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AN OUTLINE FOR A CHRONOLOGY OF ZUÑI RUINS.

BY

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## PREFACE.

This study is the result of collections made during the summer of 1916. Three weeks were spent in assisting Mr. Nels C. Nelson in a survey of the ruins in the neighborhood of Ramah, New Mexico: during the remainder of the time the survey was continued by the writer alone, principally on the Zuñi Indian Reservation further west. Realizing that the entire region surveyed should be described as a unit, Mr. Nelson has generously placed his notes and collections at the writer's disposal. Our thanks are also due the many willing collaborators, white and native, who expedited the work; in particular to Mrs. E. G. Nelson, William F. Lewis, governor of Zuñi, and Mrs. Lewis. To Professor Alfred L. Kroeber we owe the interest and assistance of the Zuñi themselves, without which little could have been accomplished.

The purpose of the study was to provide a background for ethnological investigations among the Zuñi. In his work of the previous year, Professor Kroeber clearly indicated the possibility of chronologizing the ruins of the Zuñi country. A more extended view of the field showed, however, that for the present the time-relations among the ruins could be given only in general outlines. We found almost invariably that the shallow refuse heaps yielded little or no stratigraphic information and we were therefore thrown back on the hazardous methods of hypothetical seriation. Further, when all the data were assembled it was found that our survey had not covered sufficient territory to complete the chronological outline; that is, it is still necessary to extend the field down the Little Colorado Valley. Nevertheless, we have attempted to give the results a definite form by providing a statistical setting, though it is not claimed that such results are more than indications of what a more extended investigation may discover.

LESLIE SPIER.

July, 1917.



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## THE ZUÑI REGION.

The area in which the ruins described in the following report lie is situated close to the Arizona line in central western New Mexico. It embraces the territory drained by the Zuñi River and lesser tributaries of the Little Colorado River; a fan-shaped sector extending from the great lava bed on the line of the continental divide to the confluence of the Zuñi with the Little Colorado. The modern political divisions included are the Zuñi Indian Reservation, portions of the Zuñi National Forest, and adjacent settled

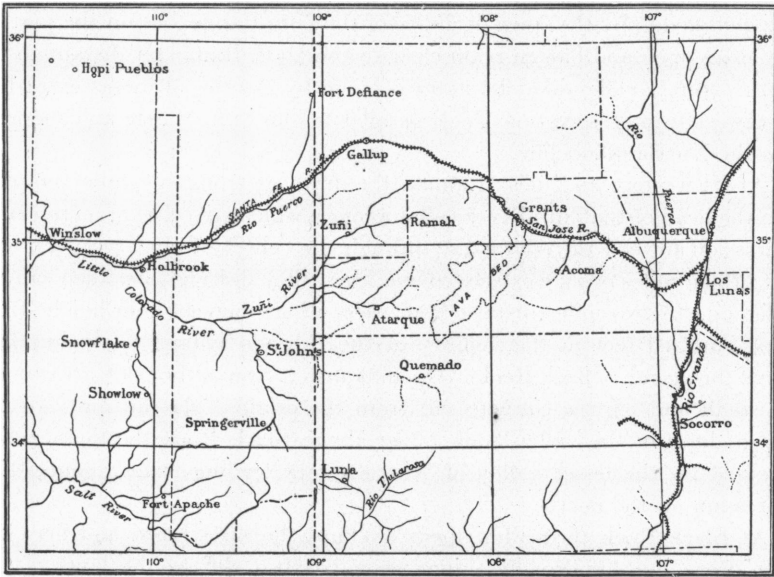


Fig. 1. Map of the Headwaters of the Little Colorado River.

lands, all within McKinley and Valencia counties, New Mexico. This area, which we shall designate as the Zuñi region, measures roughly sixty miles east and west by forty from north to south.

Topographically the area includes the western extension of the plateau which forms the continental divide midway between the Rio Grande and the Arizona line. Erosion by streams tributary to the Little Colorado, viz., the Rio Puerco along the line of the railroad to the north, the Zuñi River traversing the center, and minor nameless streams as far as Atarque on the south, has produced certain marked modifications. The remnants of the plateau

left by the marauding streams stand as the dominant land masses. Across the northeast corner of the area extend the Zuñi Mountains from northwest to southeast. They merge on the northwest into the low, rolling, but broken, country between the Puerco and the Zuñi south of Gallup, rise to nine thousand feet and attain mountainous proportions in their middle section, and merge again in the plateau south of Grants and Acoma. Thence, the plateau sweeps from the great lava bed on the east through the southern half of our area.

Along the southwestern foot of the Zuñi Range extends a broad shallow valley draining westward into the Zuñi River. Emerging from the plateau to the east it descends toward the west until in the vicinity of Ramah (see map,<sup>1</sup> Fig. 2) it reaches an altitude of seven thousand feet. On the north it is hemmed in by the steep declivity of the Zuñi Range, but on the south it lies as an open and barren plain clear to the Datil Range far distant to the south. But a valley-like character is given by a series of mesas extending northwest from Inscription Rock parallel to the Zuñi Range and merging into the Nutria monocline.

At its western end, near Ramah, the drainage from this valley empties into the head of the Zuñi River valley proper, which stretches as a crescentic depression toward the southwest through the center of our area. For the first fifteen miles of its westerly course, the valley descends between canyon walls, one to two miles distant from each other, increasing in height from three hundred feet in the vicinity of the Pescado village to six hundred above the agency, Black Rock. Opening into it from either side are numerous small and narrow canyons cut from the original plateau quite to the present level of the valley floor. Just above Black Rock the main valley is joined by the lesser valley of Nutria Creek leading from a saucer-like depression on the north.

At Black Rock the valley opens out into the Zuñi Basin and here the river drops one hundred feet through a basaltic cliff to the level of the broad plain now exposed. In the center of the plain lies Zuñi Pueblo; low mesas mark its northern margin, and its southern boundary is the sheer, high edge of the plateau. From the northern mesas rise four remnants of the plateau to their original level, the twin Zuñi Buttes and two larger eminences near Zuñi, Kwillyallanna. Dominating the basin from its

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<sup>1</sup> The map does not present topographic features with uniform correctness. It is based on the excellent "Map of Zuñi Indian Reservation, New Mexico" (Department of the Interior, Office of Indian Affairs, 1914) and on the topographic map of the U. S. Geological Survey, Wingate Sheet, for the area north of the thirty-fifth parallel. For the area to the south, we have been forced to rely on imperfect sketches and memory. We have, therefore, refrained from showing topography in the southern area, but this does not matter, as the relief there, except in the vicinity of Atarque, is relatively slight.

southern border rises Towwayallanna (the so-called Thunder Mountain) for a thousand feet sheer. Toward the southwest the basin broadens out along the river, now at an altitude of six thousand feet. Its northern margin merges into the low rolling country extending to the Puerco fifty miles distant. From Towwayallanna the edge of the plateau extends due south for ten miles and then swings westward for a somewhat greater distance into Arizona, but the edge is not clearly defined, for badly broken remnants of the plateau fill the region lying between river and plateau edge. Penetrating through these remnants from plateau to river is a minor valley on the edge of which lies the village of Ojo Caliente. A few miles below, the river strikes the impassable plateau, turns abruptly westward into Arizona, and flowing in a general southwesterly direction through the rolling hills joins the Little Colorado River forty miles away.

The remainder of our area lies on the Zuñi plateau. Its northern and western edges are defined by the Zuñi River valley, whence it sweeps south and southeast an indeterminate distance. Nor is it broken by any great valleys, although crossed by two extensive drainage systems. The first of these drains the region southeast of Ojo Caliente, traversing the plateau from east to west to join the Zuñi River not far over the Arizona boundary. The second is much more extensive, embracing all the territory southward of Inscription Rock and Ramah and thence westward south of the first system into Arizona, where the channel is lost in the rolling hills before ever reaching the Zuñi. We have purposely referred to these drainage channels as systems, for as such they exist for the greater part of the year, the typical shallow dry channels of a plateau country. But the plateau is not an unrelieved plain. Along its eastern border extends the great lava bed, a sheet of desolate country separating the Zuñi region from that of Acoma, with outlying tracts of "malpais" within the limits of our area. Westward of this are salt ponds and sinks. The drainage channels themselves form shallow canyons, while at times the plateau rises to an altitude of nine thousand feet, to judge by the flora.

The forestation of the region follows the main topographic features. The Zuñi Mountains and a large part of the Zuñi Plateau are densely pine-clad; lofty pines rising form a variety of scrub growth, including in favorable localities clumps of small oaks. Small springs, little more than seepage places, occur at not infrequent intervals in such forests, and the park-like groves around them make the most delightful camping places imaginable. Such springs occur, of course, at the heads of canyons leading into the drainage channels on the plateau, and by their location was determined that of the habitations in this section. The general level of the plateau, and this includes the majority of the mesa tops, say about seven thousand

to seven thousand five hundred feet altitude, is clothed with low cedar and piñon trees, bayonet cactus (yucca), but not much underbrush. There is but one living stream on this level in the whole area known to us, that at the foot of YallaLanna, northwest of Zuñi. Yet there are many ruins, large and small, at this level, from those perched on Inscription Rock in the east, to the group on Towwayallanna near Zuñi, and the ruin of Ketteippawa, near Ojo Caliente, to the south. In all such places there are depressions, natural or partly artificial, for the collection and storage of surface drainage. It is noteworthy that most ruins atop isolated mesas have springs or ponds accessible to them in the valley below. Near ruins located in canyons and shallow valleys scooped out of the plateau there can still be traced crescentic dams thrown up to catch the run-off. In many instances these have been rebuilt by present-day inhabitants.

The whole floor of the Zuñi River valley, including the broad basin at the foot of the Zuñi Range, is devoid of forest. Its covering is grama grass and sagebrush. This, as the terminous of all the drainage from the surrounding terrain, is naturally the best watered section of the whole region. Yet the chief localities where water may be found in the early summer, before the rains set in, can be briefly enumerated. Beginning at the east, there are springs near Tinaja and a permanent waterhole in the ruin of Cienega (percolating from under the lava sheet). The basin here presents an inhospitable appearance, but water is not far from any of the ruins even at this season. A fair-sized stream has its source in the foot of the Zuñi Range and runs westward past Pueblo de los Muertos to Ramah which is situated at the junction of several drainages capable of cultivation. Further north, Nutria Creek also rises in the mountains as a permanent stream. It is of considerable size and in the neighborhood of Nutria village irrigates an area fully two miles long. At Pescado village six miles west of Ramah are two groups of large copious springs which, gushing from under the lava fault at this point, constitute the perennial source of the Zuñi River. Water is now diverted from the springs into irrigation ditches, as it undoubtedly was in prehistoric times. Many ruins are clustered in the vicinity, duplicating the situation at Ramah. Above the Zuñi Basin the government reservoir at Black Rock now permits the cultivation of an extensive area in the vicinity of Zuñi, but it obscures aboriginal conditions at this point. Irrigation may have been practised here, but of this we are not certain. However, many large tracts in the sandy washes outside of the government project are under cultivation by dry farming and undoubtedly represent the original methods.<sup>1</sup> Whipple says of conditions in 1853 that "The soil

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<sup>1</sup> Cf. Möllhausen, 98; Sitgreaves, 5, 6, footnote, and 35.



seemed light, but where cultivated, it produces fine crops without the aid of irrigation. Not an acequia was seen; and an Indian, who accompanied us, said they were not resorted to, as sufficient moisture for the fields was derived from rain."<sup>1</sup> The large wash leading towards Zuñi from the north, and others near the foot of Towwayallanna to the south may be pointed out as typical areas cultivated by dry farming. Even sand bars in the bed of the river are utilized. Other washes occurring at intervals further down the basin are now cultivated. The Zuñi River ceases to be a source of water supply in the lower basin; for it sinks into the ground a few miles below Zuñi and only a few pools stand in the lower reaches of its bed. At Ojo Caliente the so-called hot springs<sup>2</sup> burst forth from under the edge of the lava sheet in great quantity and permit the irrigation of a large area. Here, as at other springs, grows the ubiquitous cottonwood. Portions of the washes in the valley above the springs also sustain cultivation.

This brief glance at the characteristics of the Zuñi region must have made it clear that this is no desolate waste. In fact, the foregoing description presents the minimum conditions governing the occupation of the region. We have described the country at the driest period in the year, the early summer, after the protracted windstorms have dried up everything and before the rains of that long period from the beginning of July to the middle of September have set in. Nevertheless, a copious water supply is obtainable in only four places, namely Ojo Caliente, Pescado, the Ramah district, and Nutria, and naturally about these, excepting the last, are clustered a great number of ruins. In spite of the fact that the attractions of these localities outweigh all others, all of them have not been continuously inhabited while the region was occupied. There are no certain signs of a general desiccation of this region, the presence of ruins close to the continental divide notwithstanding. For on the one hand, ranches of Zuñi, Navajo, and white settlers are today scattered widely over the same area, and on the other, its potential water resources remain unknown to us.

Climatic conditions are favorable on the whole. In the valley the winters are not regarded as particularly severe, and the summers are pleasantly cool. Most noteworthy are the windstorms of spring and early summer for their obvious influence on the location of habitations. The prevailing winds are from the northwest and west, that is, they sweep through the upper valley. Consequently, the house cluster was often built on the eastern side of a ridge in its lee, or against the western slope of a cross-canyon. This location of the buildings had an additional advantage gained

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<sup>1</sup> Whipple, I, 67.

<sup>2</sup> They were never hot during the time we were excavating in the neighborhood.

from the architectural style — they had their backs (the high side of the building) to the wind. A secondary effect of the strong winds was on the location of the refuse heaps, which are almost invariably to the southeast of the main building, although often to the east and south. Note, for example, the location of the old refuse in Zuñi Pueblo itself. Presumably, the refuse was carried thither so that it might not blow back into the pueblo. The invariable nature of this phenomenon was no mean assistance in archaeological work.

# MAP OF ZUNI VALLEY AND PLATEAU

Scale of Miles

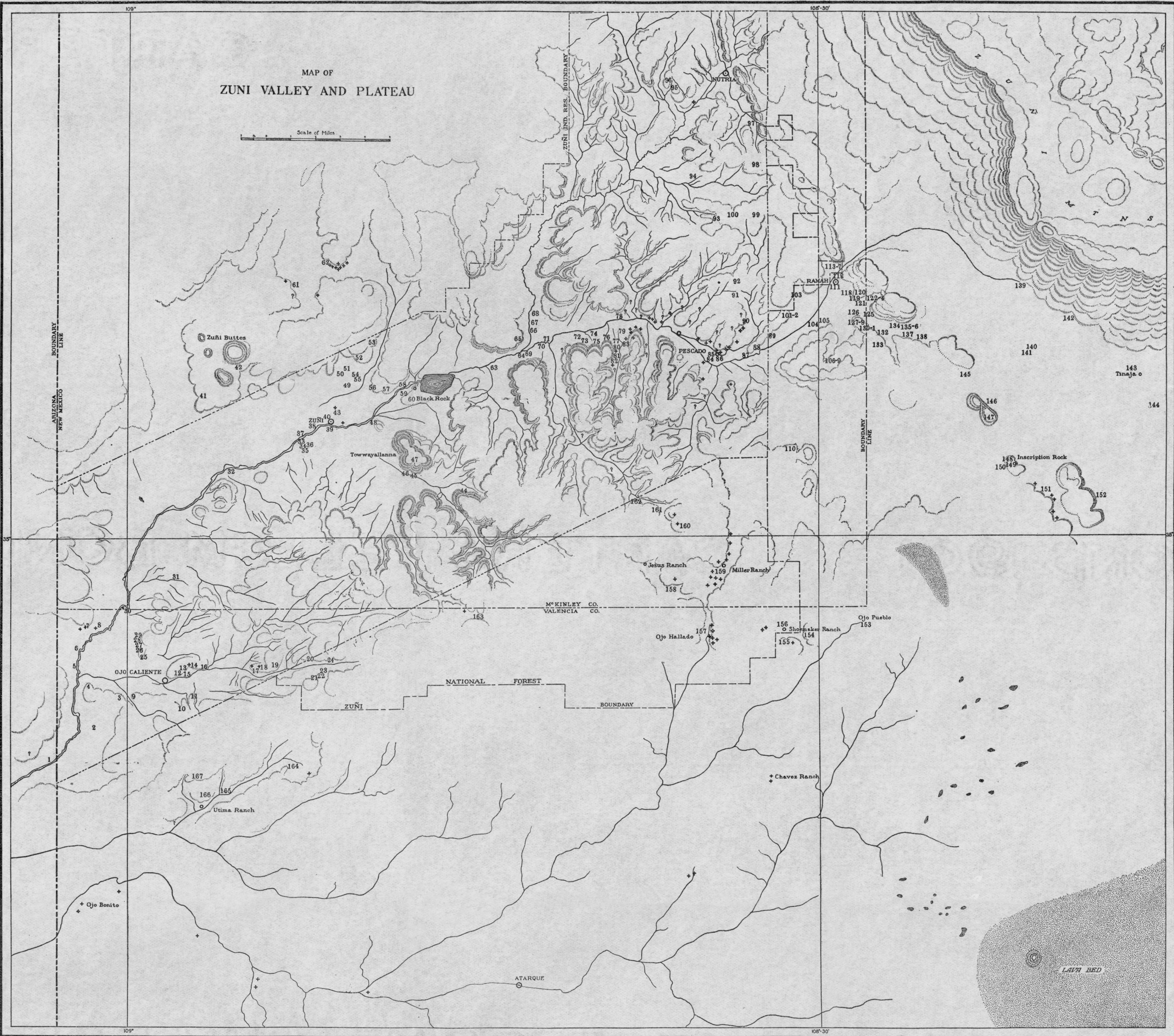


Fig. 2. Map of the Zuni Valley and Plateau.



## LOCATION OF RUINS.

There are probably more than two hundred ruins in the Zuñi region, fully half of which lie on the present Zuñi Reservation in or close to the main valley. Fifty or more lie east of the Zuñi Reservation, chiefly in the neighborhood of Ramah and in the broad valley at the foot of the Zuñi Range. An indefinite number are situated on the Zuñi Plateau to the southeast, the chief of which were visited; the remainder are, from all accounts, probably only widely scattered small houses. We believe that the following record presents a very fair representation of the ruins in this region; certainly none of the more important sites have been omitted. A few sites of uncertain character and a number of sites where potsherds were plentiful, but not masonry, have been included.

The ruins are numbered in order from the Arizona-New Mexico boundary line northeastward up the Zuñi River valley to its head east of Inscription Rock, thence south and southwestward across the Zuñi Plateau. The location of the ruins is indicated on the accompanying map (Fig. 2).

*Site 1.* A single small house, now almost obliterated, stood on the north side of Barth's ranch house near the Zuñi River, which crosses the boundary line into Arizona not over a half mile east of this place. A random collection of sherds was made from the surface of this ruin. There are reported to be similar ruins on the low hills here, but the press of time would not permit a visit to them. Mr. Nelson found a small ruin about three miles west of the Arizona line and north of the river.

*Site 2.* Two and one quarter miles from Barth's house on the direct road to Ojo Caliente, i. e., east of the river, is a site strewn with sherds, but no building stone is to be seen. A random surface collection was made.<sup>1</sup>

A ruin, *A'tella Luptsinna*, is said to lie somewhere to the east, about four miles or more south of Ojo Caliente.

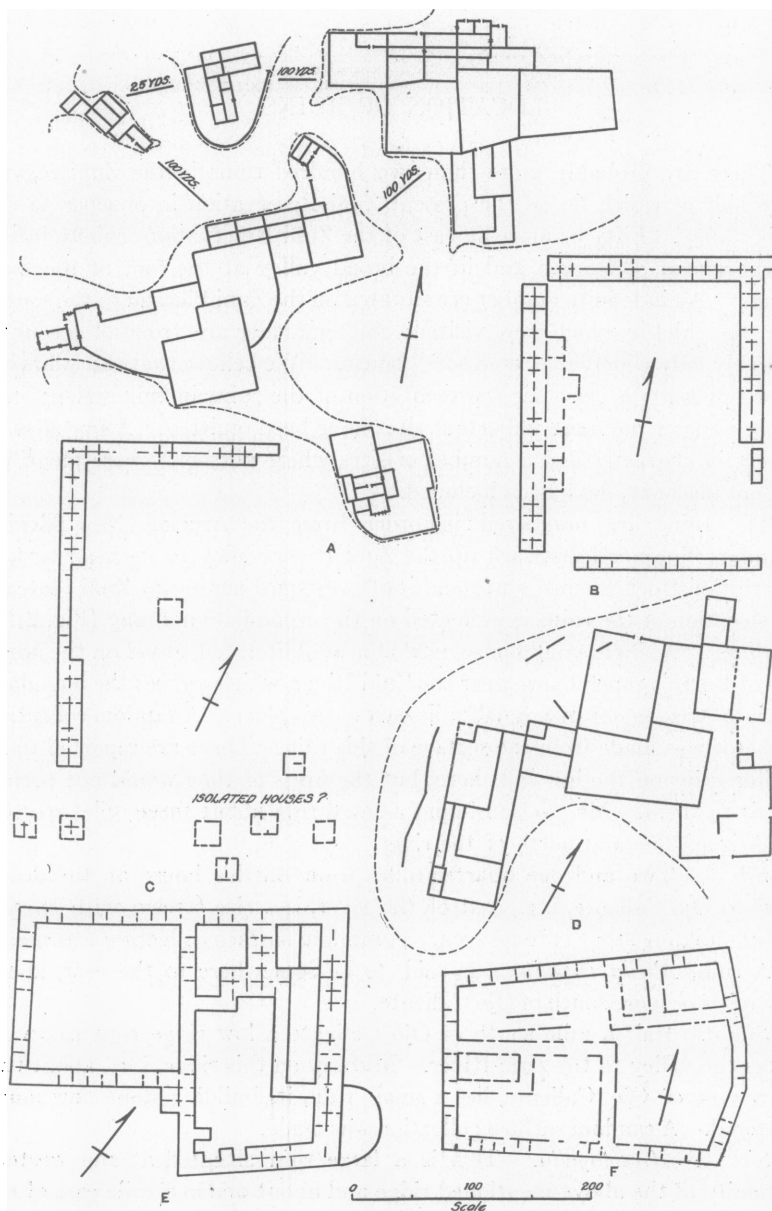
*Site 3.* Half a mile south of Ojo Caliente a low ridge runs eastward across the valley to the Zuñi River. Midway on this ridge, i. e., about two miles west of Ojo Caliente, lies a small ruin, its building stone now much scattered. A random surface collection was made.

*Site 4—Heccotayalla.*<sup>1</sup> This is a large ruin situated at the western extremity of the above-mentioned ridge and about one half mile east of the river. This ruin approximates a rectangle 200 by 250 feet (Fig. 3b). The

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<sup>1</sup> ruin + mountain.





**Fig. 3. Plans of Ruins: Ojo Caliente and Zufi Districts. a, Ruin 42; b, Ruin 4; c, Ruin 11; d, Ruin 53; e, Ruin 71; f, Ruin 61.**

ruin is in a tumble-down condition so that only a rough approximation could be made of the number of rooms in the width of the pueblo buildings. Strangely enough, trial trenches sunk into the ground where sherds showed thickly on the surface failed to reveal any ash heap, although ashes are widely scattered on the surface. A random surface collection was made.

*Site 5.* A small site with little building stone showing lies three quarters of a mile northwest of Site 4 and two hundred feet west of the river. A random surface collection was obtained.

*Site 6.* This small site, into which the river has cut, lies half a mile north of Site 5. Shifting sand has covered most of the tumble-down walls. A random collection was made.

*Site 7.* From Ojo Caliente a road runs northwest past Hawwikku to the river. Immediately opposite this point the low hills west of the river approach it closely. Here are two sites, at the foot of the slope; the western one small, with scattered small building stones. To judge by the sherds collected from the surface this is a "slab-house" site. There is a similar site one hundred and fifty feet south of this, and others may lie in the vicinity.

*Site 8. Tca' lowa.*<sup>1</sup> The other ruin lies a quarter mile northeast close to the river, a mile and a half distant from Hawwikku. The ruin is roughly circular, about 70 yards across with a central depression 40 yards in diameter, tumbled walls showing in all save the southern segment and heaped highest on the northern side. Sherds are abundant on the southwestern and southeastern slopes of the low knoll on which the ruin lies. Trial trenches were dug in both slopes: in the first two thin ash layers were revealed at 1 foot 6 inches and 1 foot 9 inches below the surface, and in the other a thicker layer from 2 feet 4 inches to 4 feet 4 inches below the surface. Random collections of sherds were made from these ash layers as well as from the surface of the ruin. The indications are that the site was not occupied for any great length of time.

A much older small site lies a few steps to the southwest.

*Site 9.* About due south of Hawwikku, on the low ridge south of Ojo Caliente there is a small site with the building stone of one or two small houses showing where the sand has blown away. A random surface collection of sherds was made.

*Site 10.* On top of a small conical hill one mile southeast is a three-sided structure, perhaps 10 by 15 feet, open to the east. All the sherds in sight — a dozen or so — were taken, but are evidently a very mixed lot.

*Site 11.* The little valley running east from Ojo Caliente is formed on the north by the mesa on which the ruins of Kettecippawa stand and by a

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<sup>1</sup> According to informant, Francisco Utima. Cf. Mindeleff, 83.

series of low hills on the south. At the eastern end of these hills is situated the largest of the hot springs, *Ky'akwyina*.<sup>1</sup> Not over seventy-five yards away and close to the eastern slope of the hill is Site 11, a large L-shaped ruin roughly built of lava blocks from the hillside above. It is now much destroyed but its general proportions can be made out (Fig. 3c). A number of confused heaps of lava lie on its southern side; some may be isolated houses. A random surface collection of sherds was made.

*Site 12—Ky'atcekwa*.<sup>2</sup> This is a small establishment of the Koliwa type, but lacking corrals, and the sherds found there are of the same sort. It lies about half a mile east of Ojo Caliente on the mesa where Kettcippawa stands: from one wall of the buildings the mesa drops precipitously, from the other the slope is steep. The ruin consists of a series of scattered small buildings, each comprising a few rooms in a line along the mesa edge. Room sizes vary — 7 by 15 or 18 feet. A random surface sherd collection was obtained.

One similar structure (10 by 12 feet ?) is located on a small knoll alongside of the wash just at the foot of the cliff here. Its sherds are identical with those of Ky'atcekwa.

*Site 13—Kettcippawa*. Mindeleff's survey<sup>3</sup> seems an adequate description of the superficial characteristics of this ruin dating from the Spanish occupation. Ashes and sherds are strewn over a considerable area around the ruin. It would seem that the ruined Spanish church here was built outside of the original pueblo and that it was subsequently enclosed by the expanding house clusters, so that the oldest part of the pueblo is probably that along the slight ridge northeast of the church. A trial trench, dug as close to these house walls as possible, revealed ash to a depth of 4 feet 6 inches at which point the original mesa surface was reached. No evidence of a change in pottery types was encountered, so that it was not considered expedient to make stratigraphic observations. A comparison of a small sample of sherds from the lowest part of this ash heap (3 feet 6 inches to 4 feet 6 inches) with those from the surface shows no material differences. Our conclusion is that the pueblo was not occupied for any considerable period.

*Site 14*. East of Kettcippawa is a series of interesting sites which appear to have escaped the notice of earlier investigators. Beginning about

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<sup>1</sup> water + out?

<sup>2</sup> water + sweet? Hodge, (a), 148, evidently refers to this cluster of ruins in speaking of "T'kanawe (a triple pueblo of which Kechipsauan formed a part), on the mesa to the south-eastward [of Hawwikku]." The sherds of this cluster, however, evidently post-date those of Kettcippawa.

<sup>3</sup> Mindeleff, 81-83 and Plate LXIX. The church appears to be built, at least in part, on top of an ash heap.



a quarter mile from Kettcippawa and extending along the ridge to its eastern brow half a mile away are six or more little sites. All show similar characteristics; a scattering of small stones and ashes on digging. Sherds are plentiful on the surface and all of one type, "slab-house." Random collections of sherds were made at three of these sites, the easternmost (14-a), westernmost (14-c), and one between (14-b).

Excavations were made in the largest site, the most eastern. Here, as in the other sites, small building stones were found; small in amount in proportion to the size of the site. This seems unusual since larger stones abound on the mesa and were used at Kettcippawa. In addition, several large slabs, a foot or two across, were found at one point in an ash layer. Nearby several manos and an open fireplace were uncovered: a circular depression, eighteen inches across and a foot deep, half lined with stones. Its position on the hillside would indicate that it lay outside of any house structure. It seems safe to say that the characteristics of this site, small stones and large slabs, and pottery, are identical with those of Site 40, Shoptluwwayala (see below, p. 227). In all probability this is a village of "slab-houses."

*Site 15.* A single small site similar to those of Site 14 lies opposite Kettcippawa at the foot of the mesa alongside of the Ojo Caliente wash. Here too only small building stones are found. A random surface collection was made.

*Site 16.* Ascending the valley in which this wash flows the first site seen lies close to the foot of Kettcippawa mesa at its eastern extremity. A few sherds among the rocks of the talus indicate some sort of settlement.

*Site 17.* Continuing directly east from this place a ruin is found on the point of the ridge extending westward on the north side of the valley. The site is three and a half miles from Ojo Caliente. The ruin is fairly well defined: a double row of rooms 65 feet long and then a single row for 20 feet extending along the ridge. A random collection of sherds was made from the surface here.

Several vague groups of building stone — probably single-roomed houses — with similar sherds lie west of this ruin.

*Site 18.* A larger site lies a quarter mile east of Site 17 on the backbone of the same low ridge. This ruin measuring 70 by 20 feet extends along the crest of the ridge. Extending from it down the slope to the south is a shallow reservoir, 50 by 100 feet. The retaining wall of this structure is of masonry, partly a laid-up wall and partly of slabs set on edge. A random surface collection was made.

One hundred feet west of this is another group of rooms.

*Site 19.* A small ruin is situated half a mile east of the last site at the inner end of the same ridge. A random surface collection of sherds was made.

*Site 20.* Continuing up the side valley due east for about five miles from Ojo Caliente a group of ruins was found in the widened section of the valley. The westernmost is a small ruin on the edge of a little hill north of the arroyo. The pottery on this site is similar to that of Site 24 (q. v.).

*Site 21.* This ruin lies on the brow barely half a mile east of south of Site 20. It is the largest single house of this group of ruins: building stone is scattered over an area 30 by 50 feet. A random surface collection was made.

*Site 22.* Directly east of the last ruin and half a mile distant is another, similar but smaller. Black-on-red pottery occurs in a small percentage at this site, but by some accident was not included in the random surface collection made here.

*Site 23.* To the northeast of Site 22 and but a short distance from it, that is, in the middle of the valley, is a small ruin on a knoll. A random surface collection was made.

*Site 24.* The most easterly of this group of ruins lies close to the foot of the mesa at the northeasterly edge of the little basin. Here several small houses are perched on a series of little knolls between the talus slope and the arroyo. Each cluster is small — a few rooms only — and now much tumbled down. Random collection of sherds were made at the clusters at the extreme west (24-a) and east (24-b).

The location of the fields cultivated by the inhabitants of this basin is not clear. The valley here is badly eroded and the main arroyo is now very narrow and deep. The drainage down the sides of the basin may, however, have been caught in storage reservoirs. But this section may never have been cultivated; fields in more favorable localities, as near Ojo Caliente, being used.

*Site 25 — Hawwikku.* This ruin lies on the point of a spur projecting southward from a low, rounded hill into the center of the broad plain west of Ojo Caliente. More exactly it lies one and a half miles northwest of that village. The remains of this pueblo, occupied at the time of the conquest, have already been described by Mindeleff.<sup>1</sup> Inasmuch as this ruin was not available for the purposes of the present inquiry only a random collection of potsherds could be taken from the surface of the site.

*Site 26.* There are three groups of ruins on the western slope of this low hill. The first, half a mile north of Hawwikku, is comprised of several small houses. A random collection of sherds was made at the southernmost, Site 26.

*Site 27.* A single house lies three hundred feet west of Site 26. A random surface collection was made.

*Site 28.* The second group of ruins is not quite a quarter mile north on

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<sup>1</sup> Mindeleff, 80 and Plate XLVI. Also Hodge, (a), 146 et seq.

the same slope. These are the remains of two or three small buildings. A random surface collection was obtained.

*Site 29.* The third group of ruins is a mile north of Hawwikku and consists of a cluster of single-roomed houses. A random surface collection was made.

*Site 30 — Acenttelowa.*<sup>1</sup> Nearly two miles north of Hawwikku the Zuñi River swings eastward until it meets a spur from the ridge on which Hawwikku stands. At this point are the ruins of two buildings, the first of four rooms end to end, the other an isolated single room. An arroyo enters the river just south of the ruin; its broad delta now under cultivation. A random collection of sherds was made.

A small older site is on the extreme end of the spur near the river.

*Site 31 — Mumpalowa.* From Ojo Caliente the road to Zuñi runs due north for a little more than four miles. At this point the road divides, the left branch running west to the river which it follows to Zuñi, the other taking a northeasterly direction directly toward the town. Just south of the fork and east of the road lies a single-roomed structure, 8 by 10 feet, called *Mumpalowa*. It seems probable from the character of the masonry and the mixed lot of sherds present, that the house was occupied at an early period and again quite recently. The large wash just south of the ruin is now under cultivation.

*Site 32 — Hampassawa.*<sup>2</sup> The wide, open valley between Ojo Caliente and Zuñi contains no ruins known to us except Mumpalowa and Hampassawa. The latter occupies a little knoll on the south bank of the river four and a half miles below Zuñi. It consists of a few rooms, some of which may have been reconstructed more than once. A random collection of sherds from the surface of the knoll shows this.

*Kwakina* was said to lie northwest of Hampassawa, but we did not visit the ruin.

*Site 33 — Pinnawa.* A mile and a half west of Zuñi, a spur of hills projecting into the valley from its southern border terminates at the south bank of the river in a low knoll. On this lies the ruin of Pinnawa, now almost entirely destroyed. The walls shown on Mindeleff's map<sup>3</sup> are still faintly traceable, otherwise only a confused scattering of small building stones marks the site. Some of these walls are evidently those of recent corrals, etc., although some may follow old lines.

A trench at the brow of the southwestern slope of the knoll — where

<sup>1</sup> rocks + crooked?: so named by Francisco Utima, Tca'lowa according to Gov. Lewis. The confusion in naming Sites 8 and 30 is reflected by Mindeleff, 83, who was informed that there was a "series of ruins called Chalowe." The group he refers to probably included Sites 8 and 26-30 and perhaps others. A reference to the sherd analyses shows that these were not all occupied at the same time.

<sup>2</sup> Mindeleff, 83.

<sup>3</sup> Mindeleff, 86. This volume, p. 22.

Mindeleff indicates a curved wall — showed only scattered débris. Excavation in the center of the northeastern corral — not ten yards from the peak of the knoll — uncovered a refuse heap 6 feet 6 inches in depth. Similar trial trenches here and there over the site indicate quite clearly that the original pueblo was a small cluster of houses perched on a little knoll, its present apparent size being due to the scattering of masonry débris in the building and rebuilding of corrals subsequent to its abandonment.

A section of the deep ash heap one yard square in area was removed six inches at a time. This ash heap, like all others found, was strongly marked by horizontal bedding. From the surface downward there was successively a mixture of dirt and ash for 18 inches, clear ash to 5 feet, and the mixture again to the original surface at 6 feet 6 inches below the present surface, broken also by a thin layer of clear ash at 5 feet 6 inches. The section contained a very large quantity of potsherds, over six hundred of them being taken from the ash between 4 feet and 4 feet 6 inches below the surface.

*Site 34 — Tetlnathuwwayala: Site 35 — Te'allatashshanna.* A short distance south of Pinnawa on the same sloping ridge lie half a dozen scattered houses, the southernmost, half a mile from the river, — single rooms probably, now uncovered and soon to be reburied in shifting sand. Two of these are now marked by shrines.<sup>1</sup> Manos are scattered about and broken pottery of similar type in all of the sites. Here, as was uniformly our experience in the small ruins, the sherds were thinly scattered, and no ash layer deep enough for stratigraphic observation could be found, so that we had to be content with a random sherd collection from the surface.

*Site 36.* Following a little arroyo down the slope towards Zuñi for two hundred and fifty feet, we came on a still buried ruin through which rain wash had cut for fifty or sixty feet. Sherds showed plentifully along the arroyo and a random collection of these was made.

*Site 37 — Hattsinawa.* On the opposite bank of the Zuñi River from Pinnawa, but several hundred yards nearer town, is a knoll bearing the débris of Hattsinawa. No building stone is in sight on the surface, and the excavations over the entire top of the knoll failed to bring any structure to light but did turn up some building stone.<sup>2</sup> Ashes appeared in quantity

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<sup>1</sup> Page 10. This and all succeeding references of this character are to Parts 1 and 2 of this volume.

<sup>2</sup> Page 7. The presence of pebbles strewn on the surface of this site and Shoptluwwayala and the absence of masonry thereon seems in no way significant, for the pebbles appear to be the remains of a layer of conglomerate which capped these and other knolls and prevented erosion of the spot. The conglomerate is to be seen on the hills to the north and to the south. In addition to this fact some masonry was found at both sites on excavating. It must be remembered that Zuñi and other pueblos, now abandoned, lie in the middle of a broad valley several miles from the source of building material, the talus slopes of the bordering mesas. In consequence ruins in the vicinity of the town have been stripped bare of stones, except for a few unusable pieces.

only in one spot, on the southern or river side, where a layer of ash much mixed with dirt but only eight inches deep appeared. Sectioning was, therefore, out of the question, but a random surface collection was made.

It seems probable that only a single house of a few rooms stood slightly riverward of the center of the knoll.

*Site 38.* Half a mile below Zuñi the river makes a slight bend toward the southwest. At this point, but two hundred fifty feet from its north bank, potsherds and a few stones are scattered over the area fifty feet square. The remains of a little ruin, probably of not more than a room or two, are evidently buried there. A random collection of sherds was made.

*Site 39 — Hallonawa.* Immediately opposite Zuñi, on the south bank of the river, is the flat knoll where the ruins of Hallonawa once stood. Superficially, nothing remains of them now, save an occasional potsherd; this seems to have been the case in 1885 as well. The site is now largely covered by occupied houses and traders' stores, so that operations today are well-nigh impossible.

It would seem from the published accounts of earlier investigators<sup>1</sup> that the pueblo was relatively small, and lay principally east of the house of the Hemenway Expedition (still standing) on the highest part of the knoll, with refuse heaps on the south slope.

Test holes sunk into the southern slope of the knoll brought some refuse to light; in one case a layer of mixed ash and dirt 18 inches deep and in another 3 feet 6 inches deep. The sherds recovered in these excavations were of identical type.

*Site 40 — Shoptluwwayala.* In front of the government day school northwest of the village is a low elliptical mound, 230 feet long, rising but slightly above the surrounding plain. The place is marked by a shrine and an abundance of small fragments of pottery. No building stone lies on the surface, but some was found in excavating the site. The absence of masonry is undoubtedly due to the proximity of Zuñi and Hallonawa, both pueblos far from natural sources of building material.

A trench carried across the short diameter of the mound brought to light evidences of a superposition of structures here. A layer of mixed ash and dirt was found over the mound to a uniform depth of about two feet. On the surface and in the upper part of this layer were sherds of certain types of pottery, including redware, found together elsewhere in similar associa-

<sup>1</sup> Mindeleff, 88 and Plate LVII; Fewkes, (a), 103. Pottery from this ruin is also described by Matthews, 151 and 153, Fewkes, (c), and Cushing, (a), Plate II. We cannot agree that Hallonawa occupied both sides of the river, for the pottery from this ruin differs essentially from that of Zuñi. Further, the existence of "old" walls in Zuñi in 1885 cannot be adduced as evidence favoring this point, for those walls must stand (or stood) far above the original knoll on which Zuñi is built. We will return to this point later.

tion. Deeper in the mound were other types, whiteware, such as were found at Sites 3, 7, 14, 15, and 50, and associated with these an unusual type of structure.

This structure is of the type known as "slab-house." Elliptical in shape, 11 by 8 feet inside diameters, it lay with its floor excavated 16 inches below the original surface of the mound, and now covered to a depth of over 4 feet.

The wall, still standing in the original excavation and in some places for a few inches above, was 4 to 6 inches thick. It was made of adobe plaster over small stone slabs set on edge in a row near its outer face. Above the slabs the adobe alone formed a wall of the same thickness. There was no evidence that the adobe had been formed into rectangular bricks, but rather that it had been built up in rough masses. The slabs were all small, about 8 by 10 inches across, thin, irregular, and not dressed. While they were set end to end and the intervening spaces filled in with smaller stones similarly placed on edge, the resulting structure was in no sense a masonry wall. No entrance gap in the structure could be found, but it must be remembered that practically nothing remained except the portion below the original surface of the mound. The floor of the house was covered by a layer of chunks of charcoal, 2 inches deep over all and in some places mixed with earth to a depth of 6 or 8 inches. This looked very much like the remains of a wooden superstructure, burnt and fallen in.

Alongside of this slab-house a hole 3 feet in diameter had been sunk below the original mound surface for a depth of 5 feet and had been subsequently refilled with mixed dirt and ash. Near the mouth of this hole were piled several stones which may represent the remains of a coping. Its purpose remains a mystery: it seems too large for a post hole and too free from débris for a well or a cooking pit.

In another part of the knoll a fireplace similar to that found at Site 14 was found. This was evidently outside of any house structure.

*Zuñi.* The growth of modern Zuñi has been treated in an earlier section of this volume. Dr. Kroeber has also given there the pertinent results of our excavations within the town, the location of excavations, extent of the original knoll, etc. The pottery data are given below (Table II) and historical notes in a later section. One or two other points may be brought together here.

Excavations showed only modern refuse at the points N, P, S, U, and V (see p. 202) as well as other points. Similarly for the excavation KK, which proves conclusively that the southeastern house block is of recent date. On the other hand, the southern block is relatively ancient, since its foundations (at Q) rest on sixteenth century refuse washed from the knoll to the north. Unfortunately, no ruined section appears in the southwestern

block. Working nearer the main house block, ancient refuse was found at the foot of the original knoll at Muhhewa and east of Room 105 (K and L) and in addition buried walls at the latter place. Working in between the main and northern blocks, similar results were obtained in the Rat Plaza and its entrance (LL and MM). Thus, working in toward the heart of the town from all sides, we found the oldest sherds in immediate contact with the original knoll just as might be expected. These results are as definite as can be hoped for so long as the town remains occupied. They indicate that the oldest section of Zuñi was the main block and the western end of the north block perched on the original knoll; then the town expanded along the base of the slopes, forming the southwestern and southern blocks and the eastern end of the main block; finally, the three eastern blocks were built on level ground.

An interesting confirmation appears in the reports relating to the early American occupation. Simpson (1849) publishes a sketch of Zuñi,<sup>1</sup> evidently drawn from the vantage point offered by the roofs in the vicinity of what are now Rooms 50 and 60, showing two or three houses in the eastern block and one or two in the southern, but the northeastern does not appear at all. The expansion had presumably not proceeded far east of the church at that time. Indeed, Simpson, Whipple, and Möllhausen refer to the compactness of the pueblo, houses extending over most of the streets.

The drift away from the pueblo must have begun fairly recently. There were evidently no permanent structures outside of the pueblo in Whipple's day (1853) except for a small group at Hallonawa shown in Möllhausen's two drawings.<sup>2</sup> Neither Simpson, Sitgreaves, Whipple, nor Möllhausen refer to villages at Ojo Caliente or Nutria. To be sure, not one of them passed near these places. The lower Pescado village had been established however, but when seen by Simpson it was in ruinous condition and only visited by planting parties in the summer and by occasional herders. Even today the farming villages are occupied throughout the year by only one or two families: the fact that they are occupied at all bearing an obvious relation to present safety from hostile raids.

*Site 41 — Amossa.*<sup>3</sup> The northern wall of the valley opposite Zuñi is a long low mesa ending abruptly four miles west of the town and from this the big mesas, Kwilliyallanna (two + mountain) and the Zuñi Buttes rise, towering a thousand feet above the valley. At the southwest corner of this mesa is Arch Spring with the ruin of Amossa above it on the mesa.

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<sup>1</sup> Simpson, Plate 59.

<sup>2</sup> Whipple, opp. p. 67; Möllhausen, opp. p. 98.

<sup>3</sup> rock + head or boss?

Judging by a casual inspection this is of the Kolliwa type: its sherds are also similar.<sup>1</sup>

A mile or so northwest of Amossa is A'tella Cillowa, a ruin said to lie close under the Zuñi Buttes. Nearby is another ruin.

*Site 42 — Heccotalalla.* On the same mesa with Amossa and two miles northeast from it is Heccotalalla<sup>2</sup> close under the foot of Yallalanna (mountain + big), the easternmost of the two big mesas seen from Zuñi. At the foot of the mesa is a shelf several hundred yards broad into which head several small canyon about 100 feet deep. The ledge is sand-covered, now supporting a peach orchard and large cottonwoods: corn might once have been grown there. Water from permanent springs just under the cliff flows in a little stream across the ledge into the head of one of the canyons. Sandy patches in these canyons and broader areas less than half a mile distant may have been cultivated. On four of the knoll-like promontories between the canyon heads stand clusters of ruins conforming closely to the contour (Fig. 3a). The situation could hardly be bettered from the standpoint of defense and with its adequate water supply and fields near by might have sheltered a large population.

The ruins are evidently those of a refuge village identical in character with Kolliwa and Wimmayawa.<sup>3</sup> House remains are quite extensive, but the corrals are few in proportion to the other refuge villages. Sheep might have been herded against the cliffs here, however. There is great uniformity in size of rooms and corrals in all the refuge villages — 7 to 9 feet by 20, 25 and 30 feet. The ash heaps here are but a few inches deep. A random collection of sherds from the surface indicates that the ruin dates to post-Conquest times.

*Site 43 — "W."*<sup>4</sup> Only a few sherds show at this site in the fields half a mile north of the village.

*Site 44 — Shunntekkya.* East of Zuñi, the ruin on the extreme south is Shunntekkya. South of Towwayallanna a deep and narrow canyon runs for miles into the Zuñi plateau. The ruin was pointed out on a ledge to the east of the mouth of this canyon, about six miles southeast of Zuñi. From a reliable description it appears to resemble Kolliwa in character, and in fact, the sherds from the site collected by Dr. Kroeber<sup>5</sup> indicate that this too is refuge village of post-Conquest times.

*Site 45 — Kyakkima.* Two miles northwest of Shunntekkya is Kyak-

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<sup>1</sup> Whipple, I, 71.

<sup>2</sup> Fewkes, (a), 111, as Hesh-o-ta-thlu-al-la.

<sup>3</sup> Cf. pages 24 and 30.

<sup>4</sup> Page 28.

<sup>5</sup> Page 34.



kima, perched on a talus slope close under towering Towwayallanna. The ruin is sufficiently characterized by Mindeff's description and Kroeber's amending statements.<sup>1</sup> The pueblo covers a fairly large area, larger in fact than shown on Mindeff's plan, for there was evidently a row of rooms along the southern brow of the knoll, another on a ledge midway down the southern slope, and isolated rooms between at the southern end. We would venture that none of the houses in the ruin was over one story in height.

The chief refuse dumps are on the eastern and southern slopes. Ash appears in the first place to a depth of only three feet and but two feet in the latter. This disappointing shallowness and the slight range in pottery types in the heaps precluded stratigraphic work. Collections of sherds were made from the surface and trenches, however. More obsidian chips were seen on the surface here than at any other site in this region.

*Site 46 — Kyakkima West.*<sup>2</sup> Kyakkima stands on one side of a gulch running into Towwayallanna: on a talus slope on the opposite side are many scattered sherds. In fact, the sherds are plentiful all over this knoll, up to its very top a hundred feet above the valley floor. But, although the search was carefully made, no signs of a structure referable to these sherds could be found. A random collection of the sherds was made from the surface here.

*Site 47 — Towwayallanna.* Three miles southeast of Zuñi the mile-long mesa, Towwayallanna, rises for a thousand feet above the valley. Scattered over its southern end and directly above Kyakkima and Kyakkima West are the ruins of thirty-eight separate buildings. All of these, with the exception of two, are small. We must agree with Mindeff and Fewkes that the statements of Cushing and Bandelier that these buildings fall into seven groups "corresponding it would seem, to the original Seven Cities of Cibola" is absurd. So far as we can judge from Mindeff's admirable plan, with which Bigelow's agrees fairly well, no grouping whatever of the buildings is discernible.<sup>3</sup> Dr. Kroeber has collected sherds at random at this site.

*Site 48 — Mattsakya.* A ridge of foothills extends northwest from Towwayallanna touching the river nearly two miles east of Zuñi. The remains of Mattsakya lie scattered over the knoll that terminates this ridge at the river end. The ruin presents a confused mass of débris and only the general position of its rooms can be traced. Building stone is scattered more

<sup>1</sup> Mindeff, 85 and Plate LII; this volume, 22; Fewkes, (a), 109. Mindeff's plan is oriented with north to the left.

<sup>2</sup> Page 10.

<sup>3</sup> Cushing, (a), 156 and Plate IV; Whipple, I, 69; Mindeff, 89 and Plate LX; Fewkes, (a), 110; this volume, 28. Bandelier, (b), 334 has six groups instead of Cushing's seven.

thickly along the eastern ridge than Mindeleff's plan<sup>1</sup> shows, so that it would appear that the principal house group was here. There are no evidences of any structure in the flat area on the western slope of this ridge, however.

The most favorable, and therefore presumably the oldest, building location is along the ridge forming the eastern backbone of the village. Sherds are scattered thickest over the eastern slope of this ridge and here was found an ash heap about 4 feet thick.

Into this two sections were cut, each a yard square, and the sherds were removed in six inch intervals. In the first section, near the southern end of the ridge, two skeletons were found in the original earth below the ash layer. One of these lay entirely outside of the section area; the skull of the other extended under the section. But inasmuch as the layers of charcoal in the ash heap continued unbroken horizontally over this skeleton, it is clear that the burial was made before the ash heap accumulated. In the second section, near the northern end of the same slope, an old wall was encountered below the ash heap; about this soil had drifted or been filled before the ash heap was formed. The base of the wall stood on the original hillside over six feet below the present surface; its upper part lay within the ash heap for about six inches. While burials and a wall older than this immense ash heap were found, it did not seem feasible to search for a still older ash heap. We believe, however, that the sherds from it represent the range of occupation of Mattsakya fairly closely.

Judging by the level on which the old wall stood and by the extent and thickness of the ash heap, it would appear that the walls of the structure along the ridge must still stand four or six feet high though buried. In that case the structure was presumably only one story, or in part only two stories high. We agree with Fewkes that the ruin was not large.<sup>2</sup>

*Site 49.* This is a small site in the sand dunes, one-eighth mile north of the Zuñi irrigation canal and one quarter mile west of the Gallup road. Building stone has been much scattered by washing so that a structure cannot be defined. A random collection of sherds was made here.

*Site 50 — He'i'tli'annanna.* Two miles due north of Zuñi, close to the long mesa on the northern edge of the valley, is a little knoll on which stands an abandoned shrine. In the vicinity of this are scattered sherds of the "slab-house" type. Kroeber has tentatively put forward the suggestion<sup>3</sup> that the presence of pebbles on the knoll was of cultural significance, but excavation shows that these are merely the remains of a disintegrated con-

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<sup>1</sup> Mindeleff, 86 and Plate LV; Bandeller, (b), 336; this volume, 22.

<sup>2</sup> Fewkes, (a), 110.

<sup>3</sup> Page 32.

glomerate (cf. Site 37, p. 226). Just north of the knoll is an area not over fifteen yards square where ash and sherds are mixed with the soil to a slight depth, but excavation revealed no trace of a structure.

*Site 51 — "Y."* This site lies a quarter mile northeast of He'i'tli'an-nanna on a low ridge which parallels the higher mesa to the northwest. It is located on the outer end of a small spur.<sup>1</sup> A small but deep canyon cuts through the ridge fifty yards east. Water for the occupants of this site might have been obtained from the "tanks" in the rocky bottom of this canyon, or by digging for seepage in the wash above.

Vestigial remains of a single-roomed (?) structure, of indefinite shape, probably with masonry walls was found. The building stone has presumably been carted off with stone quarried in this ridge to go into the building of modern Zuñi.

Kroeber's "Site X" probably lies a mile due east of this site.

*Site 52 — Kolliwa.* Half a mile northeast of Site 51 — that is, nearly three miles northeast of Zuñi — are the two house clusters of Kolliwa.<sup>2</sup> They lie on two promontories on either side of the head of a small and deep canyon which cuts into a bench half way up the mesa. While separate structures, the two clusters are identical in construction and pottery, and were, therefore, coeval refuge villages. The structures consist of a cluster of dwellings with large corrals attached; each conforming closely to the configuration of the knoll on which it stands.

Kolliwa appears to have been a stronghold into which sheep were driven during raids by Navajo (?) in post-Conquest times. It was occupied only for a short time, or for several such periods, for the ash heaps are but a few inches thick and the scattered sherds show no great range of type.

*Site 53 — Wimmayawa.*<sup>3</sup> Three quarters of a mile northeast of Kolliwa is Wimmayawa capping a small hill at the eastern edge of the same mesa. The ruin is close to the Gallup road, quite three and a half miles from Zuñi. Like Kolliwa, it consists of a small cluster of inhabited rooms, none over one story high, with sheep corrals attached. The area of habitations is somewhat more extensive than at Kolliwa, but was inhabited by not more than a few families. There are indications that the original corrals were smaller than those now standing, but the removal of intermediate walls has given the corrals their present large size (Fig. 3d).

The pottery, like that of Kolliwa, is evidently post-Conquest. The ash

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<sup>1</sup> Page 33.

<sup>2</sup> Page 24. Kroeber's plans are essentially correct. We might add, however, that both corrals in West Kolliwa are entirely closed by walls and there is another small room in the cluster there.

<sup>3</sup> Page 30.

heaps are too shallow for stratigraphic work and the pottery types present no great range. This was obviously a refuge village occupied like Kolliwa for a short period only.

*Site 54.* A small reconstructed house, about ten feet square, lies just west of the Gallup road where it enters the low hills two miles from Zuñi. A random surface collection of sherds was made.

*Site 55.* Nearer the Gallup road scattered potsherds were seen but no building stone. Some of these were collected at random.

*Site 56.* Skirting these low hills which border the Zuñi Basin in this, its northeastern corner, we find the following sites. Two miles due northeast of Zuñi and an eighth of a mile from the irrigation canal is a small house ruin on a knoll. The house measures 20 feet by 10: its walls are fairly distinct. A small collection of sherds was made here.

*Site 57.* Half a mile east is another small ruin on the slope of a low hill. Now nearly obliterated, a low mound of scattered stones, about twenty feet square marks the former position of the house. Sherds are scattered down the slope to the west.

*Site 58 — Katika.* Further east the low hills swing northeast and are approached quite closely by the river. Less than half a mile from Black Rock the hills turning again directly east form a little cove in which lies Katika. Masonry débris is heaped over an area 60 feet by 25. Two rooms about 8 feet square, can be distinguished at the eastern end. This small house is about twenty-five yards north of the irrigating canal, and Mr. R. J. Bauman says that potsherds, whole vessels, and turquoise were found when the latter was constructed. A random collection of the sherds here was made.

*Site 59.* The Zuñi Basin heads at its eastern end in a long semicircular cliff of black lava on which the agency now stands. This is known locally to the whites as "Black Rock." The Zuñi River poured through a gap in this rock — now filled by a dam — dropping one hundred feet in its passage. We have examined the fields below and above the cliff for ruins, but while recent structures are numerous we could locate only two ancient ruins. Half a mile west of the agency is a little ruin perched on a knoll close under the cliff. The main Zuñi-Black Rock road cuts through the ruin and during its construction sherds and skeletons (?) were found. The house is built of lava blocks and has been reconstructed since its first abandonment. The sherds here are of several distinct periods mixed.

*Site 60.* Directly above on the cliff is a small ruin. It lies close to the road which traverses the cliff. The house is L-shaped, the sides respectively 40 and 20 feet long and 10 feet wide. Potsherds are plentiful on the surface here.

*Site 61.* Interrupting the west-to-east sequence in the description of these sites, there are a number of ruins north of the Zuñi Basin to be noted. Following the Gallup road for about seven miles from Zuñi a road is found branching off to the left to Manuelito on the railroad. Continuing west on this road for two miles the ruin of a large pueblo is found close under the eastern foot of a low mesa. The ruin is roughly rectangular, seemingly with only a single row of rooms around a central court in which lie some other poorly defined structures. (Fig. 3f.) One hundred feet west of the main building is a small F-shaped structure 90 feet long with one wing 50 feet long. We suspect that our random collection of sherds from the surface here, the governor of Zuñi assisting, contains a lower proportion of redware than is actually present. On reference to Table XI it will be noted that this type of pueblo is usually associated with a higher percentage of redware.

There is said to be a three or four-roomed ruin on the mesa above this pueblo, and another a mile southwest on the mesa — but the latter could not be found. Another small ruin, perhaps recent, can be seen on a ledge of the mesa opposite.

*Site 62.* More than a mile northeast across the valley from the large pueblo is a ruined settlement of nineteen small houses strung along the foot of the mesa. The houses have for the most part three to six rooms: one has a dozen. Three of the ruins lie on small hillocks and a fourth on a ledge of the mesa: the remainder lie on the valley floor close to the mesa. So far as inspection on the spot can show, the sherds at all of these ruins are identical in type and proportions.

*Site 63.* A small site in the main valley, located by Mr. Nelson, lies half a mile east of the reservoir at Black Rock and south of the Ramah road.

*Site 64.* Four miles east of Black Rock the valley is narrowed to a half mile in width by two high mesas. Several small ruins lie in the valley here. Site 64 is nothing more than a patch of sherds scattered in the sand to the north of the Pescado road four and a half miles from the agency.

*Site 65 — Heppokoa.* This site is said to lie on a ledge pointed out half a mile east of Site 64. The ledge is located at the eastern corner of the mesa on the northern side of the valley.

*Sites 66-68.* Three small ruins were located by Mr. Nelson along the road which skirts this mesa and leads to Nutria. All three lie within a mile or so of the main valley.

*Site 69.* Returning to the Pescado road a small ruin is found north of the road a short distance east of the junction of Nutria and Pescado creeks. Only a little masonry shows. A random collection of sherds was made.

*Site 70.* At the eastern foot of the southern mesa is a small house ruin between the road and Pescado Creek. It is half a mile east of Site 69. A random surface collection of sherds was made.

*Site 71—HeccolaLuptsinna.*<sup>1</sup> Opening into the main valley from the south is Horsehead Canyon, a long valley penetrating for miles into the Zuñi plateau quite to the headwaters of the Little Colorado proper. A deep arroyo winds down this valley, joining Pescado Creek five and a half miles east of Black Rock agency. Situated on a low knoll at the junction of the streams is a large pueblo of the rectangular type.<sup>2</sup> The walls, while almost entirely tumbled down, can at least be traced (Fig. 3e). The principal refuse heap lies southeast of the ruin, but is only 2 feet deep. A section (4 square feet in area) was made in this heap and the sherds removed as usual from successive layers 6 inches deep. The quantity of plaster in the first foot and a half of this heap was somewhat unusual for Zuñi ruins.

A small ruin is said to lie half a mile southeast of this one. Mr. R. J. Bauman, Superintendent of the Zuñi Reservation, informed us that there are a number of ruins in Horsehead Canyon including one or more small cliff houses, which from his description, appear to be similar to that east of Ramah, Site 125. We found it impossible to enter this canyon with a wagon, so that investigation of its archaeological resources had to be postponed indefinitely. There are several ruins at its upper end, called Soldado Canyon, which will be described later (p. 250).

*Site 72.* Continuing eastward in the main valley several ruins were found along the foot of Attciatekyapoa,<sup>3</sup> the big mesa bordering Horsehead Canyon on the east. The first is a mile above HeccolaLuptsinna: a single-roomed house north of the Pescado road. A random surface collection of sherds was made.

*Site 73.* A similar ruin, a single room, is south of the road a short distance east. A random surface collection was made.

*Site 74.* Half a mile east is a ruined house group, 100 by 20 feet, to the north of the road. A random surface collection was made.

*Site 75.* Directly across the road from the last, and nearer the mesa, is another ruin, 55 feet by 20. A random collection of sherds was made from the surface of this ruin.

*Sites 76 and 77.* Three-quarters of a mile east of these ruins is another pair. Site 76 is a small house of two rooms, each 10 by 6 feet, a short distance south of the road. Site 77, which is nearer the road, is merely a confused mass of débris with but few sherds showing. A random surface collection was made at the first of these.

*Site 78—Hecota'utlla.* Directly opposite the last two ruins Pescado

<sup>1</sup> ruin + yellow.

<sup>2</sup> Fewkes, (a), 112, Hesh-o-ta-sop-si-na; Bandeller, (b), 333, Heshota Thluctzinan; Simpson, (a), 117, evidently saw this ruin when less aggraded.

<sup>3</sup> attciāne, knife + tekyapoa, hill.

Creek swings close to the mesa on the northern border of the valley. At the eastern corner of the mesa is a large polygonal pueblo built on the narrow stretch of slightly sloping ground between the creek and the foot of the mesa. No break appears in the outer wall of the pueblo, which can still be roughly traced in its polygonal, almost circular, course. The east-west axis of the ruin is about 420 feet, the north-south axis about 350 feet. The interior contains other structures and refuse heaps, but a heavy scrub growth and much *débris* obscures their character.<sup>1</sup>

The ruin was partially excavated in the winter of 1888 by members of the Hemenway Expedition; now none of the ash heaps located in the interior can be depended on for stratigraphic observations. A random collection of sherds was gathered from the surface, but these probably do not represent true conditions. The sherds seen here and the whole vessels figured by Fewkes closely resemble those of Hallonawa, both ruins being relatively recent from the standpoint of Zuñi ruins as a whole. We cannot agree with Fewkes<sup>2</sup> on this evidence that the circular form of ruin is very old in the Pueblo area.

There may be several small ruins in the little canyon immediately north-east of Hecota'utlla. There are certainly a number of them, at least fifteen, along the northern edge of the main valley from this point to the Pescado Springs. Some of these we have visited and their positions are indicated on the map.

*Site 79.* Half a mile south of Hecota'utlla stands a ruin in the middle of the valley. In its demolished condition it is L-shaped, the long wing 265 feet, the shorter 65 feet, each wing comprising a line of single rooms 8 feet wide. The site has been built on in recent times and a corral stands there now. Few sherds were seen.

*Sites 80, 81, and 82.* Directly south of this site a small canyon runs for three miles southward into the big mesa, Attciatekyapoa. Strung along the western side of the canyon close to the mesa are a number of small houses. There are ten of them within three-quarters of a mile of its mouth, and probably more further up. With the exception of the northernmost, Site 80, they are all apparently of similar construction and identical pottery types. Random collections were made from the surface of the first, Site 80, sixth, Site 81, and seventh, Site 82. Site 80 comprises two buildings, the first, 20 by 50 feet, perched on a little spur, the other, 10 by 60 feet, on the canyon floor a few feet below. Site 81 is a high pile of masonry 75 feet by 20, with a shallow depression 40 feet square contiguous to it. Site 82 is smaller, being 10 by 30 feet.

<sup>1</sup> Fewkes, (c); (a), 105-109 and plan; Bandelier, (b), 333.

<sup>2</sup> Fewkes, (c), 47.

*Site 83.* This is a much older ruin opposite Site 80 on the eastern side of the canyon. It is only a small ruin and but little masonry shows. Sherds were collected at random from the surface.

Another ruin lies a few feet north of this one: another alongside the road to the coal mine, half way up the mesa to the east. Four more lie near the foot of this mesa between this canyon and a similar one penetrating Attciatekyapoa a mile east. All of these show sherds similar in type to Sites 81 and 82. We suspect the presence of small ruins in the latter canyon as well.

*Site 84.* At Pescado Springs, sixteen miles east of Zuñi, there are three large ruins.<sup>1</sup> The largest lies west of the westerly spring. It is built on a basalt fault and probably conforms to some extent to the natural configuration. The ruin presents large heaps of masonry lying six to ten feet high, but it is overgrown with brush and stone has been removed from the walls for corrals and houses, so that its outline is obscured. However, it appears to be oval or polygonal, about 215 feet from east to west and about 150 feet on the short diameter. Basalt blocks formed a large part of the masonry. There are small ash heaps in the interior possibly a few feet deep.

*Site 85.* A smaller ruin, repeating the salient characteristics of that just described, lies adjacent to it a few steps northeast. Between the two a large spring gushes out of the lava fault. The smaller ruin approaches a circular shape, roughly 150 (?) feet in diameter. Buildings evidently followed the outer wall of the pueblo.

*Site 86.* About three hundred yards east of the westerly spring is the third pueblo ruin. It lies on top of the lava fault, which forms a little cliff twenty or thirty feet high. At its base the easterly springs percolate through the fault. The ruin is of irregular plan, roughly of the rectangular pueblo type but conforming to the shape of the cliff. Its over-all dimensions taken roughly along its major axes are perhaps 200 by 250 feet. The ruined walls now lie in heaps about three or five feet high. They were composed mainly of basalt blocks, but included some sandstone.

There are numerous small ruins in the vicinity of the Pescado Springs, some of which we visited. There is one about a quarter-mile southwest of Site 84 and another was pointed out a like distance from this in the same direction. We suspect the presence of others along the western side of the canyon opening southward from this point. We are told that another small ruin was situated on a knoll at the eastern side of the mouth of this canyon.

Four small ruins, with the same general pottery types as the large ruins here, lie close under the cliff north of the springs. There probably are others there, and some may be found on the mesa.

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<sup>1</sup> Simpson, (a), 118; Whipple, I, 65; Bandelier, (b), 333 as Heshota Tzinan.



Three-quarters of a mile northeast of Site 86 a small ruin lies in the open valley. Two others lie at the corner of the hill, half a mile east of this. There may be similar ruins along the hillside in the immediate vicinity of these. All of the small ruins have sherds of the same general type as the large ruins here.

*Sites 87-89.* Three-quarters of a mile east of Site 86 is a small ruin at the southeastern face of a low ridge; a quarter mile east of this is another and fully a mile east is a third. The ruins are all fairly well defined and measure 15 to 20 feet by 30 to 40 feet.

*Site 90.* A mile and a half east of Pescado Springs an open valley leads from the north. Three small ruins are located on the western slope of this. There may be others on the same side near its mouth. Half a mile in, that is, two miles by road from Pescado, is Site 90, a small bracket-shaped ruin 60 feet long with wings 40 feet long extending down the slope. The space between the wings is largely filled with *débris*. A random collection of sherds was obtained here.

*Site 91.* This small ruin lies on a spur over a mile north. It is L-shaped; the main section 36 by 12 feet and the other 45 by 6 feet. A random surface collection of sherds was made.

*Site 92.* Half a mile north on the same slope is the third ruin. It was a small house of two rooms, 10 by 20 feet outside dimensions. Sherds were gathered at random from the surface of this ruin.

*Site 93-94.* The Ramah-Gallup road runs northwest between the last two ruins. Three miles northwest of Site 92 is a small ruin a mile east of the road reported by Mr. Nelson. Another small ruin lies at the same distance from the road two miles further on.

*Site 95.* From the lower Nutria village a draw enters the low mesa toward the northwest. There is a small ruin on the ridge west of the draw: it is about three-quarters of a mile from the village. It may contain two rooms, the area covered by masonry being roughly 20 by 8 feet.

*Site 96.* Not quite half a mile northwest the ridge terminates in a little peak. Capping this is a mass of masonry *débris* of indefinite form: there may have been from six to twelve rooms here. Sherds were gathered at random from the surface of both of these ruins.

Midway between the ruins the road traversing the ridge passes through a mass of scattered stone and sherds which may have been another house.

It is surprising that more ruins are not to be found in the vicinity of the Nutria village. However, our search was by no means exhaustive. Mr. Nelson was told of a small ruin at or near the head of Nutria Creek. There is said to have been a small ruin in the fields south of the lower Nutria village many years ago.

*Site 97. Heccotaimkoskwia.*<sup>1</sup> Two miles southeast of the upper Nutria village is a large ruin. It lies in the junction of two arroyos in a little valley just west of a gap in the up-tilted sandstone ridge. That is, it is about three-quarters of a mile west of the Perea mail road. The main ruin is six-sided, of regular outline, and fully 350 by 280 feet in greatest dimensions (Fig. 5c). The outer building is two or three rooms wide evidently sloping toward the roughly rectangular court which is filled with low, irregularly distributed remains of structures possibly including two kivas. A section was cut in the refuse heap here.

East of this ruin is a circular wall of stone, 2 feet thick and about 90 feet in diameter. A room about 9 by 21 feet has been built against the north side and there are traces of rooms around the inside.

A small rectangular ruin lies about one hundred yards to the south. It measures 30 by 60 feet and is three rooms wide.

*Sites 98-100.* Three small ruins were reported by Mr. Nelson in the region south of Heccotaimkoskwia; the first one and a half miles due south, the second two miles further south, and the third a mile west of the second.

*Sites 101-102.* A large oval ruin lies on the Deracho property on the north side of the Pescado-Ramah Valley about two miles west of Ramah. Immediately above it on the mesa edge fifty feet higher is another building (Fig. 4a). The roughly circular ruin measures 225 by 175 feet on its diameters. The masonry is of sandstone fairly well laid in mud. The outer walls still stand four or five feet high although they have been largely removed for building purposes. The outer row of rooms appears to have been two or three stories high, the building being from three to eight rooms wide. One room measured 11 (?) by 10 feet 6 inches; another 10 feet 6 inches by 12 feet; while three rooms on the south side measured 30 feet together, i. e., about 9 feet per room. Basalt manos, metates, and mauls as well as potsherds were seen.

A long building of some thirty rooms lies along the edge of the mesa above the round ruin. It measures about 190 feet and for fifty feet of its length it is two rooms wide. The back or west walls are three or four feet high: the front wall comes out to the edge of the escarpment.<sup>2</sup>

*Site 103.* A small ruin is situated in a side canyon half a mile nearer Ramah on the same side of the valley and opposite Site 104. It is roughly bracket-shaped, 165 feet long with two arms each 45 feet long.

<sup>1</sup> Bandler, (b), 340 as Heshota In-kuosh-kuin.

<sup>2</sup> Cf. Fewkes, (a), 113. There are some discrepancies between our measurements and Dr. Fewkes's. The circular depression in the plain referred to by Dr. Fewkes near the ruin must now be aggraded for we saw no noticeable feature of that kind. We cannot support Dr. Fewkes's suggestion that the upper structure is later than the oval ruin for the sherds seen at both were of the same type.

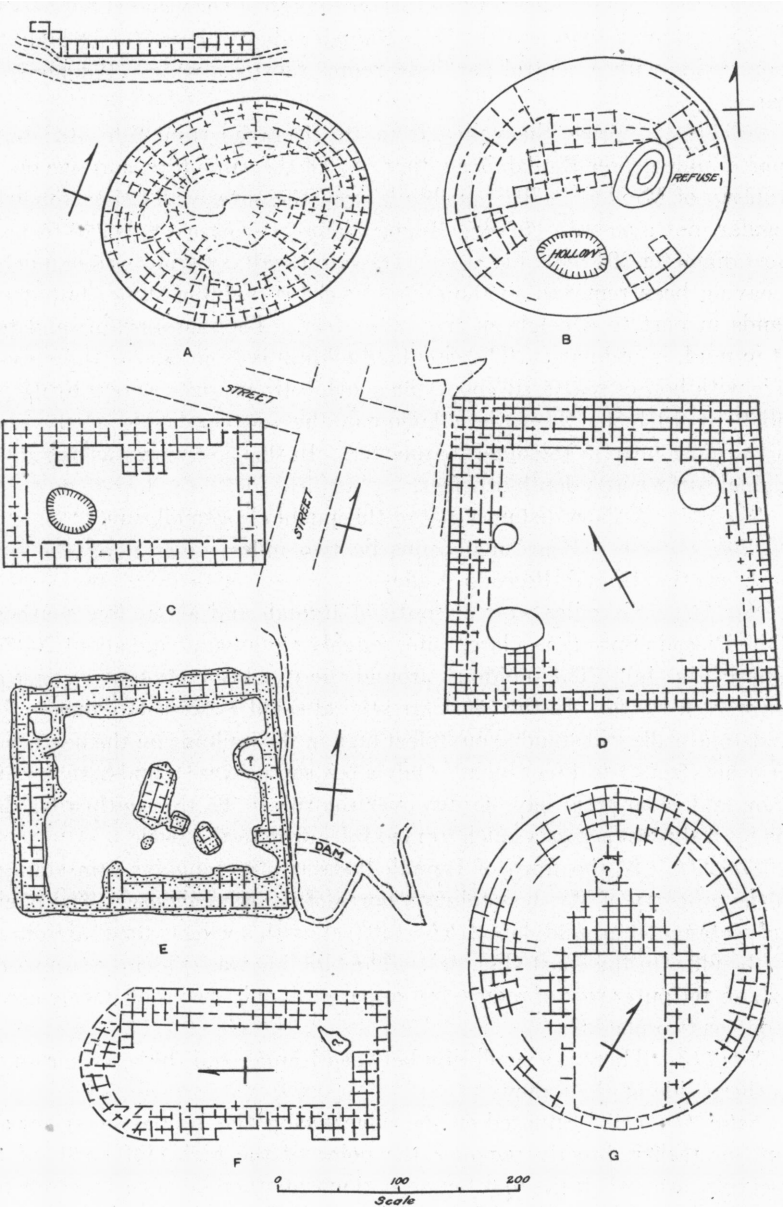


Fig. 4. Plans of Ruins: Ramah District. a, Ruins 101-102; b, Ruin 104; c, Ruin 111; d, Ruin 139; e, Ruin 110; f, Ruin 154; g, Ruin 141.

Another small ruin lies west of this on the top of the wooded hill between the Zuñi-Ramah road and the Zuñi-Ramah valley. It is 70 feet long, two rooms wide with a central part four rooms (36 feet) wide. Potsherds are scarce.

*Site 104.* Across the valley from the Deracho ruin, Site 101, but a quarter mile nearer Ramah is another ruin of the same type and size on the property of Mr. Day. This pueblo is oval, the outer wall being somewhat angular, not a smooth curve; its long diameter (east-west) is 240 feet and short diameter 204 feet (Fig. 4b). The outer wall is barely visible much of it having been removed to the débris level for building stone, but it still stands in part to a height of five or six feet. The masonry, of sandstone set in mud, is ordinary. The circular building is from one to three rooms wide with houses scattered about the court. Room sizes were 9 by 13 feet and 9 by 12 feet. There is a hollow in the southeast side of the court and a refuse heap in the opposite quarter. In this a section was dug to the original surface at a depth of 7 feet.

*Site 105.* A short distance east of this pueblo is a small ruin.

*Sites 106-109.* Four small ruins lie two miles south along the ridge south of the Ramah-Pescado Valley.

*Site 110.* Six miles west of south of Ramah and about five southeast of the Pescado Springs is a large ruin, roughly rectangular and about 200 feet square (Fig. 4e). The buildings around the roughly rectangular court are not of even width. In the court are several small isolated buildings. The sandstone walls still stand about 6 feet high in the building on the north side; the others from 1 to 4 feet high. Only a few sherds were found here. Large piñon and cedar trees have grown over the ruin. To the southeast a dam has been thrown across a gulch formed by a drop in the swale.

*Site 111.* In the town of Ramah there is a rectangular ruin standing on the property of Mr. Jess Johnson north of the schoolhouse. The pueblo is of rectangular groundplan, 215 by 120 feet, with a wing extending from the north side into the court (Fig. 4c). The building was evidently two stories high on the outer row of rooms, but apparently only two rooms wide except in one or two places.

*Site 112.* There is a small ruin between Ramah and the reservoir on the southern side of the valley.

*Sites 113-117.* Situated on the ridge facing the Ramah reservoir and dam, or rather directly opposite the point of the high cliff north of the reservoir, are two ruins and between them another lies one hundred feet down the eastern slope. All are built of sandstone laid in mud; rather rectangular in plan; probably not over one story high, although the rear set of rooms may have had two stories. The back of the ruins thus faced

the prevailing westerly winds. The northern ruin is about 100 feet or eight rooms long and 22 feet wide. The central ruin is L-shaped, the long arm 100 feet or nine rooms long and the other 45 feet long and extending eastward from this is a wall enclosing a court about 30 by 80 feet. The southern ruin has an arm two rooms long at one end, and in the angle, a round kiva. This ruin seems to have had a low addition partway along the west side. Sherds were collected from the surface here.

Two other small ruins are located nearby.

*Site 118.* Half a mile south of Ramah and a quarter mile west of Vogt's house is a small ruin on the slope east of the Ramah fields. It is bracket-shaped, 75 feet long with two arms of 30 and 27 feet. The construction is fairly regular, the building and arms two rooms wide, and facing southeast. A room on the northeast side is about 6 by 9 feet. Sherds, flint, lava manos, flint hammerstones, etc., are to be seen.

*Site 119.* In front of Vogt's house, a mile or more south of Ramah, a small ruin lies partly on the bottom of the ravine and partly on the rock ledge enclosing the ravine. The building is 60 feet long with a western arm of 33 feet. On its eastern end is another structure of a few rooms possibly 36 feet long. There is some slight trace of refuse, but the whole is very indistinct.

*Site 120.* Two ruins lie on the rocky slope northeast of Vogt's house. The first 400 feet or more east of the house is a small ruin of undressed sandstone laid in mud. There are two buildings, the first two rooms wide, 65 feet long by 18 feet wide; the second at right angles to it on the southwest, 55 feet long and three rooms wide. A single room lies southeast of the first building and just inside the gap between the two buildings is a rectangular box-like construction of upright slabs about 2 feet square and 1 foot 6 inches deep. A room excavated in the first building measured 7 feet along the east wall, 7 feet 4 inches west, 11 feet 1 inch north and 11 feet 3 inches south; the wall stood 2 or 3 feet high; the floor was partly flagged; and a lined fireplace 17 by 18 inches was on the south side. A piñon tree on the ruin measured 3 feet 5 inches in circumference.

The second ruin lies 150 yards north of the first. It is a single house built of sandstone, of regular construction 75 feet long, 24 feet wide except for a short distance at the west end where there was only a single line of rooms about 6 feet wide. Part of a stone ring, such as formed the coping to the hatchway in the roof of the ancient houses, lay nearby.

*Site 121.* A small ruin lies a short distance east of Vogt's house in the ravine opening from Josepina Canyon. It is constructed of stone and quite regular, being 106 feet or about nine rooms long by 24 feet wide; at the western end an arm 42 feet long extends down the slope to the south. We

are indebted to Mrs. Nelson for a section of the noticeable refuse heap in front of this building.

*Site 122.* A small side canyon heads toward the northeast from this ravine about half a mile east of Vogt's house. Three ruins lie along its western slope facing east or southeast. The first ruin is of regular construction, 75 feet long by 35 feet wide with two arms of a room or two each at both ends.

*Site 123.* About two hundred feet east of Site 122 is another single building constructed of sandstone. It is about six rooms long and 18 or 20 feet wide. Some sherds show here.

*Site 124.* The last ruin up this side canyon lies on the hill slope but near its base. It is L-shaped, the two arms each about 30 feet long, but without a room in the outside corner where they join. While the ruin is apparently regular in shape its character cannot be certainly ascertained without excavation. One room dug into shows a good wall of selected and probably partly dressed sandstone blocks, more or less even in size, with some chinking. Part of a stone ring, diameters 15 and 30 inches, similar to that found at Site 120, was lying nearby.

*Site 125.* Turning south into Josepina Canyon for half a mile, a small cliff house<sup>1</sup> is seen on the left. On an upper rock ledge is a building of a few rooms. Another building lies at the base of the escarpment on the talus slope immediately below this: it contains four or five rooms at most. One room excavated to a depth of 4 feet gave dimensions of 7 feet 10 inches by 12 feet, with good walls of stone set in mud plaster. Here manos, metates, a grooved maul, corncobs, turkey bones, and potsherds were found. A small house of three or four rooms lay on the valley floor just below. All the buildings are evidently of the same age.

*Sites 126-137.* Beginning across the ravine from Vogt's house and extending along the south side of the ravine and the west side of Josepina Canyon for almost two miles is a series of thirteen ruins. Three others lie still further east on the north side of the pass to Cebollita. These are all small ruins, probably all of about the same age.

*Site 138.* A composite ruin lies about three and a half miles southeast of Ramah at a place called "Cebollita" in the pass between Josepina Canyon and the broad valley at the foot of the Zuni Mountains. The ruin lies on a low sandy knoll rising from fertile meadows. The western section is nearly square (375 by 350 feet), the eastern is octagonal or possibly nine-sided, i. e., nearly circular (180 feet diameter) and between them there appears to be a connecting ruin partly covered by sand and possibly by

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<sup>1</sup> Fewkes, (a), 116.

village débris (Fig. 5f). The circular section stands higher than the rectangular portion and appears to be a later construction.<sup>1</sup> A large dam was formerly thrown across the swale here.

*Site 139 — Pueblo de los Muertos.* This ruin is situated five miles north of east of Cebollita and eight miles due east of Ramah. It lies on the eastern bank of a living stream flowing from the foothills of the Zuñi Mountains and just below the notch in that range. The stream is distinctly marked by a long line of oak trees. This is a large rectangular pueblo built on the level ground on the bank of the stream. It is approximately 260 feet square (Fig. 4d); the buildings being two to five or more rooms wide; evidently highest on the outside and sloping toward the court. At certain points the building appears to have been higher than elsewhere. It is built of slabs and blocks of sandstone partly dressed by pecking (?). Rooms are 6 feet by 5 feet 8 inches and 6 feet 8 inches square. Some structures in the court appear to be separate from the outer buildings. The existence of kivas is uncertain although there are suggestive depressions in the court. Refuse piles thrown up at various points on the ruin would indicate that it was occupied for some time, but a section in a refuse pile outside to the southeast reached the original surface at a depth of only 1 foot 6 inches. While potsherds are rather scarce about the ruin, broken stone axes, hammer-stones, sandstone and basalt manos and metates, and chert arrow points were seen.

*Site 140 — Cienega.* On the road from Ramah to Tinaja lies the pueblo ruin called "Cienega." It is five miles north of Inscription Rock, in line with the notches in the Zuñi Range; its location marked by a corral and sand dunes. The ruin is built of lava blocks and some sandstone around an irregular court and measures roughly 450 by 350 feet over all. There is some evidence that in its shape it conforms to natural features, nevertheless it approximates an oval in plan. In the southwest corner of the court is a deep water-hole fed by a spring and confined by a low wall 50 feet in diameter. A large block of basalt is set up in the court southwest of the water-hole. Sandstone manos, flint, and obsidian were seen. Ash heaps are an uncertain quantity due to the shifting dunes of sand. However, a section was made in the refuse on the west side of the court to the original level at a depth of 7 feet below the present surface and another was made similarly to a depth of 3 feet 6 inches outside the ruin to the south.

*Site 141.* About two hundred yards southwest of Site 140 is another

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<sup>1</sup> Fewkes, (a), 114-116, as Pipkin's Ruin. A number of Dr. Fewkes's measurements differ considerably from our own. Evidently an error in his notes, giving the diameter of the circular ruin as "thirty feet" led him to suggest its possible use as a kiva: a kiva of 180 feet diameter is of course out of the question.

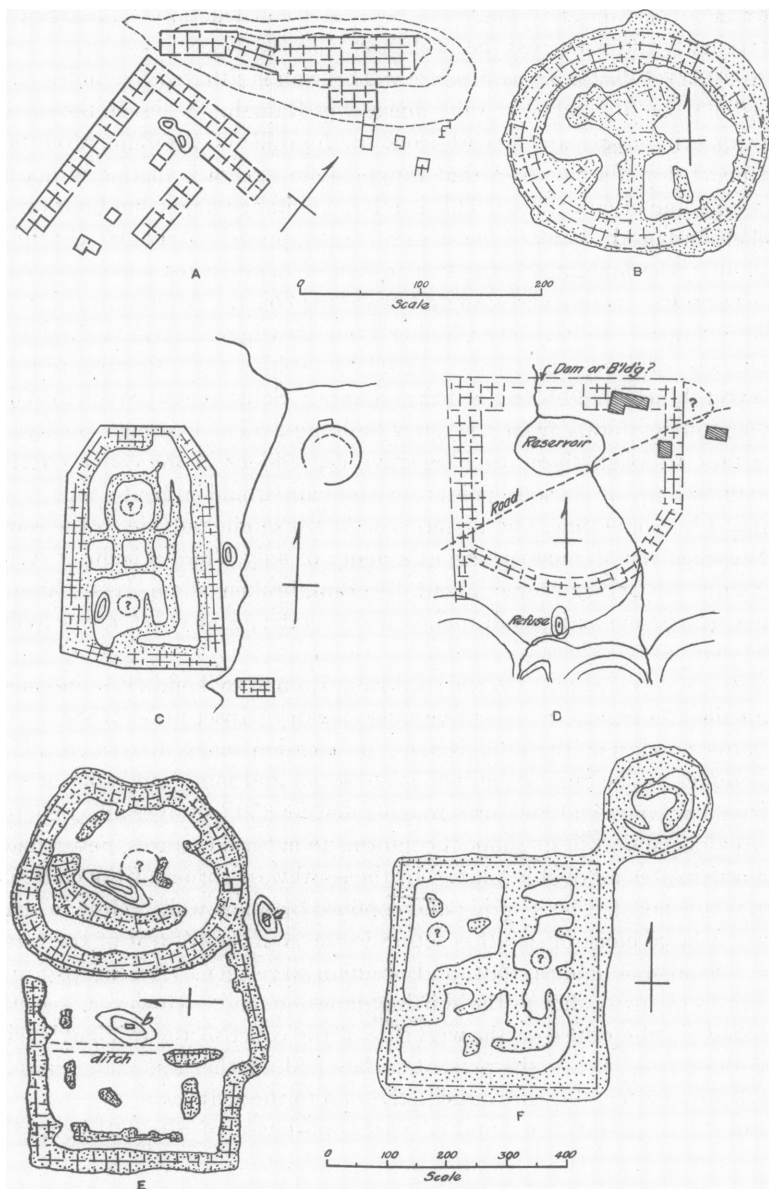


Fig. 5. Plans of Ruins: Ramah and Plateau Districts. a, Ruin 144; b, Ruin 162; c, Ruin 97; d, Ruin 153; e, Ruin 161; f, Ruin 138.



ruin, roughly oval in outline (Fig. 4g) about 245 by 290 feet. It is less prominent than the preceding ruin, its reduction being due to age or possibly to artificial causes. The main house section appears to have been on the north side, for there are traces of walls over that half of the court and on the east and west sides, but for a space on the south side there is only one row of rooms. One room was opened to the adobe (?) floor at a depth of about 4 feet: the walls were of good type and a fireplace was found against the north wall near the northwest corner. In the room were hammerstones, animal bones, and cooking pottery. Sherds are comparatively scarce on the ruin. There is some slight trace of refuse on the east side.

Mr. Gore, of Ramah, saw two small ruins of about six rooms each in the valley south of Cienega. Sherds were also noticed about half a mile to the west.

*Site 142.* A Mexican herder made a positive statement that there was a medium-sized ruin located about "one and a half miles" northeast of Cienega: but Mr. Nelson could not find it. The site should be in the next draw or valley east of the Pueblo de los Muertos Valley.

*Site 143.* Thirteen miles south of east of Ramah is the Mexican settlement Tinaja on the ranch of Mr. Leopoldo Mazón. The remains of a ruin are situated on a slight knoll by the chapel and cemetery about one-quarter mile west of the ranch house. The place has been built on by Mexicans, stones having been removed from the ruin, and it is consequently partly covered up and obscured. However, part of the ruin appears at the north end of the knoll near the chapel and another part appears at the south end near the reservoirs. While the location seems excellent so far as can be judged, the pueblo was not extensive. Few potsherds were found.

*Site 144.* About a mile and a half southeast of the ranch house and immediately south of the Agua Fria road is a low rock rising from the sandy flat valley bottom. The knoll or rock is about 35 feet high, about 250 feet long and perhaps 75 feet wide, dropping precipitously on the west but sloping to the east. Ruins lie partly on top of the rock and also below to the east and to the southeast (Fig. 5a). The building on the rock is 100 feet long and the largest below has two arms 180 feet and 100 feet long. These are built of sandstone laid in mud. Rooms measure about 7 by 9 feet, 7 by 10 feet, etc.

*Site 145.* Two small ruins are said to lie near the sandstone pinnacles, "Gigantes", six miles southeast of Ramah.

*Site 146 — Gigantes.* There is a ruin named for the pinnacles on the mesa a mile southeast, i. e., three miles northwest of Inscription Rock. This mesa is divided by a deep canyon heading into it from the west and leaving only a thin sheer wall of sandstone at its eastern face. Resting against the

inner or western face of this thin wall is a high conical talus slope on top of which is perched a ruin of irregular shape measuring roughly 170 by 125 feet. The sandstone wall is pierced at the level of the ruin by a "window," which one hundred feet or more above the base of the cliff on its eastern face, affords a magnificent view of the broad valley along the foot of the Zuñi Range. With adequate food and water the site could not be bettered from the standpoint of defense. An excavated room measured about 4 feet 6 inches by 8 feet: the well-laid walls of sandstone in adobe stood 7 to 8 feet high. Refuse extending down the slope into the canyon to the west gave a section 4 feet deep.

*Site 147.* Two small ruins lie at the southern corner of the mesa and there is possibly another on the valley floor immediately below these.

*Site 148 — Inscription Rock.* Ten miles southeast of Ramah, Inscription Rock, or El Morro, rises sheer from the plain. The famous inscriptions are at the base of the northeast angle and immediately above on the mesa top are three ruins. Two are large and prominent and have been previously visited and described.<sup>1</sup> Close to the northern edge of the mesa is a rectangular ruin, measuring roughly 160 by 100 feet. The back (north) wall of squared, even, large blocks of sandstone stands 6 feet high. The north, east, and west sides are two or three rooms wide, with the outer row of rooms highest.

*Site 149.* Just south of this ruin a deep and narrow gorge enters the rock from the west dividing it almost in two. On the opposite, or southern, side of the gorge is the larger of the two ruins, measuring about 300 by 210 feet. This ruin presents the general outline of two concentric rectangles. The "outer" building is but two rooms wide, and a deep trough extends along all but the southern side between the "outer" and "inner" buildings. A small section was made in the ash heap southeast of the ruin.

*Site 150.* The third ruin eluded the scrutiny of all previous investigators, and was discovered by Mrs. Nelson only after our outfit had left the vicinity of the rock. It lies to the west of the northern rectangular ruin. It is extensive and low, and seems to be more ancient than the other two.

*Site 151.* Inscription Rock rises sheer from the plain on the north but slopes gradually down to the south and west. Along the east side are half a dozen small ruins extending for perhaps two miles.

*Site 152.* A mile or more east are two more small ruins near an abandoned ranch house.

*Site 153.* Ojo Pueblo is roughly fifteen miles or more due south of

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<sup>1</sup> Simpson, (a), 120 and Plate 63; Whipple, I, 64, and III, 22; Möllhausen, 74; Bandler, (b), 328; Fewkes, (a), 117.

Ramah and about six miles southeast of the corner of the National Forest. Here is a large ruin seen by Mr. Nelson. It is D-shaped, roughly 400 by 350 feet, situated in the mouth of a draw on the south side of the main valley, the north side of the building being on the edge of the bottom land (Fig. 5d). The ruin as a whole is low and overgrown with weeds. The walls stand from 1 to 4 feet high, and while not much of it is exposed, the masonry appears to be fairly well made of good-sized undressed sandstone blocks laid in mud. Several modern structures stand on the ruin. Very little refuse shows, only a few bits of pottery on the surface.

*Site 154.* About three-quarters of a mile southeast of Shoemaker's ranch house (three miles or so west of Ojo Pueblo) is a narrow rocky ridge formed by a saddle in a mesa. Here at the western end in the timber is a large ruin with standing walls. The ruin is roughly rectangular, about 225 by 150 feet (Fig. 4 f). It is built of sandstone blocks; those in the upper part of the outer wall are partly dressed on the face and seemingly squared by strokes of a stone chisel (?). The outer wall is practically of double thickness, more than two feet through, but the two walls are not very well bound together. Mr. Nelson's notes add that there are a few doors partly intact, with lintels of split rails. Rooms average 6 by 15 feet or more. Trees now stand on the ruin. A collection of sherds was made here.

*Site 155.* West of this ruin are two smaller ruins. They are built of stone, but are now shapeless heaps. The pottery is apparently older than that of the larger ruin, with a smaller percentage of redware.

*Site 156.* Three small ruins lie near the Shoemaker ranch house (Township 8, Range 16, Section 4). Another and larger lies on top of a small rocky mesa back of the house. It is really a fortification, perhaps 100 by 150 feet, on the talus and two terraces above.

*Site 157.* A group of seven or more small ruins lies along the canyon at Ojo Hallado, somewhere about four miles west of the Shoemaker ranch. They are all within a mile radius of the Garcia ranch, the buildings of which occupy one of sites. Of the two nearest the Garcia house, one is 50 by 25 feet, the other L-shaped, 35 by 25 feet, with two curious embankments projecting from it suggesting a dam.

*Site 158.* Two small ruins are situated three miles northwest of Ojo Hallado on the road to the ranch of Jesus Deracho. One at the foot of the mesa was seen; the other on top is located by report only.

*Site 159.* About three miles north of Ojo Hallado is the Miller ranch fifteen miles by road south of Ramah. Fully a dozen small ruins are scattered along the valley for a mile or two north and south of the ranch house and on the ridge above. They appear to be all of about the same age, though with a little range, but neither of the earliest nor latest periods. The

majority are six to ten room buildings; straight, L, and bracket-shaped: usually facing in a southerly direction. One on top of the ridge behind the Miller house is L-shaped, about 240 feet by 60; the long arm is only one or two rooms wide; the short arm is four rooms wide.

*Site 160.* Two miles northeast of the ranch house are three small ruins on the ridge. Two lie near a spring draining into Soldado Canyon. All are built of stone and lichen-covered. Potsherds are scarce.

*Site 161.* Crossing this ridge northwest of the Miller ranch, one descends after traveling about three miles into Soldado Canyon. This is an extension of the deep Horsehead Canyon penetrating far southward into the plateau from the main Zuñi Valley. Near the head of the canyon stands a large composite ruin<sup>1</sup>; its juxtaposition of rectangular and circular pueblos resembling that at Cebolita near Ramah. The rectangular portion is roughly 350 feet or more square; the circular about 325 feet in diameter (Fig. 5e). Part of the outer wall of the circular ruin still stands. Like the other walls it is built of sandstone laid in mud, and above the height of four or five feet the blocks are partly dressed. The encircling houses are one or two and possibly three rooms wide. The outer wall is 2 feet 3 inches thick in its basal part, and 1 foot 2 inches in the upper portion; the middle wall measures 1 foot 6 inches and the inner wall 1 foot 4 inches. Refuse heaps from one to four feet high, occur both inside and outside of the courts. Sherds were taken from a section inside the rectangular court (161-b) and from another outside near the circular ruin (161-a).

*Site 162.* More than a mile down Soldado Canyon is another pueblo ruin placed on a low spur on the south side of the valley and opposite a small side canyon. It is said to lie exactly on the Zuñi Reservation line. It is oval with diameters of 210 and 180 feet (Fig. 5b). The ruin has fine standing walls and is in a better condition of preservation than any other ruin in the region despite acts of vandalism said to have been committed by a former Indian agent. It is built of sandstone laid in mud, with some chinking. The outer wall of large rectangular blocks, partly dressed, stands 5 to 10 feet high. It was formerly two, and possibly three, stories high. This wall presents no sharp angles, yet it is not quite a smooth curve. The pueblo is more compact than the similar structure in the composite ruin further up the canyon. Some irregular buildings stand in the court with

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<sup>1</sup> Fewkes, (a), 119-126, describes this ruin and Site 162 under the name *Ar-che-o-tek-o-pa*. It should be noted that this is not a correct designation for the canyon in which the ruin stands, since *Atciatekyapoa* (*attcianE*, knife and *tekyapoa*, hill) is the Zuñi name for that section of the Zuñi plateau forming the eastern side of Horsehead Canyon. Dr. Fewkes identifies this ruin and that a mile north with the "Marata" of Castañeda's report, although his reason for so doing is not stated. The pottery from this ruin is not of historic type. The assumption that both parts of the ruin were occupied simultaneously will be considered later.

some of the walls apparently on radial lines. No refuse heaps of any account were found although there is debris here and there in the court.

*Site 163.* Somewhere to the west after following the road from Jesus ranch toward Zuñi for about eight miles we came on several small ruins near a reservoir and Zuñi farmhouse. These must lie near the Zuñi Reservation line. Possibly they are the ruins called *Tekyapoa* (hill). A collection of sherds was taken at random from that nearest the reservoir.

*Site 164 — Cuminnkya.* This ruin, or rather group of ruins, lies at the head of a valley seven or more miles southeast of Ojo Caliente. The Zuñi Buttes can be distinctly seen from this point bearing about N-15°-W from this place. The houses are scattered over an irregular ridge. They are all small; one L-shaped, measures 55 by 30 feet. A random collection of sherds was made here.

A circular ruin is said to lie a mile to the south close under a big red mesa.

*Site 165.* Two house ruins of one or two rooms each lie at the foot of a low mesa in the fork of the arroyos in the valley about three miles southwest of Cuminnkya. A random collection was made.

*Site 166.* Half a mile or so down the valley and the same distance up the slope to the north is a low small ruin. Only two rooms show; the whole measuring 25 by 10 feet. The stone has been carried away to the ranch house of Francisco Utima nearby. All sherds seen were picked up.

There are said to be other small ruins down the valley near the Garcia ranch.

*Site 167.* Half a mile up the slope from the last site is another on the summit. The ruin is a small place of only a few rooms. A random collection of sherds was made here.

## POTSHERD SAMPLES.

It cannot be doubted that the pottery art in the Southwest has run a long and varied course. It is an art with a wealth of details and to the extent to which nice discriminations in technique can be made, equally fine discriminations can be made in its fluctuating phases. It would be fatuous to emphasize here the importance of pottery for establishing a chronology of Southwestern ruins. But if we know the history of the pottery art, though only in its barest outlines, we know at once the time-relations between the ruins. Simply to state the sequence of their occupation is to tell in lowest terms of the migrations of their erstwhile occupants. Migration records are but little more than suggestive indications of former intertribal relations, and for just this reason seem to be the urgent need in preparing a background for ethnological study in the Southwest. In the present study we have confined our attention simply to this point.

Needless to say this type of study requires none of the intensive excavation necessary for the elaboration of the course of minor cultural events. It is amenable to methods possible to a reconnaissance survey. Inasmuch as several distinct methods had been indicated before the present study was undertaken, it seems advisable to discuss briefly their application to our problem.

Three methods were published almost simultaneously by Messrs. Kidder, Kroeber, and Nelson. They may be characterized respectively, as the hypothetical seriation of several pottery techniques, the hypothetical ranking of surface finds and the observation of concurrent variations, and stratigraphic observation of refuse heaps.

Dr. Kidder's method<sup>1</sup> rests on the association of four different wares with ruins of varying size and degree of obliteration, on their varying perfection of technique and design, and on the extent of their distribution. With great plausibility, he tentatively ranked the wares on the basis of the combination of these factors. While the results of such a procedure are always suggestive, the objections to it are obvious. And further, wherever such a method is applicable, the methods which follow are equally applicable and certainly more productive of valid results.

Dr. Kroeber's method is outlined in the earlier pages of this volume<sup>2</sup>

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<sup>1</sup> Kidder, (a).

<sup>2</sup> Part I.

on the basis of his experience with collections of sherds taken from the surface of ruins in the vicinity of Zuñi. Dr. Kroeber found that two general types of pottery could be distinguished. Further that sherds from any particular ruin belonged to one class only. He was thus able to distinguish two groups of ruins corresponding to the two types. Their relation in time was clearly indicated when it was noted that one group included sites occupied according to historical records and native tradition in the sixteenth century. A further analysis of the general types into their constituents, distinguished on the basis of color, suggested the division of the two general periods into minor sub-periods. Ranking these sub-periods, or rather the data for the individual ruins, by the proportion of one of the constituents, a partial confirmation of the validity of the sequence was suggested by concurrent variations in the associated constituents. A fundamental objection to Dr. Kroeber's method could be based on the quality of the original data, which obviously depends entirely on the ability of the investigator to collect a sample of potsherds at random and not by selection.

Mr. Nelson's method of stratigraphic observations on refuse heaps<sup>1</sup> needs no extensive comment. It is patent that the refuse heaps of every ruin contain the superposed remnants of the successive pottery styles used there, and that starting at ruins of known historical provenience we are able to trace back the successive phases of the art. More specifically Mr. Nelson's contribution consists in demonstrating the practicability of obtaining samples of sherds at random from the successive levels of the heap, and by determining the proportions of the constituent wares at each level indicating the course of the pottery art. This method is strikingly direct and entirely eliminates the error of selection, but it is only applicable to refuse heaps of considerable depth.

Obviously the last method is the most advantageous, but its applicability to the Zuñi ruins was strictly limited by the shallowness of the refuse heaps at most of the ruins. Stratigraphic observations were possible at only five of the one hundred ruins on the Zuñi Reservation,<sup>2</sup> for example. This is in itself a fact of some significance, for the necessary deduction is that the occupation of the ruins, large and small, was transitory. Fortunately, we were able to obtain good evidence connecting the pottery of Zuñi itself with Mattsakya, an historic pueblo, and Pinnawa, a prehistoric ruin, in each of which deep refuse deposits were found. For the rest Dr. Kroeber's method alone was applicable. We have therefore been forced to combine both methods in the present inquiry giving preference wherever

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<sup>1</sup> Nelson.

<sup>2</sup> Five other ruins would probably have yielded results.

possible to the stratigraphic results. Our method of utilizing such results will be discussed after reviewing the data obtained.

It seems pertinent to inquire into the accuracy of the data obtained by the two methods. We may formulate the following questions: To what extent does a series obtained from a refuse heap represent the true sequence of types? Can we obtain a random sample of sherds by collecting from the surface of a ruin? To this end we excavated two independent sections in the refuse heaps along the eastern slope of Mattsakya, Site 48 (a ruin chosen, of course, at random). How closely these agree may be seen by inspecting the table below (p. 258). The agreement between the sections seems to be as close as may reasonably be expected, the magnitude of the deviations being relatively small and well within the range of accidental variation. This point comes out more emphatically by comparing each series with the mean series (p. 278), when it will be seen that the deviations of each series from the average have a random distribution, there being no preponderance of values on one side of the average or the other. To put the second question to the test, we compared a surface sample supposedly collected at random with a truly random sample obtained immediately below the surface. Thus, we have compared the surface sample obtained at Mattsakya by Dr. Kroeber in 1915 with the sherds from the first level obtained by the writer (p. 278). We have of necessity ignored the fact that the two samples may not be coeval, but the difference in time is probably slight.<sup>1</sup> The correspondence between the samples is quite close, and as in the case of the compared sections the differences are evidently accidental. In fact the differences are well within the range of variation exhibited by any two corresponding random samples in the series. A fairer test of this point would be the comparison of two samples made independently by one collector on the surface of a single ruin. We made such a test at least twice while in the field, but as the results are not at hand, we can simply state that the correspondences were similar to that above.

Pottery was obtained at most of the ruins seen. For the most part only fragments were available as no extensive excavations were made. While the absence of many complete vessels from our collection sets a definite limit on the description of the pottery wares, the preceding statements must have made it clear that this fact has but little influence on an inquiry into the sequence of the wares. Still it may be claimed that the lack of whole vessels would make an analysis of a sample of sherds into its constituent wares impossible; yet anyone who has handled material of this

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<sup>1</sup> The reader must be cautioned that such a comparison of samples obtained by different investigators does not include the differences due to personal bias since one of the samples is certainly a random collection.



sort will readily recognize that this objection is chiefly academic. It is simply a matter of experience that the variety of wares at a ruin is very limited and that sherds may be recognized without much difficulty. Indeed the fact that we have in the Zuñi region close parallels to the wares of the Tano, as determined by Nelson, rendered the segregation into classes conspicuously easy.

This brings us to a description of the chief classes into which these wares have been divided. We feel justified in abandoning Dr. Kroeber's twofold classification, for as he himself asserts, the very fact that subdivision is possible indicates that there has been "a steady continuous development on the soil." More particularly, we feel the necessity of abandoning the principle of classifying each sherd on the basis of its particular color in favor of a classification according to the several distinct wares. Surely such a classification more adequately represents the facts. However, the essential correctness of Dr. Kroeber's results cannot be doubted. The explanation for the close agreement between the results from the two methods lies simply in the small number of techniques and color combinations involved.

We have made our general classification of wares conform to those worked out by Nelson for the Tano region<sup>1</sup> in order to render the results directly comparable. This has been made possible, as we have already intimated, by the very close parallelism in development in the two regions. There can be very little doubt that the sequence of techniques in the Zuñi Region has been painted ware, glazed ware, combination glazed and painted ware, and finally painted ware of a distinctly modern type. On the other hand, the color combinations are somewhat simpler, for we find only three ground or body colors in use, white, red, and buff. In addition to these wares with painted decoration, we find two other types, corrugated ware and a coarse, plain, unsized, undecorated black ware. We have therefore divided the wares first on the basis of technique and secondarily on the basis of body or ground color.

In the following table we have indicated the proportions of the various wares present at each site by percentages. In the first column is the number designating the ruin in the list above, and the depths of the samples wherever stratigraphic sections were made. In the second to fifteenth columns the percentages of corrugated, black and painted wares are indicated, and in the last column the number of sherds in the sample analyzed.

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<sup>1</sup> Nelson.

TABLE I.

PERCENTAGES OF POTTERY WARES PRESENT AT RUINS.

Site	Corru- gated	Black	Two Color Painted, Ware			Three Color Painted Ware			Two Color Glazed Ware			Three Color Glazed and Painted Ware			Size of Sample
			White	Red	Buff	White	Red	Buff	White	Red	Buff	White	Red	Buff	
1	52	...	35	13	...	...	...	...	...	...	...	...	...	...	59
2	62	...	38	...	...	...	...	...	...	...	...	...	...	...	28
3	41	...	96	...	...	...	...	...	...	...	...	...	...	...	83
4	53	...	25	20	...	...	2	...	...	...	...	...	...	...	335
5	45	...	43	12	...	...	...	...	...	...	...	...	...	...	118
6	45	...	55	1-	...	...	...	...	...	...	...	...	...	...	131
7	21	...	98	...	...	...	...	...	...	...	...	...	...	...	87
8	15	41	7	7	12	7	...	...	...	11	...	...	...	...	27
	13	21	17	4	17	...	...	...	4	4	...	2	18	...	48
	7	61	10	6	8	4	...	...	1	1	...	...	2	...	204
	26	...	64	9	...	...	1	...	...	...	...	...	...	...	82
	28	7	4	16	...	...	...	...	21	12	...	...	12	...	128
	...	43	5	3	19	...	...	10	4	9	1	...	4	2	259
	21	...	98	...	...	...	...	...	...	...	...	...	...	...	208
a	21	...	98	...	...	...	...	...	...	...	...	...	...	...	108
b	11	...	99	...	...	...	...	...	...	...	...	...	...	...	188
c	11	...	99	...	...	...	...	...	...	...	...	...	...	...	67
15	50	...	50	...	...	...	...	...	...	...	...	...	...	...	10
16	35	...	62	3	...	...	...	...	...	...	...	...	...	...	109
17	50	...	45	5	...	...	...	...	...	...	...	...	...	...	153
18	56	...	36	8	...	...	...	...	...	...	...	...	...	...	184
19	24	...	74	2	...	...	...	...	...	...	...	...	...	...	167

S.W. 1'6", 1'9"  
S.E. 2'4", 4'4"  
Surface

[illegible]

<sup>1</sup> This figure represents the proportion of sherds bearing corrugations, but inasmuch as the body of the vessel was not corrugated, it does not represent the proportion of corrugated ware present. No method of determining that proportion occurs to us.

<sup>2</sup> Our recollection is that a few red sherds were seen at this ruin, but were by accident not included in this sample.

TABLE I (Continued).

Site	Corru- gated	Black	Two Color Painted Ware			Three Color Painted Ware			Two Color Glazed Ware			Three Color Glazed and Painted Ware			Size of Sample
			White	Red	Buff	White	Red	Buff	White	Red	Buff	White	Red	Buff	
46			41	24											298
48	35														
Section I															
(9) 4'0"-4'6"	7	51	3		6	2		3	9	3	2	10	2	2	127
(8) 3'6"-4'0"	5	55	10	2	15			4	5	1	3				87
(7) 3'0"-3'6"	1	50	11		16	5	1	3	5	3		5			139
(6) 2'6"-3'0"	1	53	6	1	20	6		3	8	1	1				146
(5) 2'0"-2'6"	1	41	7	2	29	2		2		2	2	9	1	2	145
(4) 1'6"-2'0"	3	51	6		18	6		4	8	3	1				119
(3) 1'0"-1'6"	6	45	2	1	15	2		6	6	3	6	8			123
(2) 0'6"-1'0"	3	50	11		11		1	2	6	1	8	6	1		131
(1) 0'-0'6"		57	17		17				5	2	2				63
Section II <sup>1</sup>															
(8) 4'6"-5'0"	18	44	5	3	2	5		2	2	3	4	10	2		100
(7) 4'0"-4'6"	15	48	3		15	6		2	5			3	1		144
(6) 3'6"-4'0"	7	52	9	4		8	2	6	2	2	4	2	2		139
(5) 3'0"-3'6"	11	54	3		8				12			8	4		92
(4) 2'6"-3'0"	4	55	7	6	9	7		6				6			102
(3) 2'0"-2'6"	2	51	14		11	2		4	6	4		6			83
(2) 1'6"-2'0"		40	17	5	23			5	10						43
(1) 1'4"-1'6"	5	43	19		24				9						21
Surface <sup>2</sup>	3	56	9	3	13	1	1		2	1	8		2	1	502
	33		67												32
	2 <sup>1</sup>		98												107
	24		76												87
	47		40	13											15
	56		28	16											29



TABLE I — (Continued).

Corru- gated	Site	Black	Two Color Painted Ware			Three Color Painted Ware			Two Color Glazed Ware			Three Color Glazed and Painted Ware			Size of Sample
			White	Red	Buff	White	Red	Buff	White	Red	Buff	White	Red	Buff	
92		43	35	20			2								93
95		60	25	12			3								116
96		50	20	26			4								136
97	(6) 2'0"-2'6"	38	31	23			8								13
	(5) 1'6"-2'0"	8	8	50			34								12
	(4) 1'0"-1'6"	44	21	13			19		3						34
	(3) 0'6"-1'0"	41	31	13			13						2		39
104	(2) 0'-0'6"	46	23	8			20						3		39
	(13) 6'0" to 7'-0"	67	17	8			8								12
	(12) 5'-6" to 6'-0"	88	12												8
	(11) 5'-0" to 5'-6"	65	8	19			8								26
	(10) 4'6" to 5'-0"	84	5	11											19
	(9) 4'-0" to 4'-6"	61	22	11											36
	(8) 3'-6" to 4'-0"	63	16	14									6		49
	(7) 3'-0" to 3'-6"	59	14	9			7								81
	(6) 2'-6" to 3'-0"	55	24	13			5		2	2			5		38
	(5) 2'-0" to 2'-6"	41	16	20			14						9		86
	(4) 1'-6" to 2'-0"	50	13	16			12			3			6		32
	(3) 1'-0" to 1'-6"	49	19	17			10			5					41
	(2) 6" to 1'-0"	55	14	23			6						2		49
	(1) 0" to 6"	60	7	20			10						3		66
	(4) 1'-6" to 2'-0"	70	10	5			15								20
	(3) 1'-0" to 1'-6"	63	12	13			12								59
	(2) 6" to 1'-0"	52	18	11			15						4		27
139	(1) 0" to 6"	53	14	12			20						1		76
	(4) 1'0"-1'6"	30	12	32			16			7			3		69

139	(3) 6"-1'0"	32	.....	11	41	.....	7	.....	9	.....	.....	.....	.....	44
	(2) 0'-6"	25	.....	10	34	.....	23	.....	5	.....	.....	3	.....	96
	(1) Surface	27	.....	11	30	.....	22	.....	8	.....	.....	2	.....	95
140a	(6) 2'6"-3'6"	64	.....	9	.....	18	.....	.....	9	.....	.....	.....	.....	11
	(5) 2'0"-2'6"	48	9	43	.....	.....	.....	.....	.....	.....	.....	.....	.....	21
	(4) 1'6"-2'0"	47	3	35	.....	15	.....	.....	.....	.....	.....	.....	.....	34
	(3) 1'0"-1'6"	67	9	18	.....	3	.....	.....	.....	.....	.....	.....	.....	33
	(2) 6"-1'0"	44	23	23	.....	2	.....	.....	6	.....	.....	2	.....	48
	(1) 0'-6"	50	16	24	.....	8	.....	.....	2	.....	.....	.....	.....	62
140b	(14) 6'6"-7'0"	33	10	38	.....	14	.....	.....	5	.....	.....	.....	.....	142
	(13) 6'0"-6'6"	49	13	26	.....	12	.....	.....	.....	.....	.....	.....	.....	67
	(12) 5'6"-6'0"	68	14	13	.....	4	.....	.....	.....	.....	.....	1	.....	67
	(11) 5'0"-5'6"	30	30	24	.....	4	.....	.....	6	.....	.....	3	.....	33
	(10) 4'6"-5'0"	33	17	32	.....	12	.....	.....	3	.....	.....	3	.....	41
	(9) 4'0"-4'6"	33	17	43	.....	.....	.....	.....	.....	.....	.....	7	.....	12
	(8) 3'6"-4'0"	12	35	29	.....	12	.....	.....	6	.....	.....	6	.....	17
	(7) 3'0"-3'6"	24	29	35	.....	.....	.....	.....	12	.....	.....	.....	.....	17
	(6) 2'6"-3'0"	26	17	15	.....	15	.....	.....	9	.....	.....	12	.....	34
	(5) 2'0"-2'6"	29	6	29	.....	18	.....	.....	12	.....	.....	6	.....	17
	(4) 1'6"-2'0"	70	5	17	.....	.....	.....	.....	7	.....	.....	1	.....	86
	(3) 1'0"-1'6"	38	12	20	.....	10	.....	.....	10	.....	.....	10	.....	40
	(2) 6"-1'0"	49	6	16	.....	6	.....	.....	17	.....	.....	6	.....	51
	(1) 0'-6"	48	6	24	.....	.....	.....	.....	12	.....	.....	.....	.....	100
146	(8) 3'6"-4'0"	42	17	25	.....	12	.....	.....	.....	.....	.....	4	.....	24
	(7) 3'0"-3'6"	39	17	18	.....	23	.....	.....	3	.....	.....	.....	.....	60
	(6) 2'6"-3'0"	51	12	22	.....	9	.....	.....	.....	.....	.....	3	.....	67
	(5) 2'0"-2'6"	51	11	13	.....	15	.....	.....	5	.....	.....	5	.....	75
	(4) 1'6"-2'0"	36	17	19	.....	16	.....	.....	6	.....	.....	4	.....	84
	(3) 1'0"-1'6"	46	8	26	.....	10	.....	.....	4	.....	.....	1	.....	77
	(2) 6"-1'0"	43	12	17	.....	19	.....	.....	9	.....	.....	.....	.....	103
	(1) 0'-6"	41	15	20	.....	20	.....	.....	2	.....	.....	1	.....	148
152	(6) 2'0"-2'6"	33	25	25	.....	9	.....	.....	8	.....	.....	.....	.....	12





The data obtained from Zuñi Pueblo itself was not strictly amenable to the foregoing classification because of its paucity. Buildings had been extended over old refuse heaps and only superposed strata of sherds were found in former open spaces. These were sufficient to indicate conclusively a change in pottery types during the occupation of the pueblo. It seems preferable to tabulate merely the actual number of sherds found, and to classify the decorated wares as of the present-day type, the painted types of the pueblos abandoned in historic times, and the types with glazed decoration. These are indicated in Table II.

Similarly, certain recent ruins in the neighborhood of Zuñi contain painted wares closely related to present-day wares. It seems inadvisable to classify these with the wares from the majority of ruins, but rather to show their comparability with the wares from Zuñi itself. We have accordingly classified them in Table III as in Table II, but as the samples are sufficiently large, percentages are given.

TABLE II.  
POTTERY FRAGMENTS FROM ZUÑI.

Location		Corru- gated	Black	Painted Wares		Glazed Wares
				Modern	Historic	
North Refuse Heap (V) <sup>1</sup>	(6) 5'-5'6"	.....	.....	7	.....	.....
	(5) 4'-5'	.....	8	7	2	.....
	(4) 3'-4'	.....	5	3	.....	.....
	(3) 2'-3'	.....	15	7	1	.....
	(2) 1'-2'	.....	7	5	2	.....
	(1) 0'-1'	.....	23	11	.....	.....
Entrance to Rat Plaza (MM)	(8) 7'-8'	.....	5	14	.....	.....
	(7) 6'-7'	.....	10	27	3	.....
	(6) 5'-6'	.....	16	15	1	.....
	(5) 4'-5'	.....	12	5	.....	.....
	(4) 3'-4'	.....	18	18	2	.....
	(3) 2'-3'	.....	12	7	.....	.....
	(2) 1'-2'	.....	9	4	.....	.....
	(1) 0'-1'	.....	8	9	.....	.....
Rat Plaza (LL)	(9) 9'-11'	.....	.....	2	.....	.....
	(7) 7'-8'	.....	8	21	7	3
	(6) 6'-7'	.....	18	22	.....	.....
	(5) 5'-6'	.....	17	20	.....	.....
	(4) 4'-5'	.....	7	7	.....	.....

<sup>1</sup> This letter refers to the location of the excavation as indicated on the plan of Zuñi by Kroeber, this volume, p. 202 and Map 6.

TABLE II — (Continued.)

Location		Corru- gated	Black	Painted Wares		Glazed Wares
				Modern	Historic	
Muhhewa (K)	(3) 3'-4'	.....	2	7	.....	.....
	(1) 0'-2'	.....	.....	8	.....	.....
	(16) 15'-15'6"	2	4	.....	4	1
	(15) 14'-15'	27	5	.....	20	3
	(14) 13'-14'	7	6	.....	9	2
	(13) 12'-13'	1	.....	.....	4	1
	(12) 11'-12'	2	15	5	12	4
	(11) 10'-11'	1	8	1	11	1
	(10) 9'-10'	.....	13	3	5	3
	(9) 8'-9'	1	14	8	6	2
	(8) 7'-8'	.....	1	11	1	.....
	(6) 5'-6'	.....	19	9	.....	.....
	(5) 4'-5'	.....	36	29	2	.....
	(4) 3'-4'	.....	38	17	.....	.....
	(2) 1'-2'	.....	21	3	.....	.....
East of Room 105 (L)	(1) 0'-1'	1	19	13	.....	.....
	(12) 11'-12'6"	.....	6	.....	6	1
	(11) 10'-11'	.....	22	.....	39	6
	(10) 9'-10'	1	45	1	29	6
	(9) 8'-9'	.....	27	.....	40	1
	(8) 7'-8'	1	7	3	1	1
	(7) 6'-7'	1	4	4	3	.....
	(6) 5'-6'	1	8	1	3	.....
	(5) 4'-5'	3	2	22	1	.....
	(4) 3'-4'	.....	2	15	.....	.....
	(3) 2'-3'	.....	5	8	1	.....
	(2) 1'-2'	1	3	1	.....	.....
	(1) 0'-1'	.....	.....	7	.....	.....
South Block (Q)	(8) 7'-8'6"	.....	1	2	.....	.....
	(7) 6'-7'	.....	19	9	11	4
	(6) 5'-6'	.....	24	36	8	10
	(5) 4'-5'	.....	38	37	3	2
	(4) 3'-4'	.....	14	12	1	.....
	(3) 2'-3'	.....	28	14	.....	.....
	(2) 1'-2'	3	4	8	.....	.....
	(1) 0'-1'	1	13	15	.....	.....

TABLE III.

PERCENTAGE OF POTTERY WARES PRESENT IN RECENT RUINS.

Site	Corru- gated	Black	Painted Wares		Glazed Wares	Size of Sample
			Modern	Historic		
12 K'yatcekwa	1	50	.....	48 <sup>1</sup>	1	92
32 Hampassawa <sup>2</sup>	6	33	26	26	9	204
42 Heccotal'alla	1	69	30	.....	.....	131
52 East Kolliwa	3	55	41	1	.....	115
West Kolliwa	1	41	52	6	.....	81
53 Wimmayawa	2	66	31	2	.....	197

<sup>1</sup> Historic painted wares of late type.<sup>2</sup> This sample may represent a mixture of seventeenth century wares and modern wares. rather than a transitional stage.

## SEQUENCE OF POTTERY TYPES.

## ZUÑI PUEBLO.

Operations were commenced in Zuñi Pueblo itself; in its refuse heaps, its plazas, and the open spaces left by demolished buildings. In spite of the failure to locate an old refuse heap of any depth, evidences were found of changes in pottery type in superposed strata in the older sections of town. The best indications were found in the deep fill near Muhhewa, situated at the foot of the slope south of the main block. Here a marked difference was found (Table II) in the wares below eight feet as compared with those above. Corrugated ware, painted wares of the type prevalent on the surface of ruins abandoned in the early historic period, and glazed wares are in the lower levels, while modern painted wares are the prevailing type above. Parallel results were obtained at a point east of Room 105, at the foot of the southwestern slope of the main block, and again below the center of the south block, where the wash was demonstrably from the main block on the north. The line of demarkation in the two cases was at the depths four to seven feet and four feet, respectively. The overlapping of the modern painted wares with the earlier types seen here may be significant, but we cannot be certain of this, as we are dealing with washed deposits. Suffice it that these finds demonstrate conclusively that the oldest wares found in Zuñi are identical with those on the surface of ruined pueblos known to have been abandoned in early historic times.

Certain other ruins (Nos. 12, 32, 42, 52, and 53) proved to contain painted wares of a type almost identical with that of modern Zuñi (Table III). While they are referred to by the natives as ancient dwellings, they are, with the exception of No. 32, undoubtedly post-Conquest refuge villages.

## HISTORICAL EVIDENCE.

The next step is to follow back the sequence of wares in the ruins of the historic pueblos. In view of the moot points left unsettled by the historiographers in establishing the identity of the historic pueblos, it seems worth while reviewing the documentary evidence in some detail. We may anticipate our results by stating that the historiographers were essentially correct in their positive identifications and that the identities established in doubt prove to be those with nonhistoric pueblos.

Documentary evidence first throws light on the Zuñi region in the second quarter of the sixteenth century. While it is possible that there was an earlier expedition in 1538 which advanced to the north as far as the Gila or the lower Colorado River,<sup>1</sup> the first report of an expedition penetrating to the Zuñi country is that of Fray Marcos de Nizza in the following year.

There can no longer be any doubt of the identity of the region which Marcos reached. Following Bandelier's closely argued identification of Fray Marcos' probable route<sup>2</sup> we may briefly describe his journey.

Instructed by Viceroy Mendoza to penetrate into the interior in order to observe and to report with particular care on the peoples and the country that he might find, Fray Marcos left San Miguel de Culiacan (Sinaloa) on March 7, 1539 (old style) guided by Estévan, the negro companion of Cabeza de Vaca. Moving northward he followed the coast of the Gulf of California as far as the Rio Yaqui in Sonora. Diverging from the coast his route then lay more directly north through central Sonora. Sending Estévan to precede him in his northerly march, Marcos received from that source his first report of a "very mighty Province" lying thirty days' journey before him. He was told that there were seven great cities in this province, the first of which was called Cibola (Cevola), and that there were also three other "kingdoms" called Marata, Acus, and Totontec.

Continuing northward Marcos seems to have passed up the Rio Sonora and down the Rio San Pedro to the Gila. Here he met an aged native of Cibola who confirmed the earlier reports, adding,<sup>3</sup>

that the lord of those seven cities lives and resides in one of them called Ahacus. . . . He also said to me, that the other Seven<sup>4</sup> Cities are like this one [Ahacus], and some of them larger, and that the principal one of all is Ahacus. He says that toward the southeast there is a kingdom called Marata, in which there used to be many and large settlements, all of which are of houses of stone and many-storied, and that this kingdom was and still is at war with the lord of the Seven Cities, through which warfare the kingdom of Marata has declined greatly, although it still holds its own, and is at war with the others. And he also stated that toward the southeast<sup>5</sup> lies the kingdom called Totontec. . . . He also said that there is another very large province and kingdom named Acus. There is also Ahacus, and that word, with aspiration, is the name of one of the Seven Cities, the largest of them all; and Acus, without aspiration, is a province by itself.

Crossing to the Salt River, Marcos entered the "desert"<sup>6</sup> beyond which, so he was informed, Cibola lay fifteen days' journey before him.

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<sup>1</sup> Bandelier, (a), 68-105.

<sup>2</sup> *Op. cit.*, 106-178; Hakluyt, 125-144.

<sup>3</sup> Bandelier, (a), 145.

<sup>4</sup> *Siz* in Hakluyt, 136.

<sup>5</sup> *West* in Hakluyt, 136. An error according to Bandelier, (a), 146, footnote.

<sup>6</sup> "despoblado," a wilderness or uninhabited country, according to Bandelier.

Meanwhile Estévan, maintaining his lead, had arrived at the "mighty Province," for while still two or three days' journey from his goal Fray Marcos was informed by a returning Indian, one of those who had accompanied Estévan, that the negro and some of his companions had been killed by the Cibolans. Although this news was confirmed by others who escaped from Cibola, Marcos pushed on.

... I followed my road till we came in sight of Cibola which lies in a plain on the slope of a round height. Its appearance is very good for a settlement,—the handsomest I have ever seen in these parts. The houses are as the Indians told me, all of stone, with their stories and flat roofs. As far as I could see from a height where I placed myself to observe, the settlement is larger than the city of Mexico.<sup>1</sup>

Taking formal possession of Cibola, Totonteac, Acus, and Marata, Fray Marcos turned about and hastened to Mexico with his report.

From this report we learn that at a distance north of Culiacan equivalent to that of Zuñi there were "seven cities" of Cibola, the chief of which was Ahacus. Three other pueblo groups were mentioned: Acus, Totonteac to the west, and Marata southeast of Cibola. Assuming that Cibola is the Zuñi country, Hodge<sup>2</sup> successfully demonstrates that Hawwikku was the first discovered pueblo and that in which Estévan was killed, and not Kyakkima, as Bandelier<sup>3</sup> maintains.

With the intention of investigating Marcos's report, Mendoza sent Melchior Diaz to the north. Leaving in November, 1539, he penetrated one hundred leagues north of Culiacan before he was forced by the cold to turn back. Indians whom he encountered gave him a more detailed and less extravagant description of Cibola than that of Marcos. He was told that

there are seven places, being a short day's march from one to another, all of which are together called Cibola.... Of the seven settlements, they describe three of them as very large; four not so big.... Totonteac is declared to be seven short days from the province of Cibola.... They say that there are twelve villages.... They also tell me that there is a village which is one day from Cibola, and that the two are at war.<sup>4</sup>

Immediately upon the return of Diaz, Francisco Vazquez Coronado accompanied among others by Fray Marcos and Pedro de Castañeda, chronicler of the expedition, left Culiacan on April 22, 1540. Following much the same route as that of Fray Marcos's earlier journey, they reached Cibola and entered the first pueblo on July 7, 1540. The indications in

<sup>1</sup> Bandelier, (a), 161; Hakluyt, 142.

<sup>2</sup> Hodge, (a).

<sup>3</sup> Bandelier, (a), 163-166.

<sup>4</sup> Letter from Mendoza to the King, April 17, 1540, in Winship, 547-551. Winship suggests that this village is the "Marata" of Marcos.

Castañeda's account<sup>1</sup> that Cibola is Zuñi are numerous. Chief among these are the situations of the other "provinces" relative to Cibola which agree closely with those of the known inhabited pueblos — Rio Grande, Hopi, and Acoma — to Zuñi. Acus is identifiable with Acoma, and Toton-teac, or Tusayan of Castañeda's account, with the Hopi pueblos. Marata alone remains unidentified.

Describing Cibola, we are told that, "this country is a valley between rocky mountains."<sup>2</sup> It comprised seven villages, the largest of which was called Maçaque,<sup>3</sup> and together with Tusayan had as many as three or four thousand men.<sup>4</sup> Bandelier has satisfactorily shown that the first village entered by the Spaniards was Hawwikku.<sup>5</sup> Jaramillo's statement differs as to the number of villages: —

In this province of Cibola there are five little villages. . . . These villages are about a league or more apart from each other, within a circuit of perhaps 6 leagues. . . . From this village of Cibola [Hawwikku]. . . we went to another of the same province, which was about a short day's journey off, on the way to Tiheux [Rio Grande].<sup>6</sup>

But according to the *Relación Postrera de Sívola*<sup>7</sup> there were,

seven villages in this province of Cibola within a space of 5 leagues; the largest may have about 200 houses and two others about 200, and the others somewhere between 60 or 50 and 30 houses.

Of these Hawwikku had two hundred houses. Their size is given as from one hundred fifty to two hundred and three hundred houses in the *Relación del Suceso*.<sup>8</sup>

The next documentary evidence relating to the occupation of the Zuñi pueblos is contained in the reports on Chamuscado's expedition of 1581.<sup>9</sup> Moving up the Rio Grande to Bernalillo, he penetrated to the west to the Zuñi Valley. At Cami<sup>10</sup> he found six pueblos of thirty, forty, and even one hundred houses. Two years later Espejo found a province called Zuñi (or in a variant report, Amf), "and by another name Cibola," comprising

<sup>1</sup> Winship. The question of identity of Cibola has been discussed for half a century: among the contributors have been Gallatin, Squier, Whipple, Turner, Kern, Emory, Abert, Morgan, Simpson, Dellenbaugh, Bandelier, Hodge, and Winship.

<sup>2</sup> Winship, 518.

<sup>3</sup> Op. cit., 517, 524.

<sup>4</sup> Op. cit., 519. Compare Hodge, (b), 351, footnote.

<sup>5</sup> Bandelier, (c), 29.

<sup>6</sup> Winship, 586 et seq.

<sup>7</sup> Op. cit., 569.

<sup>8</sup> Winship, 573. Compare the statements of Mota-Padilla and Gomara in Bandelier, (c), 38.

<sup>9</sup> Bandelier, (c), 62.

<sup>10</sup> Bolton, 148. Cami or Sumi is identified with Zuñi in *Testimonio de la entrada que hizo Anton de Espejo*, Bandelier, (c), 63.

six pueblos, one of which was Aquico. Luxán gives the names of the Zuñi pueblos visited by the party as Malaque, Cuaquema, Agrisco, Oloná, Cuaquina, and Cana.<sup>1</sup> Espejo, whose estimates are usually exaggerated, put their population at more than twenty thousand.<sup>2</sup>

The testimony of the several reports of the Oñate expeditions is important for our survey and must be given in full. Marching westward from his settlement on the Rio Grande in 1598, Oñate

rested one day [at Acoma], and on the next we set out for the province of Zuñi, going to the head of the river which is called De la Mala Nueva, next day four leagues, camping for the night in a forest, without water; next day to the Agua de la Peña, four leagues. . . . Next day four leagues to a spring which flows to the province of Cuni. We saw three ruined pueblos. The following day, which was the feast of All Saints, three leagues to the first pueblo of the people belonging to the province of Zuñi, which consists of six pueblos. . . . Remaining here one day, on Tuesday we went three leagues to visit the last pueblo, which they call Cibola, or by another name, Granada, where Francisco Vazquez Coronado nearly sixty years ago had the encounter with the Indians.<sup>3</sup>

Through Oñate we learn the names of the Zuñi pueblos for the first time. In the act of allegiance,<sup>4</sup> executed at Aguicobi,<sup>5</sup> the six pueblos are called, "Aguicobi, Canabi, Coaqueria,<sup>6</sup> Halonagu, Macaqui, Aquinsa." The report of Oñate's second western expedition of 1604-5 yields some further information.

After having travelled towards the west sixty leagues, they arrived at the province of Cuni, which is in some plains more inhabited by hares and rabbits than by Indians. There are six pueblos; in all of them there are no more than three hundred terraced houses of many stories, like those of New Mexico [the Rio Grande country]. The largest pueblo and head of all is the pueblo of Cibola,<sup>7</sup> which in their language is called Havico. It has one hundred and ten houses."<sup>8</sup>

We are now in a position to sum up these early references to the Zuñi and their pueblos brought together by the labor of Bandelier, Winship, Hodge, and Bolton.

<sup>1</sup> Bolton, 184, footnote.

<sup>2</sup> Bandelier, (c), 64-74; Bolton, 184.

<sup>3</sup> Bolton, 235; cf. Bandelier, (c), 81. We would suggest that Oñate's route was the same in 1604-5 when he passed Inscription Rock: eight leagues (about twenty-one miles) down the main Zuñi Valley from the forested Zuñi Mountains would bring him to the Pescado Springs, which flow to Zuñi.

<sup>4</sup> "Obedience y Vasallaje á su Magestad por los Indios de la Provincia de Aguscobi", Nov. 9, 1598.

<sup>5</sup> According to Bandelier, (c), 84.

<sup>6</sup> The name "Coaqueria" does not appear in the Spanish text given by Bandelier, (c), 84, footnote, but is given by Bancroft, in Twitchell, (a), I, 323, footnote.

<sup>7</sup> There is an incidental reference to "the pueblo of Cibola, which the natives call Cuni," Bolton, 239.

<sup>8</sup> Bolton, 268.



There are first the references of the legendary type to the "seven cities" and "seven caves" to the north of Mexico. Bandelier has demonstrated that these are probably entirely mythical in character,<sup>1</sup> but even if they had a foundation in fact, there is nothing to show that they refer specifically to the Zuñi pueblos.

Second, there is the hearsay evidence of Fray Marcos de Nizza and Melchior Diaz. Marcos was told that to the north there were seven cities called collectively Cibola; that the first was called Cibola and the principal one Ahacus. Marcos saw this first city from a distance and from his description Hodge has plausibly identified its position with that of Hawwikku. Diaz, who received a seemingly faithful description, was told that Cibola comprised seven settlements.

Third, there is the testimony of the explorers of the Zuñi country, some of whom, however, evidently had only a superficial knowledge of Zuñi conditions. The number of villages reported in the documents of the Coronado expedition of 1540 varies: Castañeda and the *Relación Postrera* de Sívola report seven, Jaramillo but five. The most southwesterly village is again called Cibola and another Maçaque. In 1581 Chamuscado reports their number as six. Espejo reports six in 1583 called Malaque, Cuaquema, Agrisco, Oloná, Cuaquina, and Cana. Aquico is again mentioned as one of them. Oñate puts their number at six in 1598, enumerating in his official list, Aguicobi (or Aguscobi), Canabi, Coaqueria, Halonagu, Macaqui, and Aquinsa. Of these the most southwesterly is called Cibola and Havico, and midway between this pueblo and Pescado Springs lies the most north-eastern village. Of all these Oñate's list has probably the greatest evidential value.

This seems a convenient point to inquire into the identity of the pueblos occupied during the sixteenth century.

There does not seem to be any certain evidence that the Zuñi villages numbered seven in 1540 and that one was abandoned before 1581-98.<sup>2</sup> Even the most ambitious attempts to identify the pueblos do not indicate the seventh with any degree of certainty. However, the names of seven pueblos are given by two accounts of the latter period, each of which puts the number at six: Aquicobi (Ahacus, Aquico, Agrisco, Aguscobi, Havico), Canabi (Cana), Coaqueria (Cuaquema), Halonagu (Oloná), Macaqui (Maçaque, Malaque), Aquinsa, and Cuaquina. These have been identified by Bandelier<sup>3</sup> and Hodge<sup>4</sup> as follows: Aquicobi with Hawwikku, Canabi

<sup>1</sup> Bandelier, (a), 3-23.

<sup>2</sup> Cf. Hodge, (c), 1017; Bandelier, (c), 84.

<sup>3</sup> Bandelier, (c), 84; (b), 337-339.

<sup>4</sup> Hodge (a), 149; (c), 1017; in Stevenson, 284.

with Kettcippawa,<sup>1</sup> Coaqueria with Kyakkima,<sup>2</sup> Halonagu with Hallonawa, Macaqui with Mattsakya, and Aquinsa with Pinnawa.<sup>3</sup> Cuaquina remains unidentified. The recognizable orthography of the early records and the indicated positions of the pueblos makes the identifications of some of them fairly simple. Thus the most southwesterly village of Oñate is Hawwikku, and that midway between this point and Pescado Springs is evidently Mattsakya. These attempts at identification have, of course, not been based on archaeological evidence.

It is possible to appeal directly to our archaeological data for confirmation of these suggested identifications. The question to put to ourselves is simply "Is the same type of pottery found on the surface of all of these ruins?" Referring to the data given in Table I for Kettcippawa, Kyakkima, and Mattsakya (Nos. 13, 45, and 48) we find the following percentages:—

	Corrugated	Black	White	Red	Buff
Kettcippawa	0	43	9	16	32
Kyakkima	6	46	17	16	15
Mattsakya	3	56	12	7	22

to which may be added data for

Hawwikku <sup>4</sup>	0.5	49	10	16	24
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These ruins constitute a group representing wares of the same type and proportions. On the other hand both Pinnawa and Hallonawa (Nos. 33 and 39) present striking differences from this group and from each other:—

Pinnawa <sup>5</sup>	11	50	16	19	6
Hallonaw <sup>6</sup>	60	0	15	25	0

<sup>1</sup> Hodge, (a), 148 as T'kanawe = Kyanakwe ("water-place"), the general name for the Ojo Caliente region. Bandelier, (b), 338-339, confuses the names Chyan-a-hue and Ketchip-a-uan referring to the same ruin.

<sup>2</sup> There are references to the "Peñol de Caquima," evidently meaning Towwayallanna at the foot of which rests Kyakkima, Bandelier, (b), 335, footnote.

<sup>3</sup> "A-pinawa (three miles southwest of Zufi and in ruins)," Bandelier, (c), 84; (b), 338, footnote; Hodge, (a), 149, is doubtful of this identification; Cushing, (b), 155, footnote, gives Kwa-ki-na and Pinnawa.

<sup>4</sup> Percentages for corrugated and black based on actual count, the others suggested by another sample from which these two wares had been removed. Both samples collected by Dr. Kroeber.

<sup>5</sup> Average of three upper layers.

<sup>6</sup> Probable percentages suggested by imperfect collections; certainly neither black nor buffware is present at this ruin.

Quite as marked as these differences are those in the character of the wares. The first group is homogeneous; the wares from Pinnawa are identical with those at the bottom of the Mattsakya refuse heap and bear a more remote resemblance to the wares from its surface: while sherds from Hallonawa would never be confused with any of the others. The situation in its simplest terms is just this. We have here three different groups of data, only one of which can refer to the date under consideration if we are to hold to our fundamental assumption that at any time there was only one definite pottery art, not a random display of heterogeneous stylistic preferences. No matter which one of these groups of data we may select, the other two cannot possibly refer to the same point of time. No matter which we may select, the suggested identification of the pueblos enumerated by the early explorers will not be corroborated. We are thus left with two alternatives: either the identifications or the lists of pueblos are incorrect.

On the basis of the types of pottery present we must concur in the identification of Hawwikku, Kettcippawa, Kyakkima, and Mattsakya as pueblos inhabited at the close of the sixteenth century. But on the same grounds, we cannot concede that either Pinnawa or Hallonawa were occupied at that time. Several explanations of the doubtful identifications of these pueblos present themselves.

Dr. Kroeber suggests that the "Aquina" of Oñate's list is the native name "Akinnsa" or "Appkinnsa" (*awa*, rocks + *kinnsa*, black) for Black Rock or Rocks, as it is variously styled. Black Rock, where the agency now stands four miles up the valley from Zuñi, is a long cliff of black igneous rock caused by a geologic faulting at this point. This is particularly suggestive, for when we turn to Oñate's list, where the name "Aquina" occurs, we find that the names of the villages are given *in order up the river* from Hawwikku<sup>1</sup> — an order exactly that of the identified ruins, Hawwikku, Kettcippawa, Kyakkima, Hallonawa (we will return to this later), Mattsakya, and *then* Aquina is added. If Pinnawa is meant by Aquina, then after giving the pueblos consecutively up the valley, the enumerator abruptly broke the order and returned down the valley four miles from the last pueblo mentioned, Mattsakya, to add Pinnawa as an afterthought. If it had been intended to include Pinnawa, then its name would have appeared in the ordered list before Hallonawa and Mattsakya.

We endeavored to follow up this identification of Aquina with Black Rock, but without success. A search of the vicinity revealed a number of hitherto unreported sites but nothing that would correspond to the Aquina of Spanish times. However, the site is a favorable one and the ruins of such

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<sup>1</sup> The list was prepared at Hawwikku according to Bandeller, (c), 84.

a pueblo, probably a small one, may yet be found below the cliffs, on them or in the broad valley above, now nearly obliterated by the reservoir.<sup>1</sup> We would suggest somewhat doubtedly that by Aquinsa a settlement in the vicinity of the Pescado Springs may have been meant. They lie thirteen miles up the valley where another cliff of igneous rock is exposed, which is, however, not nearly so prominent as the agency site. This place might well deserve the name "Black Rocks." But it is extremely doubtful that a sixteenth century site will be found, since Oñate saw no settlement there.<sup>2</sup>

The name "Halonagu" occurring in the lists presents a different problem. It is evidently to be identified with the name "Hallonawa," as other writers have indicated. The difficulty which has arisen in connection with identifying the pueblo of this name seems to be due to a confusion in its application. We would suggest that the name Hallonawa in the sixteenth century records was not applied to the ancient pueblo Hallonawa, but to the pueblo Zuñi itself.<sup>3</sup> The ruins of Hallonawa lie immediately across the Zuñi River from Zuñi pueblo and are now almost completely obliterated by the extensions of the modern village and traders' stores. But the name Hallonawa is a general name for the locality. Zuñi<sup>4</sup> itself is commonly called "Hallonawa" by a Zuñi away from home. The same seems to have been true ever since the present pueblo was founded. There was evidently a settlement of that name when the church and mission of "La Purificacion de la Virgen de Alona" were established about 1629<sup>5</sup> and destroyed in 1680.<sup>6</sup> On their descent from the refuge village on Towwayallanna after the Pueblo Rebellion the Zuñi are commonly believed to have concentrated at the site of their present pueblo, which appears under the name of "La Purisima de Zuñi" when visited by Pedro Rodriguez Cubero in 1699.<sup>7</sup> From this time

<sup>1</sup> Simpson, (a), 117, saw to the north of the present dam "some old but comparatively recent buildings and corral enclosures," built of lava. "The circuit of the pueblo, in plan, is about five hundred by one hundred feet." There are occupied small houses there now, but we noticed no large pueblo. Whipple, I, 66, saw gardens in the vicinity. The site would bear reexamination.

<sup>2</sup> See above, p. 270.

<sup>3</sup> We do not mean that ancient Hallonawa was built on both sides of the river, for we found no certain signs of it under the houses of modern Zuñi. Cf. Hodge, (c), 527, 1017; Bandelier, (b), 337; Mindeleff, 88.

<sup>4</sup> The name Zuñi would appear to have had local application only in recent times, probably since the advent of the Spaniards. Hodge, (c), 1016 suggests that it is a Spanish adaptation of the Keresan *Sünyitsai* or *Sü'nyitsa*.

<sup>5</sup> Hodge, in Stevenson, 284.

<sup>6</sup> Hodge, in Stevenson, 285. The early records relating to the establishment of the church are not available to the present writer, but none of the secondary sources that we have consulted refer to two churches, one in Hallonawa, the other in Zuñi, with the exception of Hodge's doubtful reference to the church "which formerly existed at Halona," in Stevenson, 284. So far as we are aware no church ruins were found in the excavations at Hallonawa, nor are there any superficial signs of such a structure.

<sup>7</sup> Hodge, in Stevenson, 285.

on the documentary notes all evidently refer to the present pueblo Zuñi, yet in 1707 Fray Francisco de Irazábal was missionary at "Alona,"<sup>1</sup> in 1715 Governor Mogollon sent twenty-five men to "Alona" to protect the Zuñi against the Apache,<sup>2</sup> and in 1716 natives were sent from Zuñi, still called Alona, to the Hopi.<sup>3</sup>

The documentary evidence is then that before the Pueblo Rebellion of 1680-92 there was a settlement known as "Hallonawa" where the pueblo now stands on the north bank of the river.<sup>4</sup> The oldest pottery types found beneath modern Zuñi<sup>5</sup> are those found in the upper layers of the ash heaps at Mattsakya, Kyakkima and Kettcippawa and on the surface at Hawwikku, and therefore referable to the sixteenth or seventeenth centuries, or perhaps somewhat earlier. The evidence of the pottery types from Hallonawa indicates that the ruin south of the river antedates the foundation of the present pueblo by a considerable period.

This attempt at the identification of the documentary name "Halonagu" has led us then to fix the foundation of Zuñi pueblo. So far as the excavations in the modern village show, the pre-Rebellion settlement was probably quite small and occupied only the summit of the little knoll now entirely covered by houses.<sup>6</sup>

We have then identified six of the seven pueblo names given in the sixteenth century records. The explorers from Chamuscado on agree that the pueblos numbered only six although the seventh name "Cuaquina," is given by Luxán as that of an occupied village. We have failed to identify such a pueblo.<sup>7</sup>

We cannot proceed with the subject of the sequence of pottery types, until the exact historical provenience of these ruins is established. Thus far we have found that Hawwikku, Kettcippawa, Kyakkima, and Mattsakya, and possibly Zuñi-Hallonawa were occupied in the sixteenth century, but we must inquire as to the date at which they were abandoned.

Hawwikku was occupied in 1629 when the mission of "La Concepcion de Hawikuh" was established. The Zuñi murdered their priest at this village, in 1632 and fled to Towwayallanna, where they remained about three years, the resettlement of their villages beginning in 1635.<sup>8</sup> The

<sup>1</sup> Hodge, in Stevenson, 286.

<sup>2</sup> Twitchell, (b), II, 178.

<sup>3</sup> Hodge, in Stevenson, 286.

<sup>4</sup> The alternative to the identification of Zuñi with "Halonagu" is that somewhere in the vicinity of Zuñi, say within half a mile, a ruin of the sixteenth century with church ruins will be found. This is extremely doubtful.

<sup>5</sup> See above, Table II.

<sup>6</sup> See this volume, p. 189 et seq and p. 228.

<sup>7</sup> "Cuaquina" may be Kwakina, a ruin said to lie on the northern side of the valley some miles west of Zuñi. Unfortunately, we did not visit this ruin.

<sup>8</sup> Hodge, in Stevenson, 284, 285.

mission was destroyed by raiding Apache (or Navajo) and abandoned in 1670 (1672 ?),<sup>1</sup> but the pueblo was still inhabited at the time of the Rebellion in 1680.<sup>2</sup> At that time the Zuñi again abandoned their villages fleeing to Towwayallana: Hawwikku does not appear to have ever been reoccupied.<sup>3</sup>

Ketteippawa contains the ruins of a church, indicating that the pueblo was inhabited after 1629, but its name is not mentioned in 1680 or later. It must have been abandoned between these dates.<sup>4</sup>

Kyakkima and Mattsakya were both inhabited at the time of the Rebellion, 1680; the latter being one of the two "aldeas de visita" of the mission of Alona.<sup>5</sup> Both were evidently abandoned in favor of Zuñi-Hallonawa when the natives descended from their refuge on Towwayallanna in 1692.

No mention is made of Aquinsa after 1598, and if such a village existed at that time it must have been abandoned before 1680 when only Hawwikku, Kyakkima, Mattsakya, and Zuñi-Hallonawa were inhabited.

Mention had been made of the use of the refuge village on Towwayallanna, the mesa that dominates the central part of the Zuñi Valley. On July 19, 1540, Coronado went "4 leagues from this city [Hawwikku] to see a rock where they told him that the Indians of the province had fortified themselves",<sup>6</sup> evidently to Towwayallanna. In 1632 the Zuñi fled to their refuge village, where they remained about three years.<sup>7</sup>

They occupied the mesa top again during the Pueblo Rebellion from 1680 for more than twelve years, for they were found there by Diego de Vargas in 1692. Again in 1703 they reoccupied the mesa temporarily, returning to Zuñi-Hallonawa in 1705.<sup>8</sup>

It would therefore appear that all the pueblos of the sixteenth century, except Zuñi-Hallonawa, were abandoned during the next century. The slight difference in time of abandonment seems to have left no appreciable mark on the wares found superficially at the several ruins. The slight differences we found (p. 272) are evidently not significant.

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<sup>1</sup> Bandelier, (b), 338, footnote; Hodge, (a), 144; (b), 300, footnote; in Stevenson, 285.

<sup>2</sup> Cf. Bandelier, (a), 174.

<sup>3</sup> Hodge, in Stevenson, 285.

<sup>4</sup> After 1636, Bandelier, (b), 338, footnote.

<sup>5</sup> Bandelier, (b), 337, footnote.

<sup>6</sup> Winship, 565; Bandelier, (b), 335. This passage does not necessarily imply that Towwayallanna was used as a refuge prior to 1540: the warlike preparations for Coronado's coming may have been the first of the kind. We found nothing in the samples of the sherds obtained on the mesa to indicate its use in pre-Spanish times.

<sup>7</sup> Hodge, in Stevenson, 284; cf. Bandelier, (b), 335, footnote.

<sup>8</sup> Hodge, in Stevenson, 285; Bandelier, (b), 335.

## HISTORIC AND LATE SITES.

Excavations for a pottery sequence were made in the ash heaps of all the historic pueblos except Hawwikku. The net result of this so far as Kettcippawa and Kyakkima (Nos. 13 and 45) were concerned was to establish the fact that their refuse deposits were very thin; so thin, in fact, as to preclude stratigraphic work. No differences were found between the wares from the top and the bottom of these shallow deposits. The significant fact is that these two pueblos were evidently occupied for a relatively short period.

On the other hand deep and extensive ash heaps were found at Mattsakya (No. 48). While probably no larger than the other two pueblos, this site had been occupied for a considerable period. Certain well-defined changes were at once noted in the types present. These were differences in proportions in wares present at top and bottom: an increase in percentage of corrugated ware and a decrease in that of buff were found on working downward, while the percentages of black, white, and red remained stationary. Equally significant stylistic changes occurred in white, red, and buff wares.

Excavation at Pinnawa (No. 33) uncovered the deepest refuse heap found by us in the Zuñi region. Nevertheless the pueblo must have been rather small. Coupled with these characteristics are the marked fluctuation in proportions and types of wares observed in the refuse heap; all indicative of a prolonged occupancy. The differences in proportions are an increase in percentage of redware, but decreases in black and buff. Changes in style are more marked than in the case of Mattsakya. The significant point is that the wares from the upper levels at Pinnawa are indistinguishable from those from the lower levels at Mattsakya. There can be no doubt whatever that the occupation of the latter site, despite slight differences in proportions of the identical wares, was practically continuous with that of the former.

Site 8, near Hawwikku, more closely resembles the historic sites in types present than it does Pinnawa. We have concluded this in Table IV in which these historic and late sites are ranked.

These relations are partly obscured by the manifold classification in this table. To make the point emphatic it will be found convenient to group these types according to some major classification, either by technique or by body color. The latter is preferable for our purpose, inasmuch as half the sherds are black ware and the percentages of the remaining technical types would still be so small that they would be obscured by their variations.

TABLE IV.  
LATE AND HISTORIC SITES.

Site	Corru- gated	Black	Two Color Painted Ware			Three Color Painted Ware			Two Color Glazed Ware			Three Color Glazed and Painted Ware			Size of Sample
			White	Red	Buff	White	Red	Buff	White	Red	Buff	White	Red	Buff	
13	.....	43	5	3	19	.....	.....	10	4	9	1	.....	4	2	259
45	7	44	12	3	14	.....	.....	.....	4	7	.....	.....	9	.....	73
South slope	6	46	7	3	15	.....	.....	.....	5	5	.....	5	8	.....	327
48	3	56	9	3	13	.....	.....	.....	2	1	8	.....	2	1	502
Surface	1	54	18	.....	19	.....	.....	.....	6	1	1	.....	.....	.....	84
1 <sup>1</sup>	2	48	13	1	14	.....	.....	2	7	1	6	.....	1	.....	174
2	4	47	7	1	13	.....	.....	5	6	4	4	.....	.....	.....	206
3	3	53	7	3	14	.....	.....	5	4	2	.....	3	.....	.....	221
4	3	53	7	3	14	.....	.....	5	4	2	.....	3	.....	.....	237
5	5	46	6	1	21	.....	.....	1	5	1	1	9	2	1	285
6	4	53	7	3	10	.....	.....	4	5	2	2	1	1	.....	283
7	8	49	7	.....	15	.....	.....	3	3	2	1	4	.....	.....	187
8	12	49	7	3	8	.....	.....	3	4	2	3	5	1	.....	127
9	7	51	3	.....	6	.....	.....	3	4	3	2	10	2	2	204
8	7	61	10	6	8	.....	.....	.....	1	1	.....	.....	.....	.....	48
Surface	13	21	17	4	17	.....	.....	.....	4	4	.....	2	18	.....	27
S. E.	15	41	7	7	12	.....	.....	.....	.....	11	.....	.....	.....	.....	71
S. W.	8	58	4	6	11	.....	.....	.....	1	6	.....	.....	.....	.....	192
33	10	50	8	6	5	.....	.....	.....	4	7	.....	2	6	.....	338
1	12	48	9	4	5	.....	.....	.....	3	5	.....	4	7	.....	226
2	16	49	7	2	6	.....	.....	.....	8	4	.....	4	.....	.....	245
3	11	40	4	1	7	.....	.....	.....	4	3	.....	10	14	.....	191
4	14	35	8	6	4	.....	.....	.....	3	2	.....	7	10	.....	302
5	13	42	10	5	5	.....	.....	.....	1	3	.....	.....	6	.....	549
6	15	34	11	6	3	.....	.....	.....	2	3	.....	3	7	.....	610
7	12	30	7	7	7	.....	.....	.....	4	2	.....	3	16	.....	344
8	12	30	6	7	10	.....	.....	.....	3	4	.....	3	13	.....	179
9	9	35	6	8	6	.....	.....	.....	6	8	.....	3	16	.....	237
10	19	35	3	3	2	.....	.....	.....	2	6	.....	3	12	.....	121
11	12	21	9	17	1	.....	.....	.....	5	7	.....	3	10	.....	.....
12	12	21	9	17	1	.....	.....	.....	4	7	.....	3	10	.....	.....

<sup>1</sup> This series gives the weighted averages from both sections at Matsakya, except that No. 9 is from the first section only.



These series, have, therefore, been classified by body or ground color in Table V where the point comes out clearly. We may summarize the changes in proportions by the following averages for the three upper and lower levels at Mattsakya and Pinnawa: —

		Corrugated	Black	White	Red	Buff
Mattsakya	Upper	3	49	23	4	22
	Lower	9	50	22	4	16
Pinnawa	Upper	11	50	16	19	6
	Lower	14	33	14	37	2

TABLE V.

LATE AND HISTORIC SITES BY GROUND COLORS.

Site		Corrugated	Black	White	Red	Buff	Size of Sample
13			43	9	16	32	259
45	East slope	7	44	16	19	14	73
	South slope	6	46	17	16	15	327
48	Surface	3	56	12	7	22	502
	1	1	54	24	1	20	84
	2	2	48	24	4	22	174
	3	4	47	22	5	22	206
	4	3	53	20	5	19	221
	5	5	46	21	4	24	237
	6	4	53	20	7	16	285
	7	8	49	22	2	19	283
	8	12	49	19	6	14	187
	9	7	51	24	5	13	127
8	Surface	7	61	15	9	8	204
	S. E.	13	21	23	26	17	48
	S. W.	15	41	14	18	12	27
33	1	8	58	5	18	11	71
	2	10	50	16	19	5	192
	3	12	48	16	19	5	338
	4	16	49	15	14	6	226
	5	11	40	21	21	7	245
	6	14	35	19	28	4	191
	7	13	42	15	25	5	302
	8	15	34	22	26	3	549
	9	12	30	20	31	7	610
	10	12	30	18	30	10	344
	11	9	35	14	36	6	179
	12	19	35	14	30	2	237
	13	12	21	16	50	1	121

## SEQUENCES BY SERIATION.

Thus far the stratigraphic method has been simple and productive of unequivocal results, but beyond this point it fails us. There are no other ruins in the Zuñi region with pottery similar to that of Pinnawa, nor any which by type or proportions would appear to have immediately preceded it in point of time.<sup>1</sup> Nevertheless, it has long been recognized that pottery from the Zuñi region, or more generally, from the Little Colorado, presents a community of characteristics which have served to emphasize the essential unity of the wares.<sup>2</sup> This fact is borne in on us again by the result of the present inquiry, and indeed, one has only to observe the unity of style in the wares from Hecota'utlla and Hallonawa published by Dr. Fewkes — accidentally mixed pottery from the two ruins — or to compare them with wares figured in the present report to reach the same conclusion. Possibly we must except the pottery from "black-and-white" ruins from this general statement, for their specifically Zuñian characters are by no means marked. It is true that the red pottery painted in black which characterizes some of the earlier sites bears little more than a generic resemblance to the wares of the Hecota'utlla-Hallonawa type — those we think of as characteristic of the Zuñi region; yet, that pottery occurs with the latter wares in other ruins and occurs with them again at Pinnawa, Mattsakyá, and other historic ruins.

We have then in the Zuñi region a large number of ruins, all presenting much the same general style of pottery, but with differences of technique and color scheme from ruin to ruin. It seems reasonable to believe that we are dealing with no other phenomenon than the several phases of a single pottery art. The essential need is therefore a principle for the seriation of the data, to be subjected to the method of proof by concurrent variations.

The sequence which we have already reviewed for the historic and late sites suggests such a principle. We have found among the other indicated changes that corrugated ware increases steadily in its proportions from complete absence in modern Zuñi to fourteen percent of the whole in the lowest levels of the Pinnawa ash heap. It seems possible then to utilize the fluctuations in this type for a first grouping, a preliminary seriation of the data from superficial samples. It will be recalled that Dr. Kroeber found the variations in this ware particularly suggestive.<sup>3</sup> It might prove

<sup>1</sup> Naturally such sites must exist elsewhere, but we will return to this point later.

<sup>2</sup> Thus, for example, Dr. Kidder (a, 453) is able to speak of the close affinities of old Zuñi wares with those of the Little Colorado and their less involved relations with those of the Pajarito Plateau. Similarly, Mr. Nelson was able, at the close of his reconnaissance trip of 1916, to define the somewhat restricted area of specifically Zuñian wares for the writer.

<sup>3</sup> This volume, page 14.

fertile then to arrange these data according to their percentages of corrugated ware in sequence from lowest to highest. But we find on referring to the data given in Table I that the samples fall into two groups. In each group corrugated ware is present in proportions varying from complete, or almost complete absence up to more than half of the whole. But any two corresponding samples from the two groups, with identical percentages of corrugated ware, have radically different wares associated with them. In one group the associated wares are black, white, red, and buff occurring in several combinations. In the other group the sole associated type is whiteware of the "black-and-white" variety. For example, of two samples with 48 percent corrugated, Ruin No. 58 has as associated wares 32 percent of redware and 20 percent of whiteware, while Ruin No. 38 yields only 52 percent of whiteware. But there can be no doubt with regard to the affinities of the two groups. The first presents wares with a style of treatment specifically Zuñian in character, bearing a marked resemblance to those in the series from the historic and late series, while we have already expressed our uncertainty as to the affiliations of the wares of the second group. It seems best for the present to consider the first group only.

The first group can be subdivided into two groups, in one of which there is no glazed decoration, the other contains glaze-decorated ware. The percentages of corrugated ware in the first subdivision average higher than those in the second. Further, the criterion of glaze would include the historic and late sites in the second subgroup. This would suggest that we are dealing here with a sequence of painted wares followed by glazed wares: a suggestion worth putting to the test by the method of concurrent variations. It will be convenient to handle each of these subgroups separately.

#### PAINTED WARE SERIES.

The first subgroup contains thirty-five samples from as many ruins. The wares are corrugated, black-on-white, black-on-red, and black and white-on-red. These samples may be arbitrarily ranked according to their percentages of corrugated ware from highest to lowest. The test of such a seriation as an historical series will lie in the observed seriation of the accompanying wares; for, when a group of three or more distinct, but mutually dependent, values are ranked according to some postulated sequence for one, and the other values are found to present serially concurrent variations, it may be concluded that the result is not fortuitous.

Ranking the samples in descending order according to their percentages of corrugated ware, we find general changes in both accompanying wares: an increase in percentage of redware and a decrease in that of whiteware.

The changes are not marked, however, as they are obscured by variations in these wares.

We have found that another seriation based on the percentages of redware yields a clearer result. That this should be so is obvious, because the percentages of redware are small as compared with those of white and corrugated ware, and by ranking redware percentages in a smooth sequence all variations will appear in relatively small magnitudes in the white and corrugated series. The seriation was suggested by the fact that redware is the predominating type in the second subgroup but does not appear at all in the group of "black-and-white" wares. It seemed reasonable to suppose, therefore, that redware had its beginnings in the subgroup with which we are dealing and rose in intensity of use therein.

On this assumption we have ranked the samples according to ascending percentage of redware (Table VI). The results are striking: there is a slight, but certain, decrease in corrugated ware and a marked decrease in whiteware. More particularly, there is rigid segregation of the values for the two wares: few values for corrugated less than 40 percent are found, while equally few values of white lie above the same point. The distribution of the wares may be indicated by curves of the type:—

for corrugated ware:—

$$y' = 49.3 - 0.26 x$$

and for whiteware:—

$$y'' = 36.7 - 0.74 x$$

where  $y'$  and  $y''$  are percentages of corrugated and whiteware respectively for the deviation  $x$  from the midpoint of the redware series, 14 percent. In these equations  $-0.26$  and  $-0.74$  express the direction of the slope of the curves and their obliquity. Testing these curves for closeness of fit, we find that the deviations of the observed values from the theoretical values computed from these formulae are as often positive as negative; that is, that the variations appear to be accidental and that the curves represent the distributions fairly well.

Another point brought out by this seriation is of equal importance. We have included in the redware in this subgroup sherds bearing decorations in white as well as black, i. e., three-color painted ware. We find that this ware appears only in samples containing 14 percent or more of redware, that is, in the second half of the series. We pointed out above that there was every reason to assume that this subgroup of painted wares preceded that of glazed wares. Now we find that the second half of this subgroup coincides in its three-color redware with the characteristic style, three-color decoration, of the glaze subgroup. This must be considered as corroboratory of the historical reality of our assumed sequence.

TABLE VI.

PAINTED WARE SERIES ACCORDING TO ASCENDING PERCENTAGE OF REDWARE.

Site	Painted Wares			Corrugated	Size of Sample
	Red		White		
	Two Color and Three Color	Three Color			
6	1-	.....	55	45	131
23	2	.....	64	34	117
21	2	.....	74	24	167
165	2	.....	56	42	146
24	2	.....	50	48	230
17	3	.....	62	35	109
18	5	.....	45	50	153
58	6	.....	29	65	105
60	7	.....	48	45	118
19	8	.....	36	56	184
40	8	.....	38	54	79
29	9	.....	29	62	56
167	10	.....	48	42	101
76	10	.....	37	53	44
164	10	.....	28	62	161
5	12	.....	43	45	118
26	13	.....	43	44	61
1	13	.....	35	52	59
28	14	1	33	53	110
95	15	3	25	60	116
56	16	.....	28	56	29
74	16	4	23	61	68
36	18	2	17	65	200
27	18	1	38	44	133
80	18	3	39	43	104
62	19	7	27	54	164
37	20	2	30	50	247
38	20	.....	35	45	134
4	22	2	25	53	335
92	22	2	35	43	93
46	24	.....	41	35	298
163	25	.....	39	36	38
96	30	4	20	50	136
86	32	10	20	48	117
90	39	3	23	38	112

## GLAZED WARE SERIES.

The second subgroup is characterized by the presence of decoration in glaze. In this group would be included the familiar wares of Hecota'utlla and Hallonawa figured by Fewkes. The group includes corrugated ware, painted wares of the types black-on-white, black-on-red, brown-on-buff, and black and white-on-red; glazed wares of the types black-on-white and black-on-red; and combination painted and glazed wares of the black and white-on-red type. Glazed and painted wares of all types form a homogeneous group from a stylistic viewpoint. Glazed wares may be conceived as those in which a line of glaze has been substituted in the decoration for a line of paint.

We have surface samples from only eight ruins in this subgroup. These have been ranked in the first section of Table VII in descending order of percentages of corrugated ware according to our assumption. To bring out the distribution of values more clearly these have been grouped by body color in Table VIII. The concomitant variations in the white and redwares are clear: whiteware increases slightly, while redware has a more decided increase. The distributions of these values take the form of curves of the type: —

for whiteware: —

$$y' = 23.9 - 0.24 x$$

and for redware: —

$$y'' = 33.3 - 0.76 x$$

where  $y'$  and  $y''$  are percentages of white and redware respectively for the deviation  $x$  from the midpoint of the corrugated series, 42.9 percent. Here, the values  $-0.24$  and  $-0.76$  express the degree and direction of slope of the two curves. By the usual test for fit, we find that observed values do not differ greatly from the theoretical and are alternately positive and negative. While definite results are obtained from this seriation, it must be remembered that they are based on a small number of cases, only eight. We would therefore consider these results as indicative but not certain.

In Tables VII and VIII we have also given the data for a number of sections made with one exception in ruins east of the Zuñi Reservation. All clearly belong to this subgroup, but their sequential relations are not clear. For convenience, these tabulations have been placed in an order similar to that for the series of surface samples. This was suggested in part by progressive stylistic changes observed in them. It is hopeless to try to find a confirmation of the series for surface samples, because the

samples from the sections are small and the percentages fluctuate widely. All are evidently closely related from the sequential standpoint, yet we cannot combine them since we do not know where to begin to equate values from the several series.

It will be noted that buffware enters into only one sample in the series; at Ruin No. 146 (Gigantes) where 1 percent occurs.

The point might be advanced that we have failed to link up this group with that of the historic and late ruins. That is true. However two points must be kept in mind in considering this objection: first, we have given only the data available for statistical treatment, and second, we are considering here only the arbitrarily selected area defined above as the Zuñi region. We must reserve the discussion of this point until we consider the extra-regional affinities of the wares.





TABLE VII — (Continued).

Site	Corru- gated	Two Color Painted Ware			Three Color Painted Ware			Two Color Glazed Ware			Three Color Glazed and Painted Ware			Size of Sample
		White	Red	Buff	White	Red	Buff	White	Red	Buff	White	Red	Buff	
104	6	24	13			5			3					38
	5	16	20			14						9		86
	4	13	16			12			3			6		32
	3	19	17			10			5					41
	2	14	23			6						2		49
	1	7	20			10						3		66
140a	6		9			18			9					11
	5	9	43											21
	4	3	35			15								34
	3	9	18			3			3					33
	2	23	23			2			6			2		48
	1	16	24			8			2					62
140b	14	10	38			14			5					42
	13	13	26			12								67
	12	14	13			4						1		167
	11	30	24			4			3			3		33
	10	17	32			12			3			3		41
	9	33	17									7		12
	8	35	29			12			6			6		17
	7	29	35						12					17
	6	17	15			15			9			12		34
	5	6	29			18			12			6		17
	4	5	17						7			1		86

3	38	12	20	.....	10	.....	10	.....	10	.....	40
2	49	6	16	.....	6	.....	17	.....	6	.....	51
1	48	6	24	.....	10	.....	12	.....	.....	.....	100
149	6	33	25	.....	9	.....	8	.....	.....	.....	12
5	38	24	21	.....	10	.....	7	.....	.....	.....	29
4	52	16	18	.....	3	.....	3	.....	8	.....	38
3	56	4	13	.....	20	.....	5	.....	2	.....	55
2	45	16	30	.....	4	.....	4	.....	1	.....	81
71	4	51	14	.....	12	.....	.....	.....	.....	.....	43
3	51	20	9	.....	14	.....	2	.....	2	.....	51
2	39	39	9	.....	5	.....	5	.....	3	.....	57
1	43	24	19	.....	8	.....	6	.....	.....	.....	150
Surface	47	22	16	.....	8	.....	1	.....	.....	.....	225
161a	8	50	11	.....	8	.....	6	.....	.....	.....	36
7	55	24	4	.....	17	.....	3	.....	.....	.....	29
6	25	19	17	.....	33	.....	.....	.....	6	.....	36
5	62	5	23	.....	5	.....	5	.....	.....	.....	21
4	43	18	14	.....	11	.....	11	.....	3	.....	28
3	53	14	25	.....	5	.....	3	.....	.....	.....	36
2	46	20	18	.....	13	.....	3	.....	.....	.....	61
161b	4	41	22	.....	13	.....	3	.....	4	.....	74
3	40	20	26	.....	12	.....	2	.....	.....	.....	50
2	48	23	16	.....	10	.....	1	.....	.....	.....	102
97	6	31	23	.....	8	.....	.....	.....	.....	.....	13
5	8	8	50	.....	34	.....	.....	.....	.....	.....	12

TABLE VII (Concluded).

Site	Corru- gated	Two Color Painted Ware			Three Color Painted Ware			Two Color Glazed Ware			Three Color Glazed and Painted Ware			Size of Sample
		White	Red	Buff	White	Red	Buff	White	Red	Buff	White	Red	Buff	
97	4		13			19		3						34
	3	21	13			13						2		39
	2	31	8			20						3		39
146	8	23												
		17	25			12						4		24
	7	17	18			23		3						60
	6	12	22			9			3					67
	5	11	13			15			5			5		75
	4	17	19			16		2	6			4		84
	3	8	26			10		4	5			1		77
139	2	12	17			19			9					103
	1	15	20	1		20			2			1		148
Surface	4	12	32			16			7			3		69
	3	11	41			7			9					44
	2	10	34			23			5			3		96
		11	30			22			8			2		95

TABLE VIII.

GLAZED WARE SERIES BY GROUND COLORS.

Site	Corrugated	White	Red	Buff	Size of Sample
91	59	21	20	.....	96
75	54	21	25	.....	113
84	46	24	30	.....	199
85	46	20	34	.....	239
30	37	23	40	.....	207
82	36	28	36	.....	149
11	35	25	40	.....	128
81	30	29	41	.....	115
121 4	70	10	20	.....	20
3	63	12	25	.....	59
2	52	18	30	.....	27
1	53	14	33	.....	76
104 13	67	17	16	.....	12
12	88	12	.....	.....	8
11	65	8	27	.....	26
10	84	5	11	.....	19
9	61	22	17	.....	36
8	63	16	21	.....	49
7	59	16	25	.....	81
6	55	24	21	.....	38
5	41	16	43	.....	86
4	50	13	37	.....	32
3	49	19	32	.....	41
2	55	14	31	.....	49
1	60	7	33	.....	66
140a 6	64	.....	36	.....	11
5	48	9	43	.....	21
4	47	3	50	.....	34
3	67	9	24	.....	33
2	44	23	33	.....	48
1	50	16	34	.....	62
140b 14	33	10	57	.....	42
13	49	13	38	.....	67
12	68	14	18	.....	167
11	30	36	34	.....	33
10	33	17	50	.....	41
9	33	17	50	.....	12
8	12	35	53	.....	17
7	24	29	47	.....	17
6	26	23	51	.....	34
5	29	6	65	.....	17
4	70	5	25	.....	86

TABLE VIII. — (Continued).

Site	Corrugated	White	Red	Buff	Size of Sample
140b 3	38	12	50	.....	40
2	49	6	45	.....	51
1	48	6	46	.....	100
149 6	33	25	42	.....	12
5	38	24	38	.....	29
4	52	16	32	.....	38
3	56	4	40	.....	55
2	45	16	39	.....	81
71 4	51	14	35	.....	43
3	51	22	27	.....	51
2	39	39	22	.....	57
1	43	24	33	.....	150
Surface	47	23	30	.....	225
161a 8	50	28	22	.....	36
7	55	24	21	.....	29
6	25	19	56	.....	36
5	62	5	33	.....	21
4	43	18	39	.....	28
3	53	17	30	.....	36
2	46	23	31	.....	61
161b 4	41	16	43	.....	74
3	40	20	40	.....	50
2	48	24	28	.....	102
97 6	38	31	31	.....	13
5	5	8	84	.....	12
4	44	24	32	.....	34
3	41	31	28	.....	39
2	46	23	31	.....	39
46 8	42	17	41	.....	24
7	39	20	41	.....	60
6	51	12	37	.....	67
5	51	11	38	.....	75
4	36	19	45	.....	84
3	46	12	42	.....	77
2	43	12	45	.....	103
1	41	15	43	1	148
139 4	30	12	58	.....	69
3	32	11	57	.....	44
2	25	10	65	.....	96
1	27	11	62	.....	95

## BLACK-ON-WHITE SERIES.

The group of samples comprising corrugated and painted black-on-white wares remains to be considered. It is not certain that these form an integral part of the series we have been considering. Still it has been shown that redware comes into being in a group consisting in addition only of corrugated and painted black-on-white ware. It would therefore be reasonable to expect that some of the samples in the present group belong immediately before the painted redware series. Such samples would be those with the highest percentages of corrugated ware.

We have some stratigraphic evidence bearing on relations in this group, however. Sherds from Sites Nos. 3, 7, 14, 15, and 50 indicate an overwhelming proportion of black-on-white ware of a peculiar style associated with plain white vessels having globular bodies surmounted by straight or constricted zones sometimes bearing a few broad coils. Sherds bearing such corrugations constitute only 1 to 4 percent, but inasmuch as the bodies of the vessels were not corrugated, these values do not represent the correct proportions of the wares. We would suggest that about one-eighth of all the vessels bore coils. The characteristic feature of these ruins, as described in a preceding section, was the almost complete absence of masonry. At Shoptluwayayala (No. 40), on the edge of Zuñi village, we found remains of the regular pueblo type superposed on a "slab-house" with which the above types of pottery were associated. The relation of the two structures is indicated by the pottery data:—

	Corrugated	White	Red
Surface	54	38	8
Trench (all levels)	29	63	8

The finds in the trench are just what might be expected if the surface types were mixed at random with 2 percent corrugated and 98 percent whiteware of "slab-house" type.

The sequential relations of this type appear to be identical with stratifications found by Dr. Kidder along the San Juan River<sup>1</sup> and by Mr. Morris in the valley of La Plata River, San Juan County, New Mexico.<sup>2</sup> There can be little doubt that these are the oldest remains in the Zuñi region.

<sup>1</sup> Personal communication from Dr. Kidder, July 4, 1916. Dr. Kidder, who saw these wares before the "slab-house" structure was discovered, pronounced them closely affiliated with the sherds found by himself.

<sup>2</sup> Morris.

This suggested ranking the samples in this group in ascending order by percentages of corrugated ware (Table IX). We have no proof for this series, except the foregoing indications, but offer it as a tentative suggestion.

It will be noted that following the wares of "slab-house" type, the value for corrugated ware jumps to 24 percent. If as we are inclined to believe, "slab-house" corrugated really constitutes 12 percent or more, the gap is not so great.

TABLE IX.

## BLACK-ON-WHITE SERIES.

Site	Corrugated	White	Size of Sample
15	1-	99	67
14 a	2	98	208
b	2-	98	108
c	1-	99	188
7	2	98	87
50	2-	98	107
3	4	96	83
51	24	76	87
57	30	70	62
49	33	67	32
72	40	60	35
70	42	58	12
166	48	52	39
16	50	50	10
73	50	50	6
2	62	38	28
83	67	33	29
35	75	25	48

## SUMMARY.

The sequence of pottery types suggested in the preceding pages may now be summarized. It is possible that the earliest remains in the region are slab-house sites with 96 to 98 percent black-on-white painted ware with 2 to 4 percent corrugated. (These figures may be 88 and 12 percent respectively, instead). Black-on-white painted ware then decreases from 76 percent to about 30 percent, while corrugated increases correspondingly.



Redware now makes its appearance, increasing to 43 percent. From zero to 14 percent it consists of black painted decoration; at the latter point black and white painted decoration appears as well. At about 20 to 25 percent glaze decoration appears; the additional decorations on redware introduced being black glaze, black glaze and white paint, black glaze and white paint on a red ground with black glaze on a white ground. Meanwhile corrugated decreases from 50 to 55 per cent to 30 percent, and whiteware decreases from 45 or 50 percent to about 20 percent, then rises somewhat to 27 percent. With the rise in whiteware, black glaze appears as a decorative technique as well as black paint. Probably buffware now begins to appear. At this point a hiatus in the data interrupts the sequence.

When the sequence is resumed, corrugated decreases from 14 percent to 0 or 6 percent on the surface of historic ruins and blackware makes its ap-

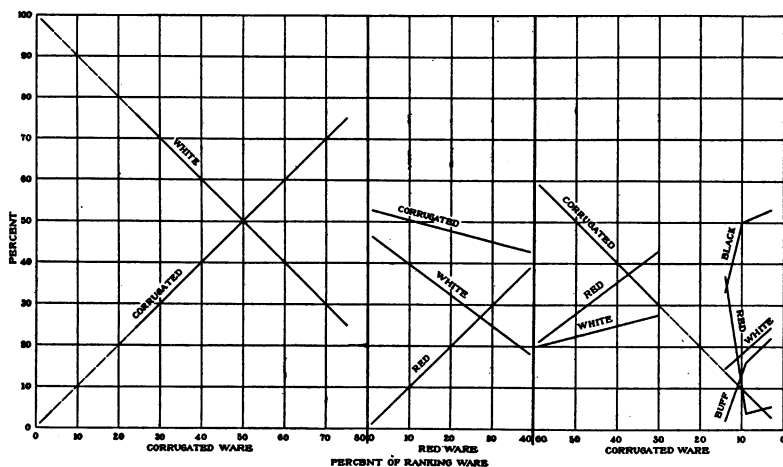


Fig. 6. Sequence of Wares, According to Ground Colors.

pearance at 33 percent increasing to about 50 percent. Redware reappears as the dominant type of painted ware, with identical decorative techniques, at 37 percent, but decreases rapidly to 4 percent, after which it remains stationary. Whiteware, including decorations in black paint, black glaze, and in addition black paint or glaze with red paint, reappears at 14 percent and increases to 23 percent. Buffware increases at the same time from 2 percent to 22 percent; decorations only in brown paint at first, then in brown and red paint, black glaze, and black glaze with red paint.

This sequence of types is shown graphically in Fig. 6. The division into groups has been retained, for, since we have no chronological unit the

percentages of the ware used in ranking each group must be used as the base for plotting. This method gives a rectilinear distribution for the ranking ware. The overlapping which appears between the several groups must be recognized as an expression of accidental variations.

Before discussing the hiatus in the suggested sequence it will be advantageous to point out the sequence of techniques corresponding to the ranking developed above. The data are given in Table X, in which the first group — the black-on-white series — is given in contracted form. The technical types are those recognized by Nelson for Tano pottery, except that biscuitware,<sup>1</sup> and Type IV, an historic two-color glazed ware do not seem to occur. On the other hand, a new type, a coarse plain blackware, which does not occur in the Tano ruins, is found here. We have found it necessary to separate two-color painted ware from three-color painted ware in Type I.

These results show no marked changes from the results obtained by ranking according to body color, yet are significant precisely on that account. Possibly corrugated ware rises from 1 percent to something less than 75 percent and then drops back to 30 percent. Correspondingly two-color painted ware decreases from 99 percent to about 50 percent and thence to about 35 percent. Three-color painted ware appears at the mid-point of the painted redware series, but never amounts to more than a few percent. Two-color glazed ware and three-color glazed and painted ware now appear together, but each as only 10 or 15 percent of the whole. Resuming the sequence after the hiatus, we find corrugated decreasing from 14 percent to 3 percent, blackware appearing at 33 percent and increasing to 50 percent, three-color glazed and painted ware decreasing slightly from about 16 to 6 percent, while the other wares remain stationary: two and three color painted wares at about 30 percent and two-color glazed ware at about 10 percent.

It seems legitimate to draw two conclusions from the foregoing: first, among the decorated wares the variations in decorative technique seem to have played a minor rôle in comparison with the variations in color combinations; and second, it is probable that glazed decoration was introduced rather suddenly into two-color and three-color decorative schemes in this region. These results are consistent with our previous findings.

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<sup>1</sup> Kidder, (a), 454, says there is no biscuitware in the pottery from Hallonawa and Heshota'utilla at the Peabody Museum.

TABLE X.

SEQUENCE OF TECHNIQUES.

Corrugated Ware	Type I			Type II	Type III	Black Ware
	Two and Three Color Painted Ware			Two Color Glazed Ware	Three Color Glazed and Painted Ware	
	Two Color	Three Color	Two and Three Color			
1	99		99			
4	96		96			
24	76		76			
75	25		25			
45	55		55			
39	61		61			
35	65		65			
50	50		50			
65	35		35			
45	55		55			
56	44		44			
62	38		38			
55	45		45			
45	55		55			
48	52		52			
53	46	1	47			
60	37	3	40			
59	37	4	41			
53	45	2	47			
54	39	7	46			
48	50	2	52			
51	47	2	49			
35	65		65			
36	64		64			
50	46	4	50			
48	42	10	52			
38	59	3	62			
59	35	5	40	1		
54	33	9	42	2	2	
46	25		25	18	11	
46	28	3	31	10	13	
37	35	9	44	8	11	
36	57	6	63	1		
35	20		20	33	12	
30	51	16	67		3	

TABLE X.—(Continued).

Corru- gated Ware	Type I			Type II	Type III	Black Ware
	Two and Three Color Painted Ware			Two Color Glazed Ware	Three Color Glazed and Painted Ware	
	Two Color	Three Color	Two and Three Color			
12	27	16	43	11	13	21
19	8	12	20	11	15	35
9	20	6	26	11	19	35
12	23	12	35	7	16	30
12	21	12	33	6	19	30
15	20	16	36	5	10	34
13	20	15	35	4	6	42
14	18	13	31	3	17	35
11	12	7	19	6	24	40
16	15	8	23	8	4	49
12	18	3	21	8	11	48
10	19	2	21	11	8	50
8	21	6	27	7		58
15	26	7	33	11		41
13	38		38	8	20	21
7	24	4	28	2	2	61
7	9	5	14	14	14	51
12	18	6	24	9	6	49
8	22	9	31	8	4	49
4	20	12	32	9	2	53
5	28	2	30	7	12	46
3	24	11	35	6	3	53
4	21	7	28	14	7	47
2	28	3	31	14	5	48
1	37		37	8		54
3	26	3	29	12	7	49

For comparison, Nelson's table for San Cristobal pueblo <sup>2</sup> is given below, the values having been reduced to percentages. The wares appear in the Tano region in the order two and three color painted wares (Type I), two color glazed wares (Type II), three color glazed and painted wares (Type III), historic two color glazed wares (Type IV), and modern painted wares (Type V), accompanied at all times by corrugated and biscuitware. The order for decorated wares (other than plastic decoration) in the Zuñi region is evidently much the same: two and three color painted wares (Type I),

<sup>1</sup> Average of surface samples of Sites No. 13, 45, and 48.

<sup>2</sup> Nelson, 166. The fluctuation in corrugated ware would appear to be as marked as that in any other type.

Thickness of Section	Corrugated Ware	Biscuit-ware	Type I	Type II	Type III
1st ft.	37	7	1	52	3
2nd "	31	4	1	62	2
3rd "	15	1	6	76	2
4th "	21	3	5	71	
5th "	17	4	1	78	
6th "	19	5	2	74	1-
7th "	23	4	18	55	
8th "	25	1	52	22	
9th "	46	1-	53	1	
10th "	55	1-	45		

two color glazed wares (Type II), three color glazed and painted wares (Type III), and modern painted wares (Type V). Biscuitware and an historic two color glazed ware (Type IV) do not appear, but a new type, blackware, appears after Type III. The principal difference would seem to be, so far as our data show, in the tendency to use painted rather than glazed wares in the Zuñi region. Glazed wares (Types II and III) appear at about the same period in this region and never attain prominence. It may ultimately be necessary to qualify the last statement, if, as we suspect, three color glazed and painted ware played a more important rôle in that section of the sequence represented by the hiatus in our data.

The sequence given by Morris for the upper San Juan Valley<sup>1</sup> parallels both Tano and Zuñi sequences in general outlines. It approximates the Tano more closely than the Zuñi, but the finer discriminations among the earlier wares show a close kinship to the Zuñi wares of the same period.

It is now possible to suggest definitely what the characteristics of the missing data should be. The sequence here should show a decrease in corrugated from 30 to 14 percent, and another in whiteware from 27 to 14 percent. Redware would be the dominant decorated ware, decreasing only slightly from 43 to 37 percent. Buffware would probably not amount to more than a few percent. Blackware would appear in this group and attain a proportion of 33 percent. The changes in technique which may be expected would not be great: a decrease in Type I from 35 to 20 percent, with Types II and III remaining at about 10 or 15 percent, but possibly with a rise and fall in Type III.

<sup>1</sup> Morris, 27.

## MOVEMENTS OF POPULATION.

With an outline of the sequence of pottery types at hand, it is now possible to speak of the time-relations between the ruins.

In spite of the limitations on the occupation of the Zuñi region imposed by its natural resources, certain general shifts of population have taken place. While the number of localities with optimum conditions for producing food and water is strictly limited, the wide scattering of former habitations throughout the region is strong evidence for the latent possibilities of the whole. Nevertheless, the advantages of these localities are so marked that they have been the scene of repeated settlements. But the striking feature of these settlements is their transitory character. Ash heaps, as we have repeatedly stated, are a minus quantity; the fact which determined the course of this inquiry. It is certainly startling to come on ruin after ruin with long rows of rooms stretching away in straight lines or graceful curves, but with hardly a sign of ashes and broken pottery — in short, every jot of evidence pointing to a fitting occupation. The natural result has been to produce a constant movement about in the valley, a sort of milling around. It is somewhat curious to find nevertheless that the center of population has shifted from period to period.

The fact is brought out by grouping the ruins furnishing the data for the foregoing sequence. For convenience of comparison four periods are chosen corresponding to the four general groups of pottery types. The location of the ruins is shown in Figs. 7 to 10. In addition, Mr. Nelson has placed at my disposal sherds and data from ruins as far east as Acoma, south to the Rito Quemado and west to St. Johns, Arizona, some of which undoubtedly belong with the ruins in the central region.

The oldest group is shown in Fig. 7. Ruins with pottery of the "slab-house" type have been differentiated from those with black-on-white painted ware and corrugated of the ordinary type. The ruins are not localized, but are scattered through the Zuñi Valley and occur occasionally outside. Outside of the area shown, several were found along the eastern border of the great lava sheet in the Cebolla-Cebollita valleys, several west of Atarque as far as Ojo Bonito, and again at Springerville and St. Johns on the Little Colorado. Some of these, as for example, at St. Johns, are probably slab-house structures, although the reconnaissance data do not make this certain. At Sites 14 and 7 in the Ojo Caliente district there are evidences of *slab-house villages*.

In the second group ruins with less than 14 percent redware are differ-

entiated from those with 14 percent or more (Fig. 8). It will be remembered that this point marked the beginning of three-color painted ware. It also proves a significant point of division with regard to distribution. The group as a whole is scattered through the valley from the Ojo Caliente district to Inscription Rock and a number of sites appear on the plateau. But the distribution of the ruins, most of which are small, shows a different focus of occupation for the two classes. Ruins with less than 14 percent

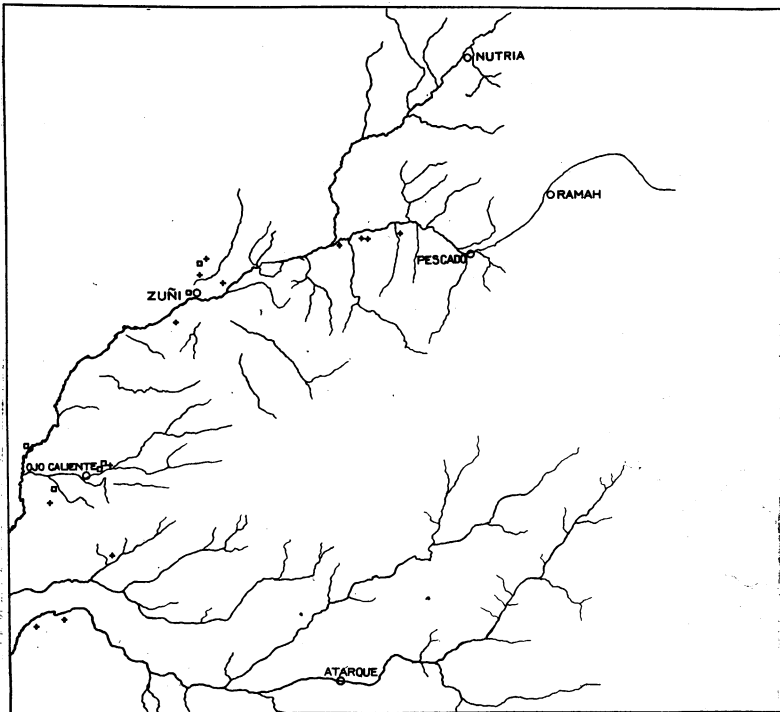


Fig. 7. Location of Ruins: Black-on-White Series. Squares, slab-house type: crosses, black-on-white type.

redware center in the Ojo Caliente district while relatively few are located up the valley. Outside of the area shown, they lie principally along the eastern side of the great lava sheet south to the Point of Malpais and several occur near Acoma. Three near Rito Quemado suggest Tularosa influence. On the other hand, ruins with more than 14 percent redware center from the Pescado district (where there are undoubtedly more than shown) through Ramah to Inscription Rock. A number are in the Zuñi district and fewer near Ojo Caliente. Similar ruins also occur in the Cebolla-Cebollita valleys north of the Point of Malpais and one further east in the

Acoma Valley. Four lie within ten miles west of Atarque, but all except the easternmost suggest affiliations with Tularosa wares rather than with Zuñi. The same is true for three ruins just south of Springerville. A shift in the center of population undoubtedly occurred during this period. The inauguration of pueblo architecture which accompanied it will be referred to later.

Ruins where glazed pottery was in use center about Pescado, Ramah, and

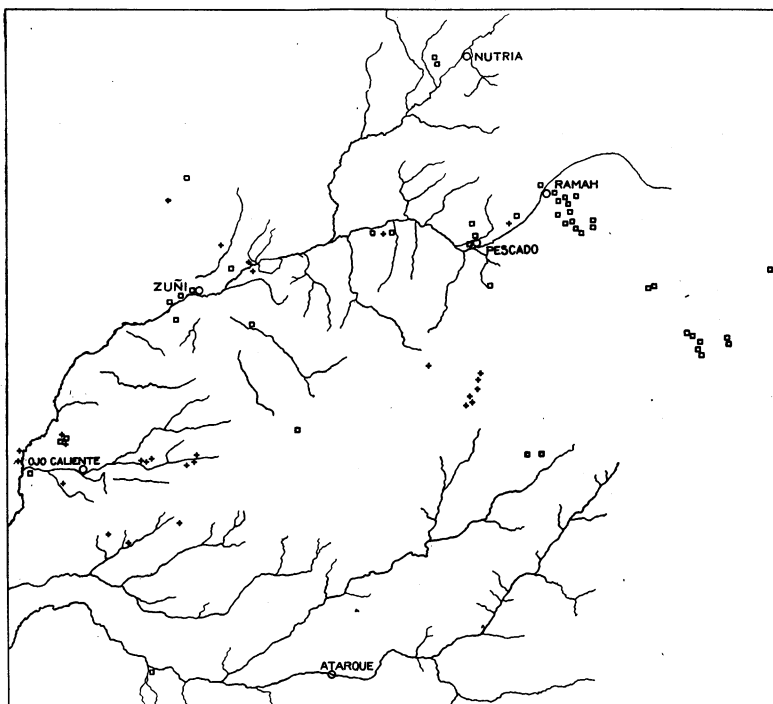


Fig. 8. Location of Ruins: Painted Ware Series. Crosses, two-color painted ware squares, three-color painted ware.

in the Inscription Rock section (Fig. 9). Only three lie further down the valley. More are situated on the Plateau to the south, but some of these (at Ojo Hallado, Ojo Pueblo, and at the Delfin Chavez ranch) strongly suggest Tularosa wares. There are four or more east of Springerville, but again Tularosa affiliations are suggested by one. Finally, several ruins to the east near Cebollita are of the same type.<sup>1</sup>

<sup>1</sup> Hodge in the *Annual Report of the Smithsonian Institution* for 1914 (46), refers one of these ruins tentatively to the Tangi, or Calabash, clan of Acoma. This does not seem likely since pottery from a ruin probably identical with this one bears a marked similarity to that of the Zuñi Region.



The last group (Fig. 10) is that of the late and historic ruins. They center down the valley again, near Zuni and Ojo Caliente, where the occupants of the region were discovered by the Spaniards of the sixteenth century. We have distinguished the post-Conquest refuge villages on the map, and it will be seen that they too cluster in the same regions. Not a single ruin of this period lies in all the country between Zuni and Acoma, for all of which we have information. Thus, another change in the focus of occupation is indicated, a change in the opposite direction. It will be

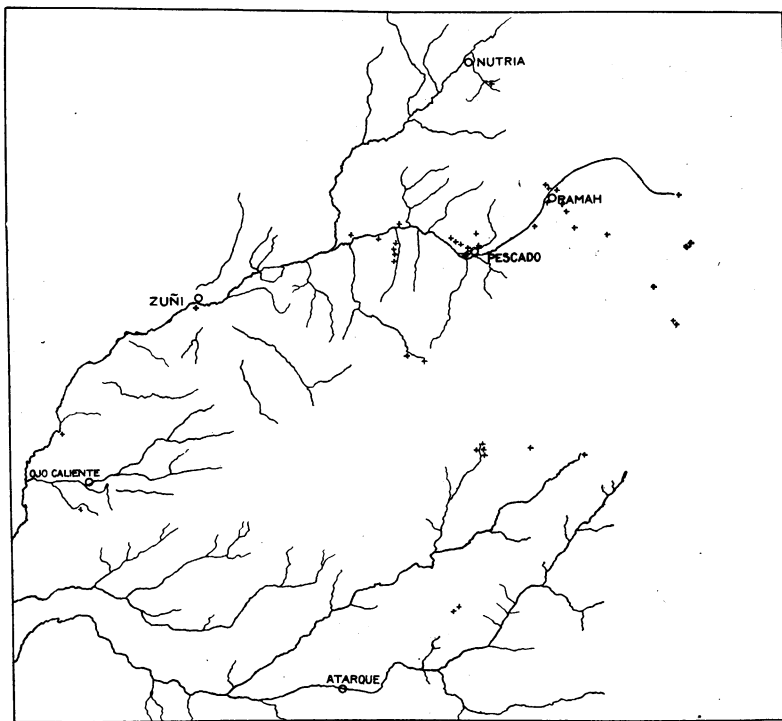


Fig. 9. Location of Ruins: Glazed Ware Series.

remembered, however, that despite the similarity of the wares there is a hiatus in our data between the group of "glaze" sites and these late and historic ruins. No ruins with wares which would fill the hiatus in the pottery sequence lie within the bounds of this region. This gap accompanied by a shift in the center of population would inject a very strong element of doubt into the postulated relations between the late sites and "glaze" sites were not the specific points of similarity between the wares of the two groups so remarkably close.

We have at hand some suggestive data on the point. No ruins of this period lie east of Zúñi, but along the Little Colorado to the west are a number affiliated with these. Two small ruins on the west bank of the Little Colorado about three hundred and five hundred yards above the bridge at St. Johns show sherds identical with those of Pinnawa (No. 33). Three others are also of the Pinnawa type but probably slightly earlier: the first, a small pueblo ruin on a rock by the Little Colorado about four or

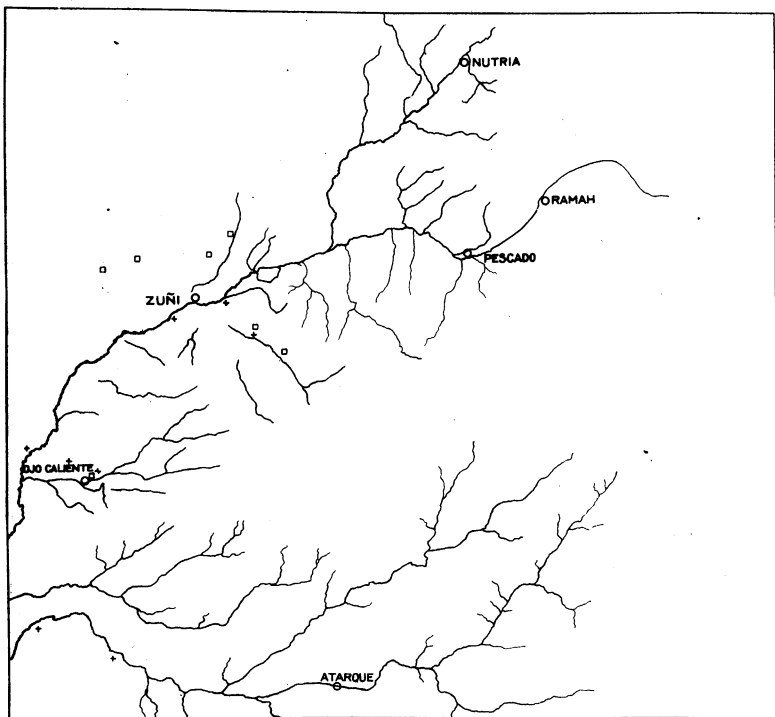


Fig. 10. Location of Ruins: Late and Historic Sites. Crosses, late and Conquest pueblos; squares, post-Conquest refuge villages.

five miles below Springerville; the second, a pueblo ruin at Ojo Bonito, ten or twelve miles due south of Ojo Caliente, and the third, a rectangular pueblo ruin about five miles southeast of Ojo Bonito on the road to Atarque.

These specific data based on sherd collections point to the west and so do all published material available. The descriptions by Fewkes and Hough of ruins and pottery in the Little Colorado Valley are fairly full and admirably illustrated. There can be no doubt that some of these ruins bear a close relation to those we have been discussing and in particular we would point out the following ruins where the essential similarity of the pottery

has been emphasized by both investigators. Beginning on the east, these are the "Stone Axe" ruins in the Petrified Forest, along the Mogollon Rim possibly those at Pinedale and Shumway on Showlow Creek should be included, "Four Mile" ruin near Taylor on Silver Creek, and along the Little Colorado, the Chevlon ruin fifteen miles east of Winslow and the Homolobi group of ruins near that town. Possibly we should include the Biddahoochee ruins north of Holbrook, but the decorative style of wares there stands somewhat apart from the others. In these ruins redware predominates, redware with decoration in black or black and white, painted or glazed or both, which is a unit with the wares from Hallonawa and Hecota'utlla figured by Fewkes in the Putnam Anniversary Volume. The essential difference between them is in the presence of a yellowware, not the "fine yellow ware" of the Hopi,<sup>1</sup> but the buffware of the Zuni historic pueblos. We cannot but doubt the dictum which populates these pueblos with Hopi clans on the say-so of native informants in the face of the demonstrably close similarities between these wares and their Zuni counterparts. It remains to be demonstrated that the Hopi wares have evolved from these. The question is still open and will never be settled by the tacit denial of historical relief and by arrogating all variations and combinations of pottery styles to the principle of clan mingling.

It is suggested then that the ruins constituting the hiatus in our sequence lie down the valley of the Little Colorado, of which the Zuni River is a tributary. If it should ultimately prove that there was actually a movement of population eastward through this valley to the location of historic times, the fact might also demonstrate that there was no hiatus in the sequence but that we have been dealing here with the segments of two sequences which may, or may not, be of independent development. However, it must be noted that these ruins of the Little Colorado mark the western limit of the area of glaze decoration, and further, that a sequence of these ruins would be expected to begin about where the ruins of the eastern Zuni Valley leave off. An actual continuity of occupation of the Little Colorado Valley is therefore not beyond the range of probability, but the problem merges here into that of the glaze area as a whole.

One final qualification must be placed on the sequence as a whole. It may be ultimately proven, as suggested by the marked similarities between the data for this region, the Tano country and the Upper San Juan, that there has been a parallel development over a large section of the Southwest. In that event, the several segments of our sequence may be found to be disparate parts of the general scheme and only artificially placed together here; but this point cannot be answered on internal evidence alone.

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<sup>1</sup> Fewkes, (b), 59; see also 61, 64, 69, and 73 for other differences.

## POTTERY TYPES.

The sequence of pottery types has been developed in the preceding sections. Some further data on the wares themselves are available for a consideration of the pottery art simply as a cultural trait. As no extensive excavations were made, there are few whole vessels in our collection. This sets a definite limit on the description of the wares, but the deficiency of material is made up by a large sherd collection.

The descriptions which follow mark significant points in the sequence outlined above. The practical limitations imposed by the material made it necessary to select wares in ruins offering, first, large random collections of sherds the analysis of which placed the ruin definitely in the series, and second, collections of large sherds which would adequately represent the wares involved. Only *typical* designs are shown, the result of laborious grouping of the sherds, and their respective prevalence is indicated. The proportion of bowls to jars is also given, but it must be kept in mind that dippers are not easily separated from bowls on the basis of sherds. In view of the fragmentary evidence offered by the collection it does not seem advisable to attempt a description of the structural technique—paste composition, etc.—with the exception of the brief note on the “slab-house” wares of unusual interest. The order of description follows the sequence above.<sup>1</sup>

BLACK-ON-WHITE SERIES: 1-4 PERCENT CORRUGATED (SLAB-HOUSE TYPE). SITES 14 AND 40.

*Corrugated.* Medium-sized jars with plain globular body from which springs a straight neck bearing unusually broad coils<sup>2</sup> (Fig. 11a). The coils are frequently obliterated in part (Fig. 11c) or entirely erased and then reindicated by incised lines (Fig. 11b). Plain vessels without coils are not common (Fig. 11d and e) but they differ from the above only in that respect. The surface is rough.

*Black-on-White.* Bowls are somewhat more common than jars. Vessels

<sup>1</sup> In the illustrations the ground colors of the sherds are not indicated: the painted and glazed decorations are indicated as follows: black by solid black areas; white by dotted areas; brown by hatched areas; and red by areas of broken hachures.

<sup>2</sup> A similar vessel from St. George, Utah, is figured by Holmes (Fig. 242).

are small and medium-sized with rather thin walls: rims are simple and straight. A thin-walled type which prevails contains a very large proportion of tempering material — chiefly sand, sometimes crushed stone. The

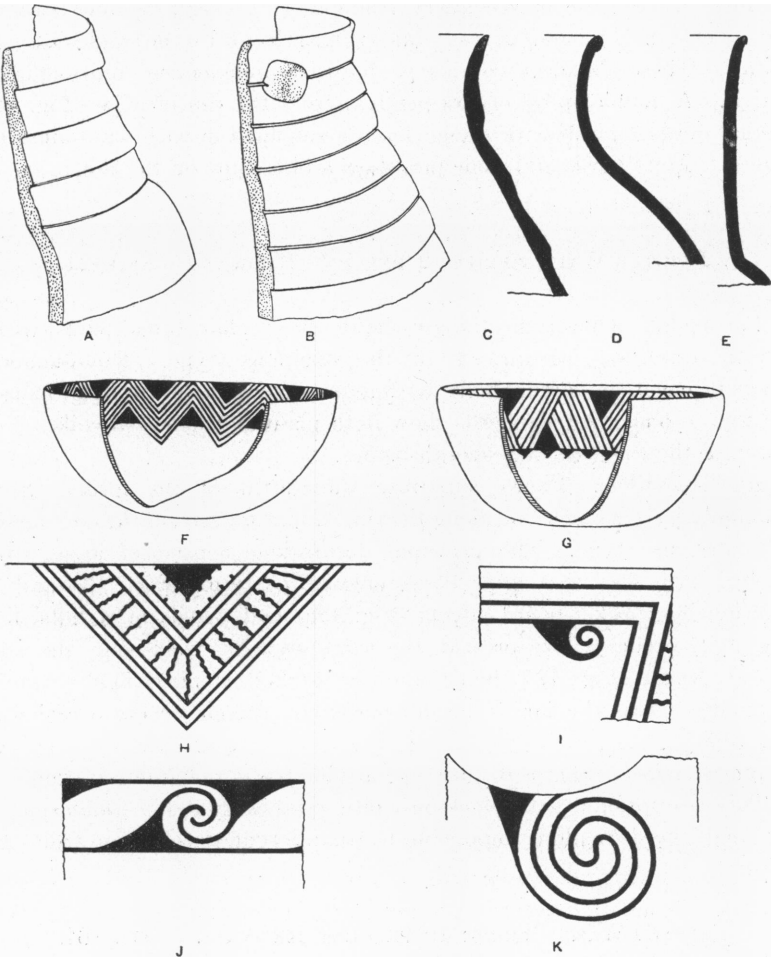


Fig. 11. Pottery of Black-on-White Series: 1-4% Corrugated. a-e, g-k, Site 14; f, Site 40; f-j, bowls; a-e, and k, jars. a, c-e, h-k,  $\times \frac{1}{2}$ ; b,  $\times \frac{3}{8}$ ; f, 8 in. diameter; g, 5½ in. diameter.

thicker-walled type has a fairly homogeneous smooth paste. Both types have a relatively rough surface finish, but in the thin-walled type the thin bluish white slip fails to cover the coarse tempering material. Bowls are

decorated only on the inside. The decorative units on bowls, and perhaps on jars, are pendent from the rim, whether they occur as independent units (Fig. 11h) or in bands or panels (Figs. 11f and g). The commonest unit is the pendent triangle (Fig. 11f). This general type of decoration is modified by the use of secondary triangles (Fig. 11g), by line-bordering dots (Fig. 11h), by bands of wavy lines (Fig. 11h), or by the single or hooked spirals. These also occur on a few sherds as independent units (Fig. 11i and j). A double spiral occurs pendent from the rim of a jar (Fig. 11k). Similar double spirals with the enclosed areas filled in with wavy lines also appear. Most bowls and some jars show a black line on the rim.

PAINTED WARE SERIES: 2 PERCENT REDWARE. SITE 24.

*Corrugated.* One-sixth of these sherds bear plain broad coils with a smooth vessel body reminiscent of the slab-house type. The remaining sherds bear narrow corrugations, both indented and plain, in the proportion of three to one. A few sherds show both plain and indented coils. Few, if any, of these vessels had smooth bodies.

*Black-on-White.* Bowls constitute three-fifths of the forms. Bowls commonly have a black line along the rim similar to that on the corresponding slab-house type. The principal decorations consist of areas cross-hatched with fine lines in bold rectangular patterns (Figs. 12a and b). Occasionally checker-board effects (Fig. 12c) and panels of parallel lines (Fig. 12d) occur. Jars present the same style of treatment, the commonest design (Fig. 12c) being a cross-hatched stepped figure running diagonally across the jar. The dot-bordered triangle occurs occasionally (Fig. 12f).

*Black-on-Red.* Sherds of this type are too few for characterization.

This description fits the black-on-white series fairly well. Small samples and small sherds made it impossible to treat a typical collection from that series.

PAINTED WARE SERIES: 10 PERCENT REDWARE. SITE 164.

*Corrugated.* Usually the whole vessel bears narrow corrugations except for short plain flaring rim. The typical vessel has indented coils, few plain coils, and a few others show a combination of plain and indented coils. One sherd bears a curious checker-board pattern of alternate plain and indented areas. Additional ornamentation occurs in the form of small spiral coils applied to the exterior surface (Fig. 18c).

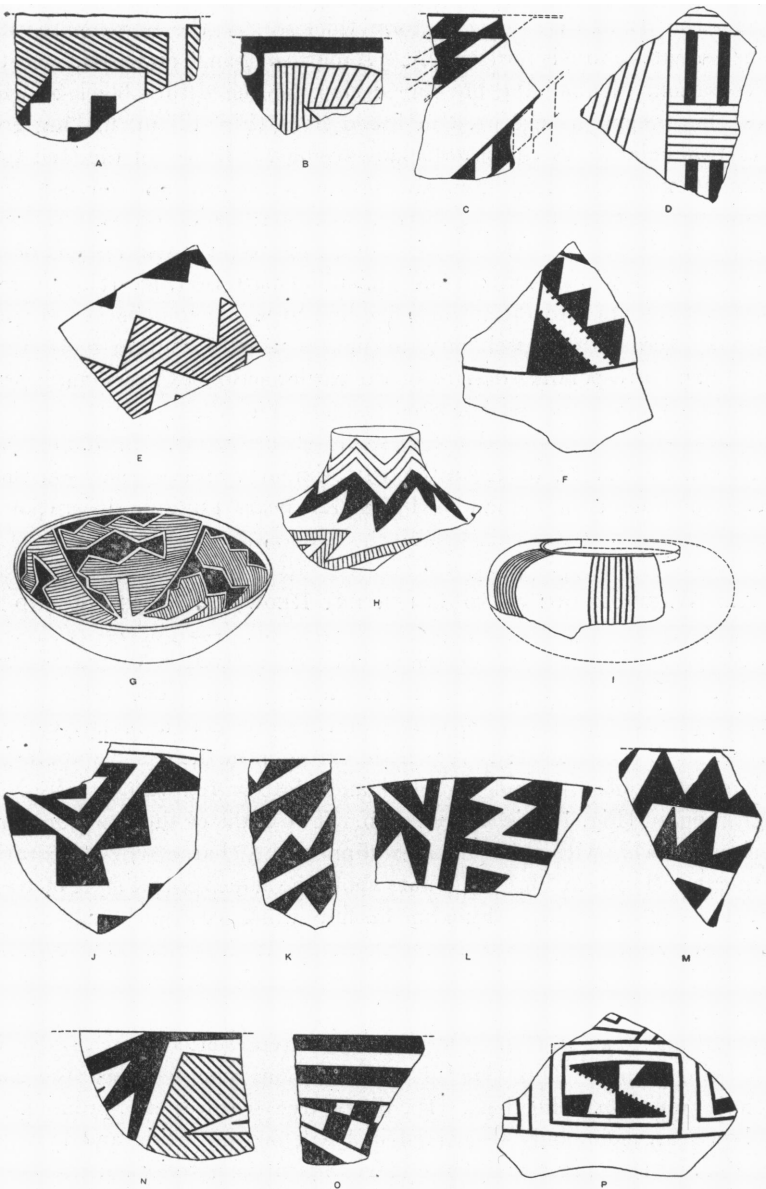


Fig. 12. Pottery of Painted Ware Series: 2% Redware (a-f) and 10% Redware (g-p). a-f, Site 24; g-p, Site 164. a-d, g, j-o, bowls; e, f, h, i, and p, jars. a, b, e, i and j,  $\times \frac{2}{3}$ ; c, d, f, k-o,  $\times \frac{1}{3}$ ; h and p,  $\times \frac{1}{15}$ ; g,  $\times \frac{2}{15}$ .

*Black-on-White.* Jars constitute four-fifths of this class, bowls and a few, dippers, the remainder. The uniform thickness of the bowls with edges finished square-across is noteworthy. A marked change appears in the style of decoration. Unlike the fine-line designs of the earlier black-on-white series, the designs are executed in broad lines (Fig. 12j-m) making great use of triangular areas and interlocking triangular figures of the step type. Combinations of fine-line and broad-line designs are less common (Fig. 12g and n). Occasionally the checker-board pattern occurs with a broad-line pattern (Fig. 12o). Jar patterns are more clearly reminiscent of the earlier black-on-white series. The prevailing pattern (Fig. 12h) suggests a juxtaposition of broad-line and fine-line areas in step figures running diagonally across the vessel, but the figures usually contain more acute angles than corresponding designs of the earlier series. Occasionally panel decorations involve the dot-bordered triangle (Fig. 12p).

*Black-on-Red.* Nine-tenths of these vessels are bowls. Both bowls and jars have a community of decoration with similar vessels of black-on-white ware. One fragmentary small bowl (Fig. 12i) bears a unique decoration.

#### PAINTED WARE SERIES: 30 TO 32 PERCENT REDWARE. SITES 86 AND 96.

*Corrugated.* Vessels are normally entirely covered with narrow corrugations even to the very edge of the flaring (?) lip. The indented coil prevails; plain as well as combined plain and indented coils are relatively rare.

*Black-on-White.* There is very little variation in the designs applied to black-on-white, black-on-red, and black and white-on-red wares. All of the designs figured (Fig. 13a-i) are common. Two-fifths of the black-on-white vessels are bowls; with these are a few dippers. A characteristic decorative treatment is shown in Fig. 13a. Jars show the same general style of treatment (Figs. 13b, c, and e). Fine line hachure work is conspicuously absent.

*Black-on-Red.* Two-thirds of the sherds are from bowls. The common bowl (Fig. 13g) and jar (Fig. 13h) decorations closely resemble those in black-on-white.

*Black and White-on-Red.* Only bowls are represented, not a single jar sherd being found. This type of ware has long characterized the Zuñi region in museum collections. Its distinctive features are pronounced. The bowls are commonly decorated in black on the inside and in white (Fig. 13d and f) or black and white (Fig. 13i) on the exterior surface. The interior decorations are usually panels extending over the whole surface. The area is rather closely filled with broad-line and hachure figures interlocking. The exterior decoration is open and delicate, consisting of angular





Fig. 13. Pottery of Painted Ware Series; 30-32% Redware. a-i, Sites 86 and 96. Pottery of Glazed Ware Series. j-r, Site 146. a, d, f, g, i-k, m, o, p and r, bowls; b, c, e, h, and q, jars; l and n, dippers. e, d, f, i-r,  $\times \frac{1}{2}$ ; b, c, g and h,  $\times \frac{1}{4}$ ; e,  $\times \frac{1}{2}$ .

meanders or rectangular panels extending only about half-way down the side but encircling the bowl.

The similarity of decoration in black paint in all three wares is perhaps closer than the sherds illustrated show. The decoration of the exterior of the bowls in white paint shows a different stylistic treatment.

#### GLAZED WARE SERIES. SITES 81 AND 82.

*Corrugated.* Indented narrow corrugations covering the vessel with the exception of the plain rim mark the prevailing form. A few sherds show plain coils, without indentations.

*Black Paint-on-White.* Bowls comprise one-third of this ware.

*Black Paint-on-Red.* There are twice as many bowls as jars of this ware. A typical example of broad-line work (Fig. 14b) shows panels of triangular helices.

*Black and White Paint-on-Red.* Only one vessel in ten is a jar. The characteristic decoration of the interior of the bowl is in black, of the exterior in white (Fig. 14a) and less frequently in black and white.

The sherds from these ruins bearing glaze decoration are too few for characterization.

#### GLAZED WARE SERIES. SITE 71.

*Corrugated.* The typical vessel is entirely corrugated except for a short distance at the rim. The coils are characteristically narrow and indented, but sometimes plain or both plain and indented together.

*Black Paint-on-White.* Jars constitute seven-tenths of this group; the remainder bowls and a few dippers. The decoration is much like the earlier wares of the same type: broad-line designs being rather prominent. Figs. 14c-f are equally common. The black paint is sometimes of a brownish or purplish-brown tinge.

*Black Paint-on-Red.* Three-quarters of the vessels decorated in black paint-on-red are bowls. The designs on both bowls and jars are not novel (Figs. 14i and 14g, respectively).

*Black and White Paint-on-Red.* No jars of this type were found. Patterns on these bowls do not differ from those on similar wares from earlier ruins (Figs. 14h and j). The usual color combination is black paint-on-red inside of the bowl and white-on-red outside. Less commonly, the interior is covered with white paint bearing the design in black and with the exterior a plain red.

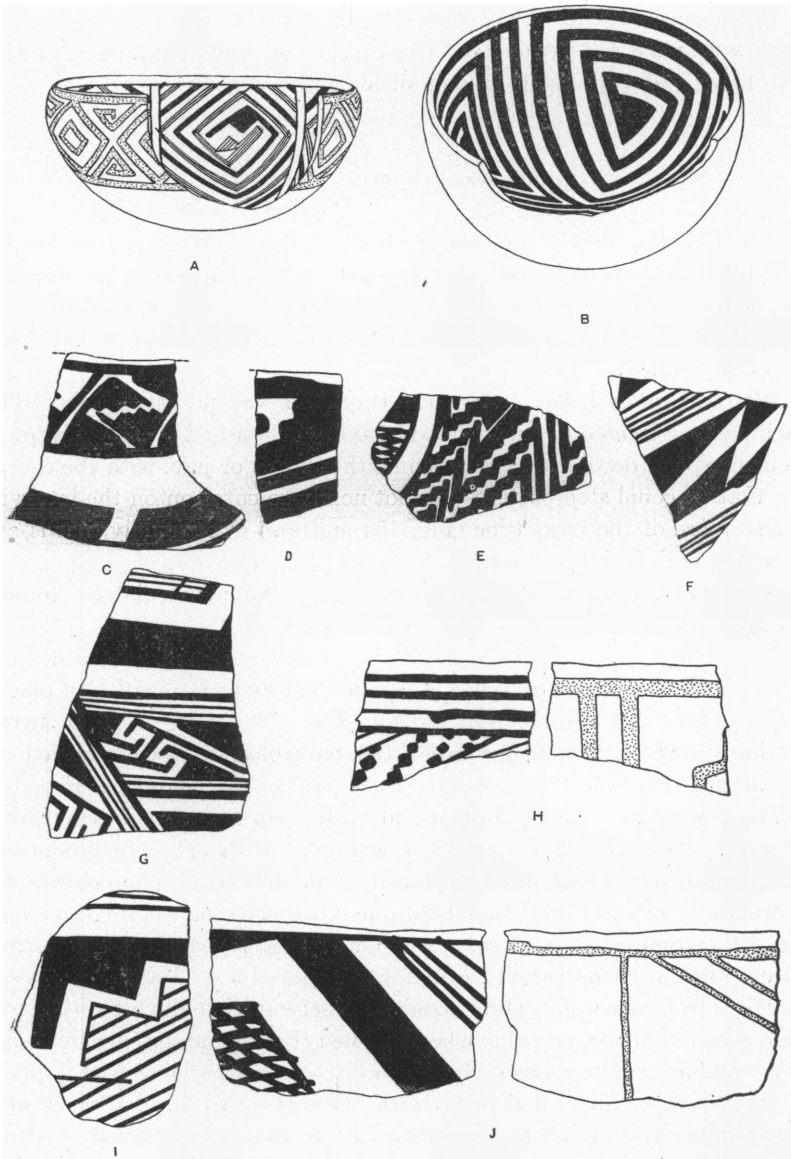


Fig. 14. Pottery of Glazed Ware Series: Sites 81, 82 and 71. a and b, Sites 81 and 82; c-j, Site 71. a, b, h-j, bowls; c-g, jars. a, 10½ in. diameter; b, 5 in. diameter; c-j, × ¼.

*Black Glaze-on-Red.* Bowls and jars in the relation of seven to three.

Black glaze-on-white and other combinations as black glaze-on-white inside with plain red outside, and black glaze and white paint-on-red inside with black and white paint-on-red outside also occur infrequently.

#### GLAZED WARE SERIES. SITE 149.<sup>1</sup>

The following description is furnished not by a surface sample but by a relatively small sample from the uppermost six-inch level of the ash-heap. The sherds figured (Fig. 15) are all from the surface, however.

*Corrugated.* All sherds bear narrow indented coils, except from the plain rim section.

*Black Paint-on-White.* One-fourth of the vessels are bowls. The black paint is commonly quite brown, having a "washed out" appearance. No new type of decoration appears on either bowls or jars, with the exception that diagonal step patterns are not nearly so common on the latter as designs more of the bowl type (Fig. 15a and c). Occasionally, bowls are decorated both inside and out.

*Black Paint-on-Red.* Bowls are half again as common as jars. No new features of design in this type appear at Inscription Rock.

*Black and White Paint-on-Red.* Only bowls were found. The designs are similar to the earlier examples. Beside the usual combination of black-on-red inside with white-on-red outside (Fig. 15d) there are also sherds showing the same interior decoration but both black-and-white-on-red on the exterior (Fig. 15e).

Too few glazed pieces occur in the ash heap sample for descriptive purposes. Nevertheless, a number of examples of this style of decoration from the surface collection are shown (Fig. 15f-m). The commonest decoration is in black glaze-on-red inside with white paint-on-red outside (Fig. 15f). Similar sherds, about as common, have both black glaze and white paint-on-red outside instead (Fig. 15h-j and l). Red bowls, decorated in black glaze and white paint outside, but coated white inside, on which designs in black glaze have been applied (Fig. 15g and k) are frequent. Other combinations are black glaze-on-white inside the bowl with a plain red exterior (Fig. 15m); red bowls with black glaze within and black and white paints outside; black glaze-on-red inside and on large areas of white outside. Bowls seem to be most abundant and to bear the simpler line designs as a rule; the jars are decorated in black glaze on white areas applied to the red ground of the vessel.

<sup>1</sup> Cf. Simpson, Pl. 64.

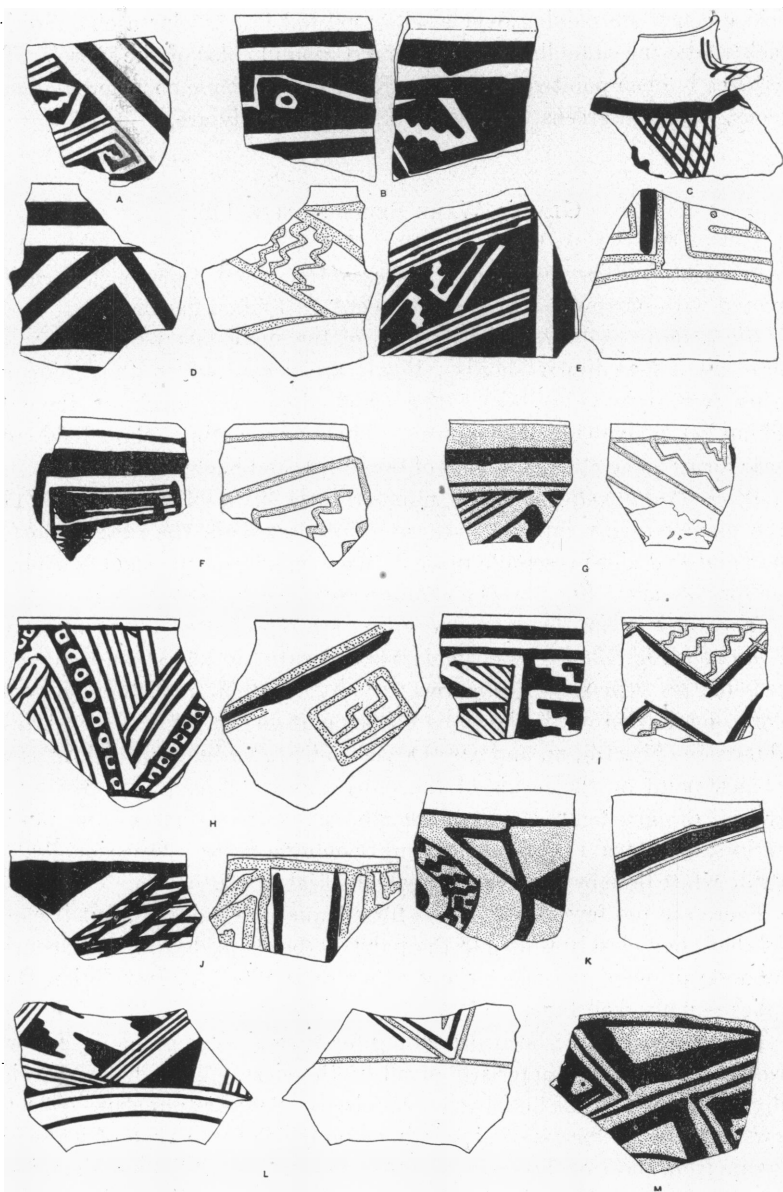


Fig. 15. Pottery of Glazed Ware Series: Site 149. a and c, jars; b, d-m, bowls. a-m,  $\times \frac{1}{4}$ .

It must be remarked in passing that black glaze sometimes appears as vivid green when passing over a white ground but attains a characteristic black where the same line strikes the red ground color of the vessel. This has already been pointed out by Dr. Kidder. We have considered all such greens, brownish greens, etc., as black, as they really are.

#### GLAZED WARE SERIES. SITE 146.

*Corrugated.* The corrugated ware is the usual type of jar entirely covered with narrow indented coils except for a plain flaring rim.

*Black Paint-on-White.* Two-thirds of the sherds are parts of jars, and there are a few dipper sherds. Bowls are decorated on the inside in a rather free style (Fig. 13k). The usual dipper design shows the interlocking key figure (Fig. 13 l and n). The jars sometimes show bold curvilinear forms using alternate areas of broad-line and hachure figures.

*Black Paint-on-Red.* Bowls number three-fifths of the whole. They have plain straight rims and are rarely decorated on the exterior surface. The painted designs resemble those in black on white: the same is probably true for the jars. Fig. 13p is a characteristic bowl pattern.

*Black and White Paint-on-Red.* Jars are represented by an occasional sherd only (Fig. 13q). Like the bowls decorated in black paint alone, the bowls of this type have plain rims. As at all other sites, the commonest color combination of the bowls is black paint-on-red inside with white-on-red outside (Fig. 13j, m, and o). Occasionally, a variant with white as well as black paint on the inside of the bowl appears (Fig. 13r). Besides the common designs figured, a less common pattern consists of the familiar interlocking steps of broad-line and hachure areas. Occasionally, the outside white designs involve the hooked spiral figure.

There are too few glazed pieces for adequate description, but it can be said that they closely resemble the painted sherds in decorative execution. The description of the same types of wares at Site 149, Inscription Rock, applies equally well here.

The wares we have been describing for several sites in the glazed ware series are equally characteristic of all of the sites. They have a decided individuality which has long been recognized. So far as our sherd collection shows there is no means of separating examples of one type of ware from one ruin from those of the same type from another ruin. Where the mixture of pottery from two ruins in the Hemenway Collection accidentally occurred, as is well known it was found impossible to separate them again. Dr. Fewkes has published on this combined collection from Hallonawa and

Hecota'utlla.<sup>1</sup> The vessels figured by him are characteristic and admirably illustrate both design and color schemes, save that we suspect that the red are printed in too light a shade. Our sherd collection would indicate, however, that at Hecota'utlla at least an adequate collection would include quite a few red vessels with large white areas decorated in black.

#### LATE AND HISTORIC SITES. SITE 33.

Corrugated ware and painted wares of black-on-white, black-on-red, and black and white-on-red varieties at this site, Pinnawa, differ not at all from similar wares elsewhere. Even a variant with white paint only on the exterior of a red vessel (Fig. 16k) is clearly of the same type. The same is true for two-color glazed wares, black-on-white and black-on-red (Fig. 16j), and it is particularly significant that even so highly specialized a ware as three-color glaze shows identical patterns in redware decorated in black glaze or black glaze and white paint on the interior and with white paint alone or with white paint and black glaze on the exterior (Fig. 16 l-o). There is a certain community of these wares with those described from the earlier ruins. It is rather startling then to find wares of different type which, as has been stated in a previous section, bear decided affinities with pottery from ruins down the Little Colorado.

*Blackware.* Sherds of this type are identical in character with those of the Zuñi cooking vessels of today. The ware is undecorated, dull, lacking a slip, rather rough and usually black, although often a dirty brown or gray. Their form was probably that of the larger jar and "slipper" pot of today.

*Black and Red-on-White.* All types of decoration in black and red on white, both painted and glazed, are more plentiful in the lower levels of the Pinnawa ash heap than near the surface. The type uniformly presents a dead white ground bearing brilliant red lines (but sometimes brownish) together with black paint or black glaze. White bowls are decorated on interior and exterior with black and red paints (Figs. 16a and e) or on the interior only (Fig. 16b). Red bowls occur with black and red paints on a white ground on either exterior or interior and in the latter case with or without white lines on the exterior. The patterns in glaze are identical: black glaze and red paint on a white ground, either of a white jar (Fig. 16c) or bowl (Fig. 16d, f-h) or one of redware bearing a white ground (Fig. 16i). The character of the lines involved in these patterns is quite different from those on sherds of other wares. These seem very sketchy.

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<sup>1</sup> Fewkes, (c); also Matthews, 151 and 153.

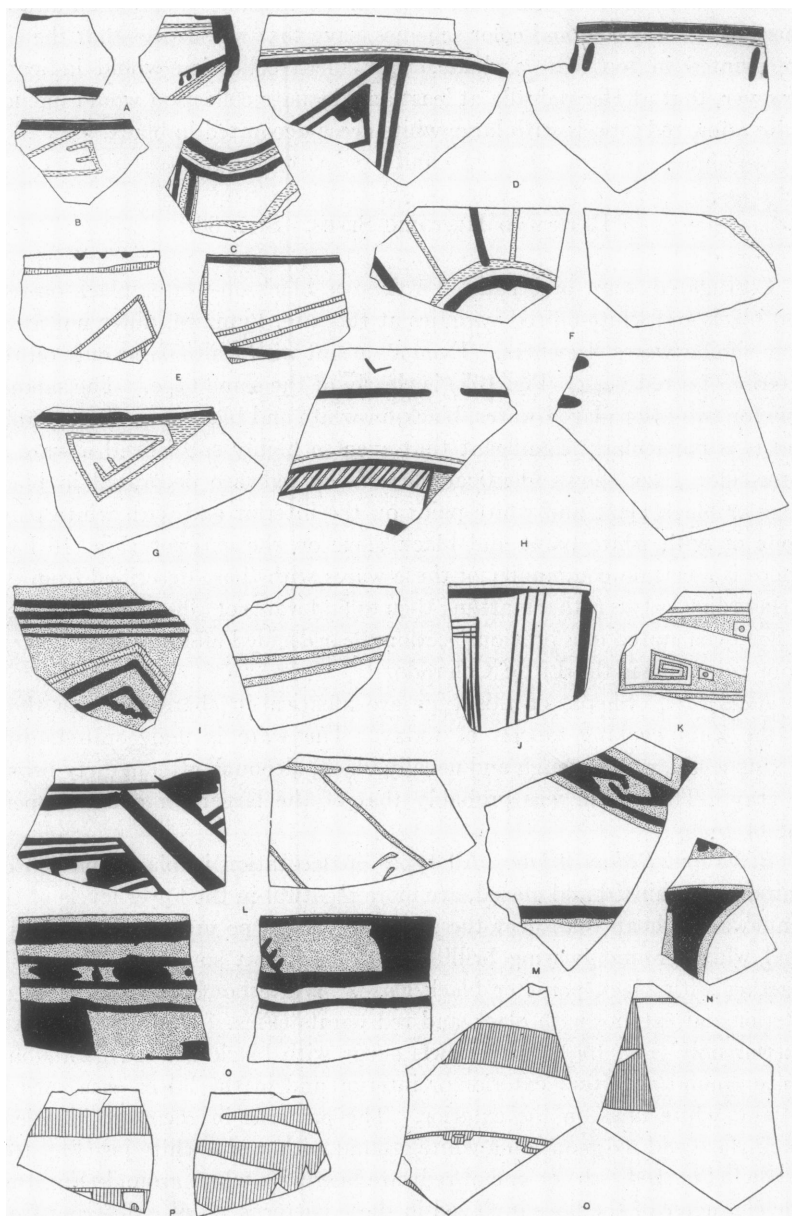


Fig. 16. Pottery of Late and Historic Sites: Site 33. a, b, d-l, o-q, bowls; c, m. and n, jars. a-q,  $\times \frac{1}{2}$ .



Some of the sherds figured are from the ash heap: d, 1 foot 6 inches deep; a, b, and e, 4 feet 6 inches; g, 5 feet; c and i, 5 feet 6 inches.

*Brown Paint-on-Buff.* Buffware ranges from lemon yellow to deep salmon in color. It is usually pale and lacks depth of color. It would not be confused with the fine Hopi yellow. The brown paint, employed usually in broad lines and areas (Fig. 16p and q), is also light. Besides brown-on-buff, brown-bordered red areas are also patterned on a buff ground. A single sherd shows black paint-on-red on the inside of a bowl with red paint-on-buff outside.

#### LATE AND HISTORIC SITES. SITE 48.

The wares from Site 48, Mattsakya, are identical with those of Pinnawa. The sherds of the upper levels of the Pinnawa ash heap cannot be distinguished from those at the base of its Mattsakya counterpart. The sherds illustrated (Fig. 17) clearly bring out this point. A bowl sherd decorated in black glaze-on-white (Fig. 17a) shows the influence of the black and red-on-white designs. Black and red-on-white ware is less plentiful in the upper parts of the Mattsakya ash heap than in the lower; a condition similar to that at Pinnawa. Both black paint (Fig. 17e) and glaze (Fig. 17c) were used. Only a small amount of redware appears here and that was somewhat roughly executed when glaze was used (Fig. 17b, f, j and l), although the patterns are of the familiar type. About one-quarter of all the sherds are buffware. Occasionally, these bear decorations in black glaze (Fig. 17k), but the common design is in brown alone (Fig. 17d, g, i and m) or in brown-bordered red areas (Fig. 17h and n). A characteristic pattern is a series of simple bands drawn around the interior or exterior of a bowl, a form which turns up again under the streets of Zuni and is even seen in some of the older vessels in use today. The decorative style of these painted buffware pieces differs from the older style as represented in the redware found here. The bands and areas in brown or brown and red are wider than anything comparable in the wares in vogue in earlier times. In addition a tendency toward pictured forms and isolated units may be noted (Fig. 17e, i and n).

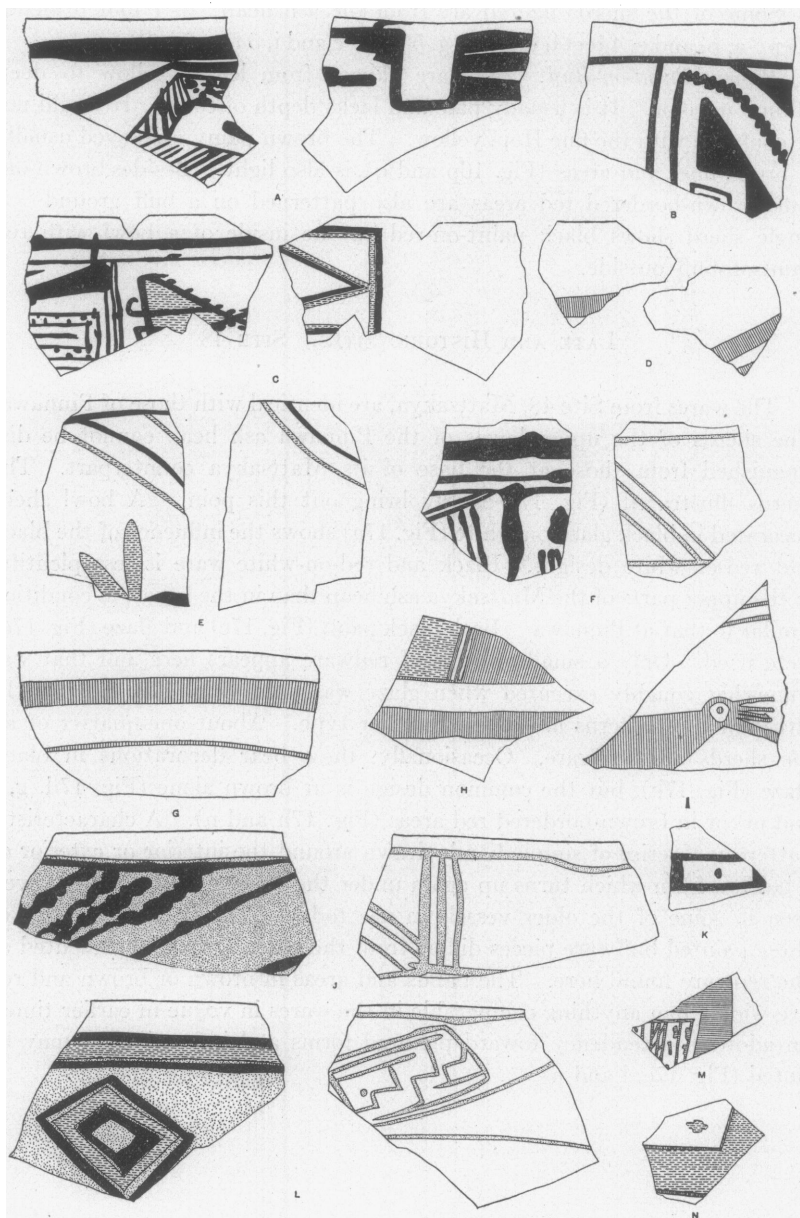


Fig. 17. Pottery of Late and Historic Sites: Site 48. a-g, i, j, and l, bowls; h, k, m and n, jars. a-n,  $\times \frac{1}{4}$ .



Fig. 18. Black-on-White and Corrugated Jars. a, (50.2-232) from a ruin southwest of Zúñi; b, (50.2-234) from a ruin east of *Cuminnkya*; c, (50.2-229) from *Cuminnkya*; d, (50.2-233) from a ruin four or five miles south of Ojo Caliente on the Salina road.

## ARCHITECTURAL TYPES.

With the time-relations of the ruins determined, it is possible to inquire into the history of another cultural trait, namely architectural types.

It has often been asserted that the pueblo type of architecture was a natural outgrowth from the small house structure with rectangular cells. The fact is probably correct, but the conclusion has been based on the generalizing method, and, with the exception of Nelson's brief statement,<sup>1</sup> has never been subjected to rigid demonstration.

The only statement worthy of serious consideration referring particularly to the Zuñi region is that of Fewkes.<sup>2</sup> Assuming that both portions of composite rectangular-circular ruins were occupied at the same time (Site 161 is under discussion), he argues that this is a transitional type intermediate between the older circular pueblo, where pueblo growth was limited by the wall of circumvallation, and the rectangular pueblo in which growth by accretion would make no impression on the form of the pueblo structure.

We have utilized the architectural data referring to the ruins furnishing pottery data for the foregoing sequence to investigate these points. In Table XI the ruins are grouped in three general types and ranked according to their positions in the pottery sequence. Where definite information was available, the shape and dimensions (in feet) are given.

TABLE XI.  
SEQUENCE OF ARCHITECTURAL TYPES.

Percent of Ranking Ware	Slab-House Type	Ruins of Small House Type	Pueblo Type
1—	15?		
2	14?		
2	7?		
2	50?		
?	40		

<sup>1</sup> Nelson, §178.

<sup>2</sup> Fewkes, (a), 123.

TABLE XI.—(Continued).

Percent of Ranking Ware	Slab-House Type	Ruins of Small House Type	Pueblo Type
4	3?	51	
24		57 — □, 20 × 20	
30		49	
33		72	
40		70	
42		166 — □, 25 × 10	
48		16?	
50		73	
50		2?	
62		83 — □, 20 × 10	
67		35	
75			
1—		6	
2		23	
2		21 — □, 50 × 30	
2		165	
2		24	
3		17 — □, 85 × 20	
5		18 — □, 70 × 20	
6		58 — □, 60 × 20	
7		60 — L, 40 × 20	
8		19	
8		40	
9		29	
10		167	
10		76	
10		164 — □, 30 × 25, etc.	
12		5	
13		26	
13		1	
14		28	
15		95 — □, 20 × 8	
16		56 — □, 21 × 10	
16		74	
18		36	
18		27	
18		80 — □, 50 × 20	
19		62	
20		37	
20		38	
22			4 — □, 225 × 180

TABLE XI — (Concluded).

Percent of Ranking Ware	Slab-House Type	Ruins of Small House Type	Pueblo Type
22		92 — □, 20 × 10	
24		46?	
25		163 — □, 36 × 36	
30		96	
32			86 — □, (?), 250 × 200?
39		90 — □, 60 × 40	
59		91 — L, 45 × 36	
54		75	
47			71 — □, 273 × 216
46			84 — ○, 215 × 150
46			85 — ○, 150
37		30	
36		82 — 30 × 10	
35			11 — □, 300 × 180
30		81 — 75 × 20	
?		121 — L, 106 × 42	
?			104 — ○, 240 × 204
?			149 — □, 300 × 210
?			161 — □, 350 × 325, and ○, 325
?			97 — □, 350 × 280
?			146 — ○?, 170 × 125
?			139 — □, 260 × 260
14-11			33
7			8 — ○, 210
3			48
6			45
0			13

These data suggest that the earliest type of dwelling was the "slab-house." Our only example of this was a semi-subterranean elliptical structure, eleven feet by eight, with adobe walls in the base of which stone slabs had been set on edge. The structure was probably covered by a brush roof. Of dwellings with rectangular cells, the small house undoubtedly preceded the pueblo type. The usual size of these is very well indicated by the tabulated dimensions. In groundplan they appear as a single straight row of rooms, or as rectangular, L-shaped, bracket-shaped, or E-shaped blocks. There is no certain evidence that the later examples of this type are larger than the others, although this is suggested. This architectural type remained in use after the introduction of the pueblo type.

The pueblo type is inaugurated after the introduction of three-color painted ware, a variety of Type I. There is no evidence to prove that in this region at least the pueblo has grown out of the small house. The evidence points rather to the direct introduction of the pueblo as an architectural type. In this connection the tendency to build large pueblos *en bloc* and to abandon them shortly after must be considered significant.

The prevailing pueblo types are the rectangular block built around a central court and a circular, oval, or rather polygonal, ring likewise enclosing a court. The courts often contained supernumerary buildings and wings, in some cases being substantially filled. Other pueblos are rather amorphous structures, conforming largely to natural features. While our superficial survey prevents any very definite statement, it would seem from the straight lines and regular curves involved that many of the pueblos were planned beforehand and built *en bloc*. It is not clear that the circular pueblo preceded the rectangular, or *vice versa*. Both types were evidently in use synchronously. In the two composite ruins in this region (Nos. 138 and 161) the walls of the circular sections stand higher than the rectangular. It is also true that the best-preserved ruin in the whole area is a circular ruin (No. 162) in Soldado Canyon. But it may be that a circular wall is better able to withstand undermining forces. The evidence does not seem to indicate a change in either direction.

The historic pueblos appear amorphous in groundplan (see Mindeleff's maps). This may be due to the fact that they conform to the knolls on which they lie. The post-Conquest refuge villages, possibly excepting that on Towwayallanna, are compact groups conforming closely to naturally defensible positions.

This brings us to the question of the relation of architectural type to defense. With the exception of the refuge villages, few of the pueblos show a situation clearly for defense. The two structures on Inscription Rock are in an easily defended location, particularly the northern ruin. So is Gigantes ruin (No. 146), and a few small ruins are located on mesa tops. But this is not an impressive list. Ruins are located on low knolls and gentle slopes with a good outlook. As stated in the description of the region the prevailing winds seem to have had as much to do with the location of at least the smaller ruins as any other factor: they generally lie against a sheltering hillside. Whether the enclosed pueblo was a sufficient protection, or whether protection was not needed cannot be answered from our data.

The historical position of another cultural trait, the use of obsidian, can also be roughly given. Our experience conforms with Kroeber's that obsidian is found only at relatively late ruins.

## GENERAL SUMMARY.

It seems worth while briefly summarizing the preceding pages in order to emphasize the distinction between the body of data of which we are reasonably sure and the outline chronology which is in part an hypothetical structure. It does not seem fair to leave an impression of greater certainty in the results than the data seem to us to warrant. At the risk of repetition then, we will briefly indicate what we believe these data show.

Let us first turn to the methodological limits imposed by the type of remains. We have seen that the natural advantages of the region under discussion are somewhat limited. Water and arable lands are by no means uniformly distributed over its extent; rather, the combination of a copious water supply with adjacent fields is found at only a few spots. As a result the structures now in ruins seem to have had a transient occupation. With the exception of certain historic and related sites the refuse heaps at these ruins were uniformly shallow. Four of the ruins, Hawwikku, Kettcippawa, Kyakkima, and Mattsakya, were identified years ago as among the "Seven Cities of Cibola." At one, Mattsakya, a deep refuse heap was found in which the potsherds could be traced back in gradual transitions to and through another deep heap at a neighboring ruin, Pinnawa. But here was the end of direct stratigraphic information, and from this point on we were forced to fall back on the uncertain method of hypothetical seriation.

Nevertheless, the body of data available for such a seriation is, we believe, on a par with that obtained by stratigraphic methods. We have no reason to doubt that samples of potsherds collected from successive levels of the ash heaps present us with valid chronological indices. Why then cavil at the use of similar samples from the surface of the ash heaps? We have demonstrated above (p. 254) that it is possible to collect surface samples approximating in accuracy to those from refuse heaps; in fact, supposedly identical surface samples differ no more among themselves than a corresponding series of refuse heap samples. We have analyzed such potsherd samples from each of the ruins for the proportions of their constituent types. Aside from their value in our hypothetical scheme, these collected data have an absolute value in that they characterize each ruin with some precision.

A suggestion for ranking these data in seriation is contained in the short stratigraphic series: there corrugated ware is seen increasing steadily from complete absence in modern Zuni to fourteen percent at the base of the



Pinnawa ash heap. But we cannot straightway rank all the data on the basis of corrugated percentages, although the unity of types in all the ruins suggests doing so, because we find that the values fall into two groups. In each group corrugated ware ranges from zero to about fifty percent, but in one it is accompanied only by black-on-white ware, in the other by black, red, and buff wares. The second group is further subdivided by the presence at some of the ruins of glaze-decorated potsherds as well as painted wares. Among these are the historic sites and the affiliated ruins which furnished stratigraphic information. This suggested a sequence in which corrugated ware rises from zero to about fifty percent (with only black-on-white ware present), and then drops back to zero again, while painted ware is being followed by glazed wares (the second general group). This suggested sequence was then ready to be checked by observing simultaneous variations in wares other than corrugated.

Nothing can be said as to the validity of the first half of our sequence, the "black-on-white series," beyond the fact that it seems plausible. But for the remainder of the sequence the checks employed give fairly certain results. First, concomitant variations occur in the wares accompanying corrugated. Second, the variations of individual values from the general trend of the sequence are not beyond the limits of chance. Third, a continuum of style is seen in three-color decoration which appears first at the later ruins of the "painted ware series" and continues on through the "glazed ware series." But while the general sequence is checked in its parts, it develops that a group of values belonging late in the series is missing; that is, we simply failed to cover sufficient territory in our survey to include ruins of this period. According to the available literature, such ruins probably lie further down the Little Colorado. But so long as such an hiatus remains in our data, we cannot be certain that the separated sections of our series are parts of a single historic sequence. True, the hypothetical sequence for the Zuñi country parallels that of the Rio Grande region. But if there has been a common development over a large section of the Southwest, we are still uncertain, for we may well be dealing here with parts of two separate sequences. The case for our chronological outline must rest at this point until the hiatus can be investigated. But until we then know the value of these data for this particular chronological scheme, we can at least be sure that they have an absolute value outside of it.

The suggested pottery sequence closely parallels that of the Rio Grande both in the order in which the several decorative techniques were used and in the style of decoration. It differs principally in the tendency to vary color combinations rather than decorative technique, and to use painted decoration in preference to glaze. Glaze decoration appears to have been

regularly substituted for certain painted decorations, but was always rather limited in use; hence we judge that glaze decoration was a borrowed trait.

So far we have used only pottery data in erecting an outline chronology in order that we might use architectural data as an independent check. When the ruins are ranked according to the pottery scheme, a parallel sequence of architectural types was found: first, probably slab-house structures (p. 228), then small houses, and finally rectangular and circular pueblos. This may be taken as a confirmation of the pottery scheme, since all students have suggested this as the probable course of development. The pueblo type appears more or less synchronously with the introduction of decoration in three colors: it probably did not develop in this region, but seems to be a borrowed trait.

Certain general shifts of the center of population have taken place. We have only a few scattered ruins belonging to the earliest period ("black-on-white series"). During the following period of the "painted ware series," the focus shifted from the lower half of the Zuñi Valley eastward to the continental divide where it remained throughout the period of the "glazed ware series." With this shift the pueblo appeared as the prevailing architectural form. The next ruins for which we have data are the historic ruins and others closely related. Again there has been a shift, for these center back in the lower Zuñi Valley. The available information suggests that had our survey been carried for some distance further down the Little Colorado Valley, of which the Zuñi is a tributary, we would have found ruins immediately antedating the historic ruins and probably intermediate between them and the ruins centering in the continental divide. This may mean that there was a general movement westward and then a return eastward to the historic location.

In short, the data assembled in the preceding pages are a reasonably certain characterization of the ruins visited. The suggested chronology may be valid in outline and even quite correct in part, but it cannot be accepted as more than indicative while an integral part of the territory remains unsurveyed. The publication of the results to date seems wholly justified as marking the completion of one important step in the establishment of Zuñi chronology, but particularly as an exposition of archaeological method.

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