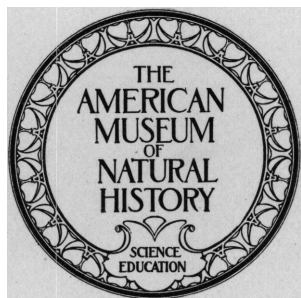


ANTHROPOLOGICAL PAPERS
OF
THE AMERICAN MUSEUM
OF NATURAL HISTORY

VOL. XVIII

THE ARCHER M. HUNTINGTON SURVEY OF THE SOUTHWEST
ZUÑI DISTRICT



NEW YORK
PUBLISHED BY ORDER OF THE TRUSTEES
1919

Director of Survey
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GENERAL INTRODUCTION

The Archer M. Huntington survey of southwestern United States was taken up at Mr. Huntington's suggestion in 1909 and has continued without interruption to the present. The fundamental objective of this investigation was the establishment of a chronology for the cultures of the Southwest. To this end, studies were made among the surviving natives as well as upon the remains of prehistoric peoples. At the outset it was assumed that the Rio Grande Valley was an important center of development for the historic type of Pueblo culture, and in consequence, the Rio Grande district was chosen as the primary base for field exploration. The surviving Pueblo villages of the district were intensively studied by Dr. Herbert J. Spinden and many of the abandoned and prehistoric villages were thoroughly investigated by Mr. N. C. Nelson. The results of the whole survey to date indicate that the initial assumption as to the location for the Pueblo center was wholly justifiable. Consequently, this district is still the major unit of the survey, and its satisfactory completion will require several more years of field study.

One of the secondary problems projected was a parallel study of the Zuñi Pueblo and the surrounding district. The first stage of this inquiry has been completed and is reported in this volume, which thus becomes the initial unit in the Huntington Survey series. Here also the living people were studied, then the ruined villages, and a correlation of the two developed.

The other secondary investigations may be enumerated for the sake of completeness. The nomadic peoples are under investigation by Dr. P. E. Goddard; the tribes of the higher plateaus north of the Colorado and the Hopi, by Dr. R. H. Lowie, and the prehistoric villages in the San Juan Area by Earl H. Morris. The last is an undertaking of great magnitude, dealing with a prehistoric culture center that laid the foundations for the later Pueblo development of the Rio Grande Valley. The results of these investigations will appear in later volumes, making a detailed statement of methods and results unnecessary here.

The Zuñi problem, the subject of this volume, can be stated in simple terms. The Zuñi were living on the present site when first described, but there are many adjacent ruins that seem to antedate the historic site. We must, therefore, seek the relation of one to the other. The solution then lies in developing a method by which the relative

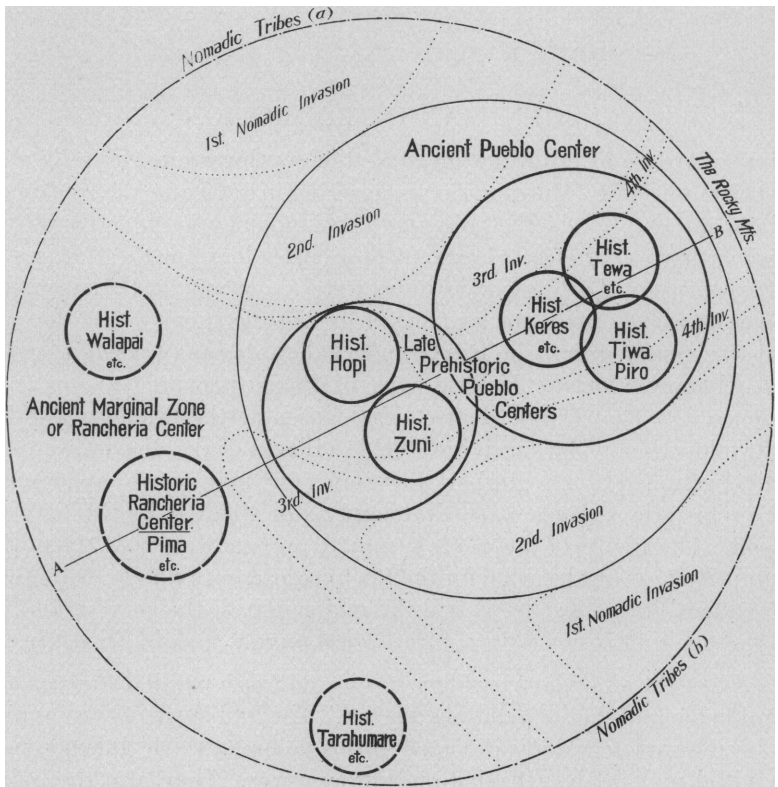


Fig. 1.

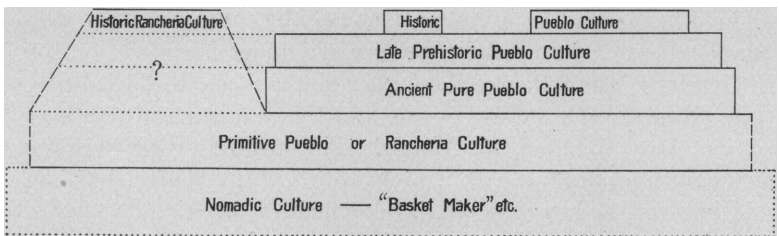


Fig. 2.

Nelson's Diagrammatic Scheme for demonstrating the Geographical and Chronological Relations in the Cultures of the Southwest—(Proceedings of the National Academy of Sciences, 1919).

Fig. 1. Geographical Position of Culture Centers.

Fig. 2. Chronological Section on a Line a-b.

CHRONOLOGY OF THE ZUNI DISTRICT

| Periods | Ceramic Characters |
|--|--|
| 8. Modern Zuni (1680—) | Modern painted ware |
| 7. Historic Zuni (1540-1680) | Historic painted ware Some glaze |
| 6. True pueblo architecture a. Moves to Zuni (?-1540) | Buffware appears Plain black |
| 5. True pueblo architecture a. Moves to Silver Creek (Holbrook) | Buffware and plain black begin here |
| 4. True pueblo architecture a. White Mountain Group b. Ramah Group becomes extinct | Glazed ware from Rio Grande |
| 3. Small pueblos a. White Mountain Group b. Ramah Group | Three-color painted Corrugated giving way to red Black-on-white constant |
| 2. Small rectangular houses | Corrugated, black-on-white, and black-on-red pottery |
| 1. Slab-house period | Corrugated pottery Black-on-white pottery |

CHRONOLOGICAL PERIODS IN THE SOUTHWEST

| | Ceramic Periods for the Rio Grande and Colorado (Nelson) | Zuni Chronology (Spier) |
|--|---|--|
| 1680- 1540-1680 ?-1540 Pueblo Period | 6. Modern painted ware 5. Historic glazed ware 4. Full glazed ware 3. Early glazed ware 2. Full black-on-white ware (Aztec and Bonito) | 8. Modern Zuni 7. Historic Zuni 6. Early Zuni (a ⁴) 5. Silver Creek (a ³) Ramah now extinct 4. White Mountain (a ²) and Ramah (b ²) 3. White Mountain (a) and Ramah (b) |
| Transition Period | 1b. Archaic black-on-white ware 1a. Basket Makers, Pottery absent | 2. Rectangular house culture 1. Slab-house period culture ? |
| Nomadic Period | Primitive Nomads (?) Pottery and agriculture absent | ? |

ages of these ruins can be determined and correlated with Zuñi itself. The Zuñi of today represents the last stage in the historical evolution of one Southwestern culture; hence, the logical procedure seems to be to work backward from Zuñi through the ruins.

Work was begun at Zuñi in 1915 by A. L. Kroeber, Professor of Anthropology at the University of California. A careful study of the town was instituted, to find out just in how far the material growth of this primitive city was an expression of the culture of its people. The presentation and discussion of this investigation forms the major paper in the volume. Professor Kroeber also examined the ruins and sought to form a tentative idea as to their relative ages by sampling the potsherds found in them and submitting these to statistical methods, the reliability of which had been tested in many sciences. With this as a beginning, Mr. Leslie Spier took up the specific dating of these ruins. The methods employed and the results obtained are presented under the proper heads; but we may summarize the conclusions by tabulating the chronology of the district, as in the accompanying table. It is thus apparent that the definite house remains of the district fall into eight successive periods, each of which seems to be an outgrowth of the others. The most definite index to this chronology is found in pottery forms and decoration, as is the case in many other parts of the world.

The establishment of this chronology is an important achievement and makes for progress, but obviously Zuñi did not work out its career in absolute isolation, for its growth was a mere part of the whole Pueblo development. Mr. N. C. Nelson also achieved a chronological scale for the Rio Grande district, which, in conjunction with the work of Mr. Earl H. Morris in the San Juan Valley, gives what appears to be the primary chronological sequence for Pueblo culture as a whole. Fortunately, the commendable independent work of Dr. A. V. Kidder in the mountains of Colorado and Utah, completes the story, so that the general outline of culture history for the Southwest now stands revealed. So by combining the tables of Nelson and Spier we get the time-relations expressed in the second tabulation.

Finally, as a synthetic presentation of the cultural relations in the Southwest Mr. Nelson has developed a diagrammatic chart, showing both the contemporaneous relations of the culture groups and their chronological origins. This diagram is based upon the well-known facts of culture distribution, and the observed tendencies for marginal cultures to present the more archaic forms and thus stand as indices of the

older culture level. As has been pointed out by many students of culture, once the center of a culture has been located, its earlier forms can be inferred from the surviving marginal traits. Thus, the Huntington Survey presents a conclusion as to the chronology of the Southwest that is fully consistent with the workings of culture in general, but is also based upon correlated and verifiable empirical observations. Not only were the horizontal correlations of Fig. 1 carefully determined by surface surveys, but typical sections (Fig. 2) were made to verify the chronological relations the surface indications suggested. Without such verification the results could not be taken with confidence.

The preceding tables and Nelson's diagrammatic scheme, which is but another method of presenting the same, give us a fairly complete outline of the development of culture in the Southwest, localizing some of the related centers of initiation and their diffusion areas as well as demonstrating their sequence. But relative chronologies are never satisfactory unless translated into terms of the calendar and it is quite right that an answer to the question "how long?" should be expected. There has been a great deal of confusion in the comprehension of New World culture due to the persistent shirking of anthropologists when confronted with this problem. It is therefore the duty of the writer, at least, to show in what way and with what precision the periods in these tables can be dated.

There are a few historical facts that give us initial dates for the series. History in the Southwest begins with the Spanish exploration of the territory about 1540. Subsequent events give us other definite points, but for the remaining nine-tenths, or more, of the sequence presented in the table, we have no such time data. Yet, we do have sources from which these intervals can be estimated in terms of the known tenth. Nelson's diagram presents the steps from one culture to the next as if equal; but this is not his intention or belief. It is common historical knowledge that the evolution of culture and, in fact, all organic things, has been accelerating with time. The tabulation of a few epoch-making events in Old World culture with the dates assigned thereto makes this clear. Counting backward from the present century, we obtain the time intervals indicated in the adjoining table. From this it appears that it took much longer to pass from flint chipping to fire and again to painting, than from iron to steam power and the more recent inventions. Thus not only the presence of acceleration is made evident, but its rate of progression is indicated.

CHRONOLOGY OF GREAT EVENTS IN THE CULTURE OF THE OLD WORLD

| | Yrs. |
|---|---------|
| Use of steam power | 200 |
| Printing and gunpowder | 1,000 |
| Use of iron | 3,500 |
| Use of bronze | 6,000 |
| Domestication of the ox and horse | 10,000 |
| Agriculture and pottery | 12,000 |
| Bows and arrows | 14,000 |
| Spear-thrower and the harpoon | 20,000 |
| Fine flint chipping | 25,000 |
| Beginning of painting and sculpture | 35,000 |
| Mortuary offerings | 50,000 |
| Use of fire and the <i>coup de pong</i> | 100,000 |
| Beginning of flint chipping | 125,000 |
| Precursors of man | 500,000 |

A curve could be plotted to express this acceleration of culture's evolution, though not with mathematical exactness. Nevertheless, the principle is there. Nelson's diagram gives us the relative geographical spread of the older and later ceramic traits for the whole Southwest, in which the same principle of culture acceleration is in evidence. Hence, it is possible to form an estimate of the respective time intervals that is more than a mere guess. From the diagram we see that the period of primitive Pueblo culture stands to the later period as about 3:2. The age of the later period can be estimated from the table where it appears that full-glazed ware dates back about four hundred years. On the basis of distribution, the interval to full black-on-white must be at least three times as long, or twelve hundred years. Sixteen hundred years is then the total interval, but the development period of primitive Pueblo cultures must have been still longer than the preceding, say, thirty-two hundred years. Then if we contemplate the rise of the basket makers, who first appear with the spear-thrower instead of the bow, how much longer must it have taken them to develop from nomads into potters, agriculturists, weavers, and initial pueblo dwellers? Anthropologists in America are wont to look askance at anyone who assigns even a thousand years to the beginning of such cultures, but can they continue to shut their eyes to the universally observed principles of culture diffusion? Is not ten thousand years a modest estimate of the time since Cliff-Dweller culture began to differentiate from the nomad

level? These are but the personal reflections of the writer but they are not in conflict with the empirical results of the Huntington Survey and are certainly consistent with the facts of Old World chronology. The spear-thrower, for example, appears here in the same relative chronological position as in western Europe, where twenty thousand years is assigned as the probable date.

In conclusion, this volume deals entirely with one specific locality in the vicinity of Zuñi, the presentation of field data from the same, together with the methods by which a chronology for these local cultures can be projected. This we hope will be an acceptable contribution to the subject. In this introductory statement we have shown the probable relation of this chronology to that for the whole of the Southwest and suggested the possibility of extending the horizon to a correlation with the chronology as a whole.

CLARK WISSLER

April, 1919.

ANTHROPOLOGICAL PAPERS
OF
THE AMERICAN MUSEUM
OF NATURAL HISTORY
VOL. XVIII, PART I

ZUÑI POTSDERDS

BY

A. L. KROEBER

NEW YORK
PUBLISHED BY ORDER OF THE TRUSTEES
1916

ZUÑI POTSDHERDS.

By A. L. KROEBER.

PREFACE.

This paper was written at Zuñi in the summer of 1915. Its materials are limited and its interpretations avowedly tentative. It was not feasible to extend the scope of the essay without undertaking work that circumstances rendered impossible at the time. Nor did the range and nature of the materials dealt with appear to warrant a subsequent recasting in the light of the available published investigations relating to the subject. The paper is therefore presented as written at the time and on the spot, except for a brief postscript dealing with the literature and certain comparative data.

February, 1916.

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ZUÑI POTSDHERDS.

In the course of a study of family life made at the pueblo of Zuñi during the summer of 1915, I recorded the native names of a number of ancient villages in and near Zuñi Valley. A late afternoon walk a few days afterwards brought me to where Mattsakya once stood, a mile and a half east of the town of Zuñi. The wall outlines which Mindeleff still traced have mostly disappeared in thirty years, save for two rooms and where a prairie dog hole had laid bare a few feet of masonry that otherwise would have been hidden. The quantity of broken rock on the surface, the sharp rise of the knoll, and the maintained shrine, or rather two, on its summit — the last, as it proved, an almost certain evidence of former occupation of the spot — all however indicated a ruin even to the novice in archaeology. A few moments revealed a pottery fragment or two. At first the sherds were difficult to see and harder to distinguish from the numerous minute slabs of stone. A quarter of an hour, however, practised the eye; and the short time remaining before darkness sufficed to fill my pockets.

A few afternoons later, I went out in the opposite direction, toward Pinnawa, a mile or more to the west. Proceeding first to the northwestern edge of the present suburbs of the town to see the communal "scalp house," I noted another shrine or monument a few hundred feet to the north, directly in front of the government day school. This occupied the center of a slight rise, perhaps a yard above the surrounding plain and two hundred or more feet in diameter. The ground was strewn with small rounded and variously colored pebbles, such as do not occur in the fine red clay of the levels of Zuñi valley. In a few seconds sharp-edged fragments of flint or chert appeared, and then occasional bits of pottery. A passing Zuñi named the spot Shoptluwwayala; its shrine is connected with the yellow Sallimoppiya dance character. The pottery was not abundant; but a pocketful was secured.

I went westward, still on the north side of the broad bed of the Zuñi River, toward a knoll nearly a mile ahead, into which the stream had cut a vertical bank. The rise in the ground made me suspect an ancient site of human occupation. Again the smooth pebbles were conspicuous; and then bits of chipped rock and potsherds were seen lying here and there. Hattsinawa was the name the Zuñi gave me next morning. As at Shoptluwwayala, there was not a single building stone visible, nor anything that might have been a fragment of one; nor did the cut bank reveal any,

although pottery pieces lay on the surface to its edge. Another pocketful was the harvest.

I followed the river bed down a couple of hundred yards, and walked across the remnants of the stream — most of which was flowing through irrigation ditches into Zuñi fields — at Pinnawa. This site is the terminus of a long spur running from the southern hills to a low end at the river. Only a few steps from the stream there lay some broken rock of the type that litters Mattsakya but is wanting at Shoptluwwayala and Hattsinawa. Pottery at first was scant; but as I proceeded up the nose of the hill, the throw-out from every prairie dog hole was decorated by from one to half a dozen fragments. Toward the summit of the knoll and the inevitable shrine — only a few yards from the wagon road — both rock and potsherds lay thick, with chipped pebbles here and there. The site is also more extensive than either of the two preceding ones; and a few minutes sufficed for a larger haul.

It was immediately apparent that red, black, and patterned potsherds predominated here, as they seemed to have preponderated at Mattsakya, while white fragments had been in the majority at both Shoptluwwayala and Hattsinawa. I therefore attempted to pick up all sherds visible in certain spots, rather than range over the whole site and stoop only for the attractive ones. In this I may not have been altogether successful, for a red, a patterned, or a deep black fragment catches the eye more readily than either a "black" or a "white" one that ranges toward dull gray. But at least the endeavor was conscientious.

Next morning my finds were washed and dried — an unnecessary proceeding, I soon found — then sorted and counted. A tabulation thoroughly confirmed the mental impression of the evening before. At Mattsakya and Pinnawa, black or blackish pieces predominated; red ones were fairly numerous, white ones less so. At Shoptluwwayala and Hattsinawa, white predominated, and black and red were rare. The corrugated ware showed similarly: at Mattsakya and Pinnawa black sherds were as abundant as white, at the two other sites the black were lacking, the white frequent. The black corrugated ware usually runs to a dark or dull gray, the white is nearly always pale buff, pinkish, or light gray; but there were few doubtful pieces. There were other differences. At the "black and red" sites, a few three-colored sherds were found; at the white ones, none. The two former were extensive and heavily littered with good-sized rock fragments, as one would expect at a stone built ruin. The latter showed no rock, but a somewhat more sandy soil than prevails in most of the red clayey Zuñi plain, with some admixture of waterworn pebbles, scarcely any more than an inch in length, and of surprisingly diverse colors. The presence at

Mattsakya and Pinnawa of one or two tiny bits of obsidian, which was unrepresented at Shoptluwwayala and Hattsinawa, was not altogether conclusive, on account of the small total yield of the two last named; but it seemed significant, as it does still. Finally, Mattsakya and Pinnawa had been previously mentioned to me by Zuñi informants as places inhabited in the *innote* or long ago. Shoptluwwayala and Hattsinawa were named only on designation and inquiry.

There could be no doubt that here, within a half hour's radius of the largest inhabited pueblo, were prehistoric remains of two types and two periods, as distinct as oil and water. The condition of the sites indicated the black and red ware ruins as the more recent; but certain misleading observations of the pottery in use in the Zuñi homes of today left me in doubt for a time. These observations rested upon fact, but the facts are due to the influence of American civilization, and would not have obtained a couple of generations ago. Once these circumstances were comprehended, the chronological priority of the white ware type became certain.

I recalled the surveys and excavations of many years ago, and a confused impression of a mass of sherds and similar uninspiring pieces obtained for the Hemenway Expedition under the direction of the memorable Cushing, sent in an exchange from the Peabody Museum to the University of California, and now stored there in a pile of trays. But an accumulation of dust and the familiar name Halona were all that emerged with distinctness. I searched my mind for published reports of the work that must have been done in the region — vainly: if anything was in print, it had been forgotten in fifteen years during which my reading on the American Southwest had been desultory; and I was remote from bibliographies. Victor Mindeleff's study of Pueblo Architecture, for which I had sent in connection with researches into the clans and town growth of Zuñi itself, I found truly admirable, and it contained valuable plots and descriptions of ruins; but they did not touch on my problem. The final clinching was given by Hodge's most useful summary of the history of Cibola and Zuñi, included in that tremendous research which will always be fundamental to all studies of the Zuñi and which is the great labor of the life of Matilda Coxe Stevenson, who died far away while I was forming my first friendships with her old friends. In Hodge's meaty compendium I found that Mattsakya and perhaps Pinnawa were inhabited Zuñi villages in 1598, and in all likelihood when Coronado stormed Hawwikku in 1540, and that at least Mattsakya was a place of abode until the great revolt of 1680.

The fate of Mattsakya was also that of Kyakkima, a better preserved ruin nestling against the giant cliffs of Towwayallanna, four miles southeast of Ittiwawa, "the middle," as Zuñi is for the world, in the belief of its resi-

dents. The pottery of Kyakkima should accordingly be that of Mattsakya. It proved to be so. A hundred seconds on its débris settled the identity.

Not only, then, are there the type and period of white ware and the type and period of black and of red ware, but the latter is the more recent. It belongs in part to the time of early American history; the former is wholly prehistoric. I call the historic Type A, the prehistoric Type B, since further exploration or study may reveal another prehistoric Type C.

Pinnaŵa was revisited, and a larger collection of fragments brought home. Their relative numbers tallied as they should with the first lot, considering the chances of accident in such small series. Sherds continue some distance to the south of the wagon road that crosses the spur just south of the little summit of the site. My companion and I continued a quarter of a mile south, or southeasterly, up the gently sloping ridge to Tetlnatluwayala, a shrine of one of the war god twins. The shrine led me to believe in an underlie of ruin; and it was there. There was no shadow of doubt as to period: every sherd but one was white. Even the corroborating pebbles, and absence of building sandstone, did not fail. The pottery was not abundant on the surface and again the industry of the prairie dogs proved a boon.

We went on along the ridge, down a slight dip, across the deeply washed trail that the bearded gods tread as they file from the southwest into Zuñi in the evening of the first summer solstice dance, and up again to the next, low summit, where I remembered seeing a piece of lava, perhaps from a thousand year old grinding slab, on an earlier walk dictated by want of exercise and before thoughts of archaeology entered my mind. The spot is perhaps an eighth of a mile from Tetlnatluwayala. As nearly as the lieutenant governor could later follow my index from a Zuñi roof, he judged it to be Te'allatashshanna; but he may have misjudged the direction of my finger, or meant a more distant place: I am not certain of the name. I could not find the lava; but a short distance to the west, and a little higher, was another shrine. The hillock was of loose white sand, wind deposited and in spots wind eroded, though mostly covered with vegetation. In one of the bare depressions, and over a small patch on the leeward slope, lay a handful of pottery fragments. Again all but one were white.

We rode to Kyakkima with the lieutenant governor. As we approached the trickle that issued from the spring at the foot of a recess in the cliffs, a whitish spot on the sandy soil caught my eye. I sensed a type B sherd; but the officer said Kyakkima lay ahead. We drank at the head of the spring; then crossed the streamlet and ascended the steep slope to the east. Here was Kyakkima, where some five hundred Zuñi once lived in a town of four levels. On the higher terraces the walls that Mindeleff plotted still

stand; half way down is the ever present shrine with the dry rotting prayer sticks from which the plumes have blown. The site is large, the pottery abundant, and much of it attractive. I filled one pocket with an average sample, in which dull black was picked up indiscriminatingly with striking black on red and black on yellow patterns. Then we hunted pretty pieces. To keep any of the collection in the open pockets of the only coat among us on the ride home, part of it had to be jettisoned. The plain black pieces were abandoned; but unless some wandering Zuñi sheep herder or traveler has in mild surprise brushed them from the large rock by the spring, they still lie on its surface, to verify my count of them, while the reader scans this page.

But the white spot was not forgotten, and before the horses were remounted a ramble over the slope west of the rivulet produced a couple of dozen sherds — two red, all the remainder whitish. As usual, building stone was not in evidence, but pebbles and boulders occurred through the sandy soil. There is no shrine; nor does there appear to be a Zuñi name for the exact spot. I have named it Kyakkima Sunnhakwi, Kyakkima West. It is not a site that suggests itself for habitation. Possibly it is only the outer fringe of a once larger settlement of period B of which the main portion is covered by the Kyakkima of period A.

It is unnecessary to continue the narrative. Other "ruins" subsequently visited conform to the two types; such data concerning them as were noted, are included in the tabulations and in the memoranda appended. It is observable that of the type B sites, Hattsinawa and one other show a fair proportion of red ware. They therefore belong to the end of age B, or possibly to the first dawns of that later period which was still blooming in the sixteenth and seventeenth centuries of our era.

The white slip pottery of the prehistoric time in Zuñi Valley is clearly, in general, of the familiar Cliff-Dweller type. Even the black and white checker board ornamentation so familiar from museum and private collections, is represented. A deviation from the colorless grayish white of most Cliff-Dweller specimens to a light buff or yellowish or pinkish white in many of the Zuñi pieces, may be the result of a peculiarity of the local clay.

Careful explorers in Arizona have warned against too much weight being given to color when inferences are drawn. Yellow ware in a ruin may be more indicative of the chemical constitution of the soil than of a type of civilization. I am ready to subscribe to this caution as heartily as anyone. It does not apply to this study of Zuñi antiquity because every ruin touched lies within the same valley, because all those examined are within an hour's distance of the pueblo, and because at least two pairs of ruins of differing periods are only a quarter of a mile or less apart.

Zuñi pottery of 1915, which may be found in every household, is overwhelmingly a white or creamy yellowish white slip ware, patterned either with black or with black and red; but in the latter case, the areas of black exceed those of red. The reason for this prevalence of white surface is that the pottery in use is confined principally to two types: water jars, usually large but low; and great open bowls for bread kneading. Now and then may be seen a canteen of breast shape, also with black or black and red ornamentation; a high jar, of plain polished red, used both for storage and as a drum; and a water jar, usually small, with red inside and bottom — the red being burned yellow ocher. There are some black cooking pots: I have seen a number with handles or knobs, none really corrugated. Most of them stand unused in interior storerooms; occasionally one is set on the hearth fire to parch or pop corn, more rarely to cook in. The Zuñi woman now cooks in a frying pan or in agate ware, and serves food either in this vessel or in a china dish or rectangular lava bowl. A hundred, perhaps twenty-five years ago, this was not the case; and I am confident that débris from the town streets of that time would have shown nearly the same proportion of blackish ware as occurs at Mattsakya and Kyakkima, simply because the native cook pots had not yet gone out of use before American made substitutes. A few holes dug a yard or two deep in the streets or fallen houses of Zuñi will confirm or disprove my prediction.

I now began to observe sherds around the town. In the course of an afternoon's survey on the housetops, I gathered as many pieces as I could carry without interfering with the work in hand. More than half were blackish, and at that I probably desisted sooner from trying to pry out of the hard baked clay obstinately imbedded pieces of this shade than gaily colored ones.

It seemed however that the prevalence of black on the roofs might be due to the blowing over of chimneys, which in former times were regularly, and now still often, made of cracked or broken cook pots. Stooping through the streets of the town was hardly calculated to enhance my standing in Zuñi, so I delegated the task to four children of my "family," who fell to the work with zeal, and I am confident observed as closely as they could my instructions to collect without discrimination. An afternoon netted them over a thousand fragments, large and small. A third of these I class as black; more than half were black or black and red on white, and at least some of the white sherds are from jars of this type. My youthful aids reported that in the vicinity of the great plaza, in the very heart of the town, black pieces were scarce, but that toward the northwestern edge of the pueblo proper, — not of the suburbs or outlying houses — they became numerous. Both red and black on red pieces were found, though they aggregate only two or three percent of the total.

I believe this collection reasonably trustworthy. While dark sherds may have been a little slighted, they are far more numerous than I should have predicted after a month of frequenting Zuñi homes. When the changes in habits are considered that recent years have worked, it is a fair inference that a similar gathering made in a stratum a few feet below the present level of the streets would contain about one half black pieces, and correspondingly fewer of the patterned water jar type. In short, Zuñi potsherds of 1915 actually approximate those of type A, while those of 1815 may be expected to differ hardly at all, in color proportions, from those of 1615 or perhaps 1515. I suspect that a gradual diminution of the red ground ware, and perhaps of corrugated, is the chief change that has taken place (in the features considered) in the centuries since the discovery.

A few minor alterations may however be noted. The round lines of the deer and birds and scrolls on some modern Zuñi jars, are almost utterly lacking from the early historic sherds. This fact substantiates the conviction gained from museum inspection of modern Pueblo ware, that these designs are not native but the result of European influence, though to the Zuñi woman of today they seem as truly Shiwwi or pure Zuñi as do the angles she paints around them, or with which she covers the whole of the next jar she makes. Patterns in type A pottery are not infrequently lustrous — perhaps not a true glaze, but with a distinct glassy shine. The art or custom of producing this has perhaps died out since the sixteenth century. Red ware with black patterns seems to be no longer made: at least I have seen none in Zuñi except in a few specimens pronounced old. Red ware with overpainted white lines is still occasionally manufactured, though I believe mostly in bric-a-brac and tourist articles; but this was infrequent also in period A. Most of the vessels in use today have their black pattern, if not a true black, at least a very dark brown. This is due to the mixing of the pigment with water containing either cedar, or ky'ahhewe, or another plant extract. The small, four-sided, step-edged bowls still used for sacred cornmeal — whose average age may be a generation more than that of household bowls and jars — mostly have their frog and tadpole patterns in walnut brown, the above dyes not having been used with the pigment. Much of the type A "black" decoration is of the same shade; especially on yellow or yellowish background. The prayer bowls also incline to a yellowish slip; so that they connect the twentieth with the sixteenth century in two ways. A distinct green, usually lustrous and sometimes bright, which is occasional on type A pieces, seems however to have no equivalent today.

The ware of type B, of type A, and of today, shows white or gray along the fractured edge. It is rarely reddish, or red like Southern California

pottery. This is presumably a characteristic of the local clays. There are some ancient and modern fragments, mostly thick and coarse, burned red through; but the majority of red pieces are covered with a highly polished slip of that color.

History tells us that the people of period A were Zuñi, speaking and essentially living as now. The men and women who inhabited the sites of period B belonged to the unidentified prehistoric past. We cannot say that they were or were not Zuñi; but there is no known fact which prevents them from having been of this nation. That their ruins are low and soil-covered can be explained by reason of their age: that they are small in extent, in the open country, and located with reference to water supply or farm land or unknown considerations rather than for defensive protection, indicates a somewhat different life in the prehistoric period. I have not turned a spadeful of earth in the Zuñi country. But the outlines of a thousand years' civilizational changes which the surface reveals are so clear, that there is no question of the wealth of knowledge that the ground holds for the critical but not over timid excavator.

The results obtained are assembled in the statistics that follow. Table 1 gives the number of sherds, of each of the ten colors or types established for classification, at each ruin of period A; table 2, the same for period B. Lots obtained on separate visits to the same site are listed separately. It must be remembered that in all cases covered by these two tables, representative collecting was aimed at. For this reason the average sample from Kyak-kima in table 1 must be carefully distinguished from the selected collection made on the same site but analyzed in table 7.

Table 3 converts the absolute numbers of table 1 and 2 into percentages. It speaks for itself.

Table 4 is a summarization of 3, on the basis of the three fundamental colors, black, white, and red. Of sherds colored differently on their two sides, or having a pattern in two or three colors, all containing any red have been counted as "red"; of the remainder, all are included under "white" which bear any white. This arrangement gives red somewhat the advantage and black the disadvantage among the three colors; but any other method of summarizing would have been subject to an equal degree of arbitrariness. At any rate, table 4 reveals clearly, even to those who may not care to absorb the more numerous figures of the preceding lists, the distinctness of the two periods. In the historic time, "A," black preponderates, and red about equals white ware. In the prehistoric period, "B," white is overwhelmingly in excess and both black and red occur only scatteringly.

As my study progressed, I frequently found it difficult to divide the corrugated pottery into "black" and "white," and the difference between

periods A and B as regards this ware became apparent as one of total frequency rather than of difference of tint, though it is true that period B corrugated samples are almost throughout distinctly whitish. I also recalled that real corrugated ware is said by the Zuñi not to be made today, and is very scarce among the street débris, while most of the period A ruins show an appreciable percentage, though small compared with the type B sites. Further, the only really large proportion of corrugated pieces from any period A locality was at site W, which in its lack of building stone and general appearance resembles a type B site; next to it comes Pinnawa, which is more decayed as a ruin than even Mattsakya, and far more than all the others. It therefore seemed as if a progressive decrease of the proportion of corrugated ware of any color were a characteristic of the lapse of time in Zuñi Valley irrespective of "period"; and I arranged the sites in order accordingly. Two of the minor sites of period B did not fit into the series; but both of these also showed other special characteristics, in their slip ware. On the other hand, Hattsinawa, which I had before classed as late B on account of its high proportion of red sherds, as well as because it is located on a more distinct knoll than any of the other B sites, comes nearer to the A ruins, in its frequency of corrugated ware, than any B sites except Kyakkima West, and from this latter the sample was of the smallest.

A subdivision of the two periods was thus indicated. I tested the obtained sequence of sites with several color characteristics. The results, which are given in detail in table 5, are surprisingly corroborative and allow of a tentative discrimination of five sub-periods, or six if modern Zuñi be included. Briefly, corrugated ware preponderated in the very earliest epoch, and diminished through all periods until it has died out in the present. On the other hand, three-colored pottery,—black and red patterns on a white or yellow ground—is wanting in B, appears sporadically in early A, becomes more numerous in late A, and reaches its climax today. Black on red ware, on the other hand, is most abundant about the middle time. It has not been found in early B, while late A and the present reveal a decline from middle and late B and early A. For red and for black pottery in general, the relative figures for period A are not worth anything; but in both classes the period B sites show an increasing approximation to period A proportions in the order of their age as suggested by the corrugated ware. I believe it may be concluded, while type B and type A sites can normally be distinguished without the least uncertainty, and the separateness of the two is fundamental, that nevertheless they do not represent two different migrations, nationalities, or waves of culture, but rather a steady and continuous development on the soil.

TABLE 1.
POTTERY FRAGMENTS FROM SITES OF PERIOD A.

| | Matsakya | | Pinnava | | Kyak- kima Sample | Kolliva | Site W | Touva- yallanna | Winna- yava | Shun- tekya | Total | Modern Zuñi | |
|---|----------|---------|---------|---------|-------------------------|---------|--------|--------------------|----------------|----------------|-------|----------------|---------|
| | Visit 1 | Visit 2 | Visit 1 | Visit 2 | | | | | | | | Roofs | Streets |
| Black, dark gray, dull, without slip | 53 | 319 | 54 | 101 | 60 | 71 | 45 | 250 ^f | 111 | 110 | 1174 | 37 | 348 |
| Red on one side or two ^a | 8 | 12 | 25 | 21 | 12 | 19 | 2 | 160 | 30 | 7 | 296 | 4 | 26 |
| White or whitish on one side or two ^a | 6 | 77 | 2 | 28 | 7 | 18 | 6 | 96 | 11 | 33 | 284 | 5 | 94 |
| Corrugated black or dark | — | 5 | 4 | 22 | 1 | — | 10 | — | — | 4 | 46 | — | — |
| Corrugated white or light | 2 | 10 | 1 | 8 | 3 | — | 8 | 4 | 3 | 1 | 40 | — | 3 |
| Black ^b pattern on white ^c | 14 | 58 | 15 | 18 | 10 | 18 | 4 | 46 | 29 | 50 | 262 | 12 | 487 |
| Black ^b pattern on red | 5 | 11 | 6 | 21 | 2 | 3 | 1 | 16 | 1 | 5 | 71 | 1 | 5 |
| Red pattern on white ^c | — | 2 | 6 | 3 | 1 | — | — | 8 | 4 | 6 | 30 | — | — |
| White pattern on red | — | — | — | 5 | 1 | — | — | — | — | 1 ^g | 7 | 3 ^h | — |
| Three colors — black ^b and red on white ^c | 1 | 20 | 2 | 1 | 3 | 9 | — | 47 | 8 | 17 | 108 | 7 | 138 |
| Total | 89 | 514 | 115 | 228 | 100 ^d | 138 | 76 | 627 | 197 | 234 | 2318 | 69 | 1101 |
| Obsidian | 2 | 14 | 1? | — | e | — | 1 | 1 | — | — | — | — | — |

^a Red on one side and white on the other has been counted red.

^b "Black" patterns include brown and green. A noticeable proportion of "black" patterns of type A are glossy; none of type B.

^c "White" ground includes cream color and yellow; and in a few cases deep saffron, salmon, and brownish.

^d These hundred sherds are separate from those from Kyakkima classified in table 7.

^e Occurs, but not in type sample.

^f Neglected for colored pieces. A representative collection would show at least half of the unslipped "black" variety.

^g Or red on white.

^h Probably all fragments of one vessel.

TABLE 2.
POTTERY FRAGMENTS FROM SITES OF PERIOD B.

| | Shoptuwocayala | | Hatsi-nasoo | Tetladuwoyala | Te'allaash-shanna | Kyakima West | He'i'hi'anna | Site Y | Site X | "Haw-ikka B" | Total |
|---------------------------------------|----------------|----------------|-------------|---------------|-------------------|-----------------|--------------|--------|--------|--------------|-------|
| | Visit 1 | Visit 2 | | | | | | | | | |
| Black, dark gray, dull; without slip | 2 ^a | 9 ^a | 8 | — | 1 ^b | — | 2 | — | 1 | — | 23 |
| Red on one side or two | — | 2 | 2 | 1 | — | 1 | — | — | 4 | 3 | 13 |
| White or whitish on one side or two | 20 | 106 | 12 | 5 | 5 | 12 ^c | 71 | 1 | 19 | 4 | 255 |
| Corrugated black or dark | 1 ^a | 8 ^a | — | — | — | — | — | — | — | 4 | 13 |
| Corrugated white or light | 15 | 99 | 11 | 35 | 14 | 3 | — | — | 108 | 19 | 304 |
| Black pattern on white | 2 | 35 | 6 | 8 | 1 | 8 | 4 | 17 | 20 | 14 | 115 |
| Black pattern on red | 1 | 5 | 2 | — | — | 1 | — | — | — | 4 | 13 |
| Red pattern on white | — | — | — | — | — | — | — | — | — | — | — |
| White pattern on red | — | — | — | — | — | — | — | — | — | — | — |
| Three colors — black and red on white | — | — | — | — | — | — | — | — | — | — | — |
| Total | 41 | 264 | 41 | 49 | 21 | 25 | 77 | 18 | 152 | 48 | 736 |
| Obsidian | — | — | — | — | — | — | — | — | — | — | — |

^a Several are sufficiently light in color to be doubtful.

^b Polished brown.

^c Includes one piece of yellow, a color which, while largely represented among the "whites" of type A, is nearly lacking from the period B sites.

TABLE 3.
PERCENTAGES OF POTSDHERD VARIETIES FROM SITES OF PERIODS A AND B.

| | Period A | | | | | | | | | | Period B | | | | | | | | | | |
|--------------------|----------------|--------|---------|---------|--------|--------------|----------|----------------|--------------------|------------|----------------|----------------|-----------|------------------|------------------|--------------|---------------|--------|--------|-------------|--------------------|
| | Matsakya | Pimawa | Kyakima | Kolliva | Site W | Towayallanna | Wimayawa | Shumtekkya | All sites combined | Zuni roofs | Zuni streets | Shoplunuwagala | Haltinawa | Tellanaltuwagala | T'altatashshahna | Kyakima West | He'it'annanna | Site Y | Site X | "Hawutku B" | All sites combined |
| Black ^a | 62 | 45 | 60 | 51 | 59 | (40) | 56 | 47 | 51 | 54 | 32 | 4 | 19 | — | 5 | — | 3 | — | 1 | — | 3 |
| Red | 3 | 13 | 12 | 14 | 3 | 25 | 15 | 3 | 13 | 6 | 2 | 1 | 5 | 2 | — | 4 | — | — | 3 | 6 | 2 |
| White | 13 | 9 | 7 | 13 | 8 | 15 | 5 | 14 | 12 | 7 | 9 | 41 | 29 | 10 | 24 | 48 | 92 | 6 | 12 | 9 | 35 |
| Corrugated black | 1 | 7 | 1 | — | 13 | — | — | 2 | 2 | — | — | 3 | — | — | — | — | — | — | — | 9 | 2 |
| Corrugated white | 2 | 3 | 3 | — | 11 | 1 | 2 | 0 ^b | 2 | — | 0 ^b | 37 | 27 | 72 | 66 | 12 | — | — | 71 | 40 | 41 |
| Black on white | 12 | 10 | 10 | 13 | 5 | 7 | 15 | 22 | 11 | 17 | 44 | 12 | 15 | 16 | 5 | 32 | 5 | 94 | 13 | 30 | 16 |
| Black on red | 3 | 8 | 2 | 2 | 1 | 3 | 1 | 2 | 3 | 2 | 0 ^b | 2 | 5 | — | — | 4 | — | — | — | 6 | 1 |
| Red on white | 0 ^b | 3 | 1 | — | — | — | 2 | 3 | 1 | — | — | — | — | — | — | — | — | — | — | — | — |
| White on red | — | 1 | 1 | — | — | — | — | 0 ^b | 0 ^b | 4 | — | — | — | — | — | — | — | — | — | — | — |
| Three colors | 4 | 1 | 3 | 7 | — | 8 | 4 | 7 | 5 | 10 | 13 | — | — | — | — | — | — | — | — | — | — |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

^a Designation of colors is as in Table 1.

^b Present, but amounting to less than one half of one percent of the total number of sherds collected at the site.

TABLE 5.

PERCENTAGES.

| <i>Period</i> | <i>Site</i> | <i>Corrugated</i> | <i>Three Colors</i> | <i>Black on Red</i> | <i>Any Red</i> | <i>"Black" ware</i> |
|---------------|-------------------|-------------------|---------------------|---------------------|-----------------|---------------------|
| PRESENT | Zuñi | 0 ^a | 0 | 1 | | |
| LATE A | Towwayallanna | 1 | 8 | 3 | 22 ^b | 53 ^b |
| | Kolliwa | — | 7 | 2 | | |
| | Shunntekkya | 2 | 7 | 2 | | |
| | Wimmayawa | 2 | 4 | 1 | | |
| | Mattsakya | 3 | 4 | 3 | | |
| EARLY A | Kyakkima | 4 | 3 | 2 | | |
| | Pinnawa | 10 | 1 | 8 | | |
| | Site W | 24 | — | 1 | | |
| LATE B | Hattsinawa | 27 | — | 5 | 10 | 19 |
| | Kyakkima West | 12 ^c | — | 4 | 8 | — ^c |
| MIDDLE B | Shoptlawwayala | 40 | — | 2 | 3 | 7 |
| | "Hawwikku B" | 49 | — | 6 | 12 | 9 |
| EARLY B | Te'allatashshanna | 66 | — | — | — | 5 |
| | Site X | 71 | — | — | 3 | 1 |
| | Tetlnatluwayala | 72 | — | — | 2 | — |
| ? — B | He'i'tli'annanna | — | — | — | — | 3 |
| | Site Y | — | — | — | — | — |

^a Present, but less than half of one percent.

^b The variation between sites here lumped seems due more to accident or selection in collecting than to differences typical of period.

^c Unfortunately only 25 pieces are available from this site.

I am aware of the thinness of my foundation in rearing a structure of half a dozen eras on nothing more than three or four color and texture features of a few thousand sherds gathered on the surface of some fifteen closely grouped spots. I was tempted to buttress my chronological classification by further collecting, especially at sites from which my representation was little more than vanishing. But my stay in Zuñi is short; the time that gathering, sorting, and tabulating would require, is scarcely available; and even twice or three times the number of surface fragments would not suffice to convert my tentative conclusions into positive ones. The final proof is in the spade; and that involves money, a gang of men, months of time, and an examination, if possible, of all ruins within a given radius. The real confirmation of my chronology I must thus of necessity leave to the future. But I am confident that however the present classification be altered in detail or supplemented by wider considerations, in essentials it will stand — because the essentials are obvious on the ground.

The problems of prehistoric Zuñi and of the earliest Southwest will be solved only by determined limitation of attention. There has been treasure hunting in this fascinating region for fifty years, some with the accompaniment of most painstaking recording, measuring, and photographing; but these dozens or hundreds of efforts, some of them costly, have produced scarcely a rudiment of true history. It is fatal for the investigator to exhume pottery in the morning, note architectural construction at noon, plot rooms in the afternoon, and by evening become excited over a find of turquoise or amulets. Such procedure may allow areas and even sites of most distinctively different type to be discriminated, but the finer transitions, on which ultimately everything depends, will be lost sight of under the wealth of considerations. One feature at a time, then another, then correlation, is the method that will convert Southwestern archaeology from a delight for antiquarians into a historian's task. The fine bowls, precious jewelry, and beautiful axes that already cumber our museums, will find their use; but that time is at the end of study, when they can be placed and used with meaning, not at the beginning, when they confuse and weary. At present five thousand sherds can tell us more than a hundred whole vessels, and the bare knowledge of the average size of room in a dozen contiguous ruins may be more indicative than the most laborious survey of two or three extensive sites.

Particularly does the necessity of concentration apply geographically. A promising site here and another a hundred miles away may show striking differences in innumerable respects. But in the present chaos of knowledge who can say which of these differences are due to age and which to locality and environment? With the chronology of Zuñi, of the Hopi country, of the Rio Grande, of the San Juan, and of the Gila worked out independently, comparison may yield momentous conclusions; but comparison at present, however suggestive, will bear no certain fruit. If the investigator who enters this greatest of American archaeological fields allows himself to be appalled by the length and variety of the labors of those who have preceded him, his outlook will be dreary; if he recalls that but for a few scattered scratches the field is virgin as regards real history, and if he wisely limits himself, and proceeds by the common sense plan of one thing at a time and that hammered at until it yields, he surely has before him one of the most promisingly productive of scientific problems.

NOTES ON INDIVIDUAL SITES.

PINNAWA.

There is plenty of loose rock on the summit of this mound, but not a trace of the walls plotted by Mindeleff is now visible. Even the rebuilt corrals and the house still in use in 1885 are gone. Pottery extends at least fifty yards south of the wagon road, and north almost to the river. The latter may be washed; the former is on higher ground than the road and plotted southern part of the village. The knoll is gentle, and the site of the open character of Mattsakya and Zuñi rather than naturally defensible like Kyakkima, Kolliwa, or Wimmayawa.

MATTSAKYA.

This ruin has decayed nearly as much as Pinnawa in thirty years. There are no standing walls whatever, and vegetation is comparatively thick. The two rooms west of the shrine are fully traceable; but that is all. (See table 6.)

KYAKKIMA.

Kyakkima has altered little since Mindeleff's survey. It must be noted that his map is oriented with east to the top of the page. The town was built on four distinct terraces or levels, which I estimated at thirty, fifteen, and fifty feet above one another. The two former figures agree with Mindeleff's contours, but his lines stop before reaching the highest terrace, which lies dead against the face of the cliff on whose top stand the ruins of Towwayallanna. With its back against this tremendous wall of rock, is a low foundation, enclosing a space much larger than an ancient Pueblo room, which shows in Mindeleff's plan as a rounded, irregular quadrangle. To my eye it seemed more nearly semicircular. The lieutenant governor, when his attention was called to it, pronounced it a "head man's dance house." The upright and horizontal slabs at the east end of the ruin are still in place; but I counted seven of the former where the plot shows five. My informant volunteered the observation that here prayers were spoken to the rising sun — somewhat as by the Zuñi pekkwine today. Mindeleff's Indians suggested defense, and he himself conjectured graves. I will not presume

TABLE 6.

MATTSAKYA.

Second Visit.

| | | |
|--|-----|-----|
| Black, dull, and gray, all without slip, mostly smoothened black inside | 307 | |
| Gray, cracked, polished, texture different from white and yellowish slip | 12 | 319 |
| Red, polished, some on both sides, some with white slip on one side | 12 | 12 |
| White slip on one side | 30 | |
| Yellowish slip — about half the pieces on both sides, the other half usually have a polished gray, perhaps slip gray, on the outside | 47 | 77 |
| Corrugated black | 5 | 5 |
| Corrugated white — some with thin white slip, others with thick gray smooth slip (?) on inner side | 10 | 10 |
| Black on white; only two show hatching. Pattern mostly on inside and generally true black, but there are a few brown pieces | 23 | |
| Brown on yellow | | |
| Pattern inside, outside white, yellow, or gray | 17 | |
| Pattern inside, outside red | 2 | |
| Pattern on both sides | 5 | 24 |
| Brown on grayish, from very light to dark | 11 | 58 |
| Black on red; only one hatched; undecorated side either white or red | 11 | 11 |
| Red on white | 0 | 0 |
| Red on yellow | 2 | 2 |
| White on red | 0 | 0 |
| Three color: black and red on white: but black is often brown; red, brownish; white, yellowish | 14 | |
| Three color: deep yellow ground with red pattern edged in brown | 6 | 20 |
| Total pottery | | 514 |
| Lava pieces, large and small | 12 | |
| Obsidian, mostly small pieces | 14 | |
| Arrow point, milky, translucent | 1 | |

to decide the conflict. Two of the three lower levels are depressed in the center, suggesting ruined house walls surrounding plazas. This was also the lieutenant governor's explanation. We may have been misled, however, by the fact that the interior cross walls which Mindeleff diagrams are not visible today. Still, one would expect that a solid cluster of rooms would fall into a heap higher rather than lower in the middle. (See table 7.)

KOLLIWA.

This ruin, named to me by several informants before it was visited, is three miles distant from Zuñi, about 15 degrees east of north or along the magnetic needle. It lies at the edge and near the eastern end of a red sandstone ridge that stretches for several miles north of Zuñi in a general east and west direction, or more nearly northeast and southwest. Some three or four hundred feet below the cliff and talus that form the top of this ridge, a nearly level bench, a short hundred yards in width, extends for some distance, more or less intermittently. At several places small but deep canyons head suddenly from the bench with a sheer drop. On two small knolls on both sides of one of these drops is Kolliwa, the western settlement measuring about 50 by 75 feet, the eastern 60 by 120. The knolls rise but slightly above the bench, and each ruin has a long straight wall along its back, facing the bench and guarding it from attack on this its weakest northwesterly side. These walls run parallel with the cliff. On their other sides, the outer walls closely follow the steep rim of the knolls. The choice of the sites from defensive motive is obvious. It is true that the cliff seems to loom above both; but its height as well as its distance would cause an arrow to be aimless or spent before it fell in either part of the town, and would render any other missile totally futile.

A hundred and fifty yards down the canyon from where it heads between the twin townlets, is a cottonwood, the only one in miles. A few steps below, is a spring, a diminutive pool with a few stones built around it by sheep herders. When seen, it was dark red from the mud of recent rains, and scarcely drinkable even to the thirsty. But the canyon bed seemed wet, and no doubt a hole in a well chosen spot would have filled with clear seepage. At any rate, the cottonwood attests permanent water.

It is difficult to decide where the inhabitants of this wild fastness grew their food. Their canyon is a rocky little gorge; and while it soon takes a calmer course, it is a mile before, uniting with other washes, it spreads into a nearly level flood plain, and an unfavorable clay one at that; while the nearest part of Zuñi Valley is a mile and a half distant. Just below the

TABLE 7.

ANALYSIS OF PAINTED POTSDHERDS FROM KYAKKIMA.

| | | |
|---|---|----|
| <i>Black on white:</i> | | |
| Black or dark brown on white; outside red | 4 | |
| " " " " " " white | 2 | |
| Shiny green on white; outside red | 2 | 8 |
| Black or dark brown on white; inside white or gray | 7 | |
| Green on white; inside white | 1 | |
| Black on white; inside black on white | 1 | |
| Black on white; inside red | 1 | 10 |
| Dark brown on pale yellow; outside yellow | 1 | |
| " " " " " " brown | 1 | 2 |
| " " " " " inside pale yellow | 2 | |
| " " " " " " brown | 1 | |
| " " " " " " reddish | 1 | |
| " " " " " " gray | 1 | |
| " " " " " " same colors | 2 | |
| " " " yellow, inside same colors | 1 | 8 |
| Black, glossy green, or dark brown on gray, light brown, or greenish gray | | |
| Pattern inside | 5 | |
| Pattern outside | 3 | 8 |
| <i>Black on Red:</i> | | |
| Black on red; outside red | 5 | |
| Black on salmon; outside salmon | 3 | |
| Glossy dark green on red; outside red | 2 | 10 |
| <i>Red on Reddish:</i> | | |
| Style of Yuman ware; pattern outside; inside same color | 2 | 2 |
| <i>White on Red:</i> | | |
| White on red; inside glossy black on red | 3 | |
| " " " " maroon on white | 1 | |
| " " " " green on white | 1 | |
| " " " " white | 1 | 6 |
| <i>Three Colored:</i> | | |
| Black and red on white; inside red | 1 | |
| " " " " buff; " " | 2 | |
| " " " " white; " black | 1 | |
| Black and red or maroon on gray or buff or yellow; inside same ground color | 5 | |
| Dark brown and red on white; inside white | 1 | |
| " " " " " yellow; inside brown on white | 1 | 11 |
| Glossy black, green, or brown and red or reddish brown on white; outside red, reddish, or white | 3 | |
| Black and white on red; outside red on white | 1 | 4 |
| Four shades from pale yellow to dark red; outside polished gray | 1 | 1 |

70

Sixteen of the above show hatching in the pattern

built on knolls, however, and for some distance along the ridge in both directions, at the same relative height, the spurs between the numerous little canyons are sand topped; and while now overgrown with cedar and piñon, and somewhat rolling, they might have afforded small level patches on which with careful nursing corn could be grown.

The population of Kolliwa was never large. The two towns together

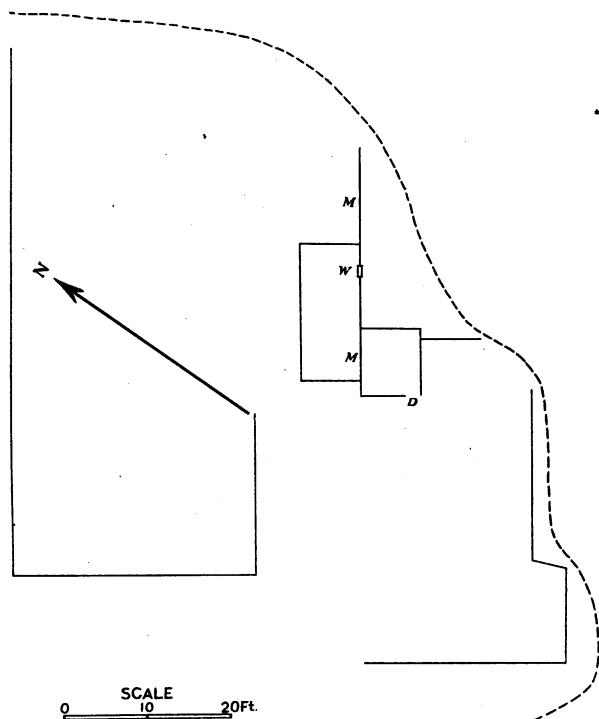


Fig. 1

WEST KOLLIWA

- D* DOOR OR ENTRANCE
W WINDOW TWELVE INCHES HIGH FIFTEEN INCHES LONG
M MUD STILL IN CRACKS OF WALLS
 — WALLS TRACEABLE, FROM SIX FEET HIGH TO LEVEL WITH GROUND
 --- BRINK OF KNOLL

may have harbored a hundred and fifty people. But living rooms are distinctly traceable only on the peaks of the two knolls, and the outer defensive walls may each have enclosed only a few dwellings.

The masonry varies in quality, and in thickness from nearly one to at least two feet. A window, three or four feet from the ground, and clay

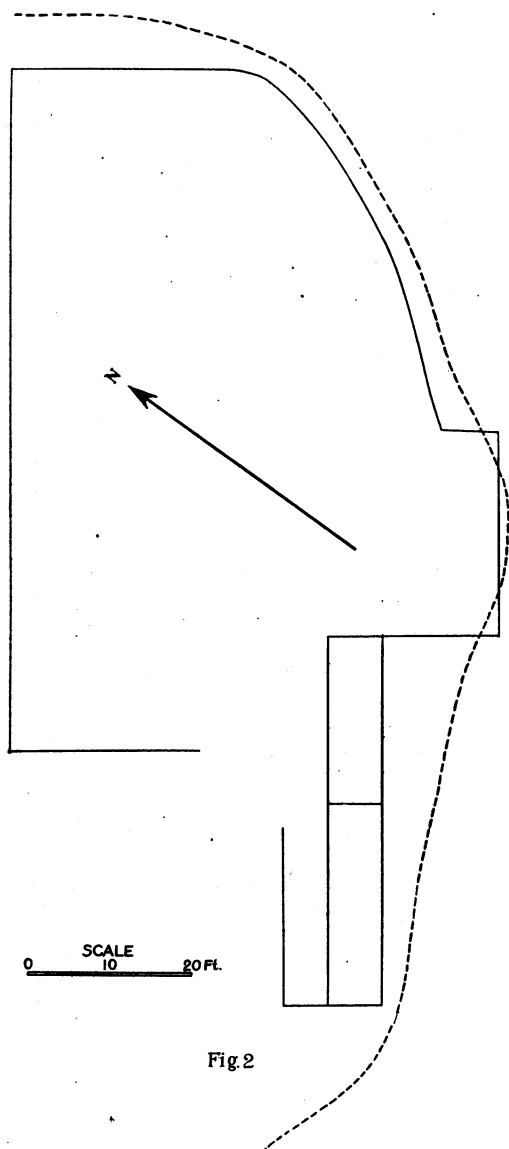


Fig 2

EAST KOLLIWA

— WALLS TRACEABLE, SOME STANDING UP TO FIVE FEET HIGH
 --- BRINK OF KNOLL

mortar with imbedded pebbles, in the chinks of the best preserved masonry, may be seen in West Kolliwa. Too great a recency need not be argued from these features; but a notable antiquity is also out of the question.

This inference is confirmed by the pottery, which is most clearly of period A. The only distinctive circumstance is the total absence, among more than a hundred sherds, of corrugated ware; and this may be accidental.

Sketches of the twin sites are appended. I had not been led to expect a real ruin, so a knife point, slab of stone, broken match, and walking stick took the place of pencil, paper, scale, and tape. Close accuracy was thus out of the question, but the two diagrams are approximately true.

SITE W.

A third of a mile northeast of the government day school, and a hundred and fifty yards from Governor Lewis's house, the children found sherds and brought them in. The site has been irrigated of recent years, and besides two or three gentle rises of a couple of feet, there is nothing to cause the faintest suspicion of former occupation, except a small proportion of pebbles in a few spots. The pottery is of type A in standard proportions, except that corrugated ware is unusually abundant; even obsidian is present — I picked up the flake myself. It is however the only type A site which is totally ruinless and rockless and on the level ground.

TOWWAYALLANNA.

Towwayallanna is the impressive mountain that all who write of Zuñi have been impelled to mention. Formed by age long erosion between the Zuñi River and a large and long wash on the southwest, it dominates the imagination as it does the landscape. Flat-topped, sheer-walled, a mile in each direction, and a thousand feet high, it has three times sheltered the frightened Zuñi in the historic period — including twelve continuous years after the great rebellion of 1680,— and no doubt served them as refuge on more than one occasion before. In their own creation myth, they found safety on its summit from the flood as well as from their foes; and their shrines to Ahhayuta his elder brother and Ahhayuta his younger brother — the war god boy twins — are still maintained on the top in undiminished sanctity, as innumerable bits of turquoise, shell, and every kind of valuable thing attest. There are two trails which are difficult if not dangerous; a third can be comfortably descended to the rolling sand hills of the peach

orchards in ten minutes, and climbed if necessary on burro back; but it has been improved for the purpose. In old days it would have constituted nearly as formidable a barrier to storm as the other two.

Locally, Americans know the mountain by its Zuñi name. In books it is written Thunder Mountain, for which Cushing is probably responsible, and which is as striking and as worthy a designation for the majestic rock as could be desired, and in the best vein of that man of genius. Unfortunately, I must incline to Mrs. Stevenson's cooler interpretation of Corn Mountain, not only on Zuñi authority, but on my own imperfect knowledge of the speech. Thunder is towowo, and corn towwa, in the orthography which I follow. I have more frequently heard Toayallanna — also, it is true, toa more often than towwa; but I suspect the ww to be slurred after o in both words.

I add for the advantage of those who may have the good fortune to follow me in a stay, however transient, at "the middle place," that it is impossible to carry away a truly full remembrance of the country of the Zuñi,— of their earth — until he has looked down the valley from the rim of this looming mesa. If, in addition, one be privileged to see distant rainstorms travel among the still sunshine, he will know the world the Zuñi heart dreams of as well as the one its body walks.

The ruins, which do not appear to bear any other name than that of the mountain, have been surveyed and described by Mindeleff. They do not seem to have altered to any sensible extent. The southeastern portion is practically on top of Kyakkima, six or seven hundred feet below. My visit occurred after a week of rains; and two natural basins of water were seen which with a little damming might have been extended to the size of those mentioned by Mindeleff. The ruin is the largest in the vicinity. It gives the casual impression of having sheltered a thousand people; but is so scattered that it cannot be surveyed in one sweep of the eye, and may have harbored twice as many. The available building stone did not break into even slabs; hence the walls are shambling and tumbledown, and afford no ground for estimating the age of other ruins by comparison with the condition of this two hundred and twenty-two year abandoned masonry. Part of the mountain top is arable sand; but the area available is too small, if ever it was utilized, to have supported more than a minute fraction of the population.

The potsherds of course are of type A. They are frequent at some distance from the structures. A pair of willing hands guided by a sufficiently patient brain, might gather a thousand pounds without a tool. All five members of our party collected at different spots; so that I suspect a somewhat undue proportion of colored pieces, and that perhaps half of the monotonous black and dull unpolished fragments within reach were left.

Red ware is relatively abundant; but if sherds red on one side and white on the other had been counted as of the latter color, the proportions would have been exactly reversed. Nineteen of the one hundred and sixty pieces reckoned as red are yellow overpainted with a streaky dark maroon; twenty-four are black or gray on the opposite side, sixty-five white; and only fifty-two red on both sides. Even these were possibly sometimes given a white slip before the red-burning wash of yellow ocher was applied.

White sherds include some with the pure lustreless crumbly slip of Cliff-Dweller vessels; others ranging from white through cream to yellowish, polished like modern ware, and in some cases probably fragments of patterned jars; while a fair proportion seem to be without true slip, and of a gray which but for its light shade would have been reckoned as dull or "black."

Decorated ware, with few exceptions, might be modern. Black on white fragments are about as numerous as black and red on white; but many may be from three-colored vessels. The same is probably true of some of the red on white sherds, but others appear to have been painted in these two colors. Some glossiness appears in a few dark green or brown patterns; but the luster is thin.

WIMMAYAWA.

This ruin is visible from the Gallup road, an eighth of a mile west of which it follows the outline of a small hill. The distance from Zuñi was said to be five miles. I estimate it at three and one half. There is a living spring near by, still known by the name of the ancient town; and a long wash, which the road follows for a distance, must carry water below ground, since it supports a cottonwood in fair condition. The levels along this stream bed would suffice for some patches of corn; but the farms of the settlement must in the main have been in Zuñi Valley a couple of miles away. The ruin is perhaps a mile to a mile and a half distant from site X, about in line with it and the Black Rock school.

Wimmayawa could have housed two or three hundred people. Its east and west, and north and south walls conform to the lines of the hill on which it is situated, though less closely than at cramped little Kolliwa. Defensibility and water led to the selection of the spot for habitation.

Most of the walls that are first visible, are recent corrals, probably following old foundations almost throughout, but with the inner walls removed to build up the enclosure. One of the corrals is in splendid condition, and its entire interior is level with sheep dung. In one place the loose, unmortared corral rests visibly on an old wall. The difference is striking, but

indicative of diversity of use rather than of deterioration of art. We too build our dwellings better than our barns. Outside of three obvious fences, the masonry is probably all ancient, and where tolerably preserved, of much the same type as in the just mentioned piece of foundation. A room eight by seventeen feet, and another ten square, are in fair condition. These seem normal interior sizes at period A sites. Mud mortar was observed in place. Building stone is at hand. It does not slab as evenly as at Kolliwa, but at least as well as at Kyakkima and far better than that of Towwayallanna; and the quality of the masonry is in direct accord with the nature of the stone. It would therefore be rash, in this region, to argue age from condition of walls, or to assert a uniform decline of the building art with the progress of time.

So far as I know, Wimmayawa has never been plotted, and I was therefore inclined to attempt a sketch survey. An encounter with a rattlesnake, presumably attracted by the innumerable lizards and small rabbits that haunt the broken walls, however led me to conclude that such a rough diagram as I could make alone with the aid of a stick, would not be worth the risk of stepping with unlegged feet over another one of the species; and I abandoned the endeavor.

Pottery was only fairly abundant; and as at other ruins, I found more in the open spaces just outside of the town than in the débris of the rooms. The kinds and proportions of ware are thoroughly representative of type A. About a third of the red pieces were white on one side. Of the eleven "white" four were yellowish, and five showed the porous bluish surface so prevalent at He'i'tli'annanna. All the red on white sherds, and some of the black on white, seem to have come from vessels that originally bore both black and red patterns on a white surface.

SHOFTLUWWAYALA OR SHOFTLUWWALAWA.

This little knoll measures 65 yards from north to south, where it is well defined, and about 120 from east to west, in both of which directions it fades out into the surrounding level ground. The shrine of the Yellow Sallimoppiya is nearly in the exact center. The spot has unquestionably been inhabited. The complete absence of building stone forces the possibility that the builders of period B may have used adobe clay. But it would be fantastic to rear any imaginings on this speculation until thorough excavations have been performed. It is more likely that all the surface rock has been carried away to be built into nearby Zuñi.

HE'I'TLI'ANNANNA.

This site, whose name seems to mean "blue wall," is on the road to Kolliwa, about two miles from Zuñi. A small knoll, five or six feet high, was seen a few yards to the left of the path, and perhaps two hundred yards east of the easterly end of Alla'immutilanna, a steep ridge paralleling for a mile or so the higher and longer one at whose base Kolliwa is nestled. As I approached, a few slabs from an abandoned shrine became visible on the summit; then the indicative pebbles appeared in the soil, and a moment later the first potsherd — a white one — was found. There were needed only the observations that no building stones lay about and that the site was a small one — perhaps fifteen yards across — to make a habitation of period B morally certain. The pottery, though not abundant, was numerous enough for ample confirmation. There were no red pieces, and only two small black ones, one of them a bit in such condition that its classification must be doubtful. All the other seventy-five sherds were white, four painted with black patterns, the rest plain. Of these, somewhat more than half presented a porous whitish slip of weathered appearance, while some twenty-five or thirty were of a distinct bluish gray, pale enough to be reckoned as white. There was not a single corrugated piece. The uniformity as well as distinctiveness of the ware at this little site is remarkable.

It may be noted that a hundred yards to the north, near one of the lowest cedars on the gentle slope that fronts toward Zuñi, lay a large brown-painted creamy-yellow potsherd — typical modern ware. Its appearance and feel were distinctly new. It may have rested where found a few days or several years. Some hundreds of yards further, right in the path, a smaller piece of typical black ware was found — with equal lack of apparent reason for its isolated presence. These examples, together with the occurrence of a piece of bottle glass and of American made china on the surface of Shoptluwwalawa among the numerous sherds of the prehistoric period, emphasize the slight weight that can be attached — in surface observations — to unique specimens, and the necessity of basing inferences on series of some magnitude.

He'i'tli'annanna is not far from the northern and now cultivated edge of Zuñi Valley. The slight slope on which it stands may also be cultivable, though this seems doubtful even for the acclimated native corn. Water may once have been obtainable in some crevice at the base of the nearby ridge.

SITE Y.

More puzzling are a few potsherds found a quarter of a mile further in the same road, at what may be called He'i'tli'annanna Pishlankwi, or "Blue-wall north." Right alongside the road, nearly all about one of the small cedars that begin to abound here, and none more than a few steps distant, lay eighteen discoverable pieces. All but one had a black pattern on white; and the exception was a minute fragment that might well have come from an unpainted spot on a decorated vessel. The other seventeen pieces classify as follows:—

| | Broad bands | Hatched |
|------------------|-------------|---------|
| Inside black | 2 | 7 |
| Inside dark gray | — | 3 |
| Inside white | 5 | — |
| | — | — |
| | 7 | 10 |

There is variety enough within this narrow compass to demonstrate against the possibility that all the pieces were remnants of one, or even of two pots, that happened to be broken here at some time. The white is of the unpolished type of period B. But the site seems most unlikely. The ground is sloping bed rock, covered only with thin patches of disintegrating slabs and sand. Fifty yards to the east is an elevation, the crest of one of innumerable spurs extending at right angles to the above mentioned mountain ridge. This spur looks like the natural spot for settlement in the vicinity; but search produced not a single evidence of occupation on the summit.

This site, if it really be such, with ancient He'i'tli'annanna on one side of it and more modern Kolliwa on the other, makes three in which no corrugated pottery was discovered.

SITE X.

The opposite is the case at nameless site X, where more than two thirds of a tolerable series was corrugated — every piece white. I cannot locate this site exactly. It is three or more miles from Zuñi, to the east of Kolliwa. Our first attempt to find the latter ruin was made with a youthful guide who proved not to know the way and led us to the right. At last we stopped in the middle of nowhere,— a sandy rolling tract away from water and nearly half a mile from the long cliff ridge at whose foot Kolliwa lies

further west. In several spots here pottery was thick; but the usual pebbles of sites of type B were absent, and only one piece of the normally frequent vesicular lava was found. Why anyone should settle in this deserted spot rather than in a hundred others about, I cannot understand. Perhaps it was at one time a cornfield; divested of its crop of piñons and cedars, its white sand might yet be made to yield grain; and the sherds may possibly be from jars brought to the growing field. The site certainly has all the typical marks of a Period B site in an exaggerated degree; but, as usual where material is sufficiently abundant, there was a sprinkling of black and of red pieces — the majority dull red outside, blackish inside. Not one of the 152 sherds bore any evidence of having been polished, as was customary on ornamented ware in period A.

SHUNNTEKKYA.

An old Zuñi woman who saw my young friends picking up sherds before her door, and learned that they were for me, brought a bag full which her father, six or eight years ago, had gathered, perhaps while sheep herding, and carried home to be ground and mixed with clay for new pots. I could not learn where the ruin is, except that it lies perhaps ten miles, as the Indians vaguely count them, to the south east, somewhere behind Towwayallanna. I was loath to include such data; but as a count revealed perfectly typical period A proportions, and as the collector's motive would have led to no deliberate selection, I have added the figures.

"HAWWIKKU B."

The same considerations apply to a smaller lot subsequently offered to me as from Hawwikku, near Ojo Caliente, one of the three outlying farming settlements of the Zuñi. But here there is a second difficulty. Hawwikku was one of the seven cities; it has ruins of a church; and it was inhabited until the Pueblo rebellion. But a glance at the sample proved it to be of type B. The owner was questioned, but, as I had never been on the site, not with much definiteness; and I only elicited that the sherds were picked up, also for pottery making, at Hawwikku itself. He may have selected, by some fancy, only such pieces as happened to be of the earlier type; or he may have gathered on a spot near Hawwikku which represents a settlement of an earlier time than the historic Hawwikku. I have therefore called the place "Hawwikku B." The next investigator may possibly

identify it with little trouble. I was tempted to acquire further collections of the same kind, of which there must be many in the town; but while the Zuñi are a reliable people, it seemed wisest not to swamp myself with material from locations I had not seen.

Zuñi,

August 3, 1915.

POSTSCRIPT.

A delay in printing allows me to add references to literature, though these remain references, unfortunately, more largely than they reveal relations.

Bandelier in his various writings, summed up in his "Final Report" in volume IV of the American Series of Papers of the Archaeological Institute of America, distinguishes the earlier period of black on white ware from the later one that extends into historic time. He notes also that obsidian occurs only in ruins of the later era.

Dr. Fewkes spent part of his first stay at Zuñi in an archaeological reconnaissance somewhat more extended than mine, on which he has an admirable paper in the first volume of the *Journal of American Archaeology and Ethnology*. As Dr. Fewkes principally examined ruins as such, and makes no reference to potsherds, his and my preliminary essays present few points of contact.

In the twenty-second Annual Report of the Bureau of American Ethnology, Dr. Fewkes describes the results of two summers of exploration in the ruins on the Little Colorado and in adjacent territory. The Little Colorado pottery bears certain obvious similarities to ancient Zuñi ware, but there are also striking differences that impede immediate correlation. Dr. Fewkes' numerous illustrations of whole vessels do not suggest very strongly my sherds of type A, while his scanty references to corrugated ware seem to preclude the close connection of his finds with my type B. His predominating attention to complete vessels and my limitation to surface fragments may account for some of the discrepancy. But his frequency map on plate 70, with its revelation of a strong preponderance of red ware on the Little Colorado, disposes offhand of any complete cultural identity of this region with Zuñi A. It would be rash to guess whether the differences represent distinctions of available material, of period, or of contemporaneous but inherently diverse cultures.

This uncertainty is increased by the one published account of the Hemen-

way Expedition archaeological results, a description by Dr. Fewkes in the Putnam Anniversary Volume, of the discoveries by Cushing in his excavations at Hallonawa, across the river from Zuñi, and at Heshshota'utlla, fifteen miles east. Dr. Fewkes identifies this ware, now stored in the Peabody Museum, with that of the Little Colorado. Many pieces are clearly of Zuñi type A; but again, the prevalence of red ware does not fit with my surface results. Dr. Fewkes also sees a greater difference between this late prehistoric Zuñi pottery and modern Zuñi ware than I am able to perceive, whereas he appears to connect the latter with the northern Cliff-Dweller pottery, in type if not historically. Dr. Fewkes also scarcely refers to the possibility of continuous cultural development within an area, or to Spanish influences, while he stresses far more strongly than I should dare, clan migrations and hypothetical compositions of tribes. Granting these latter to have occurred to the extent that he indicates, it would seem to remain to be established, instead of assumed, that such accretions would seriously affect the type of ware in customary manufacture at a pueblo or in a group of towns.

Mr. N. C. Nelson, in the concluding paragraphs of his "Pueblo Ruins in the Galisteo Basin," in volume XV of the *Anthropological Papers of the American Museum of Natural History*, has a reference to glazed pottery in late prehistoric and historic times, which shows that ware of this type is chronologically of sufficient importance to receive closer attention at Zuñi in the future than I have given it in my cursory examination. Mr. Nelson's Galisteo specimens in the American Museum however reveal a very much heavier and rougher type of glazing than I have observed in Zuñi potsherds, and the style is apparently the usual one for some periods at Galisteo, whereas at Zuñi its employment seems always to have been sporadic or hesitating. A time correlation between the two regions will no doubt be possible on the basis of glazing, but superficially the wares of the two regions do not resemble each other enough for any off-hand identification.

A sequential determination which Mr. Nelson has made from stratification at San Cristobal, which promises to be of the utmost importance, remains unpublished and unavailable to date.

On the other hand, Dr. A. V. Kidder, in his "Pottery of the Pajarito Plateau," in the second volume of the *Memoirs of the American Anthropological Association*, sets up a valuable sequence of wares in another part of New Mexico. Careful study and critical judgment compensate in this work for the absence of any discovered stratification. Dr. Kidder distinguishes a black-and-white, a "school-house," a Frijolito, and a Pajaritan period. The ware of the second of these types he connects, though without identifying, with the Hemenway prehistoric material from Zuñi described

by Dr. Fewkes. This would make Dr. Kidder's first period correspond with my B, his last three with my A.

Dr. Kidder has also done me the favor to look over my sherds, and pronounces my period A ware to be, at least in general, of the type of the Heshshota'utlla pottery in the Peabody Museum. He also regards my sherds from He'i'tli'annanna as closely similar to the typical ware of a rude and presumably early culture discovered by him in the San Juan drainage, as yet undescribed and tentatively named "slab house." This correlation confirms the distinctness of the He'i'tli'annanna ware which I had implied at least by exclusion in my table 5, and is of the greatest interest in that it indicates the probability of another period, or at any rate definite sub-era, at Zuñi.

Dr. Kidder has also pointed out to me that the difference between dark and light corrugated ware is likely to be the effect of long continued weathering. This would indeed give some measure of age for exposed pieces, but probably does away with the distinction between dark and light corrugated pottery as essentially characteristic of period. Determinations of period will therefore have to be made, in this ware, by its total frequency relative to all pottery, as I had already inclined to do in my fifth table, or by the nature of the corrugation itself.

In spite of indisputable local and non-temporal differences, as attested for instance by the absence of Dr. Kidder's "biscuit" ware from Zuñi as well as by the distinctive character of glazing there; in spite too, of the paucity of my material, and the fact that all of Mr. Nelson's and part of Dr. Kidder's ceramic data remain unpublished, it appears to be clear that chronological, or at least sequential, determinations can already be made for at least three New Mexican regions, and that these evince certain correlations among each other. The successful conversion of the archaeological problem of the Southwest from an essentially exploratory and descriptive one, with interpretation based chiefly on Spanish documentary and native legendary sources, into a self-contained historic one, seems therefore at hand.

American Museum of Natural History,
February 12, 1916.

