S RUIN

This is the largest ruin in the vicinity of Solomonville, and lies on the outskirts of the town, on the road to San José. From its position it was the most convenient to study, and considerable work was done in the mounds which compose it. The majority of the mounds had, however, been leveled to the surface of the plain by Mr Epley, and as the place is a favorite quarry for adobe makers, their excavations have destroyed most of the ancient walls.

Just back of the Epley farmhouse there still existed (1897) one of the tallest mounds, which had been partially excavated by Mr Adams. The author's party continued his work, but discovered nothing of interest save the walls of rooms, all of which were of great thickness. From the size and position of the cluster the author concluded that it was the remains of the central building or citadel of the group.

The smaller mounds which dotted the farm around it were traced almost to the river bank. The remains of house walls could be discovered in most of these, but excavations in the majority of the rooms developed very little of archeological worth. A few large ollas made of rough ware were taken from the mounds at the eastern end of the farm, but they were all broken. One or two slipper-shaped jars and food bowls of decorated ware were dug from the same rooms. Perhaps the most important objects from Epley's ruin were the skeletons of two infants, buried in the floor, accompanied by mortuary bowls and small vases.

A considerable number of whole bowls and vases were offered for sale by persons, mainly Mexicans, living in the neighborhood. It was reported that these had been taken from Epley's ruin by the adobe makers, and there is no doubt that such was the case.

While the author was at the ruin a party of these laborers unearthed from the level land, a hundred yards east of Epley's house, a decorated vase (plate LXVIII) filled with burnt human bones, which were secured and added to the collections.

It was customary, before the burial of these cinerary urns, to cover the orifice with a circular burnt-clay disk, which was carefully luted in place with adobe. These urns were deposited not far from the pyral mounds, on which the cremation occurred, and were buried only a few feet below the surface of the ground. The adobe diggers reported that they always found a number of these ollas in close approximation, and that burnt bones were generally found within them.

## BUENA VISTA

The best preserved of all the mounds in the Pueblo Viejo which were visited is situated at Buena Vista, a few miles east and north of San José, and is probably the ruin which gave the name to the

whole valley; San José being sometimes called San José de Pueblo Viejo. The ruin of Buena Vista is typical of those lower down the river—of the mounds less disturbed by the farmer. Indeed, it is probably in about the condition in which all the ruins were when Emory passed through the valley.

The site of the cluster of mounds of Buena Vista is a high bluff, at the base of which, on one side, flows the Gila river. A few modern adobe houses, inhabited by Mexicans, have been built on the bluff, and some of the ancient walls have apparently been utilized in these modern structures. The largest and most conspicuous ancient building is an irregular stone structure which is situated somewhat back from the edge of the bluff, and is now used for a corral. The walls which composed it have tumbled down, but enough remains to indicate its ancient form. Apparently it was formed of many rooms which were built about a central plaza; stones were extensively used in its construction.

Surrounding this larger stone inclosure there lie at intervals low mounds, some of which betray evidences of rooms, while others are simply ash heaps. Two large circular depressions, a few hundred feet from the central building, are conspicuous. The limits of the cluster of mounds which compose Buena Vista could not easily be determined, and probably no two persons would agree upon their extent. The more prominent, however, are sketched in the accompanying plan (plate LXVI).

It would hardly be consistent to call this cluster of mounds the ruins of a pueblo, as we ordinarily understand the word. They lack compactness and mutual dependence. The houses, save the large central building, are more like farm houses, or isolated buildings, of one story, with a few rooms, inhabited by a single family. They may better be known as rancherías, which have been arranged in a cluster for certain mutual advantages. Among these was probably nearness to a central house which might serve as a place of refuge, or, possibly, for ceremony. The vicinity to the large circular depressions in the ground, which may be interpreted as reservoirs, was also a decided advantage. The presence of small mounds of ashes near the larger mounds containing remains of house walls would seem to indicate that each family had an individual burning place for its pottery. Possibly the dead were cremated on these mounds, which accounts for the absence of cemeteries, and for the ollas with calcined human bones sometimes found buried in them.

Architecturally there is very little likeness between this central large stone inclosure or house with many rooms and Casa Grande, the best-known building of the Casa Grande group. This difference is in part due to the character of the building material, but more to the plan of the building itself.<sup>a</sup> The large central stone structure of

<sup>a</sup>From Mindeleff's valuable description of the Casa Grande group of ruins it appears that Casa Grande was neither central nor the largest structure in the cluster of buildings.

Buena Vista is more like those north of the White mountains and resembles closely the rectangular ruin at Pinedale. We have in the Buena Vista ruin resemblances to both the lower Gila ruins and those of the southern tributaries of the upper Little Colorado.

Thus far in his archeological studies the author has failed to find in the belt of Arizona ruins from Sikyatki south to the Gila any rooms which he can positively identify as kivas or ceremonial chambers. As is well known, however, each of the modern Hopi pueblos has one or more of these rooms, though some of the important secret ceremonies in the modern Hopi pueblos are performed not in special kivas, but in the oldest homes of the clans.

There was no room found in the Pueblo Viejo ruins which could be called a special ceremonial room, and in the large ruins at Cheylon, Homolobi, and Chaves pass no undoubted kivas were found. The room described in the preceding account of Four-mile ruin may, however, be regarded as a ceremonial chamber. The kiva, as we now find it in Tusayan, is a late innovation, and was probably introduced from the eastern pueblos. Its existence in Four-mile ruin may be accounted for by the position of this ruin.

#### OTHER RUINS

Many objects of pottery have been dug up near the San José settlement, and there are one or two mounds near by indicative of ancient dwellings. If there ever was a large cluster of mounds on the present site of the town, they have been wholly obliterated by its inhabitants.

There is a mound of some size on the right bank of the irrigating ditch, just as one enters the town from Solomonville, but one side of it has been worn away by freshets from the San Simon. It serves as a protection for the neighboring farm, which lies between it and the river, and on that account the owner refused to allow it to be dug away. A few days' labor at this ruin would bring to light objects of archeological value, for a beautiful vase rewarded an hour's superficial scratching of the exposed bank. One of the finest ollas obtained from the Pueblo Viejo was purchased from a San José man, who dug it out of this mound while working at Buena Vista. As charred human bones were found in it, this vase, figured in plate LXIX *c*, is regarded as a cinerary urn.

There were formerly several mounds indicating ruins near Thacher, but these have been mostly leveled and can not now be traced. A number of mounds are still visible at Mr D. Olney's ranch, and lines of stones, the foundations of ancient walls, can still be traced in the road in front of Mr Lem Place's house. The large mounds on Mr Peter Anderson's farm have been destroyed, and there are many others near it which have met the same fate. It may be said that in ancient times the houses of the aborigines dotted the valley through-

out its entire length, from Buena Vista to Pima, and the indications are that the population was larger and had a greater number of acres of land under cultivation than at the present time.

In a valley which was so densely populated we should expect to find a large number of antiquities, stone implements, ollas, and other forms of pottery. From all that can be learned comparatively few specimens have been dug out of the ground, although there are several private collections of some size. Different farmers have told the author of plowing off the necks of rows of buried vessels, and workmen on the irrigating ditches report finding pottery in abundance in several places far from mounds; but the large majority of relics are still under ground, and probably will remain there for years to come, now that the fields above them are cultivated. The only collections of any size which have found their way to public institutions, and are therefore available for study, are one of a few specimens in Tucson and that which was brought back to the National Museum.

#### CHANGES IN THE VALLEY SINCE 1847

Great changes have been wrought in the appearance of Pueblo Viejo since Emory passed through it in 1846, for if any white man lived there at that time he says nothing about him. There were evidently no settlements, for he wrote:

Everywhere there were marks of flowing water, yet vegetation was so scarce and crisp that it would be difficult to imagine a drop of water had fallen since last winter. . . . The dust was knee-deep in the rear of our trail; the soil appeared good, but for whole acres not a sign of vegetation was to be seen. Grass was at long intervals, and, when found, burnt to a cinder.

In a prophetic way he added:

The whole plain, from 3 to 6 miles wide, is within the level of the Gila, and might easily be irrigated, as it no doubt was by the tenants of these ruined houses.<sup>a</sup>

Ancient mounds, in much the same condition as those in Pueblo Viejo formerly were in, still remain in the long stretch of country between Geronimo and Dudleyville, across the southwestern corner of the Apache reservation, wherever there are plains along the Gila, but white settlers have worked marvels in other parts of the valley, which may now be said, using a familiar simile, to "blossom as the rose." At present Pueblo Viejo, from Buena Vista to Pima, which towns mark the limits of the author's acquaintance with it, is one succession of cultivated farms of corn, alfalfa, and melons, a garden of Arizona in which any crop can be raised.

It seems incredible that in fifty years such great changes should have taken place, yet it was to be expected, for in prehistoric times

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<sup>a</sup>Notes of a Military Reconnoissance, Washington, 1848, p. 68.

Pueblo Viejo was a garden spot, and there is every reason to believe that when it was inhabited by aboriginal farmers more acres of its land were under cultivation than at present.

#### FORMER POPULATION OF THE VALLEY

If we judge from the number of ruins, the capacity of ancient reservoirs, and the size of irrigating ditches, the extent of the terraced gardens, and other evidences of aboriginal agriculture, Pueblo Viejo was formerly densely populated. To be sure, there is no proof that all the ancient buildings were simultaneously inhabited, and, on the other hand, there is no reason to suppose that they were not.

The aboriginal population was not huddled into a few beehive pueblos for protection, but was spread over the plains in small rancherias, or farming hamlets, dotting the valley from one end to the other. The evidences of the large ancient population are, however, rapidly disappearing, and in a few years will have completely vanished.

#### CREMATION OF THE DEAD

There were apparently two methods of disposing of the dead practiced by the ancient people of the Pueblo Viejo ruins, viz, house-burial and cremation.

Evidences of the former method were found at Epley's ruin and at Buena Vista, and the same are reported from the ruins near Thacher and elsewhere. The skeletons found in house-burials at Epley's ruin were mostly those of infants, and were accompanied with mortuary food vessels and bowls, generally rude ware. It was also common to find metates in the neighborhood of such interments in such positions as to indicate that they were placed there by design.

Evidences of cremation were common, consisting of calcined human bones in mortuary ollas, with ashes, evidently of bones, buried on certain low mounds adjoining the houses. It was apparently the ancient custom to burn the dead on certain pyral mounds and then to gather up the remains of the burnt bones and deposit them in small rudely decorated vases. A circular disk made of pottery was luted to the orifice of these vases and the whole was buried in an upright position near the edge of the mound upon which the burning took place. In its neighborhood there were also placed jars or other mortuary objects, as in the case of intramural interments.

This method of disposing of the dead is similar to that adopted by the ancient people of the great ruins of the Gila-Salado region, adding one more indication of a close resemblance between the ancient inhabitants of the Pueblo Viejo and those lower down the Gila river.

There survive among aboriginal people of the Gila-Salt valley two distinct forms of disposal of the dead, burial and cremation. The

fact that some of the tribes in this region burned their dead and that others did not was mentioned by historians in the middle of the fifteenth century, and it would seem possible that here we have evidences of two distinct stocks in the valley. These two stocks had partially consolidated, forming a people which built the great houses. Certain clans of the compound stock, like their ancestors, cremated the dead; others interred their deceased. The custom of burning the dead does not appear to have been carried into the Little Colorado valley.

In this connection, statements of Castañeda that the Cibolans burned their dead is instructive. The author has not, however, discovered north of the Mogollones any archeological evidences of cremation, and is unaware of any well-authenticated statement that they have been found in any Zuñi ruin. The suggestion that the present Zuñians in mortuary customs perform certain ceremonials which symbolize burning the dead has been given some weight, but this might be interpreted as a survival transmitted to modern times by clans who came from the south. Our knowledge of the nature of this reported Zuñi survival is very vague.

#### ARCHITECTURE

The houses of Pueblo Viejo are arranged somewhat differently from those of the Little Colorado and its tributaries. The tendency in the latter regions is toward consolidation, toward a close approximation into a communal pueblo, while the buildings in the Pueblo Viejo are more like rancherias or farm dwellings. Each of the houses was small, apparently inhabited by a single clan, and they were generally grouped in clusters, which may for convenience be styled villages.

There is generally found in the midst of, or near, such a cluster of small houses, a larger building which occupied the relation of a citadel, or, possibly, a ceremonial room; it may be single or composed of several chambers. This feature can be well seen in the accompanying plan (plate LXVI) of the Buena Vista ruin, one of the least changed of those in the Pueblo Viejo. The existence of a central room with clusters of small houses near or about it reminds one of the Casa Grande group near Florence, Arizona.

There is no region of the Southwest from which better examples of the influence of environment on architecture can be cited than in the Gila valley. The majority of houses in portions of the valley where stones are absent were built of adobe, while in the upper part of the river valley, where rock is more abundant, we find that the inhabitants utilized it as a building material. Thus, while adobe forms the greater part of the walls of Casa Grande, the great central room of Buena Vista was constructed of rock.

In the majority of houses in Pueblo Viejo there were three building materials employed in the walls, namely, stones, adobe, and logs.

River-worn stones arranged in rows are in many places all that remain of the ancient walls of rooms. It would seem that they formerly served as foundations, and were sometimes inserted in the sides of the house, but in neither case were they closely fitted together. They imparted a certain solidity to the walls, and, when used in foundations, prevented erosion at a weak point in its structure. No attempt to dress these stones, or, indeed, to break them, was noticed, but they were laid together with clay—the main building material employed.

There were many and conclusive evidences that logs were employed in the construction of the house walls. These logs were driven upright along the lines of the foundations at short intervals, and gave strength to the walls and support to a roof which covered the chamber. The spaces between them were filled in with stone and adobe.

In the early accounts of the ancient habitations of Pueblo Viejo by Emory and Johnston mention is made of these logs, and many of them were still standing in place when the Army of the West passed through the valley in 1847. Old residents of San José say that when they first took up their abode in the place the upright logs in some of the Buena Vista house-clusters were still visible. Only a few now remain above ground, yet the bases of several were discovered by the author's excavations.

The rapid disappearance of these logs can doubtless be partly explained by their use as fuel. For years the mines in the neighborhood employed laborers cutting firewood, and the large mesquite bushes were used for that purpose. No doubt the logs of the early buildings were among the first gathered by them.

#### TERRACED GARDENS

Students of Southwestern archeology are familiar with rows of stones marking off the surface of the land in rectangles of great regularity. Some of these lines of stones extend for several hundred feet. They occur on level mesa tops or on side hills, but there is rarely any broken pottery or other evidences of human habitation about them. Various interpretations have been advanced to account for these regular rows of stones. By some authorities they are supposed to be the remains of house walls, or foundations of the same, and as such they are commonly pointed out to the visitor. Mindelleff speaks of them as "boulder sites," and describes many from the Verde valley. Similar boulder sites are very abundant, especially on the sides of the mesa bounding Pueblo Viejo, in the San Simon valley; probably a correct interpretation of them in these localities

would equally well apply to other boulder sites, as, for instance, those of the Verde valley.

The arrangement and size, and absence of remains of human life near these lines of boulders have led the author to abandon the commonly accepted theory that they have relationship to house walls, or, indeed, to habitations of any kind. The small size of the boulders employed shows that they are not fortifications, and they should not be confounded with trineheras or fortified hilltops so common in southern Arizona and northern Mexico. They may be regarded rather as the walls of terraced gardens, so placed as to divide different patches of cultivated soil, or to prevent this soil from being washed down to the plain below.

Very extensive terraced gardens may be seen not far from San José, and all along the mesa near the Solomonville slaughterhouse. It would seem from their distribution that not only irrigation ditches watered the valley of Pueblo Viejo, but also that water was in some way carried up the hillsides, so that land now barren was in ancient times cultivated by the people of this region.

As no remains of rancherías were found near some of these terraced gardens, it is evident that the farmers who tilled them had to go a considerable distance from their homes to plant and harvest their crops.

The use of terraced gardens still survives among the modern Hopi Indians, and these structures may still be seen on their reservation, at Wipo and Kanelba on the East mesa, as well as on the Middle mesa and at Oraibi. The size of the gardens on the East mesa is much less at the present day than in former times; those which have been abandoned closely resemble the rectangles inclosed by lines of stones in the Verde and Gila valleys.

#### PREHISTORIC IRRIGATION IN PUEBLO VIEJO

There are evidences that the ancient farmers of the Pueblo Viejo irrigated their farms, for remains of extensive aboriginal ditches can be seen at several points. These old canals are clearly visible in that part of the valley which is not at present cultivated, but traces of them have naturally disappeared before the plow of the white settler. The remains of large circular reservoirs can be readily traced near some of the house clusters of Buena Vista, and not far from Epley's ruin, where there is a reservoir from which was undoubtedly drawn the water supply of that neighborhood. At the time of the author's visit this reservoir was full of water, which was used on the farm.

The modern acequias, the San José and Montezuma ditches, follow in part of their courses the ancient canals, as the author has been informed by an old settler in Solomonville; and a section of a side canal at right angles to the Gila may still (1897) be traced near San José.



There can hardly be a doubt that water was carried in large earthen vessels to some of the terraced gardens, the altitude of which above the water in the river would make irrigation otherwise impossible. The surface of the land near the banks of the stream is continually shifting, on account of erosion due to heavy freshets and overflow of the river banks. On this account many of the ancient canals have been filled with soil, or their banks washed down to the level of the surrounding plain.

#### POTTERY FROM PUEBLO VIEJO

The pottery from the Pueblo Viejo ruins is identical with that from lower down the Gila river, at Phoenix and Tempe. It differs very markedly from that of the White mountains.

#### COLOR AND SURFACE FINISH

As a rule the Gila pottery is coarse, and the decoration is simple, consisting mostly of rectangular geometrical designs. It may be considered under the following types: 1, undecorated rough ware; 2, decorated rough ware; 3, undecorated red ware; 4, decorated black and white ware; 5, decorated gray ware.

#### UNDECORATED ROUGH WARE

The larger ollas found in excavated rooms are almost always made of a rough coiled or indented ware of coarsest manufacture. These were capacious enough to contain several gallons of water, and were apparently used for that purpose. The exteriors of many were blackened with soot, as though they had been used for cooking, as is at present the custom among the Pueblo Indians.

Most of the large specimens of this rough ware were broken, apparently by the falling of walls or other débris upon them. It may also be mentioned that they were almost universally found in houses, and that one contained the skeleton of an infant.

Small rough-ware vessels also occur, broken or entire (see plate LXVII). The author has limited this group to those specimens of pottery of rough ware in which there is no shining black slip on the inner surface. No food vessels of rough ware were found, but all specimens of this form, of which there were many, had a polished black interior, and belong to the second group.

#### DECORATED ROUGH WARE

In this group are placed those food vessels in which the interior is covered with a black slip, which reminds one of the modern ware of Santa Clara pueblo. As will be seen by consulting a plate showing this type (plate LXVII), there is some variation in the arrangement of the indentations and coiling in this ware, but no color decoration was attempted. Bowls of this kind are often rubbed smooth on the outer surface, but decoration by indentation or coiling is common.

## UNDECORATED RED WARE

A number of pieces of pottery of bright red color, made of coarse paste, were found in the Pueblo Viejo ruins. These were smoothly polished on the exterior, but as a rule were not decorated. In general appearance they resemble the ware still made by the Papago Indians, and they were commonly large, narrow-mouthed vases. This kind of ware was found to be abundant in caves where sacrificial vessels were found. Disks made of it often cover cinerary vases.

## DECORATED BLACK AND WHITE WARE

The white ware with black decorations, generally in geometrical designs, was sparingly represented in the Pueblo Viejo ruins, which is in marked contrast to its prominence in cliff houses near the sources of the Gila in New Mexico. This ware is so rare in the vicinity of San José that the author is inclined to regard it as intrusive in that region.

None of the specimens found are at all comparable in the wealth of their ornamental designs with similar ware from ruins in the western part of Socorro county, New Mexico,<sup>a</sup> or in the cliff houses near the sources of the Gila and Salado rivers.

## DECORATED GRAY WARE

The characteristic decorated ware of the Gila valley and its tributaries is grayish and is decorated with red; a specimen is shown in plate LXVIII. With the exception of a few sporadic specimens which have been transported to pueblos, now ruins, north of the White mountains, this ware has not been found in any valley except those of the Gila and its tributaries.

This pottery bears a smooth polish, is never glazed, and is generally decorated with geometrical figures: scrolls, terraces, stars, and key patterns. It assumes a great variety of shapes, and was apparently used in much the same way as is the yellow or red ware of northern Arizona.

## DECORATION

The decoration of the pottery from this region is mainly in geometrical patterns, resembling that of the pottery from the Little Colorado basin. No specimen with picture writing was found, so that this source of information regarding the mythology of the owners is practically wanting. Even pictures of birds, so common north of the Mogolones, are absent. The ancient people of the Pueblo Viejo had not carried pottery decoration beyond the geometrical stage, as far as can be judged from the specimens examined. Food bowls, almost identical

<sup>a</sup>The beautiful collections made in this region by Mr H. Hales are now preserved in the National Museum, and are well worth study and description. For an account of the ruins near Tulerosa see N. Francis Duff, *The Prehistoric Ruins of the Rio Tulerosa*, in *Bulletin of the American Geographical Society*, v. 29, n. 3, 1897.

in form with those of Tusayan, have their interiors decorated with rectangular patterns, sometimes with terrace figures, but rarely with spirals. Encircling bands are often broken at one point, forming "life lines," and zigzag lines are not uncommon. Few specimens with external decorations were found. Vases were generally decorated with the same simple geometrical patterns as were the food bowls, with no attempt to depict human or animal forms. It is unfortunate for the student of Gila valley ceramics that pictographic material is so scanty, as it shuts him out from most instructive data regarding ancient life in this part of Arizona.

A finely made human head, forming the handle of a ladle, was dug out of an ash heap in the Buena Vista ruin. This was the only handle modeled in human form which was found, though objects of this kind are said to be common lower down the Gila river. A like ornamentation is not a rare feature of ladle handles from the Little Colorado ruins.

The broken encircling band, called the "line of life," occurs on many of the decorated pieces of pottery, and the H figure, so common on the exterior of bowls north of the mountains, was found on a single fragment of pottery from Pueblo Viejo.



FIG. 111. Moccasin-shaped jar from Pueblo Viejo.

Another specimen from the Pueblo Viejo, in which the likeness to an Indian moccasin is close, is shown in figure 111. The specimen is, however, much smaller than a human foot.

The accompanying illustration, plate LXVIII, shows two views of one of the most richly decorated vases from the Pueblo Viejo, and exhibits several of the commoner geometrical designs from the Gila ruins. This vase was dug up near San José, and was probably a cin-



FIG. 110. Decorated slipper jar from Pueblo Viejo (number 177533).

There were a few specimens of clay slippers which were ornamented on their upper side. One of these is shown in the accompanying cut (figure 110), in which the design of the decoration can be partially seen. It is not improbable that the "foot of an idol," mentioned by Emory and his officers, was one of these slipper jars.

erary olla, as it contained, when found, cinerated human bones. The ware is characteristic of the Gila, though a few straggling specimens of similar pottery have been found at Four-mile ruin near Snowflake. It will be observed that the decoration of this vase is wholly in geometrical patterns, a common feature of all ornamented ware from the Pueblo Viejo. Almost all geometrical forms are represented—spirals, bars, terraces, stars, and squares with dots.

In plate LXIX other forms of decorated ware from Pueblo Viejo are represented. Figure *a* shows a small saucer, with exterior and

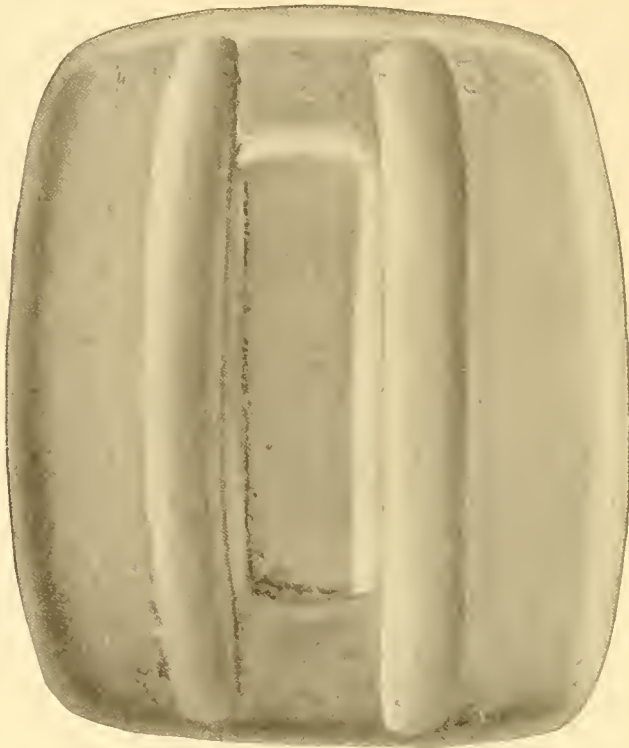


FIG. 112. Arrow polisher from Pueblo Viejo (number 177569).

interior decoration of rectangular bands of black; the margin is white. Figure *b* shows a small vase of typical Gila pottery, ornamented with zigzag red bands, which was excavated from the Buena Vista ruin. The vase *c* was dug out of the flat near the western mounds of Epley's ruin. It was found by Mexican laborers making adobes, and contained a calcined human skeleton. The external surface of this vase was smooth, and the decoration consisted of series of terraced figures, recalling those geometrical designs so prominent in all ancient pottery from Arizona.

## STONE OBJECTS FROM PUEBLO VIEJO

## IMPLEMENTS

The ancient people of Pueblo Viejo were still in the stone age, and their implements were similar to those found elsewhere in the Southwest. The stone hatchets are, as a rule, finely made, as is generally the case in the Gila and Salt river ruins. A considerable number were collected, some of which were among the finest known to the author. They were, however, identical with stone implements that have already been collected in other parts of Arizona. There was nothing strikingly peculiar in the arrow and spear points collected in this region. The stone axes were finely polished and very numerous. There were many hammer stones, pounders, rubbing stones, stone knives, and drills.

Although nothing distinctive was noticed in the arrowheads, a fine collection of these implements made of volcanic glass, from the cave in the Nantaacks hereafter discussed, should be mentioned. A number of spherical stones, varying from the size of the fist to that of a large marble, were picked up on the surface of the mounds. Some of these may belong to a type of stone objects referred to in early accounts as being used by the people in warfare. They are thus mentioned by Castañeda: "Farther off was another large village, where we found in the court-yards a great number of stone balls of the size of a leather bag containing one arroba. They seem to have been cast with the aid of machines, and to have been employed in the destruction of the village." What the nature of this machine was we are not told, but it was possibly a kind of sling. Problematic stone disks with depressed faces and circular forms are not rare. Simple stone disks of the same shape, but perforated, may once have been attached to drills. There were pottery disks which were supposed to have had a like use.

Arrow polishers (figures 112, 113) or grooved stones for rubbing down wooden sticks occur in numbers. The depressions in some of these were so smooth that their efficiency in grinding must have been small, while in general shape and size they correspond so closely with those stones which are still used for that purpose that there can be little question as to their use.

A large number of metates, or stones for grinding corn, were collected in the excavations at Epley's ruin. These were made of several kinds of rock, the favorite being lava or malpais. Evidences of long

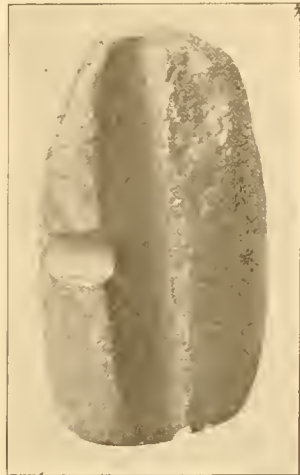


FIG. 113. Arrow polisher from Pueblo Viejo.

use can be seen in the deep depression which has been ground into them, even when the rock was very hard.

The form of metate with three legs (figure 114) is more Mexican than any which was found north of the White mountains or in the Little Colorado valley, and is not unlike rude specimens from Central America.

Small stones with a regular depression in one face were used for



FIG. 114. Metate from Pueblo Viejo (number 177471).

grinding pigments, and the remnants of color were still found on them. Green, red, yellow, and white pigments such as are still used by the Pueblo Indians were found in many of the rooms. Oblong or oval stones, with a flat face, worn on one pole, served as rubbing stones by which these substances were ground to powder. There was sometimes considerable skill shown in the way these stones were fashioned. They were sometimes mushroom-shaped, with a circular disk and a slim handle.



FIG. 115. Unknown stone object from Pueblo Viejo (number 177677).

One of the finest wrought of all the mortars was purchased from a Mexican in Solomonville. It was elongated, trencher-shaped, with knobs at the extremities.

The rock of which it was made, though very hard, was worked with considerable skill. The Mexican who sold it had used it for bruising vegetable substances. No doubt this is but a continuation of its use in prehistoric time, long before white men came into the country.

The author saw a beautiful mortar<sup>a</sup> made of a green stone, which

<sup>a</sup> Attempts to purchase this fine specimen failed.

was said to have been taken out of the ruins near Solomonville. This was one of the finest paint mortars which he ever saw from the Southwest.

One of the most exceptional of stone objects from the Pueblo Viejo ruins is shown in the annexed cut (figure 115). It has a regular disk form, and is carefully worked from a lava stone. The form is that of a paint mortar.

#### STONE SLABS

Early in the author's studies in the Pueblo Viejo, his attention was called to a stone slab shaped like the sole of a shoe (figure 116), to which it was compared by the Mexican who owned it. This object



FIG. 116. Ceremonial stone slab from Pueblo Viejo (number 177575).

was flat or slightly convex on one face, flat on the opposite, and had a shallow groove on the margin. The border on the flat side was ornamented with a number of parallel scratches arranged in clusters.

Later the author obtained other stones of the same shape and of about the same size; one of the most instructive was a specimen of irregularly rectangular form, with a bird's head carved on one edge, and the tail on the other (figure 117).

There is an interesting modification of the same class of objects in the collections of the National Museum—a circular stone slab of which the body of a snake, with head and tail skillfully carved, forms the margin. These objects, which are not rare in the ruins of the Gila and Salt river valleys, are called ceremonial slabs, and were probably used in much the same way as are the stone slabs orna-

mented with designs which have been repeatedly described from Hopi altars. In fact, some of those now in use distinctly resemble those from the Pueblo Viejo.

#### OTHER STONE OBJECTS

It was interesting to find in the ruins of the Pueblo Viejo a number of obsidian nodules, and flakes of the same material. Fragments of



FIG. 117. Ceremonial stone slab from Pueblo Viejo (number 177578).

volcanic glass constantly occur in ruins north of the mountains, along the Little Colorado, and at Sikyatki.

The fact that over a dozen specimens of quartz crystals were found shows that these objects were prized, and were probably used in ceremonies, as is the custom in modern pueblos.



FIG. 118. Stone fetish from Pueblo Viejo.

Perforated circular stones, varying in size from that of a silver dollar to several inches in diameter, were found, while similar disks made of pottery were common. Many of the latter were not perforated. Their form suggested that they were used in gaming.

These disks occur along the whole length of the Gila river, and are also found more sparingly in ruins north of the Mogollon mountains.

The ancient inhabitants of the Pueblo Viejo villages prized for ceremonial purposes stones of curious or strange shape, especially those which were botryoidal. One of the most striking of these is shown in the accompanying cut (figure 118). It is typical of several which were found in the San José ruin, at Buena Vista, and near Solomonville.



## SHELL ORNAMENTS FROM PUEBLO VIEJO

Several specimens, generally ornaments, carved out of *Haliotis*, *Conus*, or *Pectunculus* shells, were collected in the Pueblo Viejo ruins. The largest of these were armlets and wristlets. Shells cut in the form of animals are among the characteristic objects of the Gila-Salado ruins, and occur in all great collections from this region. We find various animals represented, as lizards, birds, rabbits, and snakes, as well as circles, crosses, rectangles, and the like. They are ordinarily perforated—generally at the eye, sometimes at the heart, of the animal represented. The universality of this perforation implies suspension, and the author believes that it will later be found that they were worn on the neck or body. It is not improbable that they were personal fetishes, possibly representing totems.

## CLIFF HOUSES ON BONITA CREEK

There are many cliff houses and other ruins of aboriginal dwellings in a fair state of preservation along Bonita creek, 18 miles north of Solomonville. A very good account of these, written by Professor William Stone Devol, of Tucson, has been published, with a half-tone illustration, in the Graham County Bulletin. These remains would repay more extensive study and no doubt yield collections of considerable archeological value. These cliff houses resemble in general character those near Silver City, New Mexico.

## RUINS IN THE FOOT HILLS OF MOUNT GRAHAM

There are many ruins, mostly small, on the mesas and foot hills of Mount Graham, having the same general character as those lower down the valley, near the river. The fragments of pottery strewn about upon them are identical with those from the mounds of the plain, and there is reason to believe they were made by the same people. While these ruins occur at several places on the mesa and hills at the base of Mount Graham, that at the place called Cienega is one of the largest, but it does not differ radically from those of the banks of the Gila.

## SACRIFICIAL CAVES

The use of caves for ceremonial purposes was a feature in the life of the ancient people of Pueblo Viejo. The mountains near the Pueblo Viejo have many caves suitable for this purpose. They occur in limited number near the modern Hopi pueblos and elsewhere north of the Mogollones.

The author visited one of these sacrificial caves in the Graham mountains, and found many evidences of its former ceremonial use. There were bushels of prayer sticks on the floor, and a few fragments of basketry, but no pottery or earthenware rewarded the search.

The fragments of basketry were made with a technique similar to that of the basket plaques of the Middle mesa. The prayer sticks were painted red at their extremities, and were, as a rule, about the size of a penholder. This cave, called Adams' cave, has been rarely visited since its discovery by Mr B. B. Adams, of Solomonville, but will well repay a visit by an archeologist. There is little doubt that there are other similar caves on the northern side of the Graham mountains which have not been entered by white men.

#### COLLECTIONS FROM A CAVE IN THE NANTACKS

In the broken, almost inaccessible, country north of Pueblo Viejo, there are many caves, some of which are quite extensive. The larger and more open were utilized by ancient builders in the construction of cliff houses. Many caves in this region have narrow entrances into passages which extend with many ramifications far into the bowels of the earth. The nature of the objects found in most of them shows that the caves were not inhabited, but were resorted to for purposes of prayer and sacrifice by a sedentary people akin to that which has left so many ruined houses in the Southwest.

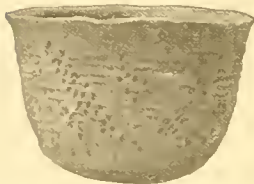


FIG. 119. Indented bowl from a cave in the Nantacks (number 177458).

A few years ago some young men from Pima, a settlement in the Pueblo Viejo, explored one of the caves in this region, and obtained from it a collection of some size and considerable archeological interest.

The attention of the author was called to this collection early in the summer of 1897, and in September he visited Pima, and secured many of the objects for the National Museum.

The collection has been divided by those who obtained it into four parts, one of which had been sent to Utah; another was owned by a man who did not care to sell. The other two parts, numbering almost 100 specimens, were purchased. They contain all the typical forms of the other two, and a few specimens which were unique.

All the specimens were small votive offerings, but those who had entered the cave declared that they left behind all fragments, of which there were many, so that we may suppose that there were larger vessels thus abandoned. The specimens were, as a rule, rough ware pottery (see figure 119), smooth, undecorated red ware, turquoises, arrowheads, fragments of marine shells, and white pigments.

A large number of clay disks occur in the collections. These were not unlike similar formed objects which were found at Epley's ruin, and probably were originally luted to the orifice of the small vases in much the same way.

There were globular vases (see figure 120), one of which had two perforated tubercles, one on each side of a small orifice. These

remind one of those vessels in which sacred water is carried in ceremonies among the Pueblos.

Another small globular vase had the whole exterior covered with indented tubercles, not perforated but evidently ornamental. This type has been found in some of the Little Colorado ruins. A long tube with similar tubercles over its surface, made of rough pottery, may have been an ancient pipe or cloud-blower. Neither of these objects had designs painted upon them.

From the great quantity of turquoise beads and obsidian arrow-points it would appear that large numbers of these objects were scattered over the floor of the cave. As the collectors exercised no special care to gather everything which they saw, no doubt the quantity of these objects could be much increased by a reexamination of the cave.

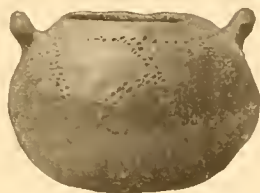


FIG. 120. Small amphora from a cave in the Nantacks (number 177463).

#### EFFIGY VASES FROM SOUTHERN ARIZONA

Pottery objects in the form of human beings are manufactured in some of the modern pueblos, and these grotesque figures may be purchased in traders' shops where modern Pueblo pottery is sold. An examination of large collections of ancient pueblo pottery from northern and central Arizona has failed to reveal a single specimen of a vase made in the human form. This, however, is not true of pottery from all parts of the pueblo area. The ancient people of southern Arizona manufactured human effigies in clay, the typical forms of which have not, so far as is known, been described. The particular interest attached to the



FIG. 121. Human effigy vase from a cave in the Nantacks (number 177519).

vases here described, which justifies calling them into prominence by special mention, is due to the rarity of this type in ancient pueblo collections, its reappearance in certain vases from Arkansas, and its common occurrence in the northern States of old Mexico.

The accompanying illustration (figure 121) shows one of these vases from the cave in the Nantacks mentioned above. It is made of coarse material and has a rough exterior, with patches of a calcareous deposit on the surface. This deposit of lime is found in greater or less amount on most of the specimens from this cave, and was deposited on them by water charged with lime percolating from the rocks

in which the cave was formed. Attempts to rub off this film are evident in some places; but elsewhere, as under the right eye, considerable patches remain, probably concealing symbols on the right cheek.

The head is marked off by a constriction representing the neck, and the eyes, nose, mouth, chin, and ears are well represented. As is generally the case with idols of stone, wood, or clay from the pueblo region, the details of the head are better represented than those of the body or limbs.

No attempt was made in this vase to represent the legs, and the arms are simply irregular ridges, one on each side of the body. The shape of the body is irregularly globular; the base is flat. The vase is of about uniform thickness, the outlines of its cavity conforming in a very general way with the elevations and depressions of the outer surface.

The author supposes that this vase was filled with votive offerings when it was placed in the cave, and that in course of time its contents were washed out. The nature of the offerings may be conjectured from the fragments of shells, turquoises, and other objects reported as strewn about the floor of the cavern.

The short parallel lines painted with white pigment under the eyes are worthy of a passing notice. These are the only symbols on the face, and consist of a few short lines extending downward from the lower eyelids. If the reader will examine the collection of Zuñi dolls which are exhibited in the "Pottery Court" of the National Museum, now installed, he will find one labeled Zuñi Hehea kateina,<sup>a</sup> which has the same markings on the cheeks as has the effigy vase from the Nantaeks.

It is instructive to note the similarities of this effigy vase with those from Casas Grandes, Mexico, and from Central America, which are so close that the vase might readily be mistaken for an illustration of a type from northern Mexico or even Central America.

It appears that while this vase has a form unknown in collections of ancient pottery from ruins along the Little Colorado and its tributaries, it is not unique in those from the Gila-Salado watershed.

The lesson taught by the presence of this effigy vase in the Nantaeks and the Gila-Salado basin and the absence of similar forms north of the Mogollones may be summed up in two words, "Mexican influence." The distribution of this form of Mexican ceramics did not cease at what is now the southern frontier of Arizona, but extended to ruins along the Gila valley and its tributaries high up into the highlands to the north, where these streams rise. As far as is known, this was the most northern extension of this particular form of ceramic technique in Arizona. Southward from this locality the relative number of

<sup>a</sup>Hehea kateina is a Hopi name, and the doll representing this person at Walpi has not the same markings on the face as the above. The Hopi variant has parallel zigzag lines above both eyes and on the cheeks. The name given above is that by which the Zuñi doll is known to the Hopis.

human effigy vases increases, until they become very common in Chiapas and Oaxaca. But, it may be urged, why is it necessary to interpret this form as due to Mexican influence? The advocate of the independent evolution of technology will doubtless say that the manufacture of a human effigy vase is no great trick and had been evolved independently again and again in different regions of aboriginal United States. Some clever potter of the Nantaacks, it may be said, invented this form. Why, it might be asked in reply, did not the potters north of the Mogollones also invent the same form? for they were equally skilled, and their ceramic ware was more variegated and elaborate. What explanation is offered on the theory of independent invention of the increase in the relative number of effigy vases as we go south?

It seems probable that the presence of human effigy vases in southern Arizona and their absence in the northern part of the Territory is in harmony with a theory of the influence of Mexican art in the former region. While recognizing the potency of this influence in southern Arizona, we are not necessarily called upon to accept a connection among all potters who have made human effigy vases, or even between those of ancient Arkansas and Chihuahua, whose effigy products have some similarity.

There are many like ceramic forms and decorations among different people, invented independently, and there is no reason to doubt that human effigies in the form of vases were so invented in several well-known instances. There are also cases where identity in form and symbol can better be explained by barter. Possibly the effigy vase described above belongs to the latter category. It would be premature to build conclusions on a single specimen, and more information regarding the distribution of ancient human effigy vases in the Southwest is desired. These vases have not yet been found in Arizona north of the White mountains, but they are represented from several localities in the south. The question awaiting answer is, What is their northernmost extension?

An effigy vase found near San José (figure 122) is instructive as recalling a kind of pottery common in the northern Mexican states.

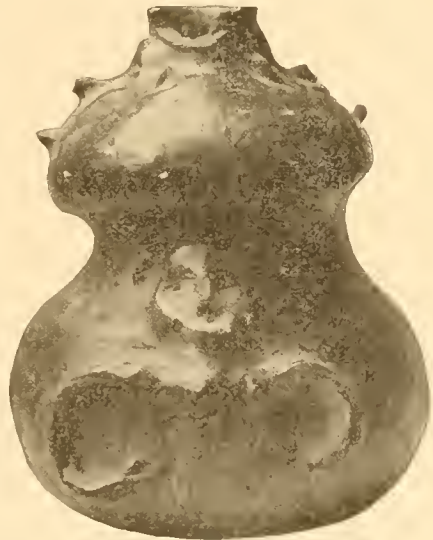


FIG. 122. Effigy vase from Pueblo Viejo (number 17732).

This piece was brought for sale by a workman, who declared that he had dug it up at San José. The author was at first inclined to believe that it was not found in Pueblo Viejo valley, but critical examination of the ware convinced him that the testimony of the man who brought it could be trusted. It is made of coarse red ware, like other vessels from this locality, and is undecorated. It is shaped like a dumbbell, and the two parts are of unequal diameter. The remarkable thing about this vase is the human nose and ears, in relief, reproduced several times on its sides. This would hardly be worthy of special mention were we considering the pottery of old Mexico or of some other parts of the United States, but like the effigy vase above mentioned, from the caves of the Nantacks, it is exceptional in the pueblo region.

One of the best specimens of clay effigies was found in an ash heap at the Buena Vista ruin. It was evidently a handle of a dipper or saucer, and was well made and well proportioned.

The frequency with which these effigy ceramic objects occur as we go south is, as has been stated, highly suggestive. Unknown in the ancient ruins of northern Arizona, they are not rare in the Gila valley and its tributaries, and their number greatly increases when we pass the boundary line into the Mexican states of Sonora and Chihuahua. This is undoubtedly an advance in pottery manufacture, and, with this advance a corresponding decline in the decoration of vases with paintings is to be expected.

#### DISTRIBUTION OF DECORATED POTTERY IN ARIZONA

In plate LXX the author has tried to plot the distribution and relative abundance of different colored pottery in the ruins studied by him in the years 1895, 1896, and 1897. A normal line is represented on one side and the relative amount of each kind of colored pottery is indicated by abscissas from that norm, arising from a point representing the latitude of each ruin. In order to determine the proper percent of the kind of pottery in each ruin, the number of pieces obtained was counted, and the proportions of those referred to different colors were reduced to decimal fractions. In the case of red ware this was only an approximation, for the limit of this type was hard to determine.

Certain general laws may be deduced from a study of this map. Black and white ware, which is so prominent a feature of cliff-house pottery, has a limited distribution in all the ancient pueblos south of Tusayan proper. Its proportion increases in the Kintiel zone.

Yellow ware is the characteristic pottery of Tusayan and is limited to the ruins near the inhabited Hopi villages. It is not represented at Kintiel.

Red ware is characteristic of the Little Colorado. Red, white, and black ware is not found in the north or south, but only near the Little Colorado and its tributaries.

A brown pottery, with black decoration and red bands, is characteristic of the Gila valley ruins.

Study of the material collected in 1897 suggests the conclusion that the higher we ascend the Little Colorado river the greater are the differences between the archeological objects found on its banks and those of the ancient Hopis who lived at Homolobi. These differences seem not to diminish as we ascend the Zuñi river and other tributaries of the Little Colorado in the Zuñi reservation. At Four-mile ruin we find both Zuñi and Hopi characteristics in ancient pottery, and no doubt some of the people of this pueblo were akin to the ancient Zuñi stock.

There was probably not so close a likeness between the ancient people of Pueblo Viejo and those of modern Tusayan as between those of the Verde and Tonto villages and the Hopis, although there is a resemblance among all the ruins of the Gila valley and its tributaries. As a general rule, the culture of prehistoric peoples dwelling along the banks of a river has a marked uniformity, while that of those separated by mountain ranges is more varied. There is therefore a general likeness between the art products of the Gila valley and all its tributaries, and those of the Little Colorado are similar, but the archeology of the two drainage areas differs considerably.

#### EVOLUTION OF THE PUEBLO TYPE OF ARCHITECTURE

The Spanish word "pueblo" has come to be used in ethnology with a special meaning, and is now applied to a certain kind of Indian dwelling. While the Spanish explorers applied the term to any large cluster of houses it is well to limit it, as is now generally customary, to a communal village in compact form, with the different rooms adjoining. In this restricted meaning the clusters of houses in the Pueblo Viejo are not pueblos, but are better called composite rancherías.

A pueblo, then, may be regarded as a collection of rancherías the component houses of which have become so approximated that they adjoin, forming a compact village. Each clan has its own rooms and has no rights in others, though the walls may adjoin.

We have a very good illustration of a communal form of architecture in early Mormon settlements, as Brigham and Sunset, now in ruins near Homolobi. When these towns were built they were palisaded, and all the different families were protected by an inclosing wall. The houses joined, inclosing a central open space, much as in a small pueblo. Had there been no danger from Apaches or other predatory Indians, these Mormon families would probably have settled on separate farms, but it must also be borne in mind that there was community of life among the inhabitants which does not exist in Pueblo settlements. Each clan in the latter is independent; all families in the Mormon towns mentioned had common property. This

community of life no doubt explains in part the pueblo-like character of the Mormon settlements, but mutual defense was an important factor in the determination of the form of their villages.

The pueblo, therefore, as we find it today, is a survival of consolidated cliff houses, cavate villages, or rectangular and circular towns of the plain, which have assumed their form for the sake of defense. But these forms are secondary; in localities and at times when defense was not necessary the aboriginal farmers erected more or less isolated dwellings or ranches, each with few rooms and with accommodations for one clan.

In very ancient times the inhabitants of the Gila were scattered over the land, or their homes were clustered together, but were not united in a compact form with adjoining walls. Even then, however, they had certain common houses for defense or religious purposes, of which Casa Grande is a good example.

As the clans moved into exposed regions in which they were raided by hostiles they naturally built their houses in pueblos or forms best calculated for defense.

It is interesting to note that when this pressure of necessity for defense was removed the former distribution of small farmhouses over the land returned. When the clan was no longer forced to huddle under the same roof with its neighbor, it returned to the isolated rancheria. In this way large pueblos have disintegrated, first into summer farming villages, later into individual farmhouses. Thus, a law of the struggle for existence and survival of the fittest can be deduced to account for pueblo architecture in the Southwest. There is nothing in an arid environment to lead agriculturists to huddle into pueblos, and it was not until nomadic robbers forced them to do so that they adopted this form of life.

The semi-deserts of the Southwest are not valuable lands for agriculture, and yet the aboriginal people of this region were preeminently farmers. This is explained by the fact that it was impossible for hunters to remain in that culture stage, for there was no game; it was alike impossible to be fishermen, because there were no fishes. The people were forced by pressure of climatic conditions either to become farmers or to perish. In more fertile lands, where game was abundant, there roamed nomadic hunters with whom they were unable to successfully contend. Thus in an arid desert land the individual farmer became secure in his poverty from his warlike fellow-man. When, by his industry, he gathered property beyond his immediate needs, the nomads sought him out to despoil him of his possessions. To meet these attacks he joined his neighbors, building his houses in clusters, which, for additional protection, were finally consolidated into a pueblo form. As the enemies grew stronger the size of pueblos increased by consolidation. The form which the builders adopted was that best fitted for mutual protection. It has always been so



with agricultural man when pressed by his foes, and on this account a cliff-building stage of culture is limited to no race or country. Its existence is purely a geological question.

The Southwest is thus full of ruins of former abodes of farmers, some of which were inhabited by a single clan, others by several clans. Each has had its own history or its own episode in the general history of the struggle of nomadic robber and sedentary agriculturist. Aimlessly to himself, perhaps, but in obedience to a law of development, man has drifted from place to place to escape his enemies, until he has been molded into the peculiar culture which we call Pueblo. This culture is a highly specialized form, and is the direct outgrowth of the peculiar climatic conditions of the Southwest.





OLD CAVES, NEAR FLAGSTAFF, ARIZONA





NEW CAVES, NEAR FLAGSTAFF, ARIZONA





ENTRANCE TO NEW CAVE, NEAR FLAGSTAFF, ARIZONA







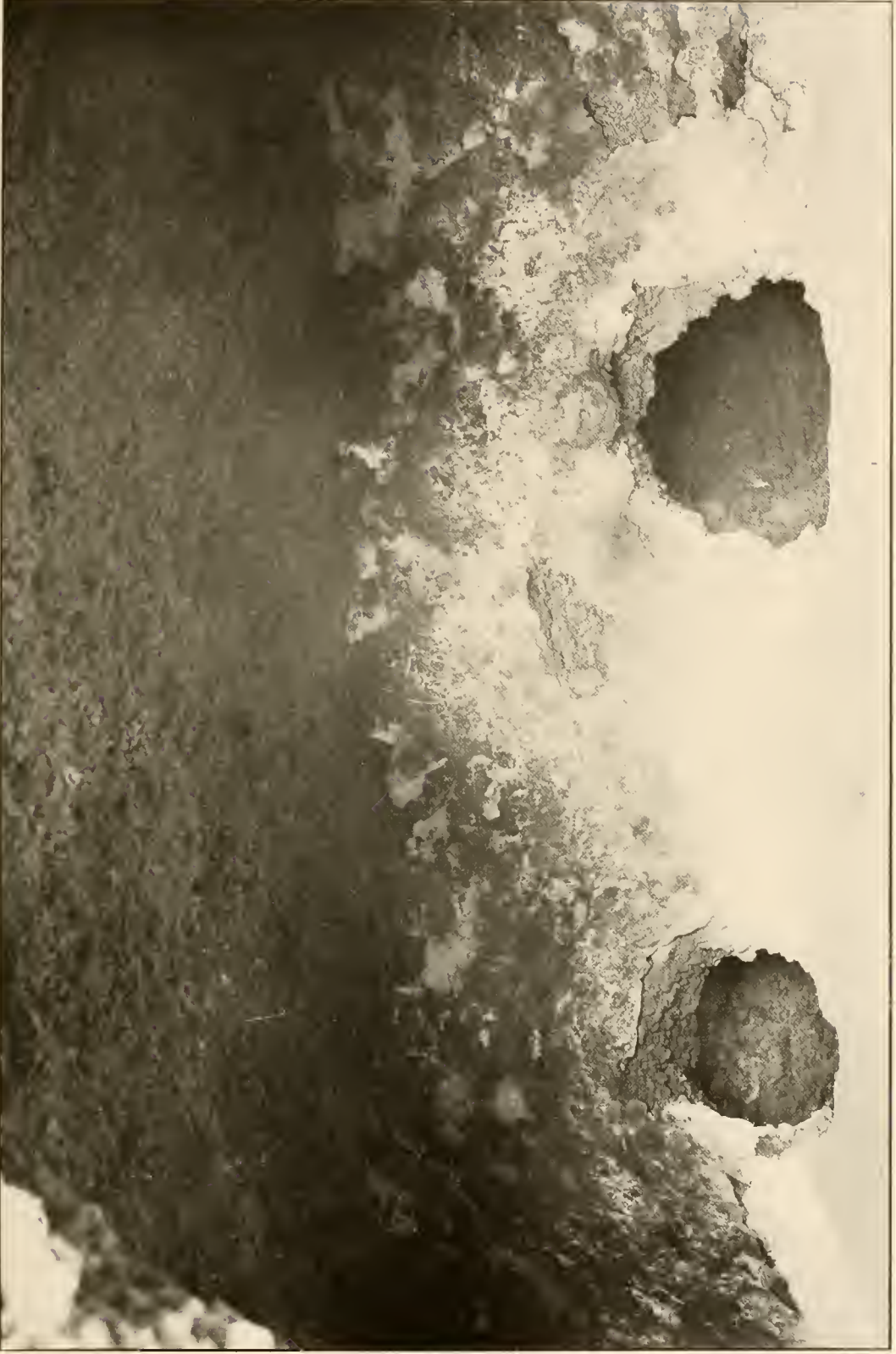
TURKEY TANKS CAVES, NEAR FLAGSTAFF, ARIZONA





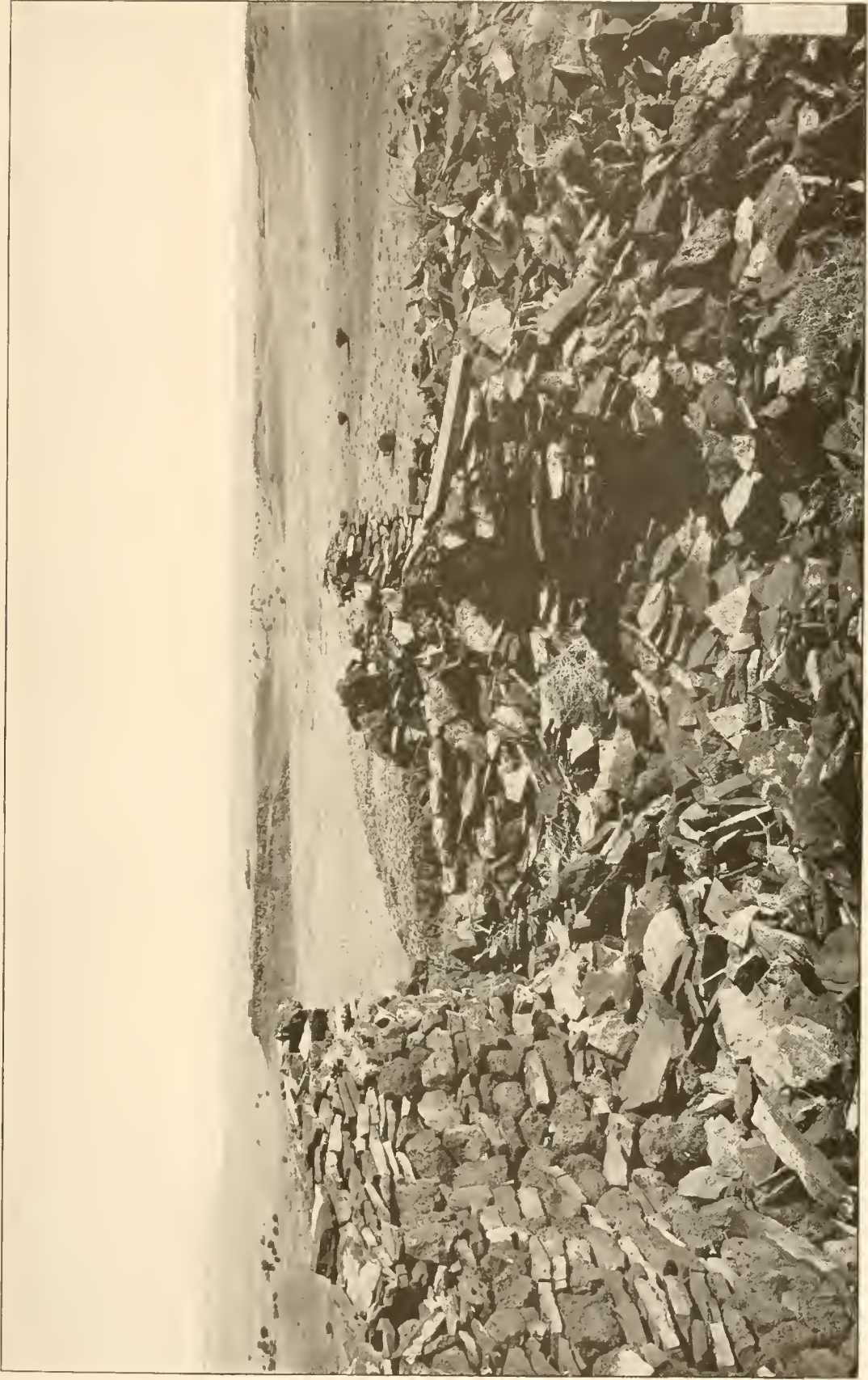
INTERIOR OF CAVE NEAR FLAGSTAFF, ARIZONA





INTERIOR OF CAVE NEAR FLAGSTAFF, ARIZONA





VIEW FROM THE CITADEL, GROUP A, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA







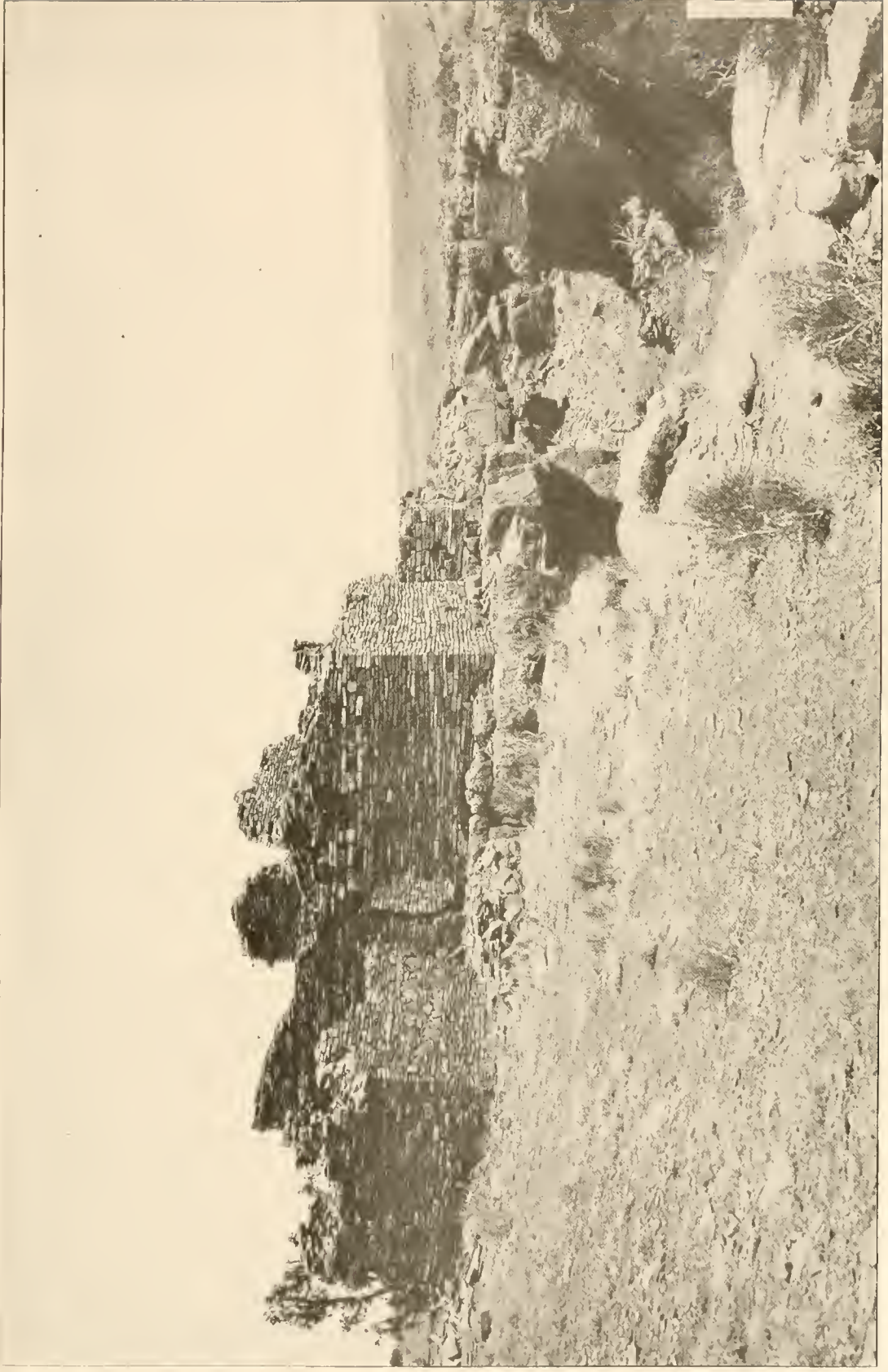
RUIN G, GROUP A, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA





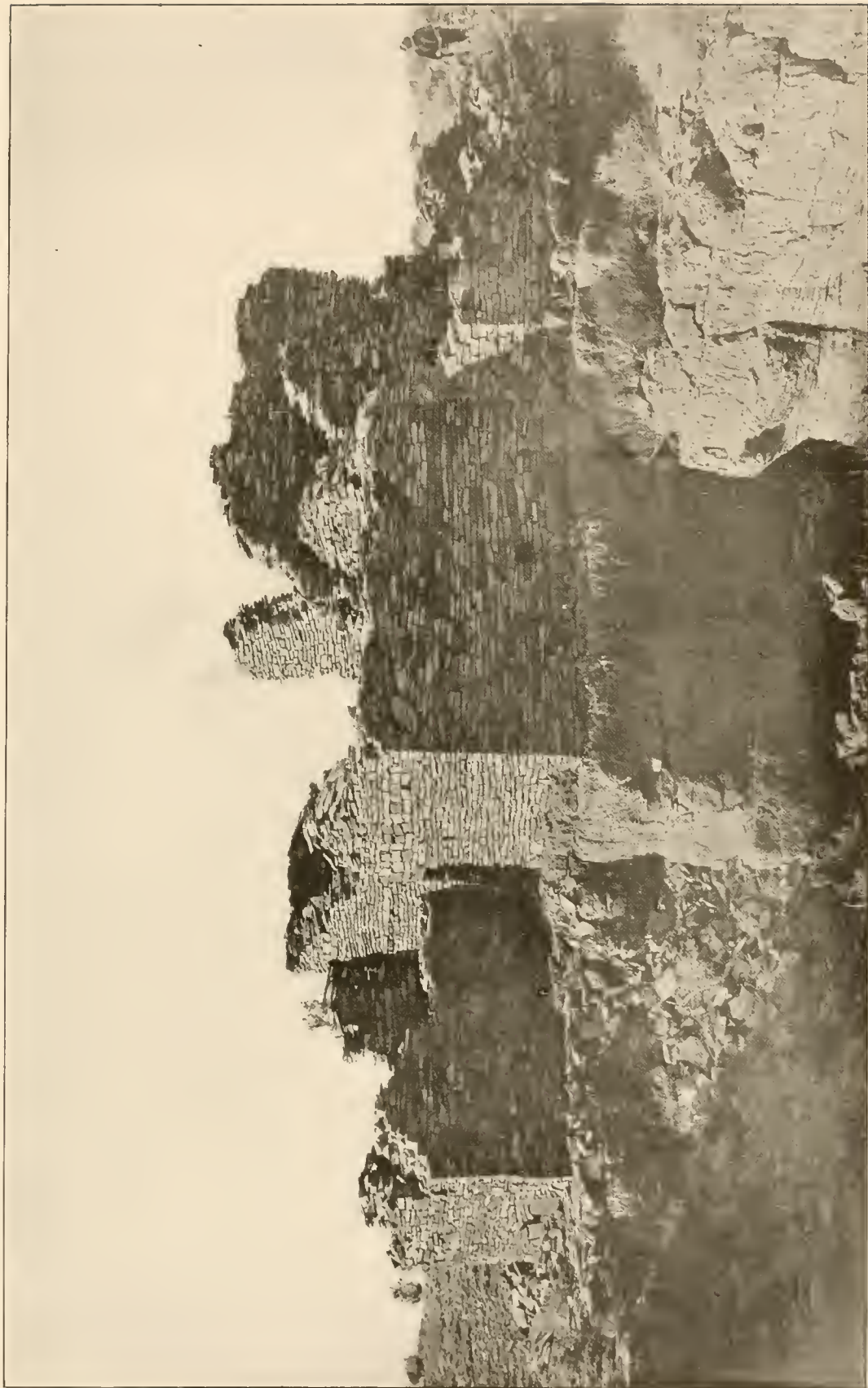
RUINS H AND J, GROUP A, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA





RUIN J, GROUP A, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA





RUIN J, GROUP A, BLACK FALLS, LITTLE COLORADO RIVER ARIZONA







RUIN A, GROUP B, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA





SECTION B, RUIN A, GROUP B, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA





RUIN A, GROUP B, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA

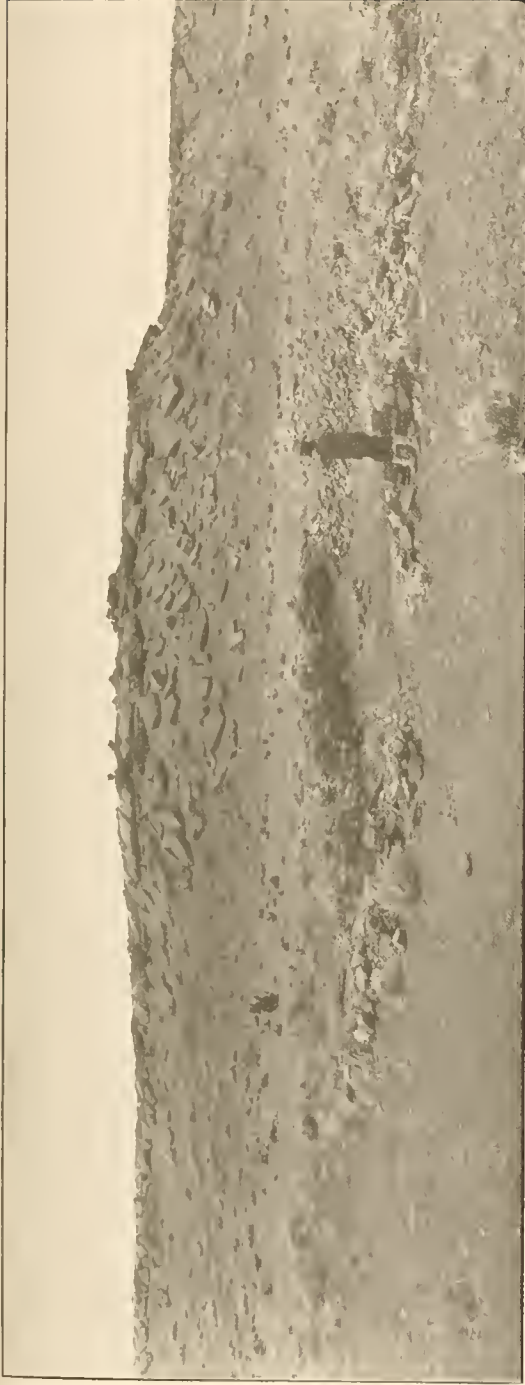




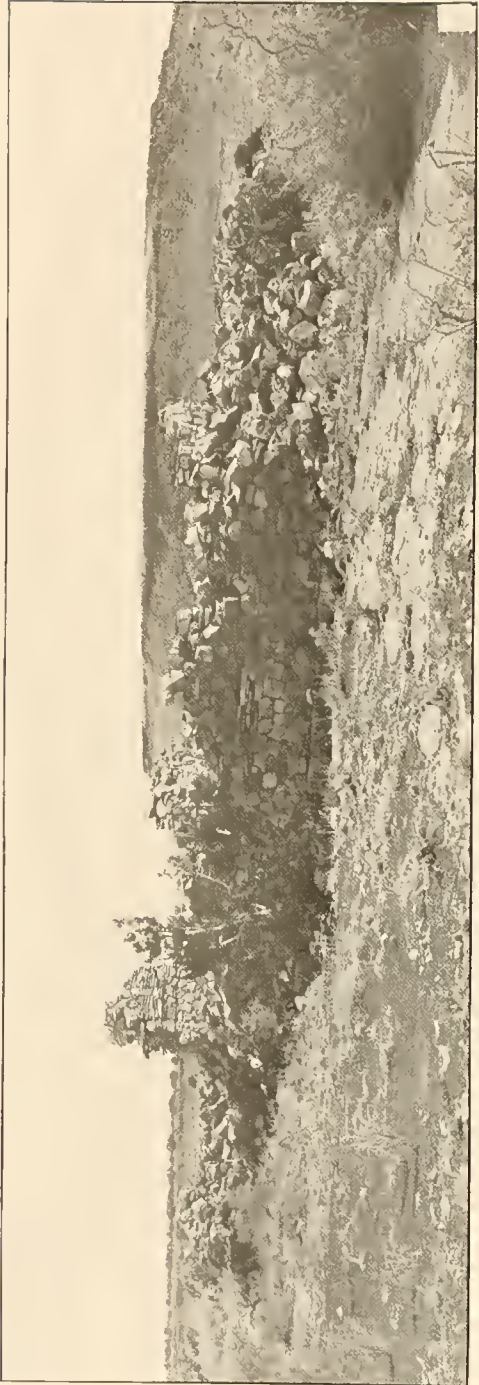
CHIMNEY IN RUIN A, GROUP B, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA





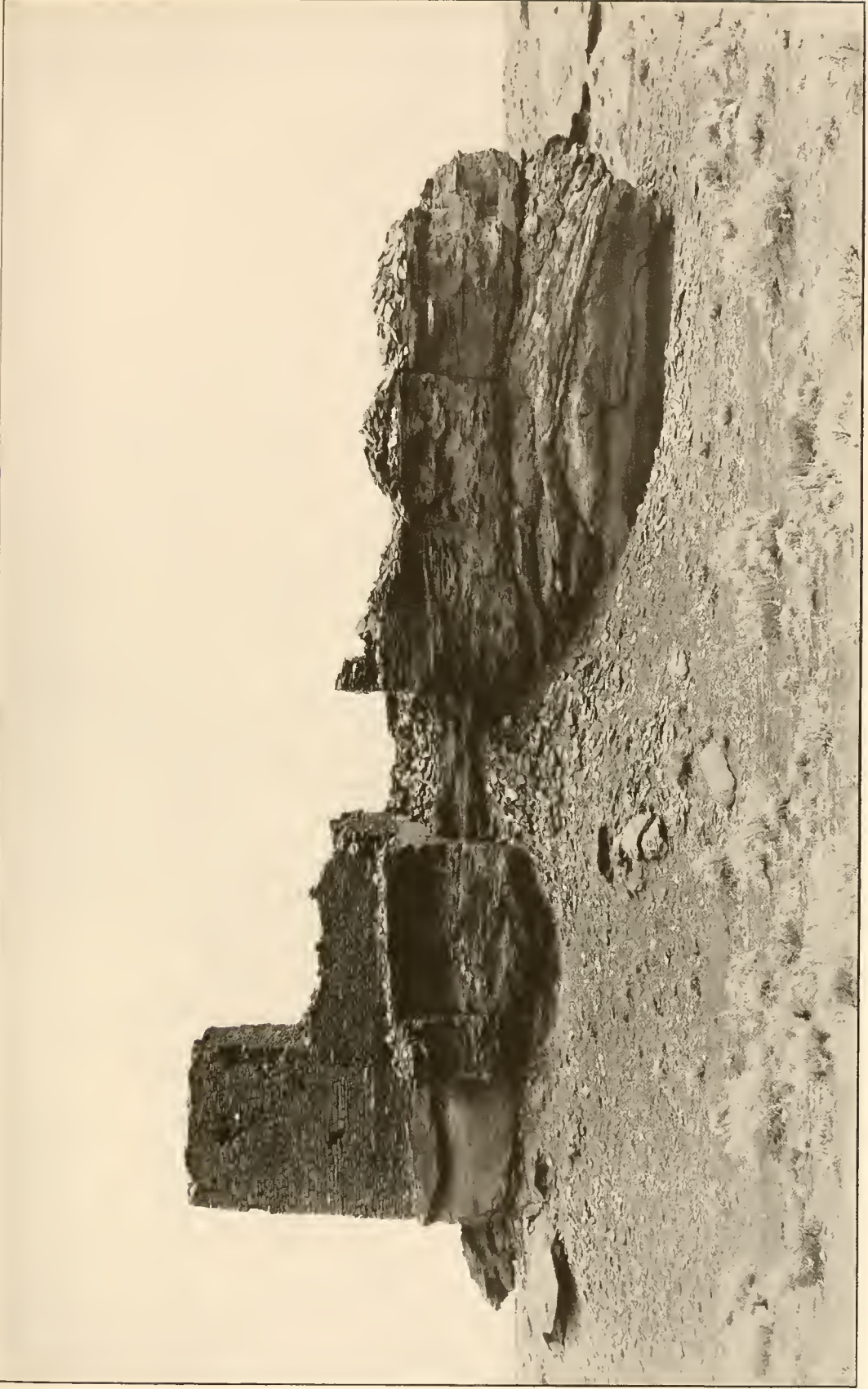


a RESERVOIR, RUIN A, GROUP B, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA



b SMALL RUIN NEAR CAMP, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA





RUIN A, GROUP C, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA  
(VIEW FROM THE EAST)





RUIN A, GROUP C, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA  
(VIEW FROM THE WEST)





RUIN A, GROUP C, BLACK FALLS, LITTLE COLORADO RIVER, ARIZONA  
(VIEW FROM THE NORTH)







VASE FROM CHEVLON RUIN, ARIZONA

(NUMBER 157005, DIAMETER 8 INCHES)





VASE FROM HOMOLOBI, ARIZONA

NUMBER 157 016, DIAMETER 11 INCHES 1





a (NUMBER 157 558, HEIGHT 6½ INCHES)



b (NUMBER 157 142, HEIGHT 7½ INCHES)

VASES FROM HOMOLOBI, ARIZONA





a (NUMBER 157361, DIAMETER 9 $\frac{3}{8}$  INCHES)



b (NUMBER 157002, DIAMETER 10 $\frac{1}{4}$  INCHES)







FOOD BOWL FROM FOUR-MILE RUIN, ARIZONA

(NUMBER 177864, DIAMETER 10 1/4 INCHES)





a NUMBER 177293. DIAMETER 7 3/4 INCHES



b (NUMBER 177110, DIAMETER 12 INCHES)





FOOD BOWL FROM FOUR-MILE RUIN, ARIZONA

(NUMBER 177 203, DIAMETER 10 INCHES)





a (NUMBER 156966, DIAMETER 8 3/4 INCHES)



b (NUMBER 156964, DIAMETER 8 INCHES)

FOOD BOWLS FROM HOMOLOBI, ARIZONA







b (NUMBER 157353, DIAMETER 8¾ INCHES)



a (NUMBER 157579, DIAMETER 9½ INCHES)

FOOD BOWLS FROM CHAVES PASS AND CHEVLON, ARIZONA





6 (NUMBER 156675, DIAMETER 10 INCHES)



7 (NUMBER 157523, DIAMETER 8 INCHES)

FOOD BOWLS FROM CHAVES PASS AND HOMOLOBI, ARIZONA





*a*



*b*

VASES FROM HOMOLOBI, ARIZONA











NUMBER 158666 DIAMETER 6 INCHES



NUMBER 156921 DIAMETER 6 INCHES

VASES FROM HOMOLOBI, ARIZONA





a (NUMBER 157374 HEIGHT 5 INCHES)



b (NUMBER 156489, HEIGHT 4½ INCHES)

VASES FROM HOMOLOBI, ARIZONA





NUMBER 15712, DIAMETER 1 1/2 INCHES



NUMBER 15713, DIAMETER 2 1/2 INCHES



NUMBER 15806, DIAMETER 2 1/2 INCHES

ALL FROM CHEVLON, HOMOLOBI AND CHAVES PAYS, ARIZONA





71 NUMBER 157466 D. AMETER 5.4 INCHES



72 NUMBER 157467 D. AMETER 5 INCHES



73 NUMBER 157443 D. AMETER 4 1/2 INCHES



74 NUMBER 156630 D. AMETER 3 INCHES



75 NUMBER 157268 D. AMETER 4 INCHES

FOOD BOWLS FROM CHEVLON, HOMOLOBI, AND FOUR-MILE, ARIZONA







a (NUMBER 157514, DIAMETER 5 INCHES)



b (NUMBER 156517, DIAMETER 5 1/2 INCHES)

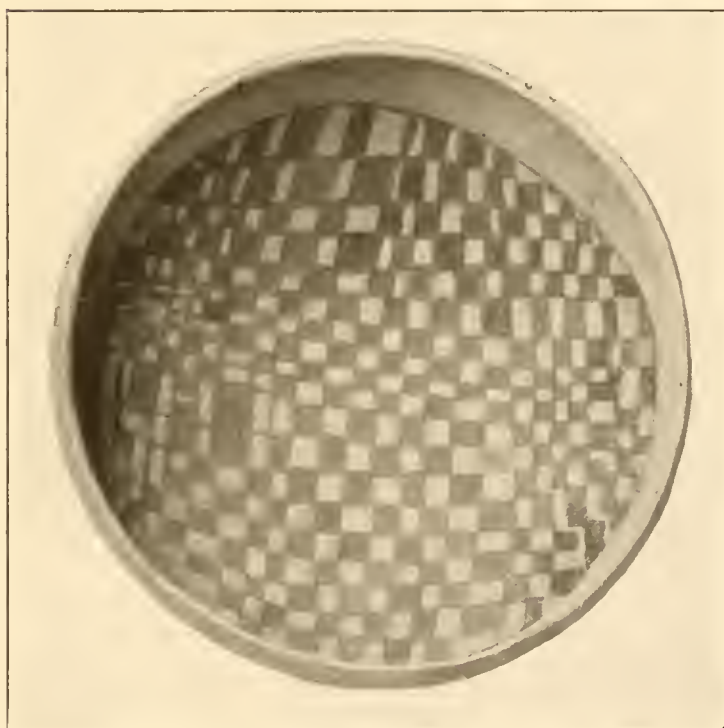


c (NUMBER 156538, DIAMETER 5 3/4 INCHES)





*a*



*b*

FOOD BOWLS FROM CHEVLON, ARIZONA





4. NUMBER 157119, DIAMETER 5 $\frac{3}{4}$  INCHES.



4. NUMBER 157184, DIAMETER 5 $\frac{1}{2}$  INCHES.

VASES FROM CHEVLON, ARIZONA.





a (NUMBER 157240, DIAMETER 7 3/4 INCHES)



b (NUMBER 157372, DIAMETER 8 INCHES)

FOOD BOWLS FROM CHEVLON, ARIZONA







a NUMBER 177219. DIAMETER 9½ INCHES )



b NUMBER 177086 DIAMETER 10½ INCHES )

FOOD BOWLS FROM FOUR-MILE RUIN, ARIZONA





a. NUMBER 177223, DIAMETER 9 1/4 INCHES



b. NUMBER 177147, DIAMETER 9 INCHES

FLINT BOWLS FROM FOUR-MILE RUIN, ARIZONA





a NUMBER 176 963, DIAMETER 9 INCHES }



b NUMBER 177 356, DIAMETER 10 1/4 INCHES }

FOOD BOWLS FROM FOUR-MILE RUIN, ARIZONA





a (NUMBER 157120, DIAMETER 9 INCHES)

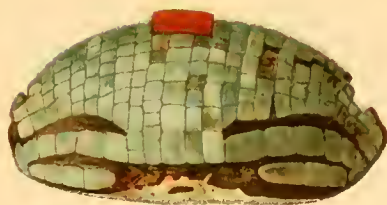
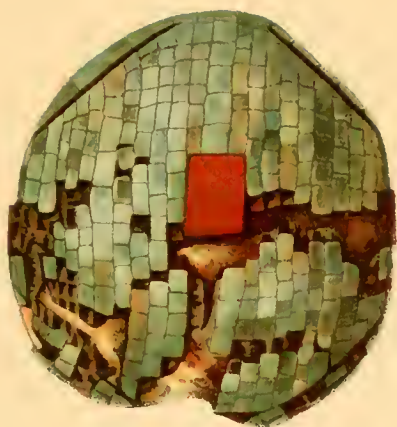


b (NUMBER 156494, DIAMETER 9 INCHES)

FOOD BOWLS FROM CHEVLON AND HOMOLOBI, ARIZONA

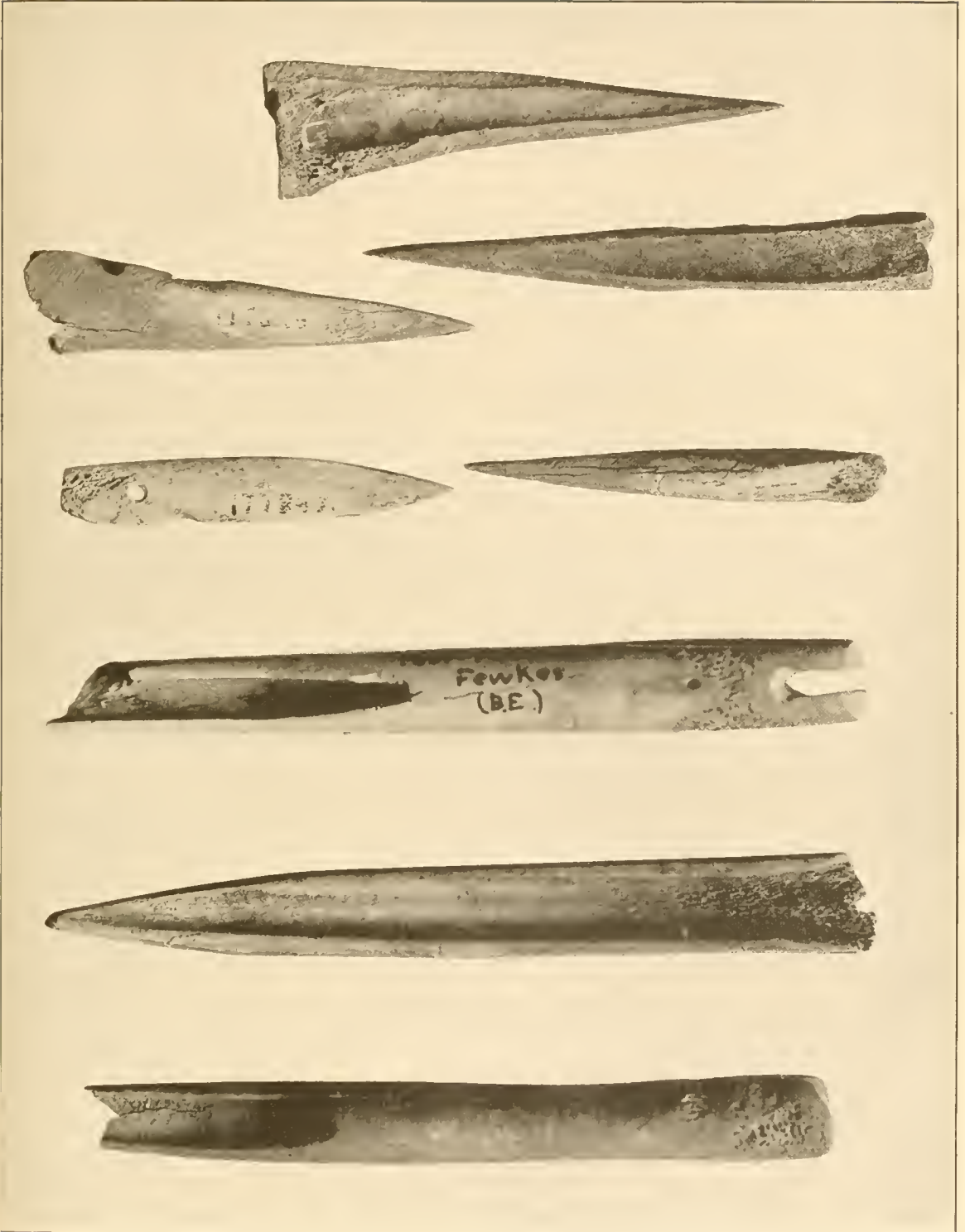






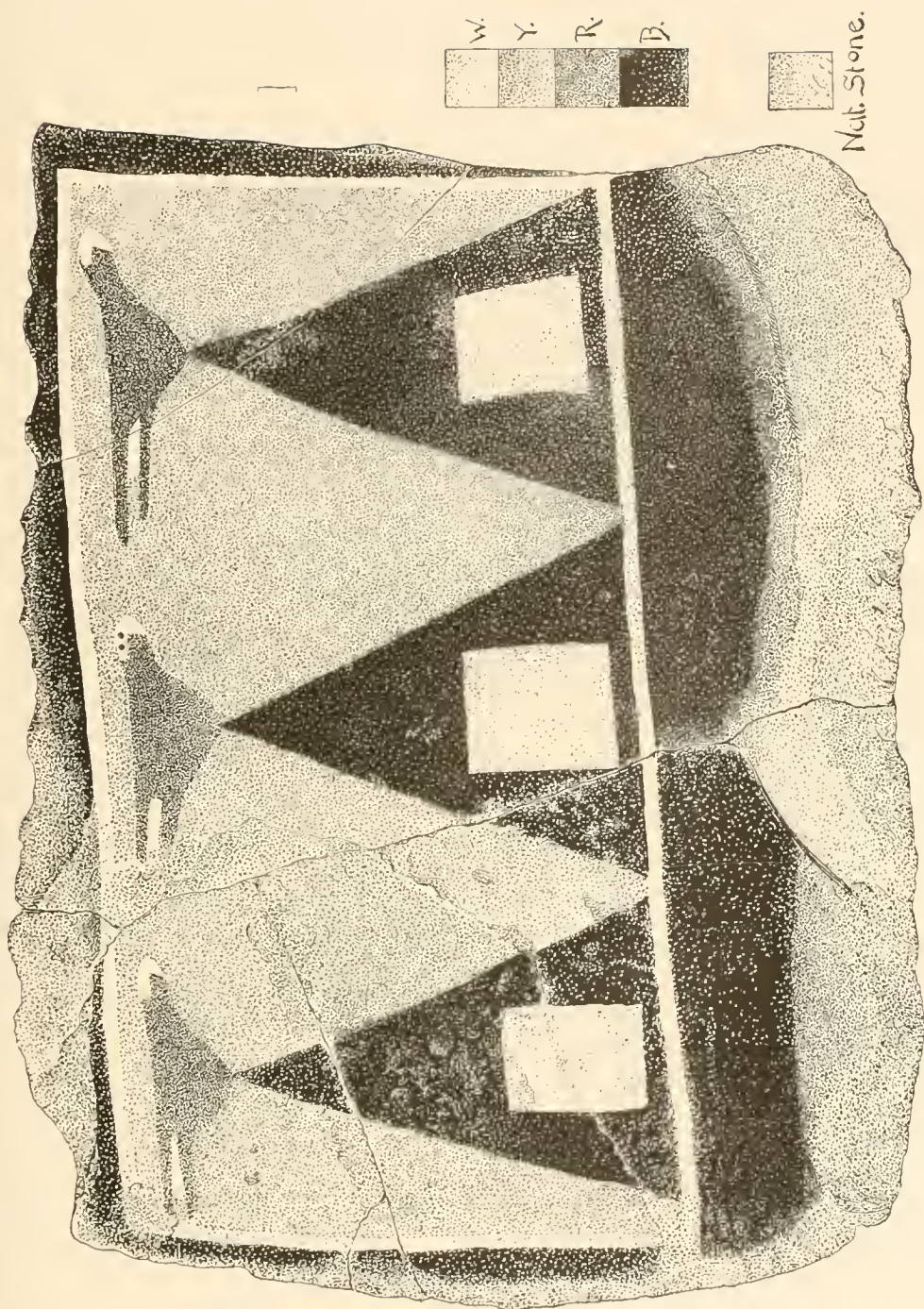
MOSAIC HELMET FROM CHAVEZ PASS, ARIZONA  
(NUMBER 15807, ACTUAL SIZE)





BONE IMPLEMENTS FROM CHAVES PASS, ARIZONA





STONE SLAB WITH RAIN-CLOUD DESIGN, FROM CHEVLON, ARIZONA  
(NUMBER 157293)





a (NUMBER 157142, DIAMETER 7½ INCHES)



b (NUMBER 157276, DIAMETER 13¼ INCHES)

VASE AND FOOD BOWL FROM CHEVLON, ARIZONA







*a*



*b*

VASES FROM SHUMOPOVI, ARIZONA





VASE FROM SHUMOPOVI, ARIZONA





*a*



*b*

VASES FROM SHUMOPOVI, ARIZONA





a (NUMBER 157784. DIAMETER 10 $\frac{3}{4}$  INCHES)

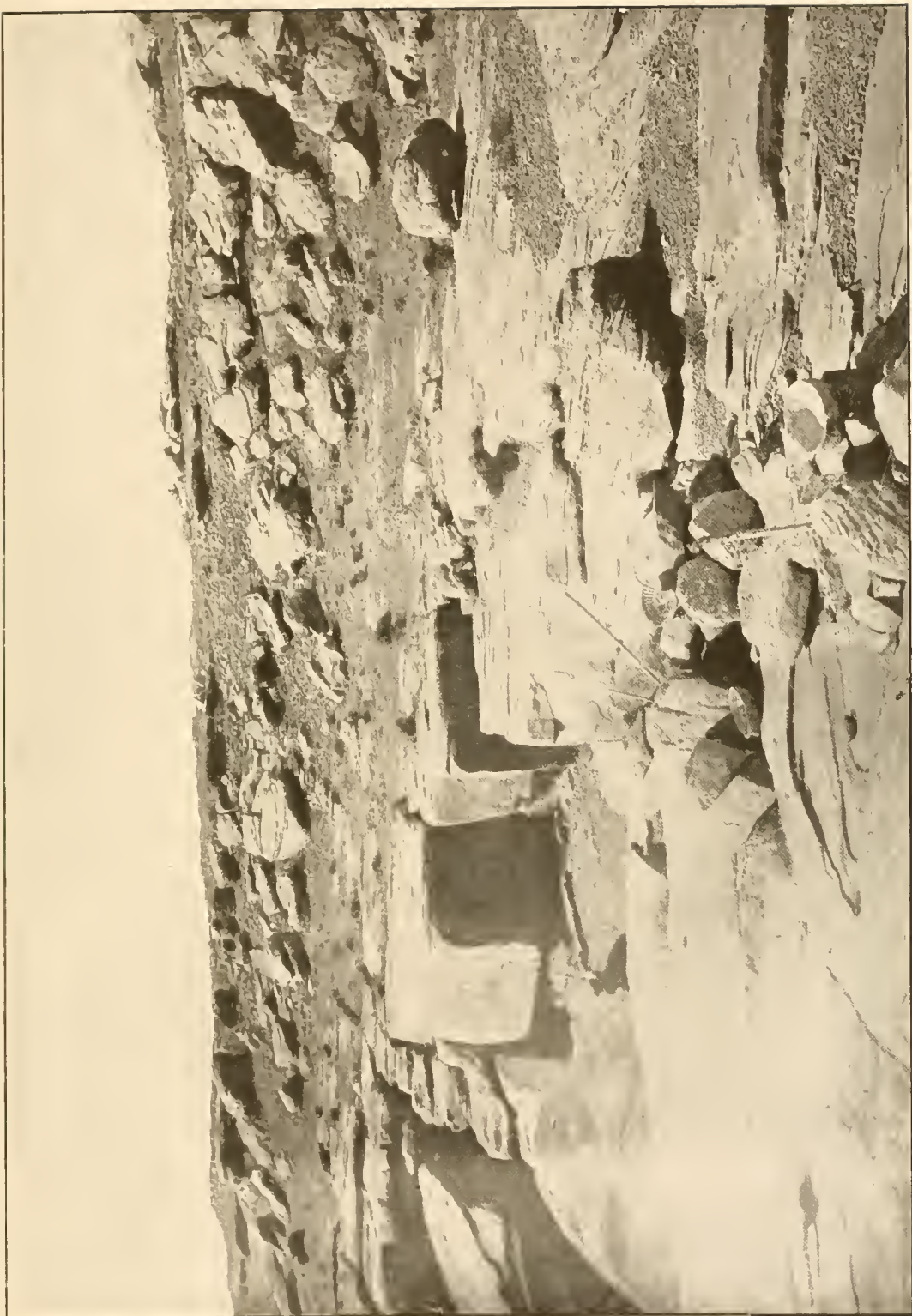


b (NUMBER 157818. DIAMETER 9 $\frac{3}{4}$  INCHES)

FOOD BOWLS FROM SHUMOPAVI, ARIZONA

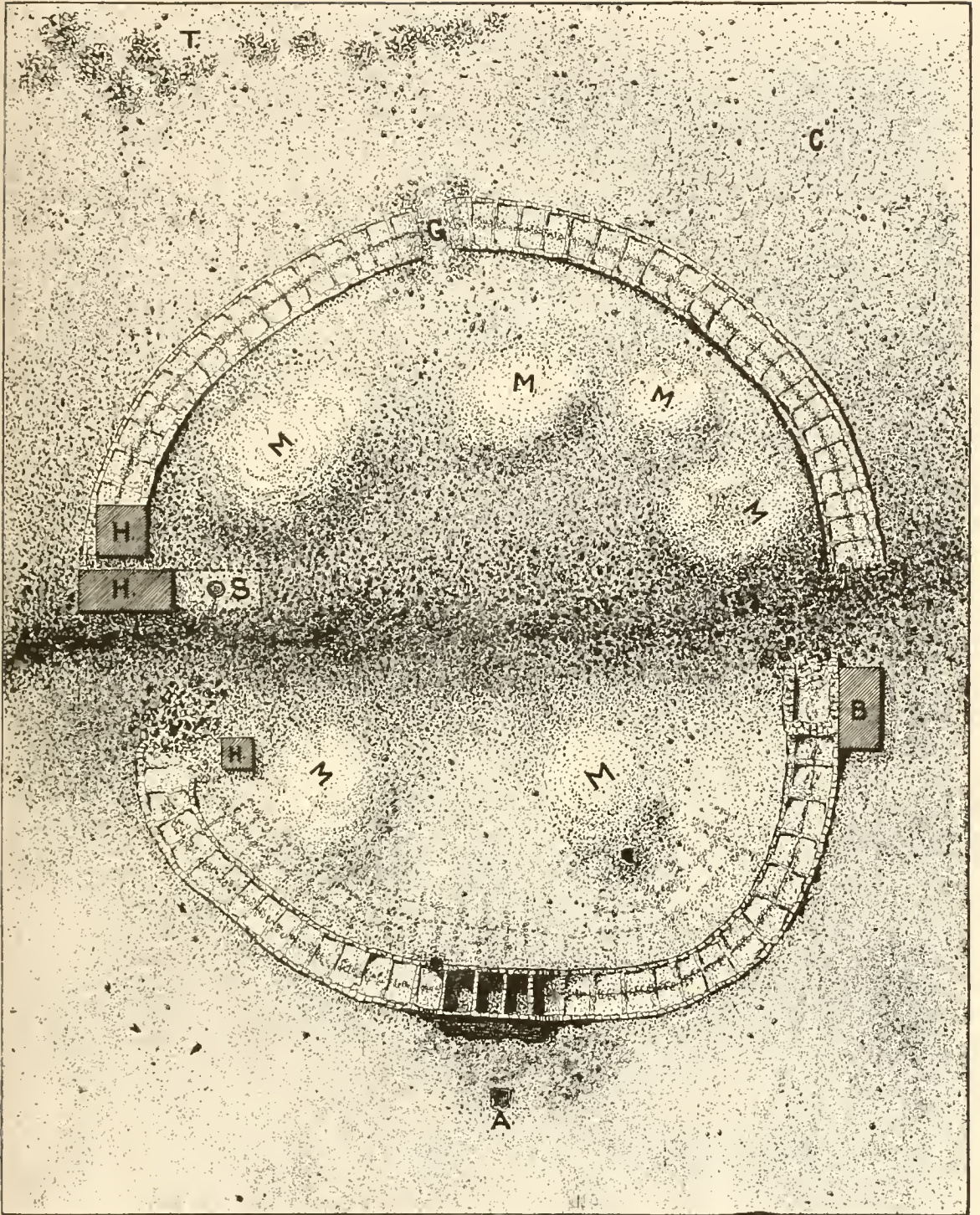






MODERN CEMETERY AT HOPI PUEBLOS, ARIZONA

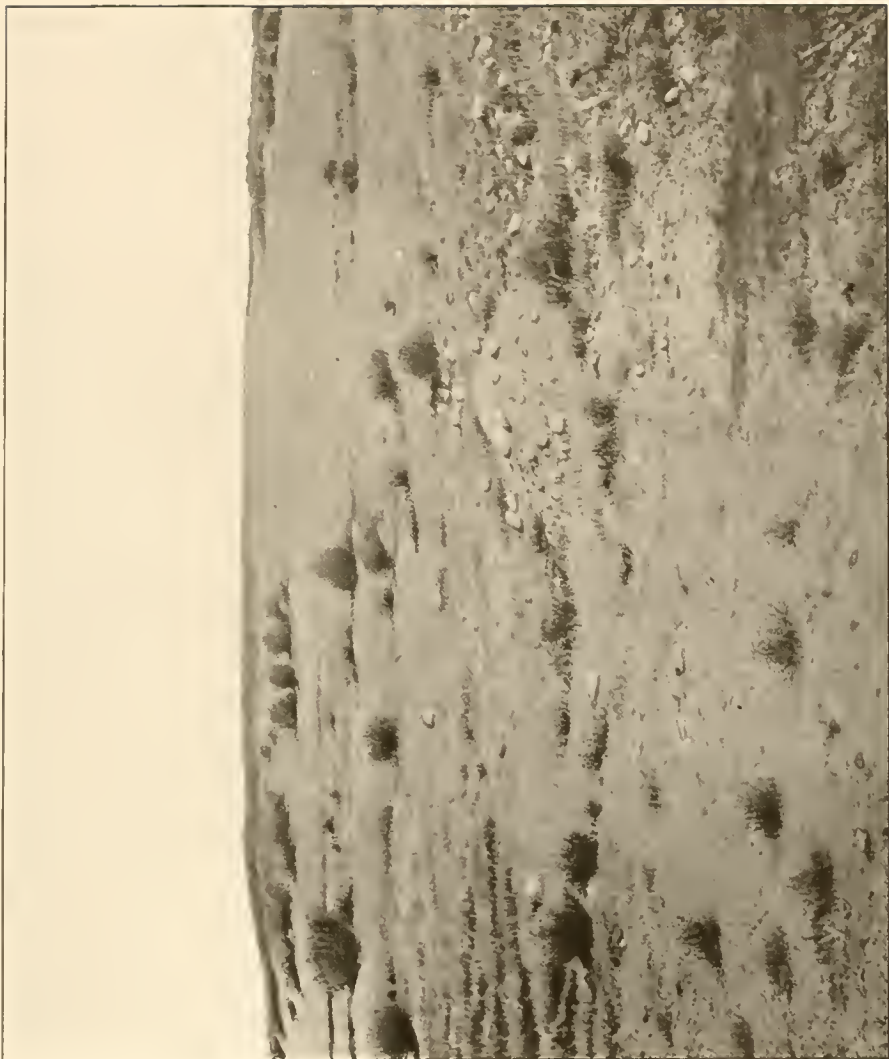




PLAN OF KINTIEL RUIN, ARIZONA

A, altar. B, barn. C, cemetery; G, gateway; H, modern houses; M, mounds; S, spring; T, trees.





SURFACE OF MOUNDS AT FOUR-MILE RUIN, ARIZONA, BEFORE EXCAVATION





a (NUMBER 177535, DIAMETER 9 INCHES)



b (NUMBER 177534, DIAMETER 9 INCHES)

FOOD BOWLS FROM EPLEY'S RUIN, GILA VALLEY, ARIZONA







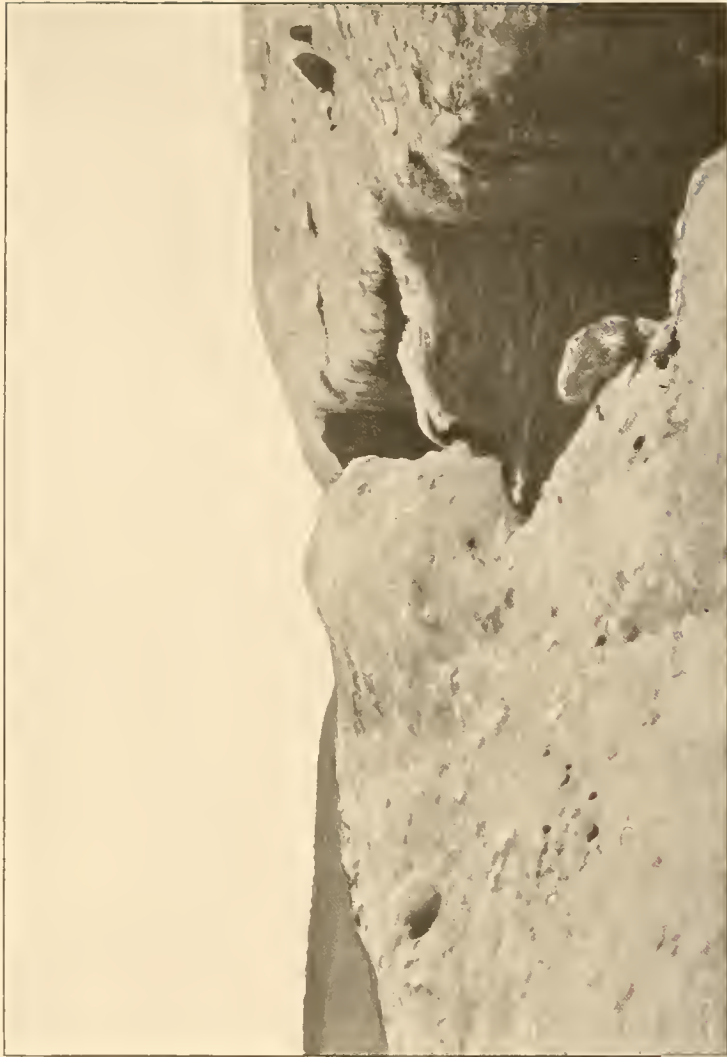
$\alpha$  (NUMBER 177082, DIAMETER  $8\frac{3}{8}$  INCHES)



$\delta$  (NUMBER 177231, DIAMETER  $9\frac{1}{4}$  INCHES)

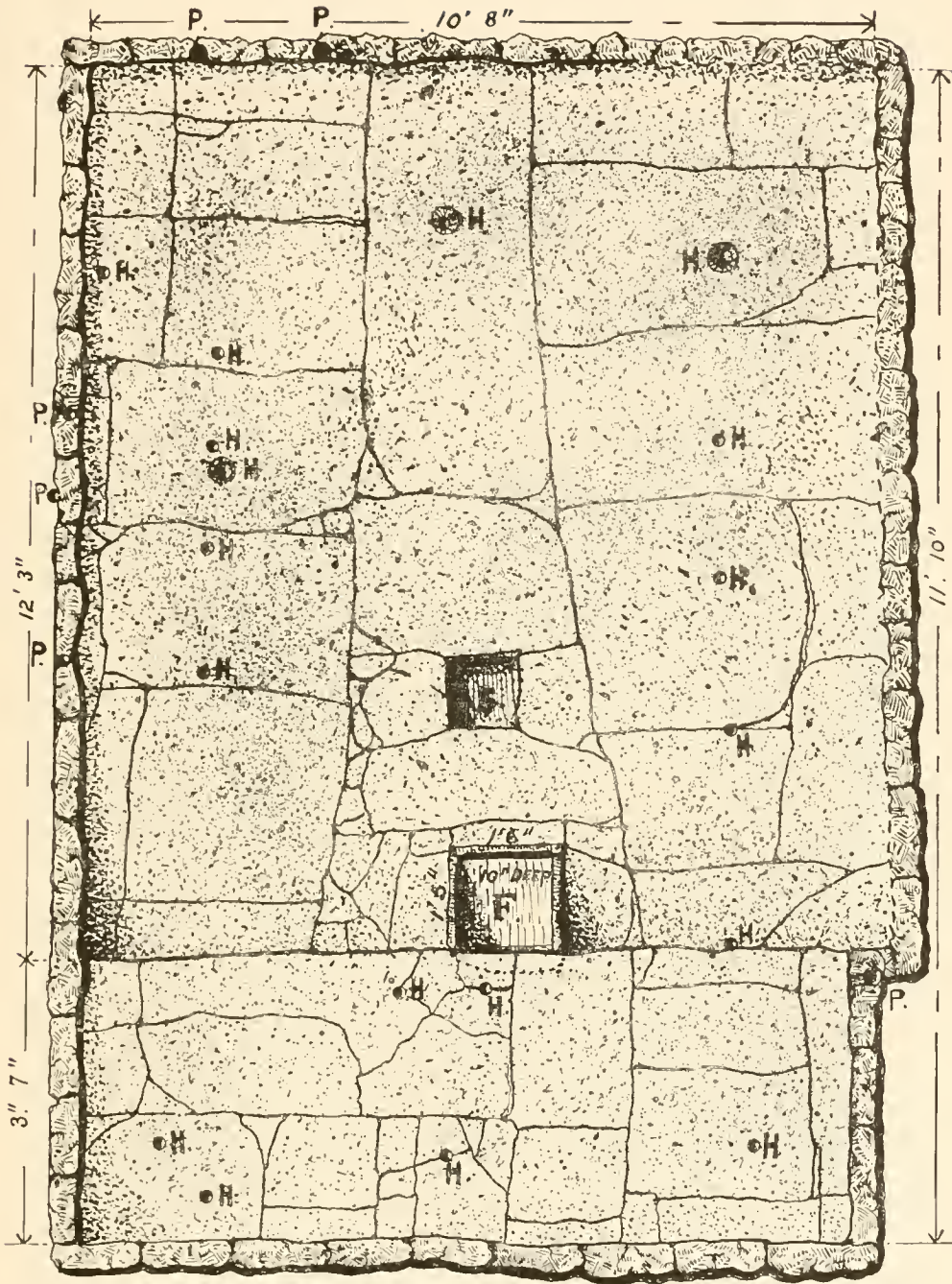
FOOD BOWLS FROM FOUR-MILE RUIN, ARIZONA





EXCAVATIONS AT FOUR-MILE RUIN, ARIZONA





PLAN OF A ROOM IN FOUR-MILE RUIN, ARIZONA

F, fireplace, H, holes, P, posts, S, shrine.





FIGURE 177254 (DIAMETER 3 INCHES)



FIGURE 177255 (DIAMETER 4 INCHES)

APPROVED BY THE BUREAU OF AMERICAN ETHNOLOGY, WASHINGTON, D. C.







5 (NUMBER 177048, DIAMETER 6 INCHES)



6 (NUMBER 177099, DIAMETER 8 INCHES)

VASE AND FOOD BOWL FROM FOUR-MILE RUIN, ARIZONA





FOOD BOWLS FROM FOUR-MILE RUIN, ARIZONA





*a*



*b*

VASES FROM FOUR-MILE RUIN, ARIZONA





b (NUMBER 177162, DIAMETER 5 3/4 INCHES)



b (NUMBER 177147, DIAMETER 9 3/8 INCHES)



c (NUMBER 177219, DIAMETER 9 5/8 INCHES)



d (NUMBER 17732, DIAMETER 10 7/8 INCHES)

FOOD BOWLS FROM FOUR-MILE RUIN, ARIZONA







SPIRAL DESIGN ON FOOD BOWL FROM FOUR-MILE RUIN, ARIZONA





PERFORATED STONE SLAB AND LOOM STONES FROM FOUR-MILE RUIN, ARIZONA





PLAN OF BUENA VISTA RUIN, UPPER GILA VALLEY, ARIZONA

A, modern adobe buildings; C. H., central house; D, depression; E, excavations; M, mounds; R, reservoir; T, trees.





a (NUMBER 177 544, DIAMETER 6¾ INCHES)



b (NUMBER 177 566, DIAMETER 9½ INCHES)



c (NUMBER 157154, DIAMETER 6½ INCHES)











7 (NUMBER 177536, DIAMETER 4½ INCHES)



8 (NUMBER 177520, DIAMETER 3½ INCHES)



9 (NUMBER 177558, DIAMETER 9½ INCHES)



