MUSEUM OF NORTHERN ARIZONA

Bulletin 24

EXCAVATIONS in BIG HAWK VALLEY

Wupatki National Monument
Arizona



By
WATSON SMITH

This sheet is submitted as an insert for the correction of errors and omissions in

MUSEUM OF NORTHERN ARIZONA, BULLETIN 24

Excavations in Big Hawk Valley, by WATSON SMITH, 1952.

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p. 112 In Table 5, 1st col., line 5, for *NA 680.6* read *NA 680.36*

In Table 5, top of col. 12, for *Length* read *Depth*

p. 134 In note 91, for *1951* read *1952*

p. 157 After line 9 insert the following:

In the Navajo Mountain region, several kivas have been reported:

MORSS, 1931

Gishi Canyon, Site 31, p. 6. A "broken-down kiva of the simple circular type." No other features mentioned. Early Pueblo III. *Kiva.*

Gishi Canyon, Site 36 (same as West's Ruin 2), p. 6, pl. 4. A two-story circular structure. "The lower story contained a slab deflector and had perhaps served as a kiva." No further description. *Kiva ?*

Segito Canyon, Site 13, pp. 6–7. All rooms rectangular, but some much larger than others or than "nine-tenths of the secular rooms in the cliff-dwellings of this region." No special features. Early Pueblo II. *Kivas ?*

Segito Canyon, Site 16, p. 11. Circular, "small," and ". . . remarkable for a free-standing inner shell of adobe, the 6-inch space between it and the outer wall of the kiva being filled with clean straw." Late Pueblo III. *Kiva.*

Segito Canyon, Site 17 (same as West's Ruin 3), Room 3, pp. 12–13. Rectangular, 13′ 6″ x 8′, not subterranean. Roof with 2 main beams like others in ruin, manhole in center, bordered with stone slabs; "appears to be no banquette"; opening in front wall 2′ 6″ above floor and 9″ in diameter; rectangular firepit; sub-floor rectangular vault with circular opening in floor covered by slab; tunnel from vault under floor and wall. Late Pueblo III. *Kiva.*

Same, Room 8, p. 13, pl. 7. Circular, apparently not subterranean. Plastered wall; probably had frontal semilunar recess and banquette; roof supported on single large beam; sub-floor vault and tunnel like that in Room 3. Late Pueblo III. *Kiva.*

Forbidden Canyon, Site 19, p. 6. Circular, diameter 13′, not subterranean. Plastered wall, slab deflector, square firepit, ventilator opening through wall. *Kiva.*

Navajo Mountain, unidentified sites, p. 11. Two large open pueblos with large circular rooms having banquettes all the way around. No further description. *Kivas.*

p. 170 In note 16, for *p. 00* read *p. 87*

p. 175 In 8th line from bottom, for *mount* read *amount*

p. 177 In 8th line from bottom, for *grous* read *groups*

p. 178 In note 56, for *Kuer* read *Keur*

p. 191 After 13th line from bottom, insert:

1945 "The excavation of Los Muertos and neighboring ruins in the Salt River Valley, Southern Arizona."

Peabody Museum of Am. Arch. & Eth., Papers, vol. 24, no. 1. Cambridge.

p. 192 In line 17, for *Kuer* read *Keur*

p. 194 In line 21, for *1951* read *1952*

p. 197 In col. 2, after line 31, insert *Burgh, Robert F., 67*

p. 198 In col. 2, after line 17, insert *Figurine, 106*

p. 198 In col. 2, line 16 from bottom, insert *170*

p. 199 In col. 1, line 18, add *58*

MUSEUM OF NORTHERN ARIZONA

Bulletin 24



EXCAVATIONS IN BIG HAWK VALLEY, WUPATKI NATIONAL MONUMENT, ARIZONA

by

WATSON SMITH

with an Appendix by

GEORGE ENNIS

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FOREWORD

For over twenty years the Museum of Northern Arizona has been studying the interrelation of the cultures of several groups of prehistoric people who lived about the San Francisco Peaks in Northern Arizona. From time to time a report of progress has been published, such as *The Sinagua*, Bulletin 22, of this series.

The sites on the Wupatki National Monument, because they are located on a cultural frontier, have offered fascinating problems. The excavation of the Heiser Spring ruin, N.A. 1754, in 1932, Wupatki in 1933–34, and Nalakihu in 1934, have settled some problems but at the same time offered new ones. Now Watson Smith, whose previous experience in the Marsh Pass area and at Awatovi makes him especially qualified, has contributed further information on a group of sites lying a few miles west of the Citadel ruin on the Wupatki Monument.

To make this work of Watson Smith possible, the Museum is grateful to a donor, who wishes to remain anonymous.

Harold S. Colton

Flagstaff, October 1, 1951
This edition is limited to 700 copies

CHAPTER I

THE EXPEDITION AND ITS PERSONNEL

THE excavations that form the subject matter of this report were carried out during the summer of 1948 under the auspices of the Museum of Northern Arizona, with the writer as field director. The area selected was the locale known as Big Hawk Valley, about 20 miles northwest of Flagstaff, Arizona, and just east of U.S. Highway 89 on land of the Wupatki National Monument. Camp was established on June 15, 1948, within the Coconino National Forest, just south of the southerly boundary of Wupatki National Monument and about a mile east of the highway; and active fieldwork was continued until August 1, 1948, when operations were transferred to the laboratories of the Museum in Flagstaff, where organization and study of the material were carried out.

During the field season a plane-table survey was made of a strip of land comprising about 3 square miles, as shown in figure 2. Within this area some 59 sites were located and four of them were excavated. In addition, two other sites in different localities were tested for special purposes: Crack-in-Rock Pueblo (N.A. 537) about 10 miles to the northeast, and Juniper Terrace (N.A. 1814E) about 3 miles to the south.

The field party consisted of the writer as director, Milton A. Wetherill as general assistant and foreman, John Edward Dalton as culinary expert, and three graduate students, Dick Shutler, Jr., of the University of California, Eugene Frosio of the University of New Mexico, and George H. Ennis of the University of Pennsylvania. To all of these men I wish to make specific and personal acknowledgment of my appreciation for their ready cooperation in all phases of the work. The industry, experience and competence of Milton Wetherill, both in the practical concerns of camp organization and in excavational techniques, were especially valuable in the achievement of whatever results were attained. The expedition's roster also included four Indian employees, all of whom gave excellent service. Three of these men were Hopis: Elmer Masayouma of Old Oraibi, Norman Sumatzkuku and Herbert Lomatewa, both of Moencopi; the fourth was a Navajo, Haskie Yazzie, of Black Falls. Although not officially a member of the party, Mr. David J. Jones, Jr., superintendent of the Wupatki National Monument, gave much helpful aid.

During the field season Dick Shutler, Jr., maintained the field catalog and later on at the Museum made a complete typological study of the sherd collections. His work in the latter field constitutes the statistical basis on which the ceramic tables and analytical discussions contained herein have been constructed, and specific recognition is due him for his careful and thorough work.

All animal and bird bones were identified by Milton Wetherill from comparative material in the Museum collections, and geological identifications of stone artifacts were made by Mr. Edwin D. McKee and Major Lionel F. Brady. Others who contributed toward the completion of this report were Katharine Bartlett, who made many of the photographs; Leo N. Bushman, who completed most of the drawings and plans; and Avis Tulloch, who made the pottery illustrations and the various graphs and tables. Mrs. Marjorie D. Smith and Mrs. Evelyn N. Brew

typed the manuscript. Human skeletal material is discussed by George Ennis, in Appendix 3.

All camping and excavational supplies and equipment as well as transportation were furnished by the Museum of Northern Arizona.

Thanks are due to Mr. John Babbitt of Babbitt Brothers Trading Company, Flagstaff, for permission to take water from one of that Company's storage tanks a short distance north of camp. Without its availability operation of the camp would have been immeasurably more difficult, since there was no other water supply within many miles.

To Dr. John O. Brew, Director of the Peabody Museum of Harvard University, I am deeply obligated. Through his permission space and facilities at the Peabody Museum were made available for research and study, and the manuscript of this report was compiled there. Miss Cordelia Galt has expended much patience and invaluable advice in preparing the MS for the press.

Very special appreciation must be expressed to Dr. Harold S. Colton, Director of the Museum of Northern Arizona, for his constant and generous assistance and advice in all phases of the work. His extensive knowledge of the archaeological background and his constant readiness to provide inspiration and guidance were invaluable, and I wish to take this opportunity of expressing my great personal debt to him, for making the expedition and the publication of its results possible.

CHAPTER II

GENERAL BACKGROUND

For many years the Museum of Northern Arizona has pursued a long-range program looking toward the final elucidation of the archaeological complex within the region east and north of the San Francisco Mountains. Many thousands of sites have been surveyed, sherd collections from them studied, and selected sites within the area have been excavated. Among the results of this work has been the recognition that within this area a very complicated human story was enacted in prehistoric times. Analysis of the material remains has indicated that the region constituted for a certain period the frontier marches of three recognizably different manifestations of the basic cultural pattern characteristic of the northern Plateau province of the Southwest. One of these elements was that of the Anasazi culture, the Kayenta Branch of which seems to have penetrated into the area from the east and northeast, where it flourished most notably in the Black Mesa-Marsh Pass area. Knowledge of the characteristics of this culture has been well worked out by extensive studies on its home grounds, but its mutations on its southwest periphery and the extent of its penetration in that direction have not been thoroughly determined.

Another element in the complex was that of a cultural group that flourished, at least during fairly late prehistoric times, in the pine-forested area east of Flagstaff, probably southward to the Verde Valley and eastward to an extent not yet determinable. This group has been called the Sinagua Branch, and although its cultural kinships are not yet fully understood, it appears to have had certain affiliations with the brown-ware cultures toward the southeast and with the Hohokam peoples of the extreme south. The third element is even less well-known, but appears to have had its center of development west of the San Francisco Mountains and south of the Grand Canyon. It has been called the Cohonina Branch. fig. 3 indicates the locations of these branches.

Geographically and ecologically the region in which these three branches met and mingled presents certain striking and influential factors. The dominating feature of the countryside is, of course, the great mass of the San Francisco Peaks, the remnant of an enormous volcano that rises to a summit of 12,611 feet from a base of about 7,000 feet. On the slopes of the Peaks and for some miles to the east, south and west, where the elevation of around 7,000 feet does not change markedly, the land lies in the Transition Zone and is heavily forested in Western Yellow Pine (*Pinus ponderosa*), with occasional grassy parks. It was in this pine forest that the Sinagua seem to have flourished, and into it the other two branches apparently did not intrude.

About 12 miles east of the Peaks and at a much smaller distance north and northeast of them the altitude begins rapidly to decrease, and the pine forest gives way to less dense stands of juniper (*Juniperus monosperma*) and pinyon (*Pinus edulis*), with more scanty grass, characteristic of the Upper Sonoran zone. Within this belt evidence of the Cohonina and the Anasazi are frequently found, rarely if ever "pure," however, but rather as components in sites that were otherwise of Sinagua character.

Still farther to the northeast and north the land continues to fall off rapidly to the Little Colorado River, which flows in a generally northwestward course, at an elevation below 4,500 feet, about 25 to 30 miles from the Peaks. The juniper and pinyon forest gives way at about 5,000 feet to open grass lands (fig. 1), which in turn become almost complete desert as the River is approached. Big Hawk Valley is a shallow drainage basin within the grassy zone. An additional feature of the landscape is a great series of lava flows that extend northward from the Peaks to the Little Colorado River.

In all four of the ecological zones involved, the rainfall was perhaps sufficient to support simple dry-farming, but during most of the period of prehistoric

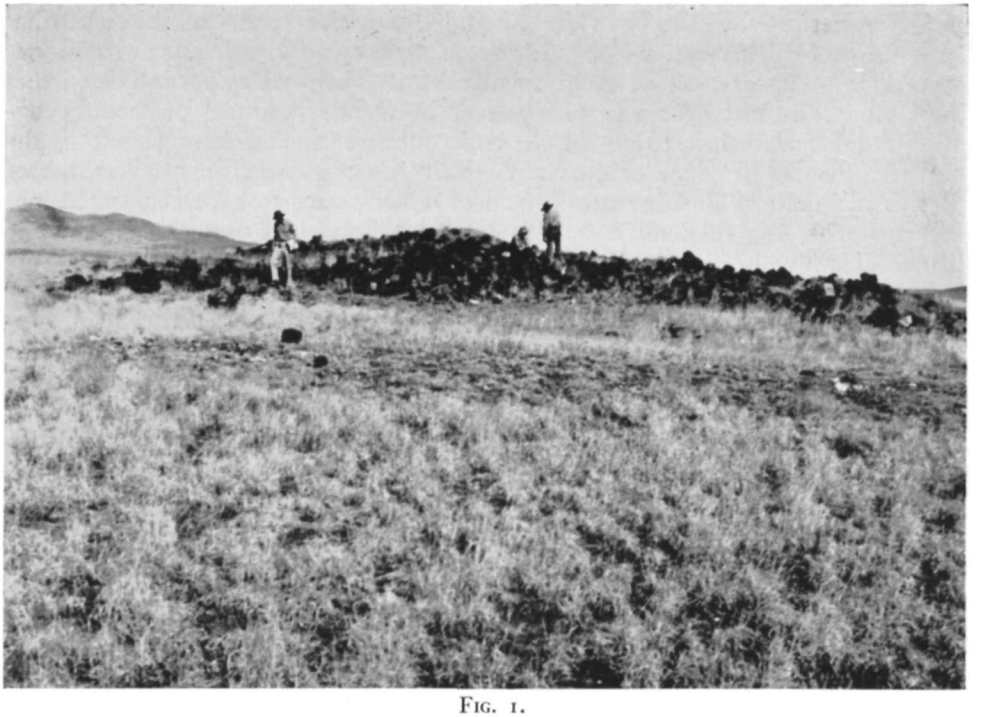


FIG. 1.

View of N.A. 680 before excavation showing character of the country.

occupation that activity seems in fact to have been carried on only in the forested parts, where there was doubtless sufficient mulch to hold back the run-off, and where occupation can be traced back to a period contemporary with that of Basketmaker III. In the lower grassy plains to the north and northeast, however, there has been no discovery of human occupancy prior to a cultural horizon contemporary with late Pueblo II, or the end of the 11th century. Today this zone is completely devoid of available water, and is quite unsuited to agriculture, and it was probably not very different a thousand years ago or more, although there are shallow water courses that may have carried occasional floods. The region is basically a limestone country, overlain, however, by large areas of very old basaltic flows and masses of hard volcanic cinders. This material has been altered into a hard stratum of caliche that in many places covers the lava flows to depths up to 2 meters. Farther toward the north a few remnants of Moencopi

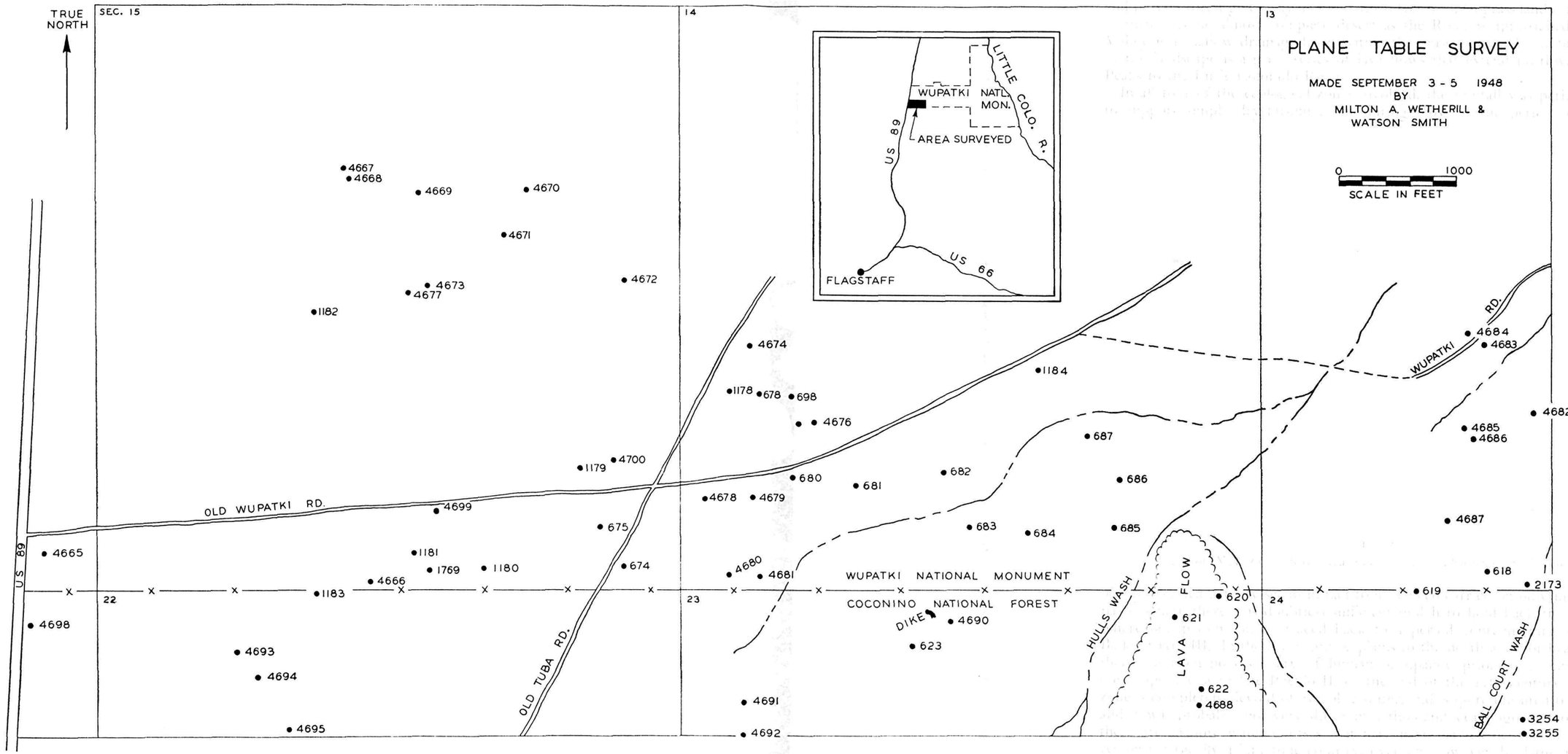


FIG. 2.

Map of part of the Wupatki National Monument showing distribution of prehistoric sites.

Sandstone of Triassic Age rise above the older level of Kaibab limestone in the form of isolated buttes or *cuestas*.

For a considerable distance around the San Francisco Peaks there extends a volcanic field from which arise numerous cinder cones of varying age, and much of the area has been at various times showered with black cinders and volcanic dust. The most recently active of the cones was Sunset Crater, about 8 miles directly east of the summit of the Peaks, which is thought to have last erupted about 1067 A.D. At that time it spread a blanket of black ash over a wide area, including the grass lands of Big Hawk Valley. Evidently this event effected an enormous ecological change, by providing a surface mulch that held back the run-off and made agriculture and consequent human occupation possible in the area. Very shortly thereafter the region, which had theretofore been uninhabited, became the scene of an active land rush, as peoples of Anasazi, Cohonina and Sinagua affiliations flooded into it. Within apparently a generation hundreds of small sites had been constructed, and activity must have been enormous. It was short-lived, however, for certainly within a century all the settlers had gone. Probably wind and water had quickly eroded the cover of ash and reconverted the Valley into a primitive dust bowl, inhospitable and desolate. It was never occupied again.[1]

Against this background several archaeological problems present themselves, and these may be considered conveniently in two groups: First, the geographical limits to which each of the cultural branches advanced its penetration into the new territory; and secondly, the manner and degree of intermixture that developed between the three branches, including the modifications in each culture effected by wider removal from its center and by contacts with other peoples. Satisfactory and complete answers to all these questions can only be had when much more is known of the indigenous or "classic" pattern of the culture of each branch in its own central area and when a more extensive investigation has been made of the frontier region itself. The basic patterns of both Sinagua and Cohonina Branches are still imperfectly understood, and as yet only spotty excavation of the area of mingling has been made. It is toward the further elucidation of these problems, however, that the recent work of the Museum of Northern Arizona has been directed, and as a contribution thereto that the present report is presented. Obviously the excavation of a few small sites within a restricted portion of the area will not in itself furnish complete answers, and I do not feel justified on the basis of the study of this material alone in drawing definitive conclusions. Integrated with data previously assembled and to be gathered in the future, however, it will constitute a considerable block in completion of the total picture. The work of the expedition of 1948 throws light into several dim recesses, in helping to delimit the geographical expansion of the three branches involved, in more precisely fixing the time and duration of their expansion, and in providing a good deal of factual data bearing on the degree of modification in terms of material culture effected by their contacts. Evidences of such modification will be most readily seen in the field of architecture and perhaps of agriculture, with certain ceremonial or social inferences tentatively derivable from the tangible remains available for study. A good deal of light also will be shed on the matter of inter-cultural commingling and exchange by an analysis of the

[1] The foregoing summary has been adapted from other more thorough presentations, to which reference is made. See Colton, 1931; 1932a; 1932b; 1932c, pp. 1–27; 1936a; 1937; 1938; 1939b; 1945; 1946; McGregor, 1936; Robinson, 1913.

ceramic material, which like radio-active isotopes serves so well in tracing the movement and mixture of otherwise invisible forces. From the relative proportions of various pottery types and wares at the several sites we may infer a good deal as to the cultural make-up of their personnel, and of the degree to which three differing peoples were blended.

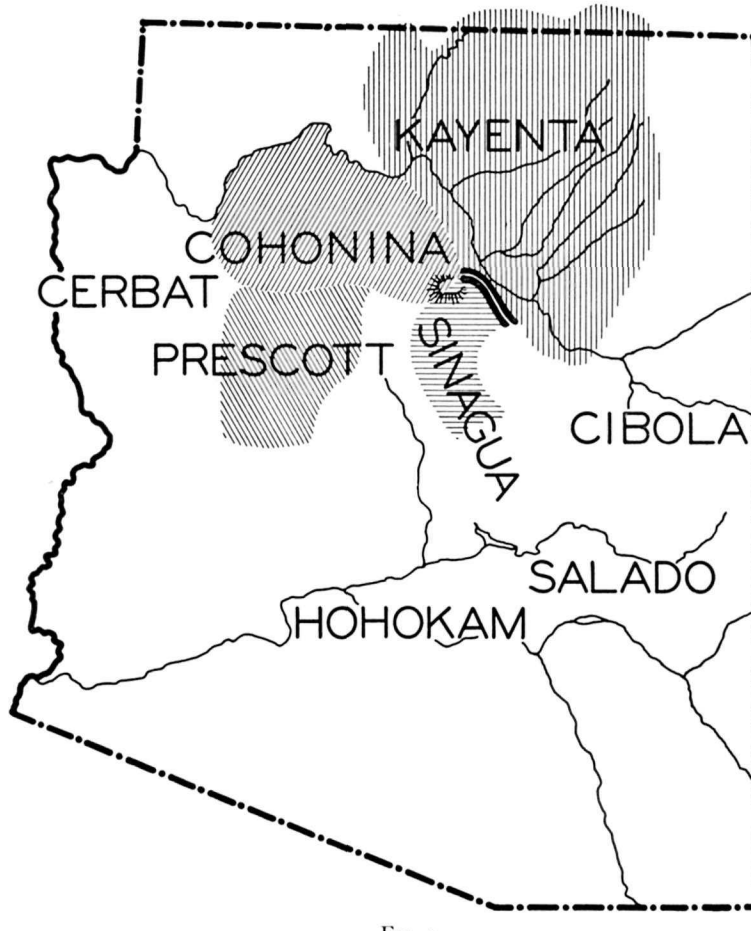


FIG. 3.
Map of Arizona showing the distribution of prehistoric cultures (after Colton).

The data resulting from the excavations and study will be presented with these considerations in mind, and comments will be made wherever it appears that emphasis is desirable. On the other hand no vulnerable positions will be impetuously occupied from which a dignified retreat would be impossible. Certain hypotheses will be formulated, but in the main the present report can presume to form only a small contribution to the solutions of the larger problems already suggested, and to be a sign-post in the direction of further study.

The six sites excavated in whole or in part during the season of 1948 will be herein described in what is thought to be their chronological sequence, the

emphasis being placed for the present mainly on architectural details. References will be included in the descriptive text to all other significant features, such as the discovery of pottery vessels and other artifacts *in situ*, pertinent geographic factors, associated burials, and the like. But analysis, comparison and discussion of these features will be postponed until subsequent chapters. At the beginning of the section on each site there will be presented a list of plans, tables and illustrations peculiarly pertinent thereto, as an aid to the reader in following the text and a device to reduce the necessity for inclusion therein of redundant statistical data such as precise measurements, compass directions, cross-references, footnotes, and the like.

CHAPTER III

SITE N. A. 618, THREE COURTS PUEBLO

PLANS AND PROFILES: Figures 4, 8, 11.
PHOTOGRAPHS AND DETAIL DRAWINGS: Figures 5–7, 9–10, 12.
POTTERY CHART: Table 1.

THERE were several reasons for the selection of N.A. 618, or Three Courts Pueblo, as a subject for intensive study. The preliminary survey had disclosed that within the area of Big Hawk Valley there were very few sites that presented surface features closely comparable to those of N.A. 618. In the first place it appeared to consist of an approximately rectangular area entirely enclosed within a low peripheral masonry wall, in one portion of which was located a fairly large block of masonry rooms. Secondly the surface collection of pot sherds indicated a predominance of San Francisco Mountain Gray Ware with lesser components of Tusayan Gray and Alameda Brown Wares. No subterranean structure was evident from surface indications. It was thought possible that this site might represent a local example of the Cohonina Branch, marking perhaps very nearly the easternmost extension of that cultural entity.

LOCATION AND ECOLOGY

The site is located in the southwest quarter of Section 13, Township 25 North, Range 9 East, about 2¼ miles east of U.S. Highway 89 and only a few meters north of the boundary fence between Wupatki National Monument and Coconino National Forest. It lies on an almost level plain, which slopes, however, very gently toward the north and also toward the east, in which direction, at a distance of about 40 meters, a fairly steep bank 5 or 6 meters in height drops into the dry bed of a north-eastward-trending arroyo. At present the ground is covered with a thin carpet of wind-blown black volcanic ash, probably from Sunset Crater, and upon this grows a good cover of grass with only an occasional small juniper. Relatively few basalt boulders lie about and no outcrop of lava exists in the immediate vicinity. To the east, in the dry bed of the arroyo a forest of fairly large junipers exists, and these trees also increase in density toward the south. Today no source of water is known within several miles, but formerly the adjacent arroyo may have provided a supply. Doubtless also water was probably available in the great sink about half a mile to the east.

COMPOUND AND ENCIRCLING WALLS

As will be seen by reference to figure 4, the surrounding wall encloses an area roughly trapezoidal and approximately 36 meters by 28 meters in extent, the longer dimension oriented almost exactly in a north-south direction. Here, as in nearly all Southwestern sites, the connotation of geometric precision gratuitously implied by the use of such Euclidean terms as "rectangular," "circular,"

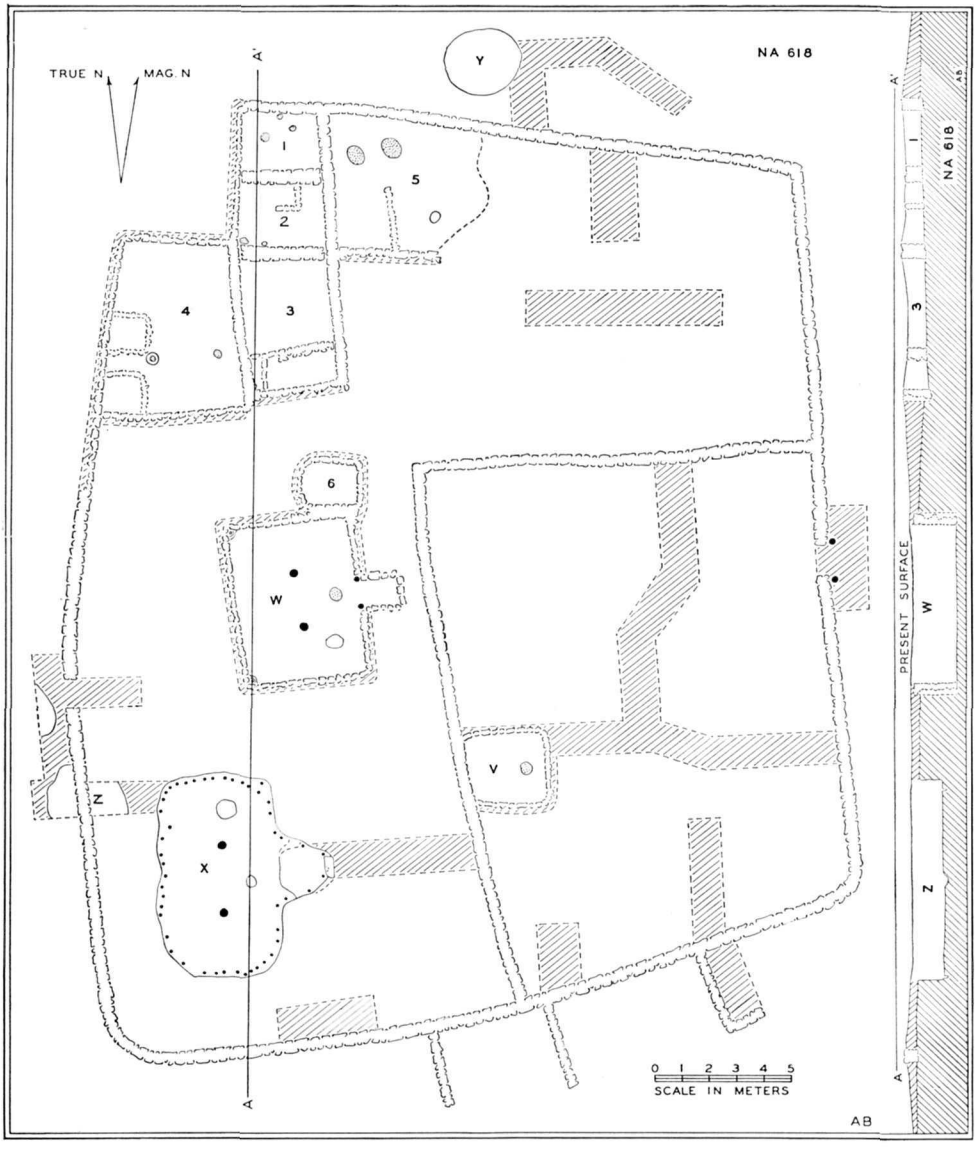


FIG. 4.

Ground plan and profile of "Three Courts Pueblo," N.A. 618. This was a mixed site, with a Winona Focus Pithouse (X), an Angell Focus Pithouse (W), and a surface structure, all enclosed by a low compound wall. The decorated pottery belonged to Ceramic Group 6, and the predominant undecorated ware was San Francisco Mountain Gray Ware.

"straight" and so on may lead to a thorough misconception of the actual shape of objects so described, which are in fact usually of a carefree and whimsical form only tenuously suggestive of recognized geometrical categories. The builders may have had words for these shapes; I doubt that the Greeks had any.

The trapezoidal character, then, of the wall encompassing N.A. 618 is modified to the extent that no one section is straight and no two sections are parallel, the westernmost being the longest and the southern and northern converging somewhat toward the east. This wall was constructed of rough and unshaped blocks of black basalt, characteristic of the many lava outcrops in the region, and stands at present no more than 2 or 3 courses high, perhaps 75 centimeters at the most. Its thickness varies somewhat but is fairly constant at about 40 to 50 centimeters, and despite the fact that it is in some places only one stone thick, it seems to have been laid with some attempt at producing an approximation to a plane face on each side. The use of mortar is not evident, and the whole thing suggests the type of dry wall so characteristic of the rocky fields of old New England farms. Apparently the wall was never much higher than it now stands: very few fallen stones lie beside it, and its crude method of construction does not suggest an ability to sustain any considerable weight. It is continuous except at about the mid-points of the eastern and western sides, where it is pierced by breaches 1.20 meters and 2 meters wide respectively. The inference that these apertures were intended as gateways is emphasized by the existence at the eastern one of two round holes in the ground, one on either side of the opening and just beyond the outer line of the wall. Perhaps these holes originally contained posts that supported some form of movable gate. There must have been a superstructure of some kind above the low stone wall, perhaps a brush or jacal fence or palisade, but no evidence of it had survived.

The plaza enclosed by the outer wall was subdivided by two other walls of similar character, one extending northward from about the mid-point of the southerly side of the plaza, to a point of meeting with the second wall, which extended westward from a point in the easterly side some 3 meters north of the gateway. No openings occurred in these interior walls, and the entire enclosure thus is divided into two areas, one in the southeast quadrant roughly trapezoidal, measuring about 13 by 19 meters, the other an L-shaped area occupying the remainder of the enclosure.

The surface of both enclosed areas was very nearly level, except where it sloped up slightly against the walls, a phenomenon due to the accumulation there of a few fallen stones and wind-blown earth and cinders. No basin-shaped depression was evident anywhere within or near it nor any midden or refuse mound. Inside the northwest quadrant, however, there existed a multi-roomed masonry pueblo at least 8 by 13 meters in extent. Its appearance before investigation was that of a low rock-strewn mound, and excavation proved it to contain at least 6 rooms. There was some doubt as to the actual number by reason of the impossibility of determining the original eastern extremities of Room 5 (fig. 4) and of our failure to excavate the area immediately south of Room 4, where another room could have existed.

What may be called the outer walls of the pueblo, that is the western and northern ones, were continuous with the walls enclosing the plaza, and it seemed evident that the entire architectural complex had been laid out and built in response to a unified plan. The curious notch at the extreme northwest corner provokes a question on the part of the observer, but elicits no answer. Why the

builders did not carry out the rectangular over-all plan at this point I do not know, but neither am I particularly inspired to speculate.

SURFACE PUEBLO

All the five identified rooms within the pueblo were relatively large and were, I believe, used at least in part as living quarters by the inhabitants. There is nothing about the entire structure that suggests a mere granary or storage unit, as is the case with many of the smaller contemporary surface ruins in this region. The rooms of the building will be described in numerical order, but there is no implication therein of chronological sequence and I believe that a study of the manner in which the walls are abutted or tied into each other will indicate contemporary construction of the entire unit, with the possible exception of Room 5, which could have been built somewhat later than the other rooms.

ROOM 1

This is a small, nearly rectangular room slightly more than 2 meters wide by slightly less than 3 meters long, not commodious, but still large enough for living quarters. It possessed a hard clay floor, uneven and broken, but fairly level, somewhat below the present ground surface but probably exactly on the surface as it existed at the time of construction. There were few floor features: two shallow basin-shaped fire-pits, filled with wood ashes, one toward the northwest corner, 30 by 25 centimeters in diameter and 5 centimeters deep, the other toward the northeast corner, 17 centimeters in diameter and 5 centimeters deep; a posthole, still containing rotten wood, 8 centimeters in diameter and 10 centimeters deep, situated against the north wall close to its mid-point. On all sides except the south, the floors were neatly faired up into the vertical plane of the walls, thus forming a rounded junction with them.

The walls themselves were heavy and of a double-faced construction, with plane surfaces on both faces. They were built of native black basalt boulders with the occasional inclusion of a block of Kaibab limestone, and were laid up in fairly even courses. The boulders were so selected and arranged that reasonably plane faces were achieved, even though the individual blocks did not appear to have been artificially dressed. The north wall was a prolongation of the north wall of Room 5 and was bonded with the west wall at the northwest corner. Both east and west walls were continuous with the corresponding walls of Rooms 2 and 3, and were undoubtedly built with them as a single constructional job. They were all about 50 centimeters thick, and were based on undisturbed soil 5 to 8 centimeters below the level of the floor. No evidence of plaster, if it was ever present, has survived.

The south wall was structurally like the others, double- and plane-faced, but was thicker, less carefully built, and was based on, rather than below, the floor level. Its ends abutted the east and west walls respectively. Very clearly, then, this wall represents a remodelling subsequent to the original construction, whereby an originally larger room was divided to form the existing Rooms 1 and 2. All walls at present stand about 80 to 90 centimeters high.

Room 2

The floor of this room was continuous with that of Room 1 as were also its east and west walls. It had, as already indicated, been originally a part of Room 1, with which it was closely comparable in shape and size, and its north wall had been subsequently constructed upon the original floor. On the other three sides the floor faired up into the walls, which were based 5 to 10 centimeters below the floor level, and stood about 80 centimeters high, as described for Room 1. In the extreme southwest corner an irregular fire-pit 28 by 30 centimeters was found, and a posthole 9 centimeters in diameter and 10 centimeters deep was situated against the south wall, removed from the southwest corner about one-third the length of the south wall. This posthole, which corresponds to the one against the north wall of Room 1, probably supported a single long roof beam, extending in the long axis of the original room, prior to its later subdivision.

A curious L-shaped wall had been built integrally with the north wall of Room 2, extending southward into the room about 1 meter and then extending at a right angle toward the west about 85 centimeters. This was a light, poorly constructed wall, plane-faced on its inner surfaces, but rough and unfinished on its outer surfaces. It was not double, but was laid up of a single column of stones. Perhaps it had once extended all the way to the west wall of the room, thus enclosing a storage bin, but if so all evidence of its westerly extremity had disappeared. All walls stood 70 centimeters to 1 meter high and displayed no surviving evidence of plaster.

Room 3

The east and west walls of this room, which measured about 5 by 3 meters, were continuous with those of Rooms 1 and 2, and they also were bonded with the south wall. The north wall of this room, however, which was also the south wall of Room 2, abutted the east and west walls. I do not believe that this fact indicates a significant time differentiation, but merely a secondary stage in the process of original construction. The walls of Room 3 were in general similar to those of Rooms 1 and 2, except that their bases along the north, west and south sides were formed of upright slabs of limestone and sandstone, above which were the usual basalt blocks in fairly even courses. The use of vertical slabs will also be seen in Rooms 4 and 5.

There were no floor features whatever discovered in this room to suggest human dwelling activities, but its size seems to negative its use as a mere granary or store room. Across the room and 1 meter from its south end extended a masonry partition, plane-surfaced on its north face but very irregular on its south face. Its maximum thickness was about 75 centimeters and it extended outward from the east wall a distance of 2.25 meters. At this point it had collapsed but its original continuation to the west wall was indicated by two basalt boulders and an upright sandstone slab on the floor in prolongation of its north face. The area behind this wall to the south was about 1 meter wide and across its westerly portion, three irregular sandstone slabs lay flat on the floor in a row parallel to the west wall and 30 centimeters from it. The walls stood 80 centimeters to 1 meter high, and showed no evidence of plaster.

ROOM 4

Here was a very large room that seemed to have been the major dwelling unit within the pueblo. It was trapezial in shape, the dimensions being approximately as follows: north, 3.8 meters; west, 6.2 meters; south, 5.3 meters; east, 6.0 meters.

Walls. The walls were generally similar to those already described in Rooms 1, 2, and 3, of irregular basalt blocks laid in very approximate courses, and plane-faced. The east wall, however, was largely of horizontal slabs of Moencopi sandstone with a few blocks of limestone, laid in even courses above a lower course or wainscot of upright sandstone slabs, 18 to 30 centimeters broad and 28 to 35



FIG. 5.

Detail of east wall of Room 4, N.A. 618, showing vertical and horizontal sandstone slabs. The bar is 1 meter long.

centimeters high (fig. 5). This type of construction was unusual and especially peculiar inasmuch as the west wall of Room 3, which was structurally only the other face of this same wall, did not contain the upper courses of sandstone slabs, though its base was likewise formed of such slabs set vertically. The south wall had almost completely collapsed, but the north, east and west walls still stood about 1.3 meters above the floor. The great quantity of fallen building stones that occupied the fill of this room seemed to be sufficient to account for a possible second story. A large section of the west wall had fallen inward in tact, its stones lying horizontally but still in their original relation to each other. The lower portions of this wall had been almost entirely of basalt boulders of

medium size, the upper parts chiefly slabs of sandstone. It appeared that the north, west and east walls were all integrated and tied into each other, whereas the south wall had been abutted against the west wall, which was continuous with the west boundary wall of the plaza. The south wall was not exactly continuous with the south wall of Room 3, but seemed to extend along the southerly or outer face of the latter. Lack of excavation in this area, however, renders that detail uncertain. All interior surfaces of the walls of Room 4 were plane; their outer surfaces were not investigated.

Floors. The original floor of Room 4 was a fairly hard-packed but uneven layer of clay at a level 5 to 8 centimeters above the bases of the walls. Only the southerly half was completely excavated, but not a single feature was disclosed in this area. No postholes existed in the floor itself, though one post about 10 centimeters in diameter had been built into the wall in the extreme southeast corner. Since the great size of this room almost surely precluded the construction of a roof without some intermediate support, the apparent absence of such members poses an unsolved riddle.

About 30 centimeters above the original floor there existed a later floor, definition of which was not always easy or certain. Its general position, however, was determined by the existence of a thick layer of wood ashes irregularly spread over it, as well as by various features to be discussed presently. The fill above the lower floor consisted for its first 25 centimeters of clay, volcanic ash and small pebbles, evidently water- and wind-laid; but its upper 5 centimeters, immediately below the secondary floor, was composed of a layer of ashes, perhaps from the burning of the roof.

Within the upper floor was one well-made fire-pit in the southwesterly part of the room, just in front of the storage bins yet to be described. This pit was basin-shaped, 25 centimeters in diameter and 15 centimeters deep. It was surrounded by a well-formed ring of clay, 10 centimeters high and of about the same thickness. At a point 2 meters from the south wall and 70 centimeters from the east, was another small ash-pit, 20 centimeters in diameter and 10 centimeters deep.

Bins. Built upon the upper floor and aginst the west wall were two rectangular storage bins, constructed of very unstable single-tiered walls, plane-faced on the interior but irregular on the exterior. The southerly bin was set into the southwest corner of the room and was almost exactly square, with inside dimensions of 1.2 meters. The other was north of the first, but separated from it by a passageway 60 centimeters in width, and measured about 1.15 by 1.3 meters inside.

Three small corn cobs and other charred plant material were found above the upper floor in the fill, which was composed of a 20-centimeter layer of fallen roof material, then the fallen walls already described, surmounted by wind- and water-laid earth and cinders.

Room 5

It is not perfectly clear that this area was ever a room at all. It may have been a court, open at the east end, since no indications of a wall could be found there. The north wall is the outer plaza wall, the west wall is also the east wall of Rooms 1 and 2, and the south wall is abutted to the west wall exactly opposite to the abutment of the wall separating Rooms 2 and 3. All walls were plane-faced

inside and the northerly one was built of large basalt boulders very approximately coursed, the lowest course containing the largest stones. The south and west walls were formed of a basal course of large sandstone slabs and blocks of limestone set vertically, surmounted by slabs and blocks of the same, neatly laid horizontally but not in continuous courses. The face of the west wall of Room 5 is thus of different construction than its other face, which forms the east wall of Rooms 1 and 2, and which is built of irregular basalt boulders, thus presenting a situation similar to that obtaining in the wall between Rooms 3 and 4.

The surviving walls of Room 5 were built upon the original ground level, which also formed the floor of the room, a fact lending support to the hypothesis that the area was not an interior room but perhaps only an open-air court partly enclosed and perhaps roofed, since in all other rooms the walls were based below the floor levels. The lower floor was not completely excavated but no features were found in it. There was constructed through the west wall, however, a rectangular opening 42 centimeters long by 22 centimeters high, which had originally opened into the original Room 1–2 before it was subdivided. When the partition between Rooms 1 and 2 was built its eastern end abutted against the aperture and sealed it. The base of this passage was 20 centimeters above the floor or ground surface within Room 5 but only 4 centimeters above the floor of Rooms 1 and 2. It was roofed by a sandstone lintel 4 centimeters thick. Perhaps it had been a ventilator for Room 1–2, a hypothesis that would further indicate subsequent construction of Room 5.

Floors. Above the original floor of the room was a layer of occupational debris varying in thickness between 20 and 30 centimeters and containing a considerable quantity of sherds as well as corn cobs, charred vegetal matter, animal bones and ashes. One large but ill-defined lens 5 centimeters thick and about 75 centimeters in diameter, containing black ash, charcoal and charred corn kernels, was situated about 40 centimeters from the north wall and 1.75 meters from the west wall. It lay within the deposit above the early floor, but about 5 centimeters below a secondary floor of hard-packed but uneven clay that extended over the whole area of the room on top of the stratum of debris.

This upper floor was difficult to follow continuously and its eastern limits were impossible of definition, although they must have existed about as shown by the dashed line in figure 4. As in the case of the earlier floor it would appear that the area may have been an open-air working space with no well-marked eastern boundary. Two fire-pits existed in the upper floor. One of them, unusually large with a diameter of at least 70 centimeters, was near the northwest corner, 1 meter from the north wall and 65 centimeters from the west wall. It was 25 centimeters deep, basin-shaped, with sloping sides and a flat bottom, and had been clay-lined. Its entire outline was not clearly marked and may have been elliptical, with a long diameter even greater than the one mentioned above. It was filled with white wood ash, and seems entirely too large to have been used in an enclosed room, another factor suggesting the *al fresco* character attributed to Room 5. Another and smaller fire-pit was located 1.3 meters from the south wall and 3.3 meters from the west wall. It was an elliptical ash-filled basin, 45 by 39 centimeters in diameter and 17 centimeters deep.

Bin(?). Extending northward into the room 2 meters from the west wall and at right angles to the south was a jerry-built stub wall 2.1 meters long and from

25 to 35 centimeters thick. It was composed of a single column of basalt blocks, plane-faced on its west side and irregular on its east. This must represent the remnant of a storage bin once built into the southwest corner in the manner of the bins in Room 4.

Over a large portion of the northerly part of the upper floor was a stratum of black ash containing small charred sticks, evidence perhaps of a quondam brush canopy over the area. The complete absence of clay in this stratum negatives the existence of a permanent sod roof. The 50 to 60 centimeters of fill above the charcoal contained few large stones, but was composed mainly of sherds, cultural debris and wind-blown material.

Room 6

The area immediately south of Room 3 was not completely excavated but the existence there of another room is postulated on the basis of a small masonry structure shown in figure 4 as area 6. This is an enclosure about 2 by 1.5 meters, rectangular on the north, east and south, but somewhat rounded on the west end. It is formed of a thin wall of relatively small basalt blocks, plane-faced on the interior, and in every respect strongly suggestive of the bins already described in Room 4. The southerly wall of this hypothetical bin is integrated into the outer face of the north wall of Pithouse W, to be discussed in a later paragraph, and if the east and west walls of Room 3 were to be prolonged southward to this same Pithouse W, a room approximately the size of Room 3 would result and area 6 would fit neatly into its southeast corner as a storage bin. For this reason a Room 6 is postulated in this position, integrated with Pithouse W and therefore probably contemporaneous with it.

WALLS OUTSIDE COMPOUND

In addition to the pueblo and the plaza wall the only other surface features of N.A. 618 were three fragmentary walls that extended outward from the outer face of the south plaza wall. These were all double-faced, but like the plaza wall itself were not over 2 or 3 courses high. One had an ell at its extremity. Whether these walls are indicative of a row of small rooms, or served only as windbreaks I do not know, but I incline toward the latter thesis because of the absence of fallen stones suggestive of once higher structures.

PITHOUSES

In order to explore the area within the plaza for possible sub-surface features, a number of trenches were dug as indicated on figure 4. They paid enormous dividends, in the form of at least four subterranean structures, and these will now be individually described, the sequence being purely arbitrary and not suggestive of a relative chronology.

Pithouse V

This structure was a shallow pit, roughly rectangular but with rounded corners, 2.6 by 3 meters in extent, dug about 60 centimeters into the hard native soil, which also formed its floor. Only 2 or 3 courses of crude masonry existed, made

of comparatively small basalt boulders, and the absence of any significant quantity of fallen stone suggested the original existence of a perishable superstructure of some kind. No postholes or other evidence thereof survived, however. There was no indication of a side entrance or of a ventilator. The only floor feature was a basin-shaped fire-pit, 50 centimeters from the east wall and about equidistant between the north and south walls. It was 35 centimeters in diameter, 12 to 15

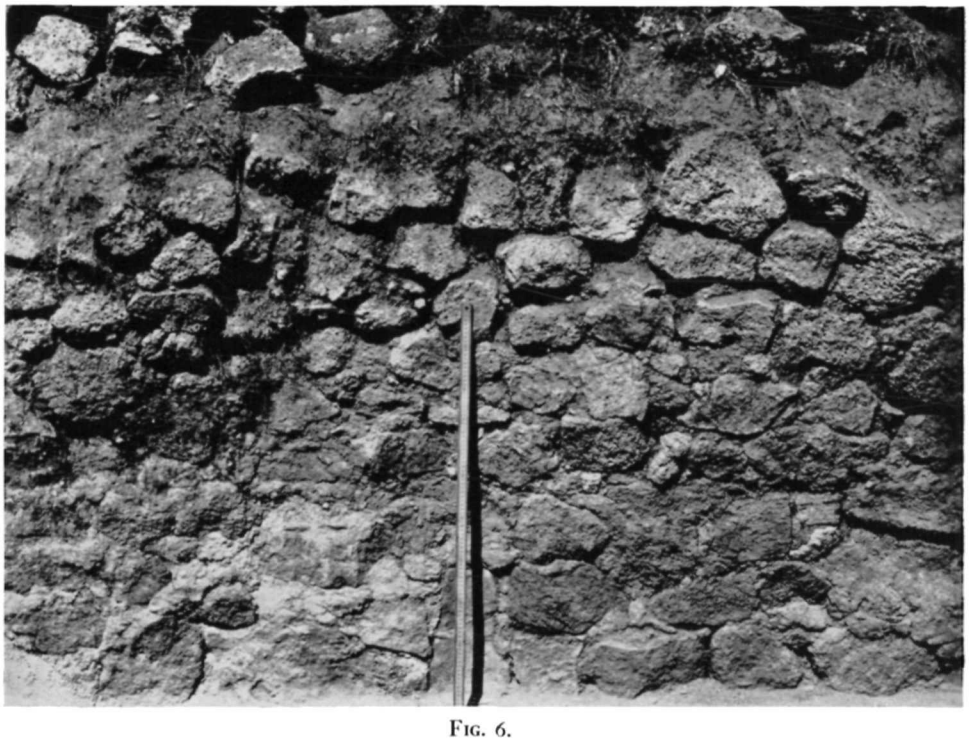


FIG. 6.

Masonry detail of west wall of Pithouse W, N.A. 618, showing use of irregular basalt blocks. The bar is 1 meter long.

centimeters deep and had been lined with small nearly vertical sandstone slabs. On the floor near the northwest corner lay about half of a Black Mesa Black-on-white bowl (cat. no. 618.479, fig. 37, B). The room had been filled with very hard, water-lain earth containing clay and gravel but no volcanic cinders and very few sherds. A quantity of finely ground azurite was found in the fill.

PITHOUSE W

About 4.5 meters south of Room 3 was found a very large rectangular pithouse, the floor of which was 1.5 meters below the original ground level. The room measured 6.2 by 4.2 meters and was almost perfectly rectangular, the long dimension oriented north and south, the walls of masonry, with a sloping entrance on the east side (figs. 6 and 7).

Floor. The floor was a fairly level surface of hard, evenly laid clay. At a point 60 centimeters from the east wall and midway of the long dimension of the

room was a circular basin-shaped fire-pit 45 centimeters in diameter and 15 centimeters deep; it had neither stone liners nor a surrounding raised collar. No deflector existed. Near the southeast corner, 70 centimeters from the east wall and 1 meter from the south wall, was a large cist, which had evidently been filled up prior to the final abandonment of the room, for the plastered floor had been sealed completely over it. This cist was oval in plan, 64 by 55 centimeters, and 50 centimeters deep, with vertical walls and a slightly concave bottom. Wood-ash and charcoal lay on the bottom, and the fill above contained a piece of abalone shell, a piece of azurite, one chipped flint flake, several corn cobs and a few sherds.

Postholes. The only other features evident in the floor were 6 postholes. Two of these had been for the main roof supports and were located in the long north-south axis 1.65 and 1.70 meters from the north and south walls respectively. They were both 28 centimeters in diameter and more than 50 centimeters deep. Clearly, then, the roof of Pithouse W had been supported by a single longitudinal ridge-pole. Two other and smaller postholes were placed snugly against the walls in the northwest and southwest corners. Each was 20 centimeters in diameter, and around the base of the one at the northwest corner a low smoothly molded collar of clay had been built up as a reinforcement, extending in a quarter-circle from the north wall around the post to the west wall.[1] These posts were perhaps secondary roof supports, but no corresponding ones had been placed in the northeast and southeast corners. The eastern side did have additional support, however, for two posts 9 and 11 centimeters in diameter respectively, had been set flush into the masonry exactly at the junction of the east wall of the room with the sides of the entranceway.

Objects in situ. Pithouse W had not burned, but neither had it been looted after abandonment. On the floor *in situ* were the crushed but restorable remnants of two Deadmans Fugitive Red ollas (cat. nos. 618.315 and 618.369) and also a Winona Brown jar and bowl (cat. nos. 618.300 and 618.305). Against the west wall and 1.4 meters from the south wall lay a coiled basket about 23 centimeters in diameter (cat. no. 618.379). It was too fragile for recovery but was apparently bowl-shaped and woven with a 2-rod-and bundle technique. In the basket lay a bone awl (cat. no. 618.383, fig. 47, A), and over them both a perfect Black Mesa Black-on-white bowl (cat. no. 618.391, fig. 37, A) had been inverted. A few corn cobs and other vegetal matter also lay on the floor.

Walls. The walls of Pithouse W were formed almost entirely of medium-sized basalt blocks, mostly ranging from 15 to 23 centimeters long by from 9 to 18 centimeters wide, although a few were somewhat larger, mostly in the lowest course. They were generally pretty well coursed and evenly matched, with very rarely a small sandstone spall to fill up a chink. The surfaces of the walls were plane, but no evidence of plaster had survived (fig. 6). The bases were very slightly below the floor level. Corners were square, except the southeast, which curved on a radius of 35 centimeters. No niches or other features existed in the walls, and they rose to the level of the original ground surface, a height varying from 1.5 to 1.7 meters above the floor; this was about 20 to 30 centimeters below the present surface.

[1] Similar reinforcement was found at the Hohokam site, Roosevelt: 9:6. Haury, 1932, p. 12.

Entranceway. Entrance to the room was had through a rectangular passageway adjoining the east side, 2.2. meters from the north end and 2.6 meters from the south (fig. 7). It was 81 centimeters wide at its inner end, 1 meter at its outer end, and 1.5 meters long; its walls were vertical and supported with masonry like that of the walls of the main room. Flush with the inner end of the passageway was a step 30 centimeters high, very nicely constructed of two vertical sandstone slabs set into the floor for the riser, capped by three horizontal sandstone slabs 3 centimeters thick for the tread. These latter extended slightly outward beyond the vertical riser slabs. From the top of this step a clay-floored ramp rose 45 centimeters in a horizontal distance of 1.3 meters, at a gradient of about



FIG. 7.

View of Pithouse W, N.A. 618, from the southwest, showing entrance ramp, postholes fire-pit, and floor cist.

35%. At the eastern or outer end a second step 35 centimeters high rose to the original ground surface. This step was narrow, only about 35 centimeters wide, and was recessed into the masonry wall of the passageway about 19 centimeters.

Fill. The fill in Pithouse W was composed for most of its depth of almost pure volcanic cinders, into which a little earth and small pebbles had been mixed, but very few sherds — only 86 in the entire 40 cubic meters of fill. This fill contained a much larger proportion of pure cinders than did that in Pithouse X, immediately to the southwest, or that of Pithouse V to the east, which contained none at all, a fact perhaps corroborative of the hypothesis that the rooms were abandoned and filled at different times and under different meteorological conditions. Like the fill of Pithouse X, however, most of that in Pithouse W seemed

to have been water-laid, as evidenced by the stratification lines sloping toward the center and the occasional presence of pebbles and small lenses of unevenly sorted material. On the other hand there were some strata composd of fine, evenly classified matter almost without cinders, that must have been wind-laid. The uppermost 20 to 30 centimeters was composed of mixed earth, cinders and organic matter, characteristic of the surface of the region generally.

Bins. Within the cinder fill, and at a level of 30 centimeters above the floor, there were found the rickety masonry walls of two storage bins in the northeast and northwest corners of the room. These bins were exactly like those already described in Room 4, and were made of a single tier of basalt boulders, plane-faced on the interior. Roughly rectangular, they measured respectively 1.5 by 1.2 meters and 1.7 by 1.5 meters and the walls stood about 50 centimeters high. The inexplicable factor about them was that they were built directly upon loose cinders, scarcely of sufficient density to support their weight, and nowhere was there the slightest evidence of a floor at or near the same level. One can only surmise that they were casual structures, built for temporary use by some persons who occupied the site after the abandonment of this pithouse. The trouble with this theory is that ceramically, as will be discussed later,[2] this house appears to have been the latest occupied unit at the site.

Burials. Two huan burials occurred in the fill within Pithouse W, both of them about 70 centimeters above the floor and consequently intrusive after the abandonment of the room, and probably even after abandonment of the site itself. Burial 2 was that of a very young baby, perhaps not more than 2 months old. Its bones were badly broken, but it lay extended on its back, head to the west, near the center of the room. Over its face was about half of a Flagstaff or Wupatki Black-on-white bowl (cat. no. 618.368, fig. 38, E).

Burial 3 consisted of the right leg of an adult, the head of the femur lying inside the main room, the knee and lower leg in the north part of the entranceway. The ankle and foot bones were missing, but the fact that the femur, patella, fibula and tibia were all in proper articulation makes almost inescapable the inference that the leg itself was thrown or buried here while still covered with flesh. Near the right leg also lay a left fibula and one rib. At a later point we shall have occasion to refer again to the perplexing local habit of unicrural dismemberment and inhumation.[3]

Pithouse X

Beneath the southwestern quadrant of the plaza lay one of the most interesting and certainly the richest discovery of the entire season. This was a moderately deep pithouse in the form of a rounded rectangle, with vertical but very irregular sides (figs. 8, 9). It had been dug into the hard native caliche, which underlies most of the region, and which is sufficiently resistant when excavated to support itself without artificial aid. The pit had been dug 90 to 100 centimeters below the original ground surface, which has since been covered over by an additional layer of 30 to 40 centimeters of earth and volcanic cinders. It measured approximately 7.8 meters by 4.4 meters, the long dimension oriented nearly north and south, and had a sloping entrance in the middle of the east side.

[2] See pp. 171, 173.
[3] See pp. 53, 67, 180.

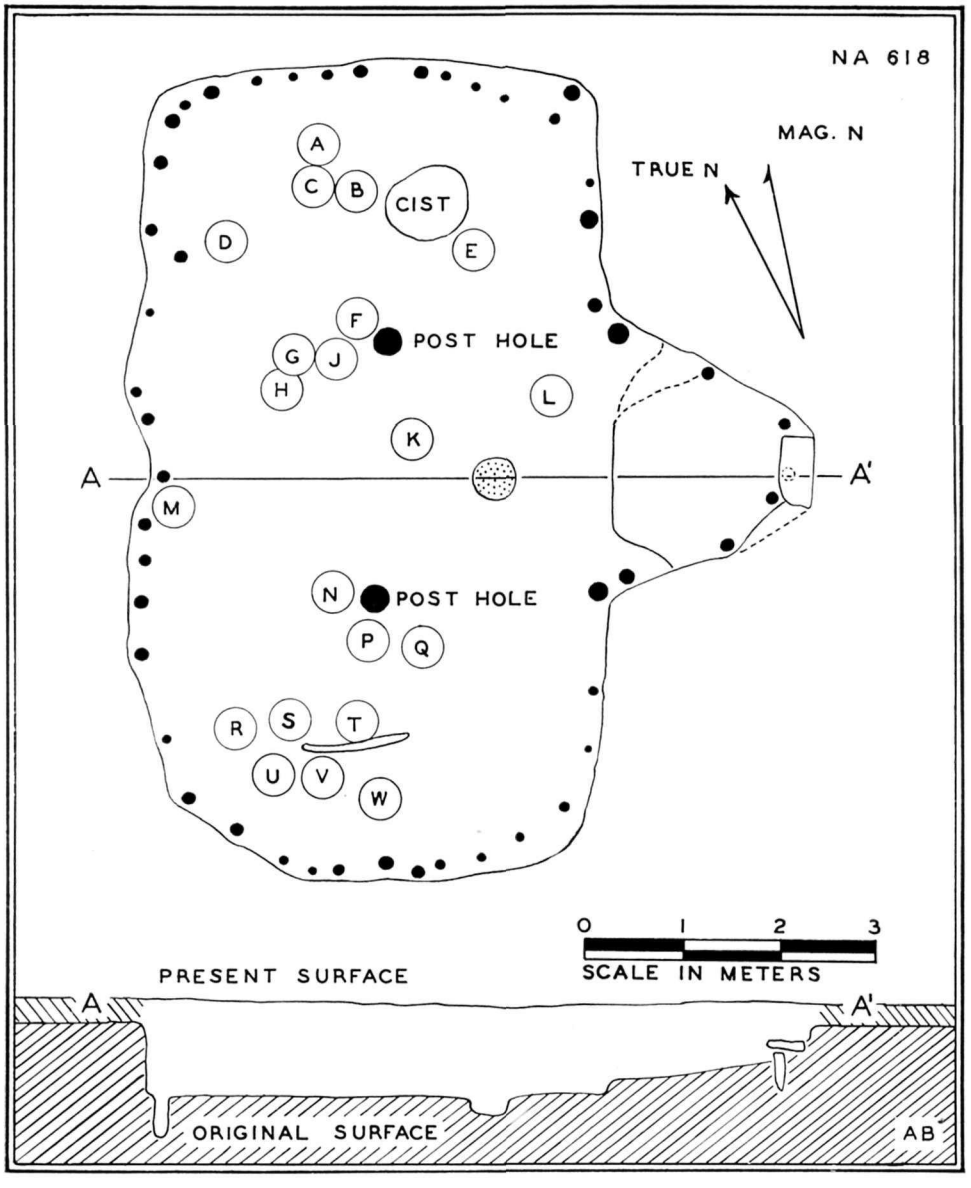


FIG. 8.

Ground plan of Pithouse X, N.A. 618, showing floor features. The room had burned and numerous charred beams also lay upon the floor, as well as pottery vessels, which were found in situ, in accordance with the following list:

Deadmans Fugitive Red Jars: A(306); D(303); E(299); F(319); H(318); J(320); K(345); M(317); Q(321); R(347); S(344); T(343); U(348); V(346); W(370).

Deadmans Gray Jar: C(304).

Winona Brown Jars: B(302); G(301); L(349); N(322).

Tusayan Corrugated Jar: P(363).

Floors. The floor was easily definable and fairly level though slightly irregular. It had been formed of a thin layer of clay, not over 1 centimeter thick, spread upon the native caliche. Floor features were not numerous or striking and included a fire-pit and storage cist besides numerous postholes. The ash-filled fire-pit was hemispherical in profile and circular in plan, 20 centimeters in diameter, 15 to 18 centimeters deep, and without rim or stone lining slabs. The floor sloped



FIG. 9.

View of Pithouse X, N.A. 618, from the south, showing peripheral row of postholes for a timber or brush wall, 2 main roof supports near the center, fire-pit, floor cist and entrance. This room displays many Hohokam affinities, and is closely similar to houses elsewhere ascribed to the Winona Focus of the Sinagua Branch.

downward gently all around the fire-pit over an area about 85 centimeters in diameter, so that the level of the floor at the lip of the fire-pit was about 8 centimeters below its mean level. This pit was about mid-way of the room's long axis, and about 90 centimeters from the east wall, thus placing it directly in front of the east-side entranceway. No deflector existed.

An enormous cist had been dug through the floor near the north end of the room, 1 meter from the north wall and 1.3 meters from the east. It had been cut through the caliche and into a stratum of volcanic cinders that seems to

underlie the caliche in the whole region, and was also seen elsewhere in the excavations, as for example below the floor of the pithouse at N.A. 681.[4] This cist was elliptical in plan, about 80 by 65 centimeters in diameter and 1 meter deep. The upper half of its sides were vertical, but it bulged outward somewhat toward the bottom, which was nearly flat (fig. 10). Over the floor of the cist lay a mat of decayed juniper bark, 3 to 4 centimeters thick. The fill contained many sherds and a jet button (cat. no. 618.324, fig. 48, A).

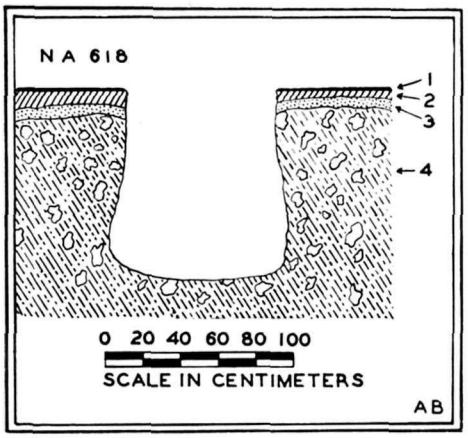


FIG. 10.
Profile of cist in floor of Pithouse X, N.A. 618.

Postholes. Two large postholes, 30 centimeters in diameter and 50 centimeters deep occurred exactly in the long axis of the room, 1.5 meters from the north and south ends respectively. Plainly, then, the roof had been supported by a single long ridge pole. Around the periphery of the room ran an irregularly spaced row of 48 smaller postholes, set vertically into the floor, mostly from 12 to 15 centimeters in diameter, with a few 10 and a few over 20. They were mostly from 10 to 25 centimeters from the wall but one was 30 and another 40. The spacing between posts varied from about 20 to 60, with 2 or 3 slightly greater (fig. 8). Since these posts were vertical, and since no evidence was found of inclined posts outside the line of vertical ones either at floor level or higher up at ground level, we can postulate some form of vertical wooden or brush wall just inside the sides of the excavation and supported on the posts. In the fill around the periphery were found many small charred fragments of sticks, cane and grass, and in places there was evidence of fire on the walls of the excavation. Perhaps brush had been lashed horizontally between the poles and the earth side walls and backed with loose fill to keep it firmly in place.

Entranceway. Nearly in the middle of the east side of Pithouse X was located the entrance (figs. 8 and 9). This was a roughly triangular area slightly truncated, 2.8 meters wide where it debouched into the main room, narrowing to 70 centimeters at its outer extremity. Its walls were curved continuations of those of the main room and the row of peripheral posts followed them. The floor of this

[4] See pp. 38, 47.

entranceway was a ramp that extended upward between a lower and an upper step. Directly in line with the east wall of the main room a step, cut into the native soil, rose 10 centimeters to the base of the ramp. This step did not extend entirely across the entranceway, however, but was only about 1.1 meters wide; on either side the floor of the room extended a distance of about 50 centimeters into the entranceway, and then rose gradually to the level of the ramp. The ramp itself was 1.6 meters in length and sloped upward a total of about 16 centimeters, at a gradient of 10%. At its upper end was another step 18 centimeters high, capped by a horizontal sandstone slab 7 centimeters thick and 70 by 25 centimeters in area. This was supported under its outer edge by at least one small wooden post. Another step above this rose 10 centimeters to the old ground surface.

Objects in situ. On the floor of Pithouse X were found *in situ* approximately 21 crushed but restorable large pottery ollas, the majority being Deadmans Gray and Fugitive Red, with a few Winona Brown and one Tusayan Corrugated.[5] Several of these vessels contained corn ears, some with husk still attached, shelled corn kernels, seeds and other vegetal foods. Upon and around the crushed vessels lay many fragments of charred roof beams,[6] but they were not disposed in such a manner as to disclose the pattern of roof construction, except that the main beams extended north and south, with secondary ones east and west. With the larger beams were also large quantities of charred brush and grass,[7] probably used as a cover for the roof. It was very peculiar that although the entire room had burned and collapsed there were found no recognizable lumps of clay, such as must almost certainly have been baked and preserved, had it been used in the original construction of the roof.

Fill. The fallen roof, which must have burned during the occupancy of the house, to judge from the large number of pottery jars *in situ* and the absence of wind-drift on the floor, was covered by a fill almost entirely composed of volcanic cinders. This fill had been either washed or blown into the pit mostly from the west and southwest, whence come the prevailing winds, and the strata are thicker on those sides, sloping gently toward the center. The lower 30 to 40 centimeters of this fill shows evidence of stratification and contains a good deal of soil mixed with the cinders, as well as many small pebbles and some lenses of pure earth or pure cinders; it had evidently been laid down largely by water and the material was not evenly sorted. At some points in this lower part of the fill there were even thin layers or lenses of charcoal, including fragments of corn-cobs, corn-husk, kernels, grasses, bits of sticks and the like, which could not be associated with the roof material and must have washed in during the period of filling. In the next 60 to 65 centimeters, however, a little earth was mixed with the cinders, but not in lenses, and the material seemed to be fine, evenly sorted, and unstratified, as if laid down by wind. What this differentiation means meteorologically I do not know, but we shall revert to it again at a later point.[8]

[5] The exact number is uncertain, since all the specimens have not yet been reconstructed, and in some cases it was impossible to keep separate the sherds from two or more vessels. Their locations are shown in figure 8.

[6] Included were specimens of *Pinus ponderosa*, *Pinus edulis*, *Juniperus monosperma*, *Populus fremontii*. Numerous promising specimens were saved for dating purposes.

[7] Included were greasewood, chamiso, cane, grama, and brome grasses, corn, piñon, and various deciduous species.

[8] See pp. 25–28.

Human bones. On the floor of Pithouse X there were a few fragments of human bones, including bits of a skull case, one carpel and the proximal end of a radius. These remains were not saved, and there was no certain indication of their source. Certainly they did not represent a deliberate burial, nor did they seem to be the remains of an individual killed and burned in the holocaust that destroyed the house itself.

PIT Y

Pit Y, just outside the north wall of the plaza, was not a dwelling or an architectural feature of any sort. It was excavated because a shallow circular depression on the surface suggested the presence of some subterranean structure. Actually, it turned out to be an irregular basin, about 3 meters in diameter and perhaps a meter deep, scooped out of the hard caliche; probably it had been a borrow pit from which the builders of the other structures had secured material for mortar and plaster. It was filled with almost pure volcanic cinders, laid down in irregular lenses, some fine and evenly sorted as if wind-laid, others less well classified and mixed with some earth and a few small pebbles.[9]

Another human burial had once been made in the fill of Pit Y, as evidenced by parts of a pelvis and a few other bone fragments that had been cast aside during the recent past by a pot-hunter. This was recorded as Burial 1.

PITHOUSE Z

In the process of investigating the site a test trench about 1 meter wide was dug along the outer face of the western plaza wall to ascertain whether or not anything might lie beneath it. The effort was rewarded by the discovery of what had apparently once been the floor of some sort of structure, lying directly beneath the wall and immediately west of Pithouse X. It was designated Pithouse Z and appeared to have been oval in plan, about 2.2 meters wide and perhaps 7 meters long, these dimensions being hypothetical, however, since the room was only partially excavated (fig. 11).

In the area just above the location of Pithouse Z the present ground surface is about 65 centimeters above the original surface, displaying a much greater accumulation of deposit than exists in other parts of the site, due probably to the banking up of wind-drift against the peripheral plaza wall. Pithouse Z had been dug into the hard native earth below the old surface to a maximum depth of about 33 centimeters; its sides were steeply sloping, almost vertical at the top and curving smoothly into the plane of the floor. The floor itself was uneven and hard-packed, but within the area excavated it displayed no architectural features such as postholes, fire-pits or the like. But a charred fragment of the roots of a corn plant (cat. no. 618.275) and about 100 charred corn kernels (cat. no. 618.274) were found on the floor near the center of the room.

Fill. The lower portion of the fill within Pithouse Z was composed of a miscellaneous mixture of earth, cinders, stones, sherds, and charcoal, without apparent differentiation or stratification. But above this occurred a fairly pure layer of volcanic cinders that filled not only the upper portion of the pit but

[9] Mr. Edwin L. McKee and Major Lionel F. Brady, who inspected the site, identified the fill as secondarily deposited by wind and water, and not directly from volcanic eruption.

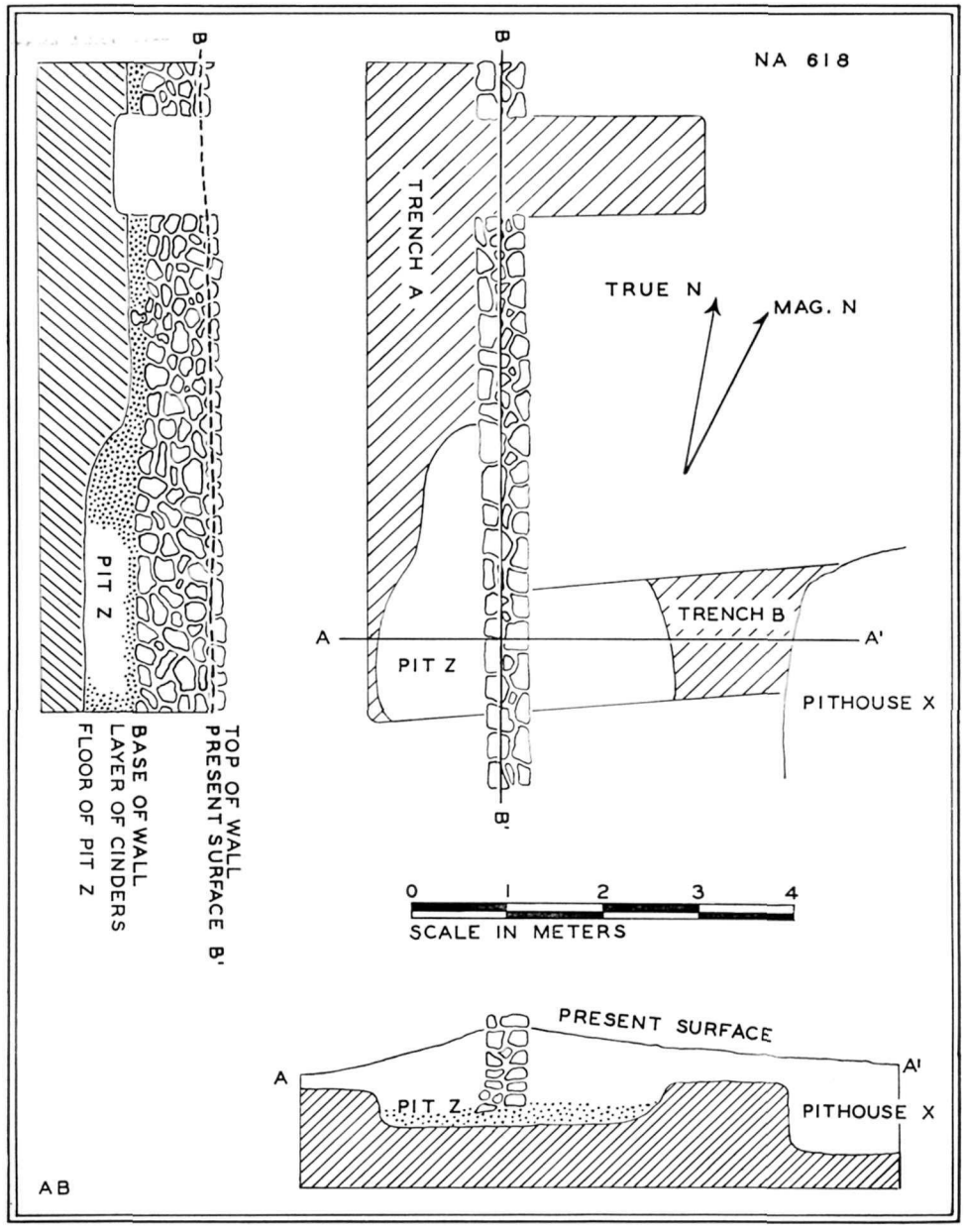


FIG. 11

Ground plan and profiles of Pithouse Z and Trench A, N.A. 618, showing superposition of compound wall above the fill of Pithouse Z.

also extended over the surrounding ground level to a depth of 10 to 12 centimeters. This stratum seems to have been wind-lain,[10] and upon or in it was constructed the west wall of the plaza, passing directly above Pithouse Z, so as to bisect the latter along its longer north-south axis (fig. 11). The base of this wall was very uneven but it was definitely not laid directly upon the old hard ground surface, but instead about 10 centimeters above this, with only the loose cinder bed as a foundation. In this cinder bed and at a point 1 meter south of the gateway and

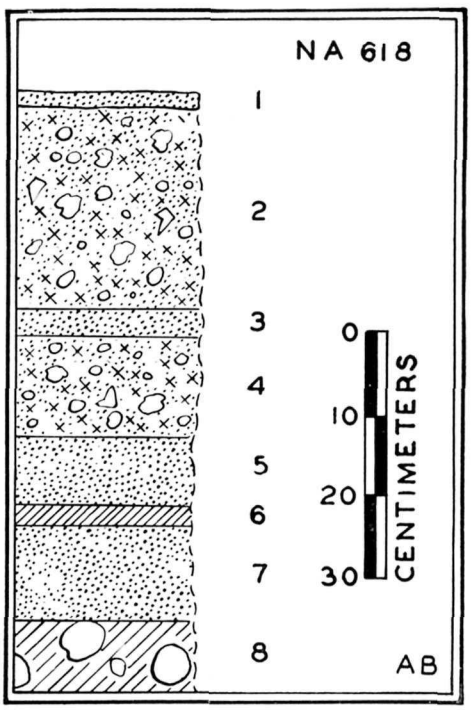


FIG. 12.

Generalized profile of fill in west face of Trench A, N.A. 618, showing lenses of volcanic cinders (1, 3, 5, 7); clay with pebbles, cinders, sherds (2,4); pure clay (6); clay with basalt boulders (8).

literally beneath the wall was found a miniature jug of Tusayan Gray Ware (cat. no. 618.281, fig. 37, H).

Another irregular shallow pit had been dug about 12 centimeters into the old ground surface just west of the plaza wall and south of the gateway. It was largely filled with white wood-ash, but was not completely excavated.

The exploratory trench west of the plaza wall above the original ground surface exposed a profile of about 65 centimeters of fill, which displayed a series of about seven strata. While these strata were not everywhere of uniform thickness, and while in some places one or another of them was absent, a gen-

[10] For identifications of the nature and origin of all deposits herein referred to I am indebted to Mr. Edwin L. McKee and Major Lionel F. Brady, who viewed them *in situ*.

eralized diagram is presented in figure 12, to show their sequence and average relative thickness. It is interesting to note that there seem to be represented an alternating series of wind-lain and water-lain deposits, which perhaps are indicative of corresponding changes in weather, but beyond that hypothesis I do not know what interpretation to place upon them. We at first thought that the lowest layer of cinders, which overlay Pithouse Z but was below the plaza wall, might represent the original fall of cinders from the eruption of Sunset Crater, and that it would therefore fix Pithouse Z as pre-eruptive. On closer inspection, however, the layer was seen to be secondarily deposited by wind and was not an original fall. Since Pithouse Z was thus clearly not pre-eruptive its chronological position could not have been very much earlier than that of the other rooms in N.A. 618, and it was not further excavated for lack of time, desirable though it would have been to do so.

The taxonomic characterization of the various parts of N.A. 618, both chronologically and in terms of cultural foci and components, as deduced from a study of the pottery and other artifacts in conjunction with architectural and positional factors will be taken up at a later point.[11] It will be more effective to consider this all-important and inferential part of the work after the architectural data from the three other sites in Big Hawk Valley have also been presented, and the complete picture is thus made available.

[11] See pp. 100–102, 168–174.

CHAPTER IV

SITE N. A. 680

PLANS AND PROFILES: Figures 13–15.
PHOTOGRAPHS AND DETAIL DRAWINGS: Figures 16–18.
POTTERY CHART: Table 2.

THIS site was one of three [1] excavated in Big Hawk Valley that were apparently representative of very nearly the same foci and components. There were numerous differences in detail among them, however, so that no one can properly be considered as "typical" of the group, but together they do present a pretty clear picture of the domestic arrangements created by the inhabitants of the Valley during the brief efflorescence of their occupation. Among the very numerous sites in the immediately surrounding region many appear from surface criteria closely to resemble the three that were excavated. All differ notably from Site N.A. 618, hereinbefore described.

SURFACE PUEBLO AND WING WALLS

The surface appearance of N.A. 680 presented a low L-shaped rock-strewn mound the wings of which, about 15 and 11 meters long respectively, embraced an open area to the southeast, within which was a shallow circular depression. From the outer extremities of the two wings of the mound extended low walls for distances of 3 and 9 meters respectively. It seemed that the architectural complex thus included a masonry surface building with a probably associated subterranean structure, and excavation verified this inference. The surface unit had originally consisted of possibly 4 or 5 rooms, although only one was fully excavated and another was tested. Since the highest part of the mound existed at the angle formed by the two wings, excavation was started there. The northeast wing, which certainly contained one small room and perhaps two, was not investigated.

ROOM 3

This room (figs. 13 and 14) was approximately rectangular and had originally measured about 5.6 by 2.9 meters, the longer axis oriented just a little west of north. Subsequent to its construction, however, it had been subdivided by a cross wall that reduced the principal northerly portion to a length of only about 3.6 meters. Most of what is to be said hereinafter will apply to that northerly portion, designated as "3" on figs. 13 and 14, whereas the remaining small southerly portion is designated "3A."

Floor. A floor had existed at or a little below the original ground surface, made of hard-packed clay, and fairly even and level. It abutted the walls, including the southerly partition, but was not faired up into their vertical planes. All

[1] The others were N.A. 681 and N.A. 682, described on pp. 41–50 and 51–69.

the walls were based 4 or 5 centimeters below the floor, and this feature characterized the partition wall as well, proving that it must have been constructed prior to the original occupation of the room and could not have been part of a later remodelling. An irregularly circular basin-shaped fire-pit, 35 centimeters

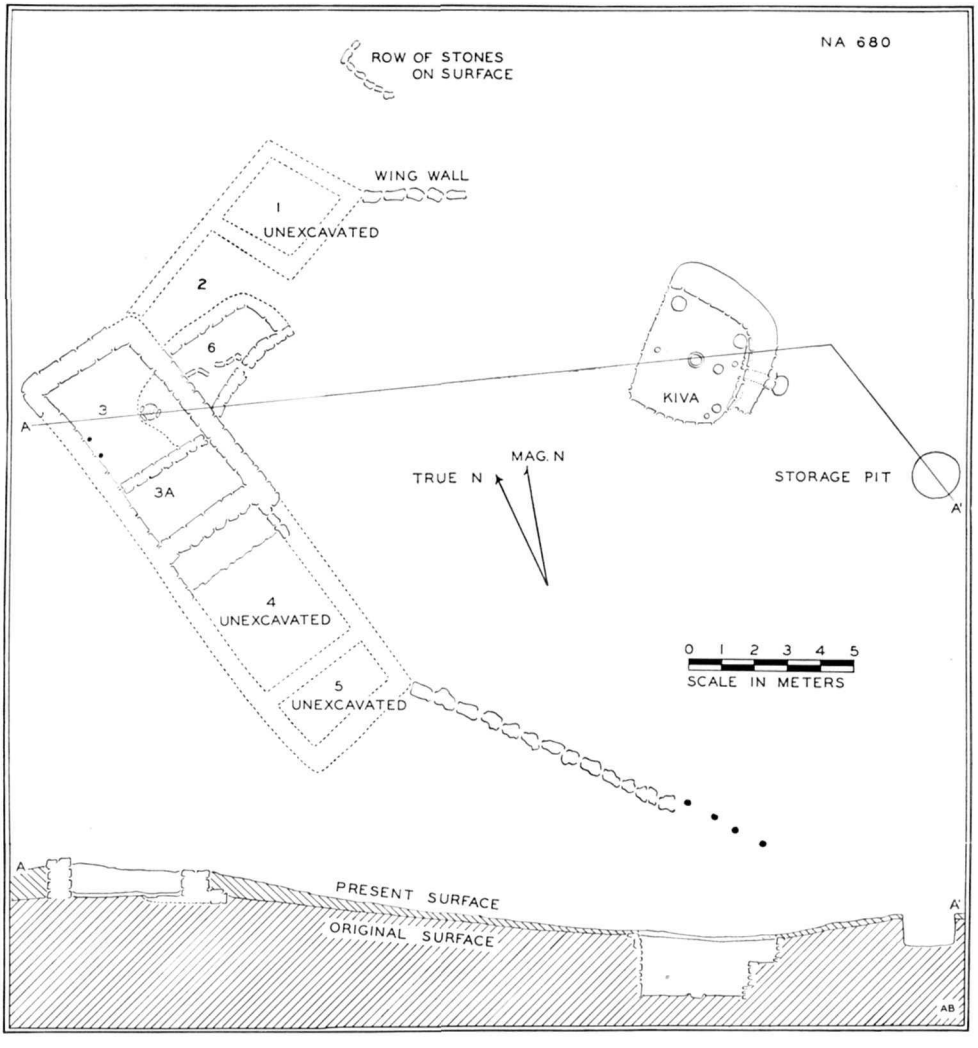


FIG. 13.

Ground plan and profile of N.A. 680, a Kayenta Branch site of the Klethla Focus, composed of a small surface pueblo with wing walls and a probable kiva.

in diameter and about 10 centimeters deep, occurred about 1 meter from the east wall, 2 meters from the north wall and 1.3 meters from the partition. It was clay-lined but was not reinforced with stone slabs or a raised collar and was filled with wood ash. About 65 centimeters west of the fire-pit was a large circular hole, 15 centimeters in diameter and containing juniper splinters and charcoal. It could have been a posthole; I am inclined to regard it, however, as

the socket for a notched ladder giving access to a hatchway in the roof above the fire-pit. No other features existed in this floor, and the only artifact found *in situ* upon it was a chert scraper (cat. no. 680.80).

Above the floor just described lay another floor of well-packed clay. It was neatly faired into the walls on all sides, and at its southerly extremity was from 5 to 10 centimeters above the earlier floor, upon a stratum of occupational debris. Toward the north, however, the interval between the floors decreased and at about 1.5 meters from the north wall they coalesced and became indistinguishable. A circular, basin-shaped fire-pit occurred 65 centimeters from the east wall, 90 centimeters from the south and 2.25 meters from the north, placing it thus a little to the southeast of the fire-pit in the lower floor. This upper pit had been protected by a ring of small stones set around it on the floor level. No deflector existed between the fire-pit and a ventilator hole in the east wall, which will be described later (see p. 32).

Postholes. Two small postholes 8 centimeters in diameter appeared against the west wall, 60 centimeters apart and slightly south of the mid-point of that wall. No other postholes occurred in either floor, so that the method of roofing remains obscure; it would seem logical to expect an opposite post against the east wall, to support a ridge pole, but if such a ridge pole existed it must have borne directly upon the masonry. Since the room had not burned no beam fragments remained.

Objects in situ. On the floor near the north wall lay three bone awls (cat. nos. 680.12, fig. 47, C; 680.13; 680.14, fig. 47, B) and two manos (cat. nos. 680.18, 680.45) while against the west wall and just north of the postholes lay three manos (cat. nos. 680.39, fig. 45, F; 680.42, and 680.43) and three hammer stones (cat. nos. 680.50, 680.52, and 680.54). Scattered about elsewhere on the floor lay a large number of other artifacts: one bone awl (cat. no. 680.27); five manos (cat. nos. 680.33; 680.38; 680.40; 680.41; 680.44, fig. 45, E); two hammer stones (cat. nos. 680.17; 680.47); two scrapers (cat. nos. 680.19; 680.55); two choppers (cat. nos. 680.36; 680.51); a portion of a broken metate (cat. no. 680.46); a grinding slab (cat. no. 680.16); a sandstone hoe (cat. no. 680.48); one obsidian and two chert flakes (cat. nos. 680.26; 680.11, and 680.24); a polished pebble (cat. no. 680.28); two vesicular basalt cylinders (cat. nos. 680.20; 680.21); one projectile point (cat. no. 680.22); fragments of malachite, hematite and turquoise (cat. nos. 680.8; 680.10; 680.25). These numerous objects have been listed here as indicative of the variety of artifacts apparently in use in this one room at the time of its abandonment as well as to suggest the high degree of domestic activity that must have obtained at that time. It is curious, however, that there were no pottery vessels, and that despite the presence of ten manos, only one small fragment of a broken metate remained. Perhaps the inhabitants took with them, when they left, the larger and less easily replaceable items.

Walls. The exterior walls of Rooms 3 and 3A had been built as a unit, with square bonded corners and double faces, the core being filled with rubble. The north, east and west walls were plane-faced on both sides but the south wall, between Rooms 3A and 4, was uneven on its south face, and considerably thicker than the others. A characteristic of these walls was the method of laying their foundations. It appeared that a shallow trench had at first been dug about 10 centimeters below the ground level, and partly filled with puddled clay; into

this matrix a course of large irregular boulders had then been set. Above the foundation, stones of somewhat smaller dimensions were used, laid in approximate courses but not artificially shaped. The wall between Rooms 3 and 3A differed somewhat from the others and will be described presently. All walls were set in copious mortar, quite without spalls, and the masonry was of a "wet" rather than a "dry" technique, wherein the individual blocks were kept in place almost entirely by the mortar and not by virtue of direct bearing upon each other.[2] Nevertheless, despite the absence of spalls, these walls were amazingly sturdy, and to demolish them was very difficult, chiefly because the clay was so hard and resistant. Nearly all the building stones were of vesicular basalt, with an occasional block of sandstone. The walls were from 50 to 60 centimeters in thickness, and stood from 1 meter to 1.25 meters high at the time of excavation. In a few spots remnants of 2 or 3 superimposed coatings of wall plaster survived, and the entire interior surfaces were probably once so finished.

The east wall was pierced by a rectangular hole, 29 centimeters wide and 35 centimeters high. Its sill, which was paved with slabs of sandstone. was very slightly above floor level; its lintel was simply a rough block of basalt that spanned the width of the aperture, and its sides were not defined by the use of vertical slabs. That this hole served the purpose of a ventilator is indicated not only by its position opposite the fire-pit but also by the existence on the exterior of the wall of what must have been the remains of a ventilator shaft leading upward from the outer end of the wall tunnel. The stone masonry of the shaft survived only on the north and east sides and was two courses high, but since the wall tunnel itself had originally been above ground level, it is hardly likely that the shaft was ever very high. Perhaps it was merely a shield to prevent water and dust from entering the room. In the bottom of the shaft was a fairly large collection of sherds, mostly Deadmans Gray, the latter apparently from a single olla.

Fill. The lower 30 to 40 centimeters of the fill in Room 3 was composed of clay and some vegetal material, probably the remnants of the roof; there was no charcoal. Above this was a mass of fallen building stones and a fair quantity of miscellaneous sherds, hammer-stones, manos and broken metates.

Room 3A

As already indicated, this area was structurally a part of Room 3, in that its east and west walls were continuous with those of Room 3 and its south wall was bonded with them. Its north wall was, however, separately constructed and abutted the east and west walls. This partition, which of course also formed the south wall of Room 3, was about 40 centimeters thick, and although double-faced, only its northerly face was plane-surfaced. Its base was below that of the lower floor of Room 3, and within the area designated as Room 3A there was no trace of any floor at all. The wall must therefore have been built as a part of the original plan of the room, and since it stood only 80 centimeters high, which was considerably less than the height of about 1.25 meters that still remained of the outer room walls, it very likely never extended appreciably higher, and formed probably the front of a large storage bin. The south wall of Room 3A, between that area and Room 4, was unusually thick, about 80 centimeters.

[2] For a discussion of "wet" and "dry" masonry methods see Roys, 1936, pp. 123–130.

ROOM 4

Although it was not completely excavated, a room approximately equal in size and shape to Room 3–3A, existed immediately to the south of the latter. Its east and west walls were continuations of the corresponding walls of Rooms 3 and 3A, and there was surface indication that approximately its southerly fourth had been partitioned off. A small test pit was dug against the north wall, which demonstrated that the latter was bonded with the east and west walls, but was, unlike them, not plane-faced on the southerly surface, an unusual feature for the interior of a room that seems to have been large enough for a dwelling. No floor was found, but a ledge of native red rock occurred at about the level of the floor in Room 3.

WING WALLS

As already pointed out, low wing walls extended toward the east and southeast from the extremities of the surface house. Both consisted of rows of large irregular boulders of vesicular basalt, widely variable in size and shape, placed without any apparent attempt to produce a faced wall of even crude masonry. They resembled, rather, low wind rows and were probably never more than 40 or 50 centimeters high. Perhaps they were wind breaks or sand fences such as those used today, as well as in prehistoric times, as protective devices in Pueblo agriculture.[3] Perhaps a brush superstructure once surmounted the stones, and we searched carefully for evidence of postholes indicative of the former existence of a palisade. Although similar wing walls occurred at Sites N.A. 680, N.A. 681 and N.A. 682, this search was rewarded in only one instance. In prolongations of the southeast wall at N.A. 680 were four possible postholes spaced from 60 to 80 centimeters apart and 5 or 6 centimeters in diameter. They contained some small fragments of rotten wood. No similar postholes were found beyond the extremities of any of the other seven wing walls investigated at the three sites.

ROOM 6

In the process of excavation of Room 3 it became apparent that beneath the earlier floor of that room there lay a stratum of occupational debris that suggested a still earlier structure. This hypothesis was strengthened by the discovery of a low wall beyond the east wall of Room 3 and at a somewhat lower level. Pursuit of these clues led to the excavation of an irregularly shaped room, numbered 6 on figures 13 and 14, slightly subterranean and in part underlying the east wall and southeast corner of Room 3.

Floor. The floor of Room 6 lay at a level some 25 to 30 centimeters below the lower floor of Room 3 and consequently at the same depth below the original ground surface. In the major part of its area it was hard-packed clay, although toward its northeast and southwest ends it was uneven and pebbly and indistinguishable from the native caliche into which the room had been dug. The shape of the room defies geometric terminology, but it was about 3.2 meters long by 1.1 meters wide at its northeast end and 2 meters wide at its southwest end.

[3] For a discussion of this practice, see Hack, 1942, p. 33, fig. 18.

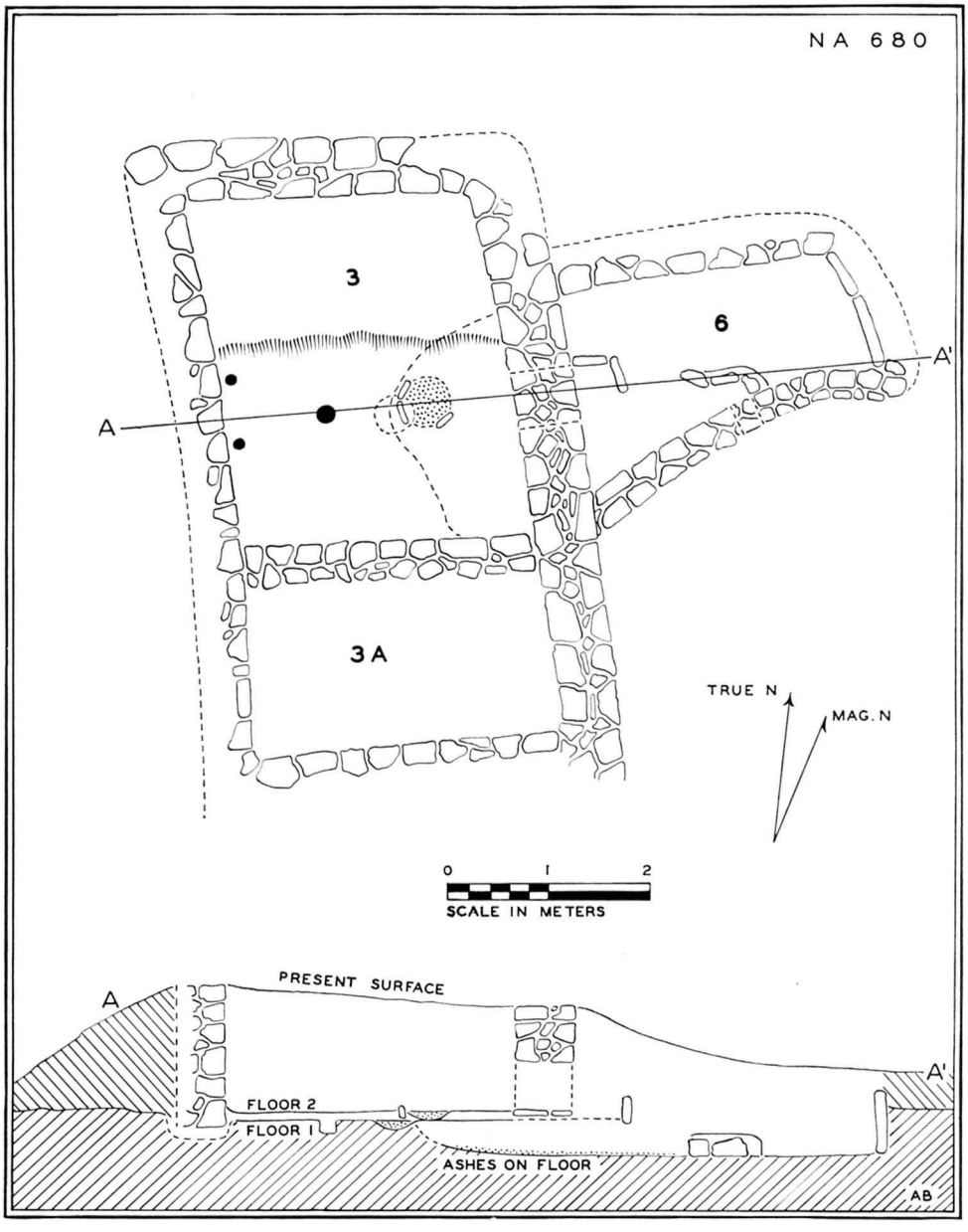


FIG. 14.

Ground plan and profile of Rooms 3 and 6, N.A. 680, showing floor features and superposition of part of Room 3 over Room 6.

Neither of the long walls was even approximately straight, but both curved unevenly on a radius of roughly 10 meters, with a center toward the southeast. Three corners were rounded, but the southeast corner formed an acute angle of about 70 degrees. No fire-pit was found but an irregular area covered with wood ashes and charcoal, perhaps 60 to 90 centimeters in diameter, existed at a point directly beneath and on both sides of the superimposed east wall of Room 3. The accumulated debris here contained charred corn cobs, beans, cotton seed and a small fragment of grass or reed matting (cat. no. 680.70). No postholes were found.

Walls. The walls of Room 6 were uneven and poorly constructed in comparison with those of the surface masonry building. The long walls were of irregular basalt boulders, laid in a bed of clay as were the walls of Room 3, and were fairly plane-faced on the interior surfaces, although quite without coursing. The exterior faces were uneven. They stood from 60 to 75 centimeters high. The northeast end wall was unique, and was formed by two tremendous basalt boulders, 50 and 72 centimeters wide and 55 and 64 centimeters high respectively. They were much thinner than that but could scarcely be called slabs. No masonry above them had survived. The long walls appeared to abut against the exterior of the east wall of Room 3, but that portion of Room 6 that lay actually beneath Room 3 was quite devoid of walls. Its outline was definable only by the termination of its floor and by the clearly demarked edges of its excavation. Doubtless the walls of Room 6 had been razed sufficiently to permit Room 3 to be built above it, and perhaps some of its building stones had been appropriated for use in the walls of Room 3.

Ventilator and deflector. Through the southeast wall of Room 6, at a point about 1.2 meters from the southeast corner, a small ventilator tunnel had been made (fig. 14) 12 centimeters high by 15 wide, its sill at floor level. In front of this aperture was a deflector made of three stones set in clay mortar, so as to form a low wall 15 centimeters high, and neatly molded to a smooth surface. One stone, immediately to the left of the hole, was set snugly against the wall and normal to it, extending 14 centimeters into the room; the other two stones formed a diagonal member extending 32 centimeters to the right, and being 33 centimeters from the wall at the outer extremity. Curiously enough no fire-pit was discovered behind this deflector or screen.

The area of Room 6 was filled with occupational debris, charred corn, beans, grass seeds, small sticks, as well as numerous sherds. It apparently did not represent an occupation significantly earlier than that of Room 3 above it, however.

PITHOUSE

As has been said above a slight depression southeast of the surface building suggested the existence of a large subterranean structure, and a test trench was projected across the area. This trench was dug through the soft surface accumulation to hard undisturbed earth, which was everywhere about 30 centimeters below the present surface. At about 13 meters from the east wall of Room 3 the edge of an excavation was discovered, which proved to be the side of a large, approximately D-shaped room, the floor of which was found about 1.9 meters below the present surface (fig. 15). It measured about 3 by 3.5 meters in

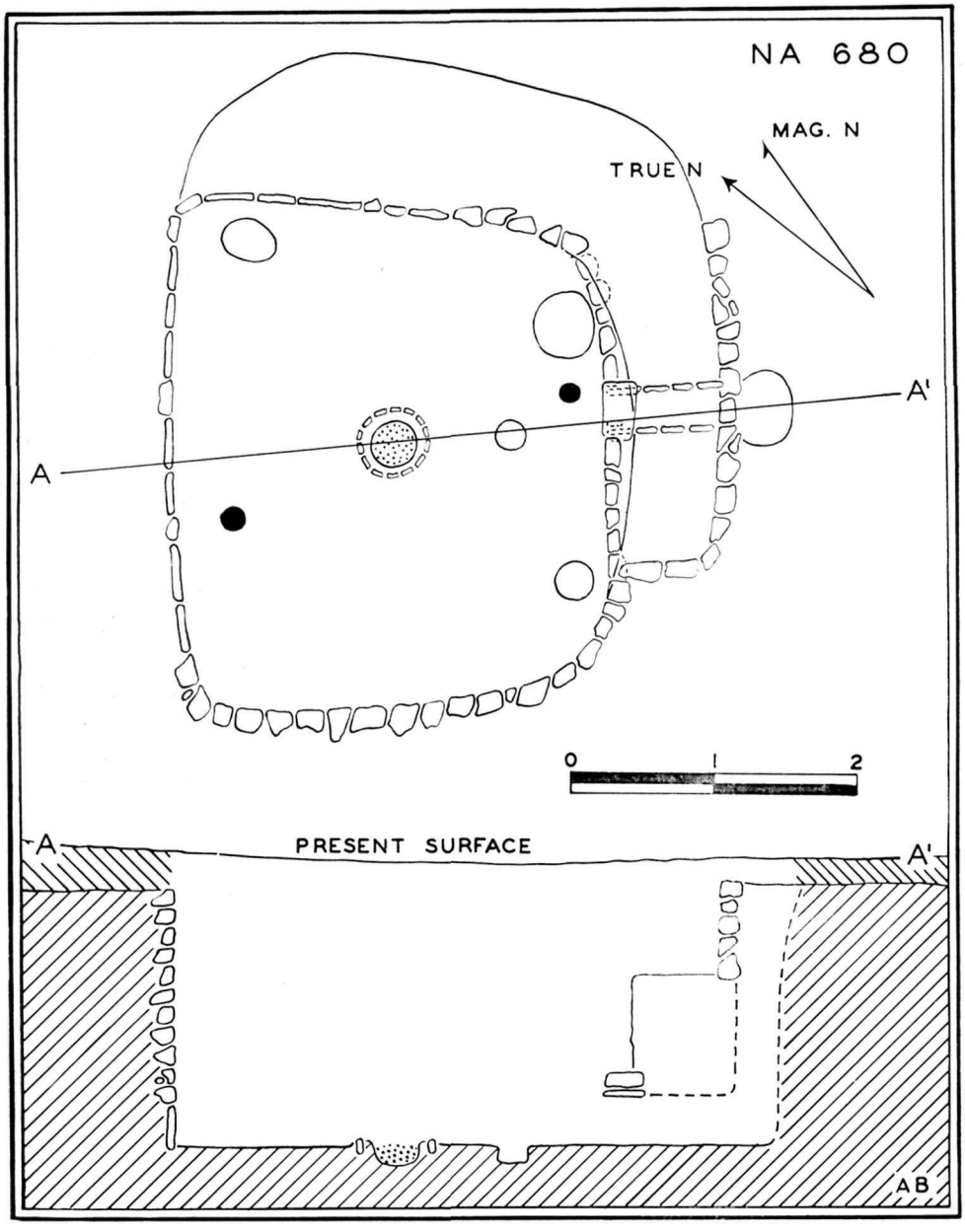


FIG. 15.

Ground plan and profile of the Kiva at N.A. 680, showing floor features, bench and ventilator.

diameter; its northwest side was nearly straight, while its other sides were gently curved. The corners between the straight wall and the adjoining ones were rounded on arcs of about 35 centimeters, whereas the corners between the three curved walls were rounded on arcs of approximately 1 meter.

Bench. A raised and recessed bench existed along the northeasterly and most of the southeasterly sides of the room. This feature was about 1.2 meters above the floor and extended outward to a depth of 1 meter at its northerly end and 80 centimeters at its southerly end. Its outer or back walls were vertical and curved in approximately the same form as those of the corresponding lower portions of the



FIG. 16.

View of Kiva, N.A. 680, from south, showing patch-work character of masonry, floor cist, fire-pit and ventilator.

room. Masonry was employed along the southeasterly part of this back wall but was absent along the northeasterly part. The surface of the bench was hard native earth. (See fig. 16 for a general view of the pithouse.)

Floor. The floor was a hard, well-defined surface of clay, and contained, very near its center, a well-made fire-pit (fig. 17). This was almost exactly circular, 32 by 33 centimeters in diameter and 15 centimeters deep, with nearly vertical sides and a slightly concave bottom, the whole interior smoothly plastered with clay, which had been burned hard. It was surrounded by a parapet of clay 6 to 8 centimeters thick rising about 5 centimeters above the floor; into the outer edge of this parapet was set a row of small sandstone slabs that rose very slightly above the surface of the parapet itself. No deflector was found.

A shallow, basin-shaped pit, 22 centimeters in diameter and 10 centimeters deep, lay about midway between the fire-pit just described and the opening of the ventilator tunnel, which will be discussed later (see p. 40). This pit was filled with wood ashes and charcoal, and was evidently a secondary fire-pit.

Two circular holes, 17 and 18 centimeters in diameter were found in the floor, one 35 centimeters from the northwest wall of the room, the other 18 centimeters from the southeast wall, each approximately midway between the other sides. These very strongly suggest holes for roof posts, over which would have been placed a single ridgepole, since the size of the room must have required some support other than the walls themselves. The only element of doubt in such a hypothesis is the fact that one such post would have stood partly in front of the ventilator opening, which will be discussed later (see p. 40).

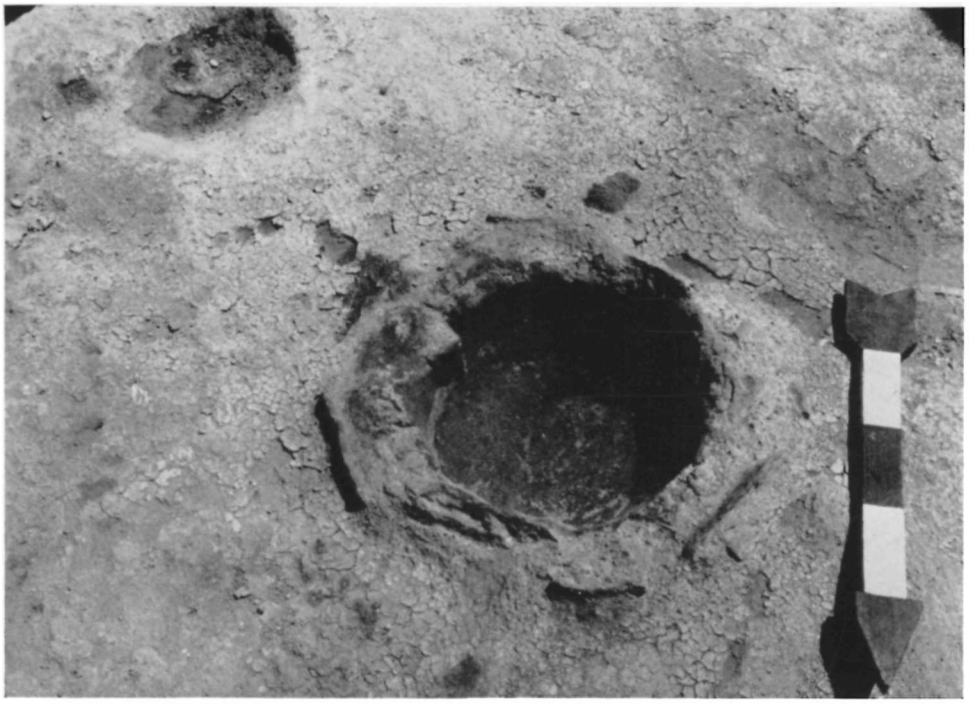


FIG. 17.

Detail of fire-pit in Kiva, N.A. 680, showing clay parapet with reinforcing stones.

Three other large pits, all roughly circular, appeared in the floor, but their purpose is not perfectly clear. They all penetrated deeply into a stratum of volcanic cinders that underlay the floor of the room, and their sides and bottoms were not exactly definable, being unplastered. This volcanic layer is the same one that also was found beneath Pithouse X in N.A. 618 (see p. 23) and under the floor of the pithouse at N.A. 681 (see p. 47). The pits contained miscellaneous occupational debris but nothing directly to suggest their use as storage cists. They measured 40 by 50, 45 by 57 and 28 by 30 centimeters in diameter respectively, and their positions may be seen by reference to figure 15.

Walls. The walls of the pithouse were very interesting, and were mostly formed of the hard surface of the native grayish caliche through which the pit had been dug. They were everywhere vertical and in some areas were quite sufficiently cohesive as to require no reinforcement whatever. In other places soft spots necessitated the erection of sections of masonry to prevent collapse. Sometimes this masonry took the form of a section of solid wall built up from the floor; in others it was merely a patch or plug to fill a small hole. It was continuous, however, around the base of the walls just above the floor, and the lowest course was formed mostly of vertical slabs of sandstone along the northeast and northwest walls, but of basalt boulders along the others. In general the masonry was rather more crude than that of the surface building at this site. Above the lowest course, it was composed of large and small basalt blocks and slabs and chunks of sandstone, without any attempt at coursing.

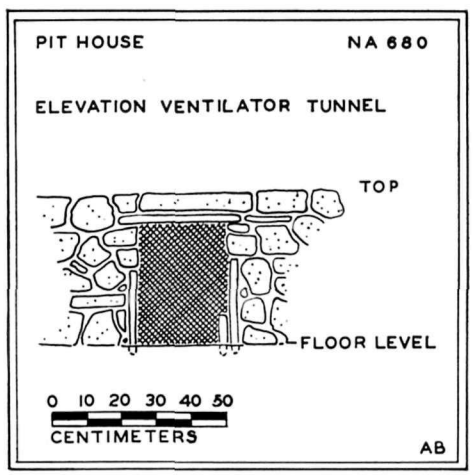


FIG. 18.
Detail of ventilator tunnel opening in Kiva, N.A. 680.

The practice of using patch-work masonry for reinforcement of earth walls in subterranean houses was fairly common in the Southwest. It has been reported, for instance, from Flute Player House in Hagoe Canyon, Monument Valley;[4] from Pueblo II structures on Alkali Ridge, Utah;[5] from the kiva of a Pueblo II site in the Ackmen area, Southwestern Colorado;[6] and in a tenth-century pithouse at Starkweather Ruin in the Mogollon area.[7]

At a height of about 1.2 meters above the floor a broad level bench extended around the entire northeast and most of the southeast sides of the room (fig. 15). It varied in width from 95 to 65 centimeters and like the room had been dug out of the hard caliche. Its floor was level but not surfaced, and its back wall was supported by basalt-block masonry only along the southeast portion, above and in front of the ventilator.

[4] Kidder and Guernsey, 1919, p. 43; fig. 18.
[5] Brew, 1946, p. 212.
[6] Martin, 1938, pp. 248–49.
[7] Nesbitt, 1938, p. 30.

Ventilator. The ventilator consisted of a horizontal tunnel passing beneath the bench at about the mid-point of the southeast side of the room (figs. 15, 16, 18) and a vertical shaft immediately outside the masonry behind the bench at that point. The tunnel itself was rectangular in section, 29 centimeters wide by 36 high at its mouth. Its sill was at floor level; the lintel was a large sandstone slab, and the sides were formed by vertical sandstone slabs about 20 centimeters high surmounted by masonry of small basalt blocks. The mouth of this tunnel extended into the room about 20 centimeters beyond the upper part of the face of the bench, but the bench wall along its lower part, and up to the height of a single course above the ventilator opening, extended evenly to right and left of the opening and, at the adjacent corners of the room, curved into the same vertical plane as the upper part of the wall. The vertical shaft of the ventilator was oval in section and about 30 to 40 centimeters in diameter up to the level of the bench; above that its position and size were not clear, but it appeared to have sloped outward to a point somewhat removed from the back wall of the bench.

There was nothing *in situ* on the floor or on the bench of the pithouse. The lower half of the fill was hard and compact, but contained no identifiable evidence of the roof; in it were recovered about 600 sherds but almost no stone or bone artifacts. The upper half of the fill was much softer and more heterogeneous; it contained nearly 1900 sherds as well as 6 hammer stones, 4 manos, and numerous other artifacts. Almost no fallen rocks occurred anywhere in the fill.

STORAGE PIT

About 6 meters southeast of the pithouse was a pit 1.45 by 1.35 meters in diameter, 55 centimeters deep with vertical sides and a nearly flat bottom. Its walls and floor were smooth, and were formed of the hard native caliche, without supporting plaster or masonry. Although it contained nothing but wind-blown cinders and a few sherds it must have served as a storage pit; since there was no evidence of fire it could not have been used as a roasting oven.

CHAPTER V

SITE N. A. 681

PLANS AND PROFILES: Figures 19, 22.
PHOTOGRAPHS AND DETAIL DRAWINGS: Figures 20, 21, 23.
POTTERY CHART: Table 2.

ABOUT one-quarter mile east of N.A. 680 lies N.A. 681, a site closely similar to the former in both its chronological and cultural position, although probably a little later in date and characterized by numerous variations in architectural detail. Like the sites already discussed, N.A. 681 will first be objectively described, and its comparative significance in relation to the other sites will be reserved for discussion at a later point.

Like sites N.A. 680 and N.A. 682, this site comprised a small masonry surface house with long wing walls extending east and southeast, and a subterranean structure located within the area embraced by these walls.

SURFACE PUEBLO

The surface building in this case was composed of three rectangular rooms arranged in a single row oriented northeast-southwest, without the ell characteristic of those at N.A. 680 and N.A. 682. Structurally the middle room, Room 2 on figure 19, had been built first, and Rooms 1 and 3 had later been added at its ends, as indicated by the fact that the four walls of Room 2 were all bonded to each other at the corners, whereas the contiguous walls of Rooms 1 and 3 abutted those of Room 2. I believe, however, that while this architectural feature indicates the actual sequence of construction, it does not imply any significant lapse of time between building periods, and that the whole edifice was built as a single unified project. With this preliminary statement we shall consider the rooms individually in sequence.

ROOM 1

This room is at the northeastern end of the structure, and is slightly trapezoidal, with a long dimension of about 3.5 meters oriented northeast-southwest, and nearly parallel ends measuring respectively about 1.6 and 2.1 meters. No definable floor could be recognized, but at about the level of the original ground surface, which was from 40 to 50 centimeters below the present surface, there were irregular areas of clay interspersed between numerous large boulders of bed rock that extended upward irregularly, especially at the south end of the room, where the wall had been built directly upon them. The general level of this "floor" sloped slightly toward the northeast and its only artificial feature was a deep circular clay-lined cist near the north corner. This cist was about 38 centimeters in diameter and 47 centimeters deep; it contained nothing but undifferentiated debris. Two small fire areas were visible on the floor, but no actual fire-pits. One

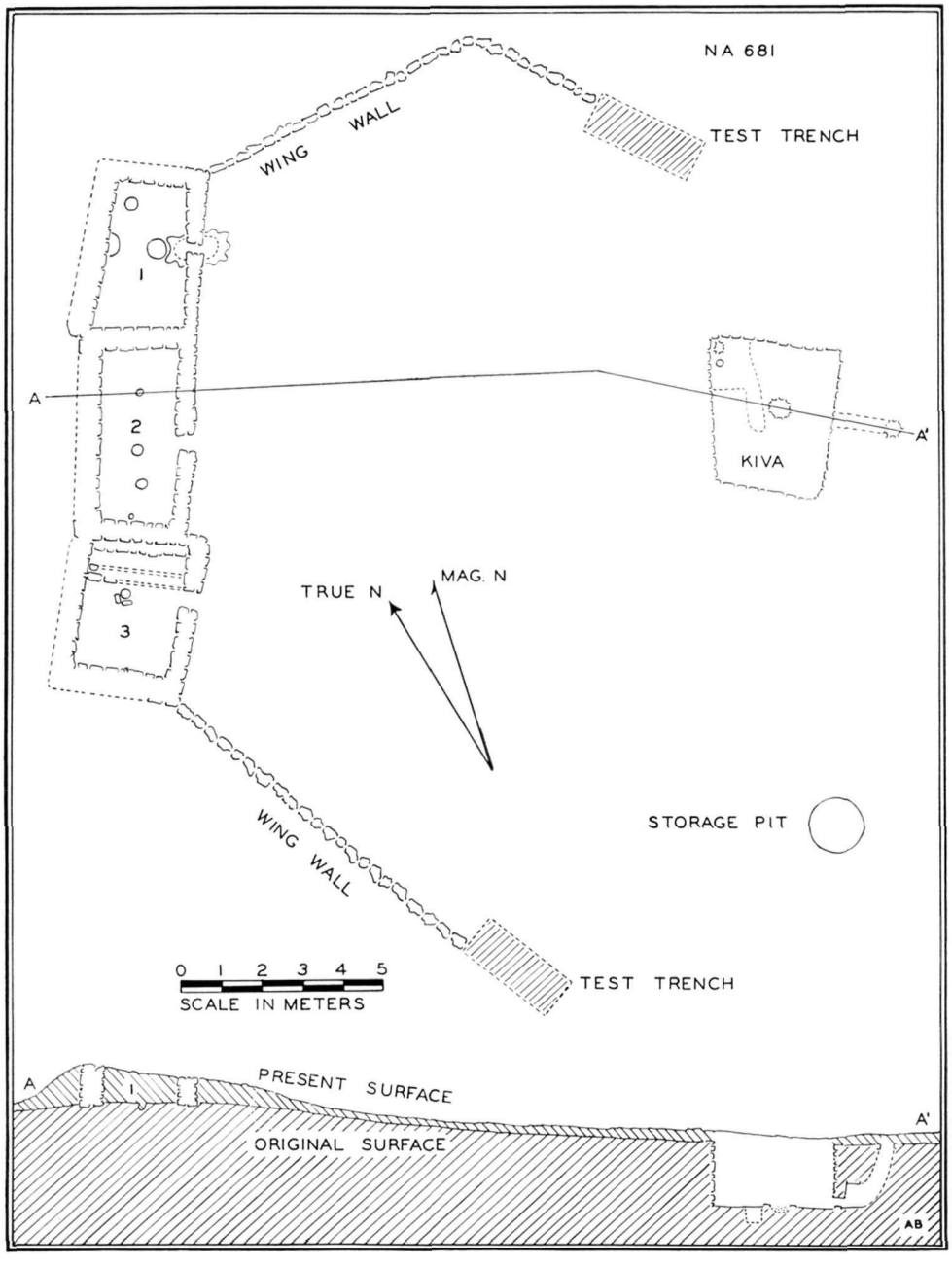


FIG. 19.

Ground plan and profile of N.A. 681, a Kayenta Branch site of the Klethla Focus, composed of a small surface pueblo with wing walls, a pithouse or possible kiva, and a circular storage pit.

such area lay against the northwest wall near its mid-point and the other about 50 centimeters in diameter, was placed 40 centimeters from the southeast wall about opposite the mid-point of the latter. No postholes were evident. Not a single artifact was found *in situ* on the floor.

Walls. The walls of Room 1 were generally similar to those in the other rooms of this site as well as in sites N.A. 680 and N.A. 682. They were double-faced, 40 to 60 centimeters thick, with plane surfaces on both interior and exterior, the core rubble-filled. They were made of unshaped basalt boulders of varying size, the basalt course containing the largest ones, and all laid in copious mortar without the use of spalls. The walls were founded directly on the native soil or on ledge rock, except along a portion of the southeast side, where an area of fill underlay the wall. They stood mostly from 70 to 90 centimeters high but as low as 50 centimeters along the southeast side. The northwest, northeast and southeast walls were bonded at the corners, which were approximately square, but the two long walls abutted against the southwest wall, which was structurally integral with the walls of Room 2. This abutment at the outside of the west corner extended beyond the original line of the northwest wall of Room 2 and was, so to speak, wrapped around it. A similar situation occurred also at the point where the southeast wall of Room 3 joined the south corner of Room 2, overlapping rather than abutting it.

At about the middle of the southeast wall of Room 1 a very narrow opening occurred, 17 centimeters wide and 18 centimeters above the floor. It was not clear whether this had been the lower part of a doorway, for which it would seem too narrow, or the remains of a ventilator hole similar to those that existed elsewhere. No lintel or upper termination of the aperture existed, but since the wall at this point stood only about 35 centimeters above the sill of the passageway, it cannot be known how far upward the aperture originally extended.

Early fire-pit. Below the footing of the southeast wall, directly beneath the passageway just referred to, there existed a natural basin in the bed rock, about 1 by 1.5 meters, irregular in outline and 10 centimeters deep. Its long axis extended northwest-southeast, and about one-half lay below the floor of Room 1, the other half beyond the limits of that room. It was filled with ashes and undifferentiated cultural debris, but nowhere could a floor or occupational level be found in association with it. Apparently it had been an open-air fire-place prior to the building of Room 1 above it.

ROOM 2

This was the central room of the surface structure and was almost exactly rectangular, about 4.2 by 1.8 meters in dimensions (fig. 20). A well-defined but irregular clay floor existed at or a little below ground level, through which protruded large bed-rock boulders to heights up to 8 centimeters. Two fire-pits existed in the floor, both circular and basin-shaped, one very near the center of the room, 25 centimeters in diameter and 12 centimeters deep, the other at about the middle of the southwestern half of the room, 30 centimeters in diameter and 12 centimeters deep. Neither was reinforced or lined in any way. There was no deflector.

Postholes. Two postholes stood in about the center line of the long dimension, one 13 centimeters in diameter and 90 centimeters from the northeast end, containing the charred stump of a piñon post, the other 10 centimeters from the southwest end, containing remnants of charred juniper. Apparently, then, the roof had been supported by a single long ridge pole.

Walls. The walls of Room 2 were, as has been said, bonded at all corners, and varied from 65 to 80 centimeters in thickness. They stood from 75 to 95 centimeters high and were based mostly on native earth or bed-rock, although



FIG. 20.

View of Room 2, N.A. 681, from south, showing fire-pit, posthole, masonry of basalt blocks, and bed-rock protruding through floor.

at the northern corner, a lens of volcanic cinders underlay the masonry. No evidence of a foundation trench with clay-filling, such as occurred at Site N.A. 680, was found. The masonry was, as usual, formed of irregularly shaped blocks of basalt, arranged in approximate courses, the largest stones along the base, and were double-faced with plane surfaces on each face (fig. 20). In the southeast wall was set one large sandstone slab, 50 centimeters high by 20 centimeters wide, and near it an old metate had been incorporated as a building stone. Rarely also small sandstone blocks were used. The masonry was laid in copious clay mortar with a "wet-wall" technique as discussed above with reference to the masonry of Site N.A. 680, to which it was closely similar, though perhaps somewhat less massive. No convincing evidence of surfacing plaster remained on the walls.

Doorway. At about the mid-point of the southeast wall a narrow doorway existed, 35 centimeters wide at the bottom, and 40 at the top. Its interior sill was at floor level, but half way through the passage a large boulder of bed-rock formed a step upward of 20 centimeters, thus indicating that the interior floor may have been excavated slightly below the original ground surface. That this aperture was really a doorway and not a ventilator hole was evident from the fact that it extended upward 70 centimeters to the full height of the surviving portion of the wall.

Objects in situ. It seems pretty certain that Room 2 had been the principal dwelling and work room at N.A. 681, not only by reason of its ample size, but also because of the multitude of artifacts that were found on its floor, apparently *in situ*. These included 3 unbroken basin-type metates, 2 of them open at both ends (cat. nos. 681.110, fig. 44, B; and 681.174) and the third open only at one end (cat. no. 681.176, fig. 44, D). Two lay flat on the floor, while the third stood on end leaning against the southeast wall. Eight whole and broken manos lay on the floor, 5 of them close together just north of the central fire-pit (cat. nos. 681.134, 681.163, 681.164, 681.166, 681.167); two others were in the west corner (cat. nos. 681.127 and 681.140) and the last (cat. no. 681.129) was found with a restorable Moencopi Corrugated olla (cat. no. 681.493) and part of a Walnut Black-on-white olla (cat. no. 681.492). Two other fragmentary pottery vessels were also found on the floor, both Flagstaff Black-on-white bowls (cat. nos. 681.71 and 681.496, fig. 38, F).

Other artifacts scattered on the floor included 4 hammer stones (cat. nos. 681.132, 681.142, 681.168 and 681.171); 3 bone awls (cat. nos. 681.121, 681.123 and 681.126); a stone hoe (cat. no. 681.144); a grooved maul or axe (cat. no. 681.131, fig. 46, D); one sherd pottery scraper (cat. no. 681.447); 3 sherd disks (cat. nos. 681.114, fig. 41, B; 681.117 and 681.120); two vesicular basalt cylinders with the manos near the fire-pit (cat. nos. 681.169 and 681.170); and what may have been a bone die (cat. no. 681.119).

ROOM 3

At the southwest end of the row lay Room 3, nearly rectangular, 2.2 by 3 meters, with a floor of fairly smooth clay at or slightly below the old ground surface. The floor was neatly faired up on all sides to cover the lower parts of the walls. A fire-pit lay slightly north of the center of the room, basin-shaped, 28 centimeters in diameter, and 14 centimeters deep. Two upright slabs of sandstone still remained of what had probably once been a protective coping around the fire-pit. There were no postholes and no deflector.

Walls. The walls seem to have been laid directly on the native earth and on bed-rock. They were double-faced and plane-surfaced, varied from 65 to 80 centimeters thick, and stood from 85 centimeters to 1 meter high. The northwest, southwest and southeast walls were bonded at the corners, but they abutted the northeast wall, which was integral with Room 2. A doorway 43 centimeters wide pierced the southeast wall about 80 centimeters from its northeasterly end; its sill was composed of the lowest course of wall masonry and was 15 centimeters above the floor. Both jambs of the doorway were carefully made and plane-faced.

Subsequent to the original construction some remodeling had taken place at the northeast end of the room. Snugly against the northeast wall there had been built a thin plane-faced veneer of masonry, 20 to 25 centimeters thick, well-laid of comparatively small basalt blocks, and abutted at its ends against the southeast and northwest walls. It stood 40 centimeters high and was fairly level on top, in places capped with clay. This veneer obscured the lower part of the main wall across its entire length and provided a narrow shelf or bench, above which the face of the main wall was exposed (fig. 21). The purpose of this ledge was not apparent.



FIG. 21.

View of north wall of Room 3, N.A. 681, showing the low veneer wall that had been constructed against it to form a narrow bench or shelf.

About 40 centimeters southwest of the ledge just described three stones remained *in situ* at floor level against the northwest wall, and represented what had apparently once been a partition extending across the room to a point immediately northeast of the doorway. The course of this wall was evident from the marks of its former position upon the floor, where two shallow slots or troughs indicated its outlines. There was no indication of its original height, but its thickness had been about 40 centimeters.

Six manos and one metate (cat. no. 681.155) with an oval grinding surface were found on the floor of Room 3.

WING WALLS

As at Sites N.A. 680 and N.A. 682 wing walls extended outward from the extremities of the surface structure. These were mere rows of large boulders rather than true walls. and the one at the southerly corner extended southeasterly in a straight line about 10 meters. The one at the northeasterly corner extended easterly about 7.5 meters to a point where it turned an interior angle of about 125° and continued 3 meters farther on a southerly course. Test trenches were dug in prolongation of the outer ends of both rows, but no postholes or other evidence of a former stockade were found. The hypothesis of the existence of a brush wind break supported by these stones, as suggested for Site N.A. 680, applies here as well.

PITHOUSE

About 12.5 meters southeast of Room 2 was found a roughly rectangular subterranean masonry structure (fig. 22). The floor of this room was 1.65 to 1.80 meters below the present ground surface, which in turn is about 25 centimeters higher than the original surface.

Floor. The floor was plastered and carefully smoothed, and was faired up into the plaster that had originally covered all the walls. The shape of the room was actually trapezial, no two walls being exactly parallel, but its average dimensions were about 3.5 by 3 meters. Corners were nearly square except that at the south, which was curved on an arc of about 40 centimeters radius.

A large fire-pit, oval in plan and basin-shaped, lay very near the center of the floor, and was lined with clay and protected around the edge with a low parapet of small horizontal sandstone slabs, embedded in the clay floor. There was no deflector, and no postholes or other architectural features were apparent.

Just northwest of the fire-pit appeared a sharply-defined area that suggested a sub-floor human burial. Its maximum dimensions were 48 centimeters by 1.25 meters, and its outline resembled that of a human body. It had been dug through the floor, and then plastered over, but had subsided slightly leaving its outlines well-marked. Excavation of this area, however, disclosed nothing but undifferentiated fill and a few sherds. It had been dug about 40 centimeters deep into the stratum of coarse volcanic material that has also been mentioned as underlying the pithouse at Site N.A. 680 and Pithouses W and X at Site N.A. 618.[1]

Objects beneath floor. Another subsidence in the floor at the northerly corner did provide some things of interest. On investigation there was found an irregular pit, very roughly rectangular and measuring about 1 by 1.3 meters, by 40 centimeters deep, and perhaps merging with the pit already discussed. Snugly in the corner of the room, its orifice 18 centimeters below the floor, stood upright a complete Tusayan Corrugated olla (cat. no. 681.245), 28 centimeters in diameter and 29 centimeters high. It had been set in a sort of crude box formed by 5 vertical sandstone slabs that surrounded it except on one edge. The jar contained nothing but a few very badly decayed fragments of wood in its very bottom; on its exterior it had been blackened by a coating of soot as

[1] See pp. 23, 38.

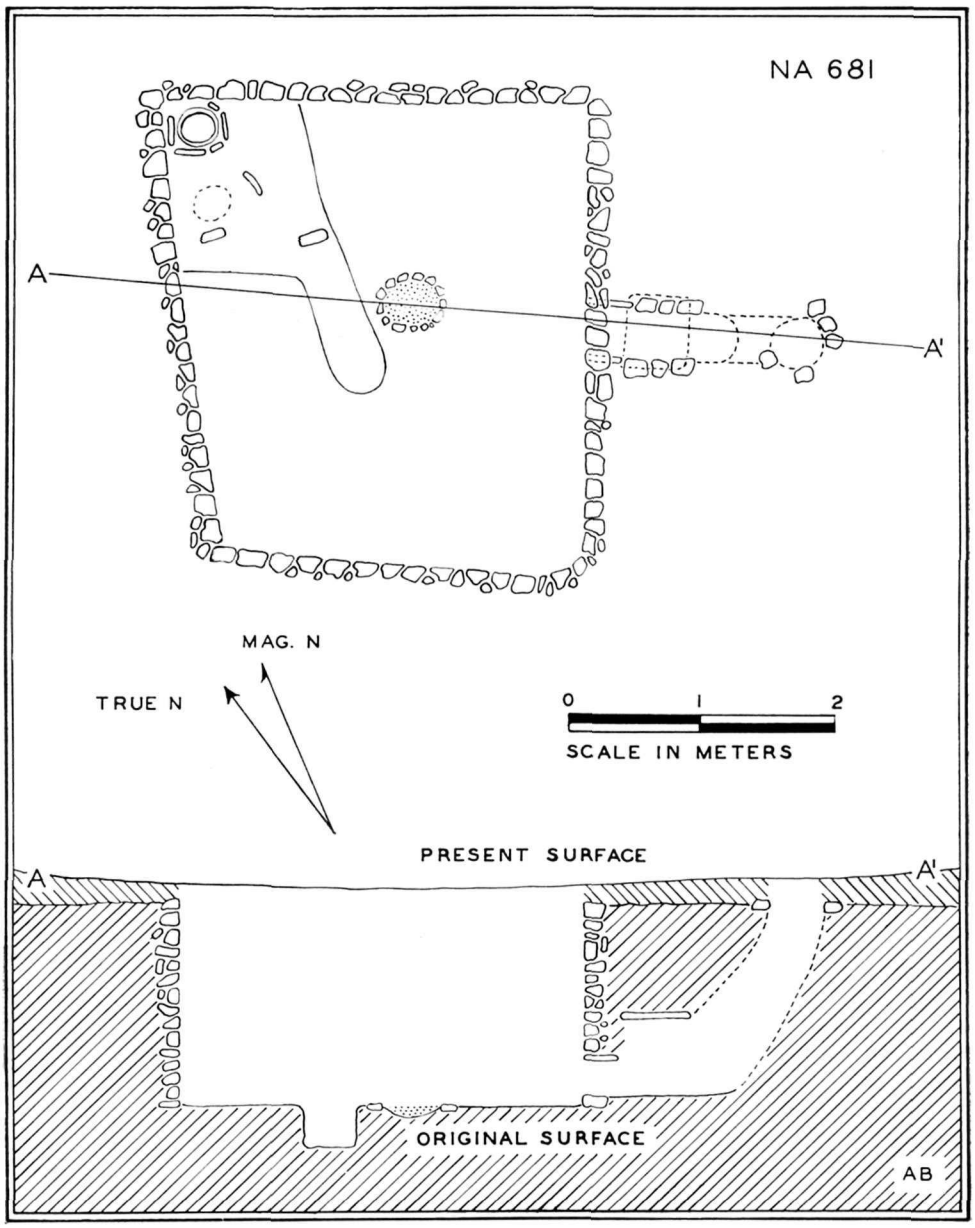


FIG. 22.

Ground plan and profile of Kiva, N.A. 681, showing floor features and ventilator. This structure was like a Padre Focus pithouse in form, but its position in a site with Klethla Focus characteristics suggests that it probably served as a kiva.

much as 2 millimeters thick. At other places in the pit were 2 manos (cat. nos. 681.247, fig. 45, C; and 681.262), a sherd disk (cat. no. 681.432), 2 bone awls (cat. nos. 681.243 and 681.252) and a bone gouge or chisel (cat. no. 681.244, fig. 47, B). Why the olla and the other artifacts had been buried is not clear; the olla had certainly been set with a good deal of care, but had had no connection with the floor, which extended completely across it. No evidence of an earlier and lower floor was found. Practically nothing remained *in situ* on the floor of the pithouse; only a bone awl (cat. no. 681.191), a sherd disk (cat. no. 681.189) and an olivella shell bead (cat. no. 681.188) were found there.



FIG. 23.

Detail of ventilator tunnel opening in Pithouse, N.A. 681, showing use of sandstone slabs around aperture, in a wall constructed generally of irregular basalt blocks. The rod is 1 meter long.

Walls. The walls of the pithouse were of well-made masonry similar to those of the surface building, but of perhaps somewhat smaller stones and in less well-defined courses. All rose from a foundation slightly below the floor to the level of the original ground surface. The small number of fallen stones in the fill testified to the probable fact that they had never risen much higher. The walls had been plastered, evidently with at least two or three coats, and there were a few fragments of this plaster that strongly suggested the presence of painted decoration. Some of these displayed indefinite black and gray areas that may have been the result of smoke-blackening, but one bore a small area of pink that must almost surely have been paint.

Ventilator. A ventilator pierced the southeast wall at about its mid-point (figs. 22, 23). Its sill was 10 centimeters above the floor, and its mouth was 28 centimeters wide by 24 high. The sill was uneven and formed of small basalt

blocks, but the sides and the lintel were of sandstone slabs 3 to 4 centimeters thick. The floor and sides of the tunnel extended horizontally through the wall and into the native earth behind it for a distance of 1.05 meters, but the top was stepped upward about one-third the way back. The slab forming the lintel extended back horizontally 25 centimeters, but at that point the height of the tunnel rose 35 centimeters and then continued backward 48 centimeters farther, supported by another sandstone slab 6 centimeters thick. The exact position of the vertical shaft was not clear, for it was not masonry lined, but it seemed to slope upward and outward to a point about 1.35 meters outside the wall of the room. At least there existed at this point a rough circle of stones 36 centimeters in diameter that must have been originally the coping around the upper orifice of the shaft.

STORAGE PIT

The only other feature of Site N.A. 681 was an approximately circular pit, located 7 meters south of the pithouse and 16 meters southeast of Room 3. It was about 1.5 meters in diameter and one meter deep, with vertical walls of masonry laid in approximate courses but apparently without the use of mortar. The individual stones were comparatively small and selected for symmetry, the resultant wall being very even and substantial. The floor was formed by bed-rock, fairly level but uneven. No artifacts were found in the pit and it was filled with almost pure volcanic cinder drift. It showed no evidence of having been burned, and could hardly have been used as a roasting pit, although just above the floor were found three stones covered with a thick deposit of soot and charcoal, among which were identifiable charred pine needles and small twigs. Whether these stones had been used *in situ* as the hearth for a small fire I do not know, but all things considered, I suspect that the pit was probably used as a storage receptacle or granary.

CHAPTER VI

SITE N. A. 682, THE HOUSE OF TRAGEDY

PLANS AND PROFILES: Figures 24, 25, 27, 30.
PHOTOGRAPHS AND DETAIL DRAWINGS: Figures 26, 28, 29, 31.
POTTERY CHART: Table 3.

THIS site lay about one-quarter mile east of Site N.A. 681, and in general was closely comparable to it, though differing in numerous details, especially with reference to the associated pithouse, which in this instance seems very likely to have served as a kiva.

SURFACE PUEBLO

Like N.A. 680 and N.A. 681, this site consisted of a masonry surface unit, with wing walls extending outward from its northeast and southeast extremities, and embracing an open area within which was a subterranean structure (fig. 24). In addition there were four out-of-door storage pits. The surface structure was laid out in the shape of an ell, two contiguous rooms oriented northeast-southwest, with two others at right angles to the first pair. In fact it might be regarded as two separate two-room houses, since the units were not contiguous but were linked by a low wall about 3.5 meters long. We shall consider first the northerly unit comprising Rooms 1 and 4. Their surrounding walls as well as the wall dividing them had been built integrally and bonded at all corners.

ROOM 1

This was a nearly rectangular room, 3.6 by 2.7 meters, the long dimension oriented northeast-southwest. The floor was laid upon the original ground level, about 1.1 meters below the present surface of the mound, and was pretty uneven, but hard and approximately level. A circular fire-pit with nearly vertical sides and slightly concave bottom, 26 centimeters in diameter and 20 centimeters deep, was placed in the northerly part of the room 85 centimeters from the northeast wall and 55 from the northwest wall. It had no protective rim and there was no deflector. Exactly in the northerly corner was a large cist, nearly circular in plan and 42 centimeters in diameter. It was 70 centimeters deep, bulging slightly to a maximum diameter of 51 centimeters at a depth of 50 centimeters, below which it contracted to a conical bottom — the shape closely similar to the familiar Navajo cooking pot. This cist must once have been used for storage, but at the time of excavation contained only loose fill including a few sherds of Deadmans Gray pottery. Neither postholes nor any other features were found in this room, and the only artifacts on the floor were a full-grooved stone axe (cat. no. 682.195, fig. 46, E) and a mano (cat. no. 682.199).

A masonry partition had been built across the room 2.3 meters from its northeasterly end, leaving an area at the southwest end somewhat smaller than the other portion. It likewise had a hard but uneven floor, completely devoid of architectural features.

Walls. The walls of Room 1, as of the entire building, were double-faced, plane-surfaced both inside and outside and rubble-filled at the core. All corners were bonded and very slightly rounded. The masonry was similar to that in Sites N.A. 680 and N.A. 681, of irregular basalt blocks, the largest ones set in a

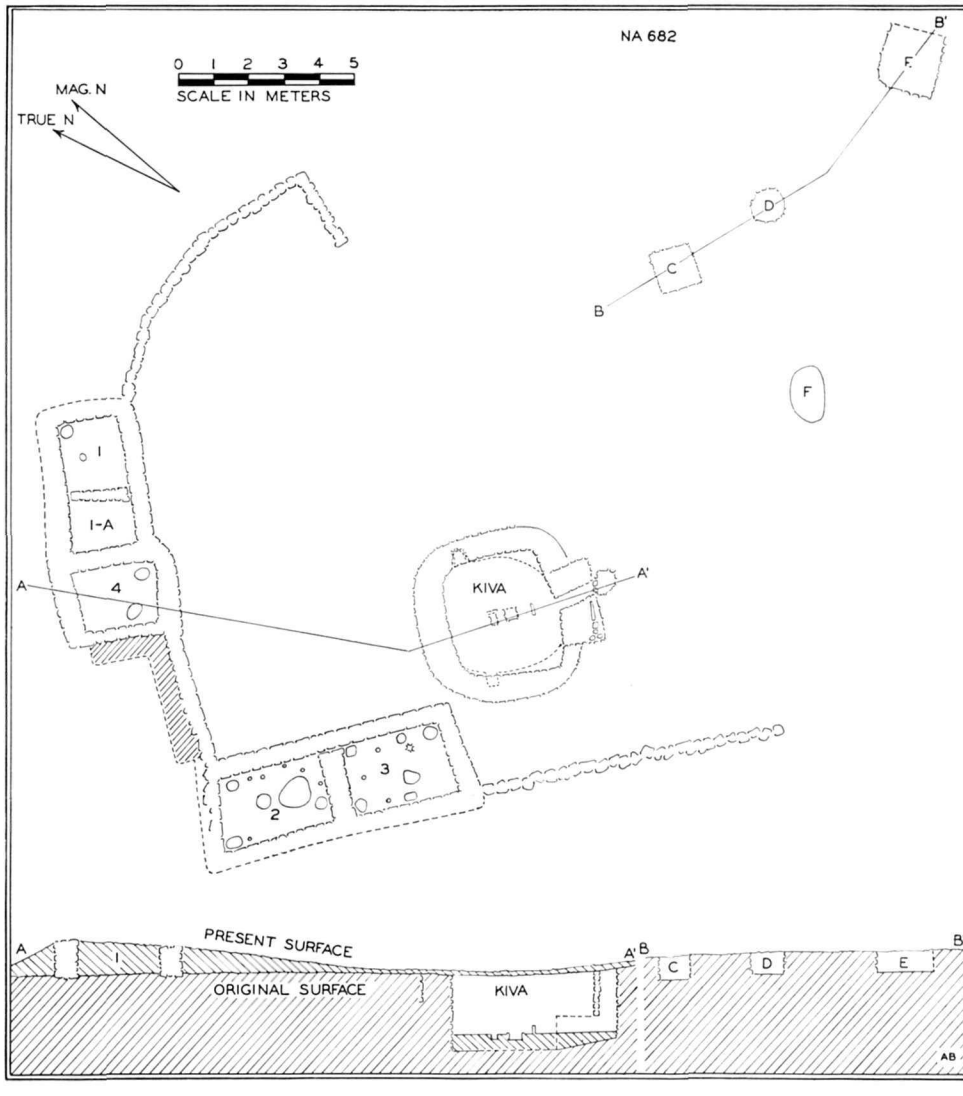


FIG. 24.

Ground plan and profile of N.A. 682, a Kayenta Branch site of the Klethla Focus, comprising a surface pueblo, a subterranean kiva and numerous storage pits.

basal course, the others not evenly coursed, but laid in clay mortar with a "wet wall" technique. They were founded directly on native earth, slightly below floor level, stood from 80 centimeters to 1.1 meters high, and were from 65 to 80 centimeters thick. No evidence of surface plaster had survived. The partition wall, already referred to, was double-plane-faced like the others but was less well-

constructed and varied in thickness from 50 centimeters at its southeastern end to 30 centimeters at its northwestern. Its ends abutted the main long walls of the room, and it thus did not constitute an integral feature of the original construction. No door or ventilator appeared in any of the walls.

The fill of Room 1 contained the usual stratum of clay and decayed vegetal matter just above the floor, doubtless representative of the fallen roof, with building stones, cinders, sherds, etc. above.

Burial 1. In the fill of the southwestern part of the room, however, occurred a very peculiar and interesting burial, which should be considered in connection with certain other burials in the area.[1] This one seemed to be just beneath and within the layer of roof material and consequently appeared to have been interred shortly after abandonment of the room but prior to the collapse of the roof. I suspect that it was not in fact ceremoniously buried at all but carelessly thrown into the room as the aftermath of some episode of violence. This inference derives from the fact that only parts of two legs had been interred, the remainder of the body being nowhere to be seen. Moreover, the femurs of both legs had been broken transversely approximately in half, apparently deliberately and before burial, and the proximal portions were missing. The remnants of the right leg consisted of the distal half of the femur, the patella, the upper half of the tibia and the complete fibula. The left leg consisted of the distal half of the femur, the patella, tibia and fibula, both complete, the heel bones and some carpels. These might have been regarded as miscellaneous bones thrown out of an earlier burial that had for some reason been disturbed, but for the fact that both knees were in proper articulation, indicating that the legs had been placed in this spot while the flesh and sinews were still intact upon them. It would appear quite possible that they were torn from a recently deceased corpse, deliberately broken, and cast aside, but the reasons for this must remain speculative. Since, as will be seen, this is not an isolated phenomenon, it must have some explanation beyond that of mere accident. A stone knife (cat. no. 682.264) was found between the legs, but its presence there may have been fortuitous, although perhaps it was used in cutting the legs.

ROOM 4

This was a small rectangular room, just southwest of Room 1, and integrated with it. It measured 2.1 by 1.8 meters, the longer axis lying transversely to that of Room 1. The floor was not artificially laid, but seemed to have been formed simply by the top of the hard caliche stratum at what was about the old ground surface, and the only floor features were two irregular basin-shaped fire-pits in the easterly and southerly corners. One was 35 centimeters in diameter by 5 centimeters deep; the other 40 to 50 centimeters in diameter by 8 deep. Both contained wood ash and charcoal. Three bone awls (cat. nos. 682.206, 682.207, and 682.227) and a basin metate with both ends open (cat. no. 682.239) were found on the floor. There were no postholes.

Walls. The walls were more than usually massive, ranging up to 70 centimeters thick, double-plane-faced, with bonded corners. They stood from 75 centimeters to 1 meter high, and contained no doorway or other aperture through them.

[1] See pp. 20, 67, 180.

From the southerly corner of Room 4 a wall extended southwesterly in approximately the same course as that of the southeast side of Rooms 1 and 4. This wall was abutted against the outer face of the southwest wall of Room 4, and was plane-faced on its southeast side toward the court-yard or plaza; it was unfinished and irregular on its northwest or outer face, however. Its function was apparently only to provide a protective barrier across the space between the northerly two-room unit and the southerly one. This latter, comprising Rooms 2 and 3, which had been integrally constructed and were oriented northwest-southeast, will now be described.

Room 2

This was a nearly rectangular room approximately 3 by 2 meters in dimensions, with a hard but uneven floor directly on the old caliche ground surface. The complexity of its floor plan defies reasonable analysis, but can be described in objective terms. No less than 6 irregular pits and 7 possible postholes embellished the floor. It is hardly credible that all of these were in use at any one time but there is no means of determining their chronological sequence, if any. What was probably the principal fire-pit was situated in the mid-line of the room about 1/3 the distance from its northwest end. This pit was basin-shaped, about 40 centimeters in diameter and 13 centimeters deep; it was filled with ashes and charcoal. A second basin-shaped fire-pit, placed very near the westerly corner, was oval in plan, 45 by 35 centimeters in diameter by 12 centimeters deep. It also contained ashes and charcoal.

Two pits along the southwest wall contained no ashes, and had been perhaps for some other purpose such as grain or food storage, though in shape they both resembled fire-pits. The one in the southerly corner was 38 centimeters in diameter by 20 centimeters deep. The other, a little to the westward of it, was oval, 50 by 25 centimeters in plan and 10 centimeters deep. Finally, the pit near the northerly corner was 33 centimeters in diameter and 20 centimeters deep; it too contained no ash.

A very large depression existed beneath the floor of the southeast half of the room, perhaps a meter in length by somewhat less in width. It did not appear to have been artificially excavated but may have been only a natural cavity in the caliche ground surface. It had been filled with miscellaneous cinders, earth, sherds, and other debris to bring it up to the level of the floor, which had then been laid continuously across it.

Postholes. The 7 postholes are all somewhat problematical and were not located in accordance with any symmetrical pattern. All, however, lay from 10 to 30 centimeters from the walls, varied from 6 to 15 centimeters in diameter and were from 8 to 20 centimeters deep. If they had served as sockets for roof supports, the latter must have been mere casual braces to reinforce an otherwise shaky superstructure. A mano made from a fragment of a basin-shaped metate (cat. no. 682.201) and a bone needle (cat. no. 682.192, fig. 47, A) were found together on the floor near the center of the southeast wall.

The walls of Room 2 will be considered below together with those of Room 3.

ROOM 3

This was also a roughly rectangular room, oriented along the same long axis as Room 2. Its dimensions were approximately 2.9 by 1.6 meters, and its floor, like that of Room 2, was uneven and very much broken by a variety of features, including at least 6 pits and 4 postholes. What was probably the main fire-pit was a heart-shaped basin in the long axis and just southeast of the center. It measured 50 by 43 centimeters by 10 centimeters deep, and was ash-filled. Another small ash-filled pit, 30 by 25 centimeters and 6 centimeters deep was near the northeast wall opposite its mid-point.

Other irregular pits existed in the north, west and east corners, but none contained ashes. These pits measured respectively: 43 by 39 by 19 centimeters; 39 by 35 by 14 centimeters; and 48 by 45 by 23 centimeters. Recessed into the floor near the mid-point of the southwest wall was a rectangular depression with rounded corners 36 by 27 centimeters in dimensions. It was paved with 3 neatly fitted and shaped sandstone slabs, and must have served as a base for some heavy object. At first it was supposed that a buried storage jar would be found beneath the floor, the stones forming a cover, but nothing whatever was there, not even a small cist.

Postholes. Two of the postholes appear to have supported a ridgepole across the short axis of the room. They were placed 90 centimeters from the northwest end-wall and close to the long walls, and were respectively 16 and 18 centimeters in diameter, and 28 and 16 centimeters deep. A third posthole was placed in the long axis of the room 35 centimeters from the northwest end; it was 14 centimeters in diameter and 12 centimeters deep. The fourth lay very close to the southeast end and 65 centimeters from the easterly corner; it was much smaller than the others, only 5 centimeters in diameter by 8 centimeters deep.

A peculiar and problematical feature existed 80 centimeters from the southeast end and 30 centimeters from the northeast side of the room, close to the smaller of the fire-pits. It was a rectangular box set 15 centimeters into the floor and formed of sandstone slabs 3 to 4 centimeters thick, set almost vertically but sloping outward slightly. These stones were respectively 9, 12, 15, and 17 centimeters wide and all extended above the floor from 3 to 8 centimeters. The area at the base of the box was 9 centimeters square. This curious device was too small to have served as a fire-pit. Perhaps it was a socket, reinforced by the slab lining, for another roof support, or conceivably for a pole-ladder providing access to a roof hatchway. Nothing was found on the floor except half a Flagstaff Black-on-white bowl (cat. no. 682.187, fig. 37, G) against the southwest wall near the flat slabs.

Walls. The walls of Rooms 2 and 3 may best be considered together, for they were constructed as a unit and also integrated with the connecting wall between Rooms 2 and 4. As already stated, this connecting wall abutted the southerly corner of Room 4 and was prolonged southwestwardly without break to form the northwest end wall of Room 2. It thence continued all the way around Rooms 2 and 3, every corner being bonded and nearly square, until it returned upon itself at the northerly corner of Room 2, where the junction was abutted and not bonded. This wall varied between 45 and 60 centimeters in thickness and stood only 40 to 65 centimeters high. What had become of the upper portions

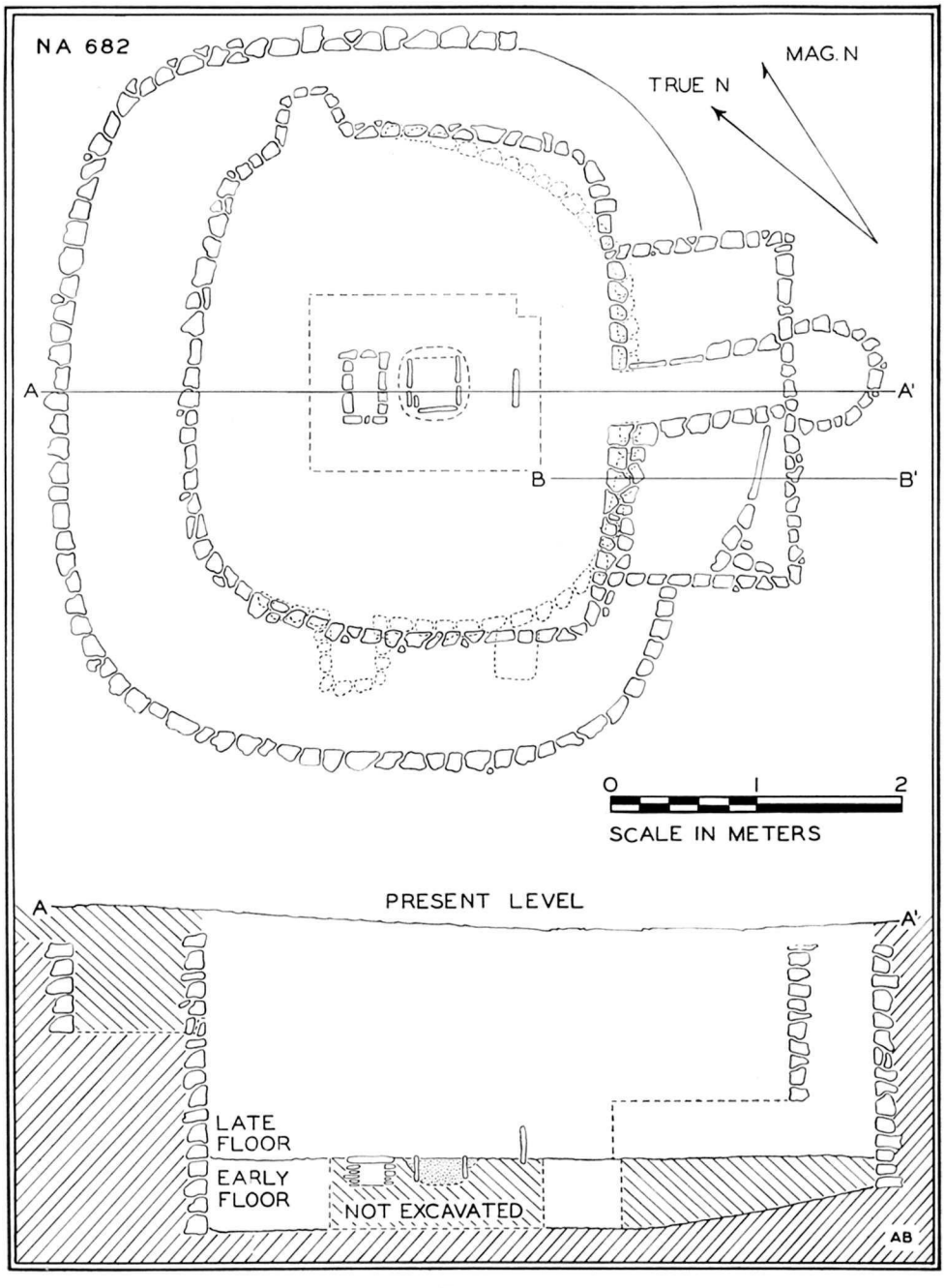


FIG. 25.

Ground plan and profile of Kiva, N.A. 682, showing sipapu, fire-pit, deflector and other features of upper (later) floor. Position of early wall shown by dotted lines.

was rather mysterious, for the quantity of fallen stones was not great. The division wall between Rooms 2 and 3 was bonded with the long southwesterly wall, but abutted at its northeasterly end. It was thicker than the peripheral walls, measuring about 70 centimeters. All walls were made with double-plane-faces and were based on the native caliche ground surface, nowhere extending below the floor level of the rooms. The material used was irregular basalt boulders, a course of comparatively large ones along the base, with smaller ones above in very approximate courses. There were no sandstone slabs, used either vertically or horizontally.

WING WALLS

The wing walls already mentioned, like those at N.A. 680 and N.A. 681, were in reality only crude wind rows of large basalt boulders. One extended from the southerly corner of Room 3 in prolongation of the southwest wall of that room a distance of about 8.5 meters. The other ran from the easterly corner of Room 1 and curved irregularly toward the east and southeast a distance of about 8 meters to a point where it turned at a right angle and continued southerly about 2 meters farther. Test trenches beyond the terminations of these walls failed to disclose any evidence of a stockade.

PITHOUSE

Just east of Room 3 and nearly contiguous to it was a large subterranean structure that proved to be the most complex as well as the most interesting single unit among all those excavated during the season (fig. 25). For reasons that will be more fully discussed later it was the only structure in the Big Hawk Valley sites that seems almost certainly to have been a kiva. We shall for the present postpone consideration of that identification, however, and limit the immediate discussion to objective description.

In shape this room was something between a rectangle with broadly rounded corners and an oblate circle; what its builders thought it was I do not know, and what we call it is probably of little significance. The central sections of its sides were slightly concave and three of its "corners" turned in arcs respectively of 60, 50 and 40 centimeters radius; the fourth "corner" was not definable as such, the wall where it should have been merely continuing the general circumferential curve. The room had been rebuilt at least once, and perhaps twice, with resulting complications in its structure, but it will be convenient to discuss it chronologically, providing first a description of its earliest form, and relating its subsequent changes to this basic scheme.

EARLY PHASE

Floor. The floor of the earliest phase of the room was of very even and hard-packed clay about 2.2 meters below the original ground level. It was smoothly faired up into the plaster coating that everywhere covered the walls. No architectural features were discovered in this floor by reason of the fact that a large block was left unexcavated in the center of the room in order to avoid the destruction of the deflector, fire-pit and probable *sipapu* of the upper floor, which

will be described later.[2] It seems reasonable, however, to postulate at least a fire-pit and deflector in this unexcavated area, if not certainly a *sipapu*. The entire periphery was cleared, however; no postholes were discovered, and not a single artifact.

Walls. The walls of the early phase were very evenly faced and were everywhere neatly plastered over (fig. 26). Since the plaster was not disturbed it is not possible to describe the masonry with complete certainty, but it appeared to be composed of rather small basalt boulders laid in approximate courses. In places



FIG. 26.

Detail of south walls of Kiva, N.A. 682, showing plastered surface of lower wall, with niche at floor level, and slab construction of bottom course of upper wall.

the walls may have lacked a masonry surface and have consisted of the hard native caliche, as was the case in the pithouse at site N.A. 680. The original height of these walls cannot now be determined, because the later construction of another structure above and within the first one destroyed the upper portions of the walls, at least in some areas. They must have extended up to ground level, however, a height of over 2 meters. The floor of the second room lies from 50 to 55 centimeters above that of the early room, and we can be positive of the nature of the walls of the latter only up to that point, since in most parts the periphery of the upper room is slightly outside the limits of the lower, most of the upper walls of which have consequently been destroyed. Whether or not a

[2] It was felt by Mr. David J. Jones, Jr., Superintendent of Wupatki National Monument, within which the site was located, that it should be preserved insofar as possible, and it was subsequently refilled for protection. It was the hope of Mr. Jones that it might eventually be re-excavated and stabilized for display purposes.

bench encompassed the room, in the manner of the standard San Juan circular kiva, cannot be positively determined either, but its former existence seems very doubtful for the reason that along the northwest, or the side opposite the ventilator, the wall of the later room appears to be the same as that which had served the earlier. At least there is no recognizable break in the masonry, which seems to be homogeneous from the floor of the early room up to the ground surface and displays no hint of reconstruction. This wall thus appears to have remained in use continuously throughout both periods of occupation, and no bench occurs within it.

Ventilator. The ventilator, already referred to, was situated on the southeast side of the room (figs. 25, 29). It was composed of a horizontal tunnel and a vertical shaft, both of them masonry-lined throughout. The tunnel was 40 centimeters wide at its mouth, which was at the room floor level, but its floor sloped unevenly upward to a point at its outer end 40 centimeters higher. Its sides converged slightly and were only 32 centimeters apart at the outer end. The tunnel pierced the southeast wall nearly at its mid-point; its course, however, did not lie in the northwest-southeast axis of the room, but at an angle of about 10 degrees to the east of this axis. The side walls were of basalt-block masonry for the most part, but there were two large sandstone slabs set vertically about half way back on the northeast face. The bottom was not paved but was formed of the rough volcanic clinkers of a stratum underlying the entire area. Nothing survived of the roof of the tunnel. Above the outer end of the tunnel arose a vertical, roughly circular shaft, about 50 centimeters in diameter, the outer wall of which was 182 centimeters from the mouth of the ventilator tunnel. This shaft, lined throughout with basalt boulders, rather crudely and unevenly set, extended up to ground level.

Recess. We are faced here with another uncertainty, namely whether or not the early room was equipped with a recess above the ventilator tunnel. No direct evidence of such a thing remains, but in connection with the upper or later phase of the room, a recess did exist above the later ventilator tunnel, which in turn had been exactly superimposed upon the earlier tunnel by the expedient of filling it up to the new floor level and extending its side walls upward. It also utilized the same vertical shaft, as evidenced by the continuity of the masonry therein, which was in its upper part integrated with the back wall of the upper recess. Again, in order not to destroy these features, we did not excavate below the floor of the upper bench, but everything points to the inference that it represented merely the elevation to a new level of a feature that had already been present in the earlier room. This inference is further strengthened by the fact, already stated, that the lower tunnel did unquestionably extend outward 1.8 meters beyond the wall of the main room; there would have been no purpose in so long a tunnel but for the necessity of clearing the width of a recess.

Niches. Two niches were set into the walls of the lower room, both of them at floor level. Niche A was in the curved wall section at the northerly corner of the room. It measured 40 centimeters wide at the base of its mouth, but was only 33 centimeters wide at the top. This difference was caused by the fact that it had been carefully lined throughout with mud plaster, which had been molded to a concave surface at the upper edges. This plaster lining was also neatly curved around the front corners to form a continuous surface with the outer wall plaster. The niche was 44 and 42 centimeters high at its respective sides, 40

centimeters deep, and 28 wide at the back, the corners of which were also rounded. The masonry at the sides was simply the basalt blocks of the wall structure, but the lintel was a sandstone slab 4 centimeters thick. Nothing was found within this cavity, but the very precision of its construction suggests that it must have been made for some specialized purpose.

Niche B was opposite niche A, near the northwest extremity of the southwest wall. It was 33 centimeters wide by 28 high and its floor was 4 centimeters above the room floor, protected by a sill formed of a thin sandstone slab set on edge across the opening and flush with the face of the room wall. The lintel was a sandstone slab 4 centimeters thick, and the left side was formed of a similar one. The right side was formed of the basalt masonry of the wall; the back was bare earth through which one large boulder protruded to give an irregular contour to the inner face. None of the faces had been plastered. Maximum depth was 38 centimeters.

Late Phase

The pithouse, or kiva, had probably been abandoned for a short time and had filled with wind-blown and water-laid debris, including a small number of sherds. There was no indication that the roof had collapsed, however, nor had it burned. Eventually a remodeling took place, and a new floor was laid about 50 to 55 centimeters above the earlier one (figs. 25, 28). At the same time the walls, with the probable exception of those around the southeastern recess and the one opposite, were razed, and new ones erected along a slightly different periphery from that of the old ones. The new floor was hard, well-packed clay, uneven but generally level. It had been repaired at least once, by the application of a new layer of clay directly upon the older one, from 2 to 5 centimeters thick. This did not indicate a reoccupation, however, but merely a renovation. The upper floor was neatly faired upward to join the plaster of the wall surfaces.

Changed shape. The shape of the upper room was more nearly a rounded rectangle and less of an oblate oval than was that of the lower. The outline around its northwest side and its north and west "corners" was the same and the walls there appeared not to have been reconstructed at all. But along the northeast and southwest sides the upper walls were more nearly straight and were set farther back than had been the lower ones; moreover the east and south "corners," which had hardly been definable as such in the lower room, were now fairly sharp, turning in arcs of 15 and 10 centimeters radius respectively. The southeast wall, in front of the recess, instead of being farther back like those just described, was actually somewhat forward of the position of the corresponding wall of the lower room; it was also less concave, so that the mouth of the ventilator tunnel stood about 10 centimeters nearer the center of the room than had that of the lower room.

Along the northwest-southeast axis of the room were placed a deflector, a fire-pit and what may well have been a *sipapu*. The deflector was a single slab of Moencopi sandstone, set vertically in the floor 60 centimeters from the mouth of the ventilator and at right angles to its axis. It was 24 centimeters wide by 4 centimeters thick and stood 22 centimeters high above the floor.

Fire-pit. Directly in line with the deflector, and 35 centimeters farther from the ventilator, was a very well-made fire-pit. It was almost a perfect square, 40

Images of human burials have been removed from the electronic edition.

FIG. 27.

Ground plan of Kiva, N.A. 682, showing positions of Burials 2 and 3, as well as artifacts found in situ on the upper floor, in accordance with the following list:

A. Mano (cat. no. 265); B. Tusayan Corrugated olla (488); C. Moencopi Corrugated olla (489); D. Mano (267); E. Hammer stone (271); F. Bone awl (273); G. Hammer stone (270); H. Hammer stone (269); J. Stone hoe (272); K. Lignite button (277); L. Unfired clay jar stopper (341); M. Metate (283); N. Walnut Black-on-white bowl (256); P. Mano (266); R. Moencopi Corrugated olla (257); S. Hammer stone (under R) (258); T. Mano (under right knee of Burial 3) (261).

2. Scattered human bones, apparently parts of a single individual; catalogued as Burial 682B2.

3. Burial 682B3 — complete skeleton with detached left leg.

centimeters in each dimension, and 20 centimeters deep. it had been lined with vertical sandstone slabs on all sides; those on the northeast and part of the southeast sides had disappeared, however. Its floor was nearly level, and it was filled with white wood ash. Evidently this fire-pit was a remodeled version, for it had itself been built inside a larger, roughly-circular, basin-shaped pit about 55 centimeters in diameter. The portions of the older pit lying outside the slabs that contained the new were still filled with wood ash.

Images of human burials have been removed from the electronic edition.

FIG. 28.

View of the upper floor of Kiva, N.A. 682, from the north, showing Burials 2 and 3. The detachment of the left leg of Burial 3 is evident.

Sipapu(?). Twelve centimeters beyond the fire-pit was a small rectangular masonry box let into the floor, and covered with a carefully shaped sandstone slab 4 centimeters thick, and 30 by 65 centimeters in dimensions, the upper surface of which was very slightly below the contiguous floor level. The box itself measured 40 by 17 centimeters inside, the long dimension being transverse to the axis of the room, and 15 centimeters deep. It was constructed of small slabs of laminated sandstone, 3 to 4 centimeters thick, and evenly laid in 4 or 5 courses. The interior faces of these minature walls were planefaced and very even. The bottom was of hard clay. Nothing was found in this receptacle. While its function cannot be determined with satisfactory certainty, its presence, more than any other one feature supports the hypothesis that this room was a kiva, for it would seem that the little box must have been either a *sipapu* or else a resonator such as are used in modern days at Hopi and elsewhere. This matter

will be considered fully at a later point in the discussion, however.[3] No postholes were found in the upper floor.

Ventilator. A ventilator had been constructed at the southeast side of the room, consisting of a horizontal tunnel through a recess, which will be described presently, and a vertical shaft just outside the back wall of this recess. The mouth of the tunnel was about in the middle of the southeast wall of the room and was 40 centimeters wide at that point; it extended outward through the bench but at an angle of about 10 degrees east of the axis of the room, and narrowed to a width of 32 centimeters at a point, 1.25 meters distant, at which it penetrated the



FIG. 29.

View of Kiva, N.A. 682, from the west, showing fire-pit and deflector in the upper floor, as well as the ventilator tunnel and the southeastern recess. The irregular character of the masonry is evident, as is the offset in the back wall behind the right half of the recess.

back wall of the recess. Beyond this point stood a vertical shaft about 50 centimeters in diameter, extending up to ground level. As has been stated above[4] this shaft was the same one that had also been used in connection with the ventilating system of the earlier room; and the tunnel of the upper room, although newly constructed, was aligned precisely above the earlier tunnel, its walls constituting merely upward extensions of the older and lower ones. The walls of this new tunnel were built mostly of irregular basalt blocks, but in the left side two large sandstone slabs were set vertically near the mouth of the passageway. There was

[3] See pp. 72–74.
[4] See p. 59.

no indication of a top or roof for the tunnel, and its original position was difficult to determine, as will be seen from the description of the recess above it.

Recess. The usual recess in the standard San Juan kiva ordinarily possesses a floor or bench extending across its entire area, perhaps 40 to 80 centimeters above the floor of the room, and incorporating within itself the roof or covering for the ventilator tunnel. In the case under discussion, however, the construction was very different. To begin with, the walls of the room in front of the recess

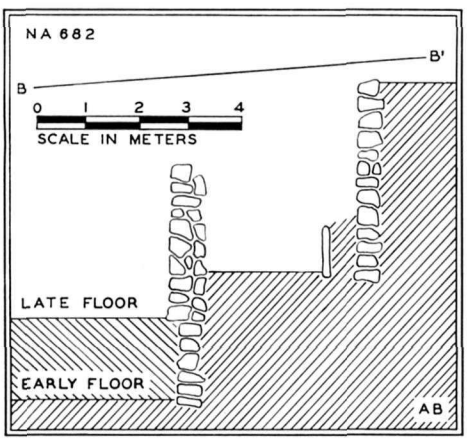


FIG. 30.

Profile of part of Kiva, N.A. 682, showing construction of southeastern recess, with its front walls rising above the floor level.

as well as the side walls of the ventilator tunnel rose well above the level of the floor of the recess, which itself was 35 centimeters above the floor of the room and the floor of the ventilator tunnel. At the time of excavation, the front walls of the recess extended upward from the floor of the room to a height about 45 centimeters above the floor of the recess in its left half and about 70 centimeters in its right half, and there was no way of determining how much higher they might originally have been (fig. 30). The sides of the tunnel were bonded at their front corners with these walls and also had been carried up to a level above that of the floor of the recess. This arrangement in effect divided the recess into two compartments or bins with a long, narrow passageway between them. Whether this passageway had ever been roofed in the manner of a ventilator tunnel we cannot know. Conceivably it might have been left uncovered, the actual ventilator being merely a hole through the back wall of the recess connecting with the vertical shaft on the outside. The floor of the tunnel or passageway did penetrate this outer wall and formed the bottom of the vertical shaft, but the wall itself had so badly collapsed at this part that it was impossible to determine the nature of the orifice that once had passed through it.

Within the two compartments of the recess the floors were of hard and well-defined clay, faired up into the walls on all sides, although the walls themselves were not plane-faced in the interiors of the compartments, and, with the exception of the one at the front of the right-hand compartment, they were not double-

faced. This exceptional wall was double, indeed, but even so was irregular on its interior surface. This same right-hand compartment had been peculiarly constructed in its rear area; the lower part of its back wall, which was made of one very large vertical sandstone slab and some small basalt boulders, rose 30 centimeters above its floor to an irregular upper margin. Above this point, however, an entirely separate wall was set about 25 to 30 centimeters farther back and was continuous with the back wall of the other or left-hand compartment. It at first appeared that the forward and lower wall was merely a secondary structure, inserted to reduce for some reason the size of the compartment; but this was not the case, for investigation showed that the upper and outer wall had never at this point extended below the level of the top of the forward lower wall. All in all, the peculiarities of this recess and its appurtenances elude convincing interpretation.

Walls. The masonry of the walls of the upper pithouse generally, including those of the main room itself as well as of the recess, was mostly of approximately coursed basalt blocks, laid in copious mortar with a wet-wall technique. There were sporadic instances of small horizontal sandstone slabs, but no spalls as such were used. The basalt blocks varied greatly in size and shape, though most of them averaged about 20 to 35 centimeters long by 10 to 20 centimeters wide. One enormous boulder, set in the wall 60 centimeters above the floor on the northerly side, measured 60 by 40 by 30 centimeters, and must have weighed at least 150 pounds.

Around the southeast and southwest walls, to the right of the recess, however, a different method of construction was used. Here a row of large irregular sandstone slabs up to 60 centimeters long by 40 centimeters high were set vertically to form the lowest course. Immediately above these was a zone of carefully laid very small sandstone slabs in neat horizontal courses carried up to the level of the top of the highest of the vertical slabs, thus evening up the irregular margins of the latter. Above this zone occurred the usual basalt-block masonry. All around the room the walls stood to a height of 1.8 meters above the floor, or probably somewhat above the old ground surface. No plaster on the wall surfaces had survived.

A single rectangular niche existed in the southwest wall 80 centimeters above the floor and 30 centimeters from the southerly corner. It measured 28 centimeters wide at the bottom, 25 at the top, 20 high and 35 deep. Its top and sides were formed of single sandstone slabs, but its floor was the surface of the uneven basalt blocks of the wall structure.

Outer retaining wall. There is one further architectural feature of the structure that must be discussed. Surrounding the wall of the main part of the upper room, less than 1 meter outside it and of almost exactly similar outline, there existed another wall, built of similar masonry and plane-faced on the interior surface (figs. 25, 29). At its southeasterly extremity it abutted the right-hand side-wall of the recess of the inner room, and did not continue around the outside of that feature. At a point about midway of the northeasterly side the masonry terminated, but the outline of the excavation, sharply defined against the hard caliche surface, continued 2.25 meters parallel to that of the inner room until it too abutted the left-hand side wall of the recess.

The fill between this wall and that of the inner room was loose sandy earth mixed with volcanic cinders and a few sherds, and it was at first supposed that the wall represented a large early room, inside which the one already excavated had later been built, the interval between the walls having been artificially filled. On investigation, however, this hypothesis proved incorrect. The top of the outer wall was probably above the old ground level, and it extended downward only about 75 to 90 centimeters. It was based on nothing but loose fill. Despite its relatively shallow depth it still might have been an early structure, through the floor of which the later and smaller room had been dug; but nowhere was the slightest evidence discovered of a floor that might have accompanied it. In fact the loose fill continued downward below it and behind the walls of the inner and deeper room. When a section of the inner wall was removed to enable a more thorough study, the fill poured downward and with it that portion of the outer wall that had stood upon it.

What all this adds up to I do not know, but two possible explanations suggest themselves. One is an ingenious hypothesis first formulated by Hargrave.[5] In discussing the evolution of the peripheral bench in some circular pithouses or kivas, Hargrave sought to explain its presence in terms of the physical dynamics of the situation. In digging a deep pit, he reasoned, especially if the soil is relatively loose, the walls of the excavation must be terraced in order to prevent their continual collapse. The excavators might well, therefore, have begun with a pit of larger area than required, carrying it downward as far as possible without risking collapse, then have built a retaining wall from this level to the surface, and have continued downward with a pit of smaller diameter than the original one. When the inner and lower pit had been completed and its walls constructed up to the level of the set-back the resulting structure would have had the form of a circular pit with a peripheral bench, and as a finishing touch the latter might have been paved with stone slabs or clay mortar.

If this rationale of the bench is sound it could apply with a slight variation to the present case. The excavators of this particular structure might have built the outer wall as a retaining wall during the process of digging the central pit deeper, but later instead of permanently utilizing it to form the back wall of a high bench, they might simply have carried the inner walls of the room straight up to full height, abandoning the outer retaining wall, which had served its temporary purpose, and filling the interval between it and the inner wall with loose earth and debris. I do not espouse the foregoing course of reasoning with strong conviction, but it does provide a possible explanation of a puzzling situation.

A more plausible interpretation is derived from a kiva at Aztec Ruin, excavated by Earl H. Morris, who wrote of it: "Although mostly subterranean, to allow for the covering of the conical roof with earth, a concentric retaining wall, slightly greater in diameter than the kiva itself, was erected above ground."[6] Nothing further has been published about this kiva, but it would appear in this respect to provide a close parallel to the one at site N.A. 682, and to suggest that the outer wall at the latter may also have been constructed to assist in the support of an above-ground roof, whose radial beams and earth cover would otherwise have slipped outward and collapsed.[7]

[5] Hargrave, 1933, pp. 58–59.

[6] Morris, 1916, pp. 607–608.

[7] For corroboration, the description and profile of this feature were submitted to Mr. Morris, who stated in a personal communication: "As to the retaining wall surrounding Kiva

Fill. The upper or later pithouse had not burned and the fill within it was mostly wind-blown or water-lain debris, including sherds and artifacts, presumably carried in from the surrounding surface after abandonment. No clear differentiation in the fill was found that could indicate the existence of roof material at any particular level. That the house had been abandoned hurriedly, and perhaps after a scene of violence, was, however, strongly suggested by the condition of the floor.

BURIALS

Upon the floor lay one complete human skeleton and scattered fragments of another, which were designated for reference purposes Burials 2 and 3 (figs. 27, 28). As will presently appear, however, neither had been deliberately ceremoniously buried in the proper sense of the word; rather had they been thrown down carelessly upon the floor and left to die as they fell.

Burial 2. This was a fragmentary skeleton, consisting of the skull, mandible, scapulae, clavicles, sternum, 24 ribs, pelvis, coccyx, 19 vertebrae, right femur, patella, left humerus, left ulna, left radius, and 2 carpels. All were scattered about haphazardly and may have been exhumed from an earlier grave and thrown into the room, although the reason therefor is not apparent. An interesting fact is that 4 of the lumbar vertebrae were found in precise articulation on the floor of the ventilator tunnel, some distance from the coccyx and the other remaining vertebrae; but that they belonged to the same individual was made certain by the fact that these same 4 vertebrae were missing from the larger series, all of which also remained in articulation. Thus it would appear that the spinal column had been severed before decay of the fleshy parts that held the bones together.

Burial 3. Lying extended on its back lay the complete skeleton of what appeared to have been a young adult female, the skull just south of the deflector, and the legs extended toward the west. The left arm was at the side of the body, its hand on the pelvis, but the right arm, flexed at the elbow, lay across the fire-pit. Perhaps the young woman had been killed on the spot or had been thrown through the hatchway and permitted to lie as she fell. A very striking phenomenon adds mystery to the case, however. The left leg had been separated from the hip, and the head of the femur lay 25 centimeters removed from its socket in the pelvis. All bones of the leg itself were present and in proper articulation, so that it would appear to have been wrenched from its socket at or shortly after death by human agency, and not by the act of prey animals. Had some beast torn off the leg for food it would almost surely have mangled it and scattered the lower leg and foot bones, as well as leaving marks of its teeth upon them. No such marks were found, nor for that matter any other physical marks of violence.[8]

In addition to the skeletons numerous other objects lay on the floor, as if left there by the last occupants. The positions of all these may be seen by reference to figure 27, and its descriptive caption. Suffice it here to note merely that the list included 4 pottery jars, one bowl, 4 manos, 2 metates, 4 hammer stones, 1 bone awl, 1 lignite button, and an unfired clay jar stopper.

E at Aztec, if you assume a court level at or slightly above the base of the outside wall shown in your sketch, you would have an exact parallel." Mr. Robert Burgh informs me that there is a kiva similarly constructed at Far View House on Mesa Verde.

[8] Other burials of detached legs have been referred to. See pp. 20, 53, 180.

STORAGE PITS

Site N.A. 682, to a greater extent than its companion sites, was equipped with several out-of-door storage pits. Four of these were found, all in the general area east and northeast of the pithouse.

Pit C. The nearest, Pit C, lay 7.5 meters to the northeast, and was almost rectangular, measuring 122 centimeters on 3 sides and 115 on the other. It was 60 centimeters deep with a hard-packed floor, and was lined with a masonry wall of medium-sized basalt boulders, plane-faced on the interior and laid in 3 fairly even courses. The quantity of fallen stones suggested that the walls had originally stood about an equal distance above the ground. The pit contained nothing but loose fill, with casual sherds.

Images of human burials have been removed from the electronic edition.

FIG. 31.

View of Pit D, N.A. 682, showing masonry lining and horizontal sandstone slabs. The skull cap of Burial 4 is visible below the slab at the lower left. The other bones of Burial 4 were disposed under, over and around the slabs in complete confusion.

Pit D. This feature was 2 meters east of Pit C and was nearly circular, with diameters varying between 84 and 91 centimeters. The floor was uneven but varied from 50 to 65 centimeters deep. It was masonry lined with medium-sized basalt boulders laid in about 4 courses. At a depth of 20 to 30 centimeters were found 5 large sandstone slabs, which looked as if they had been originally matched and laid horizontally as a cover for a receptacle of some sort. At the time of excavation, however, they had fallen crazily into various positions (fig. 31).

Burial 4. Above these slabs was loose fill containing a fairly large number of sherds and many whole and fragmentary human bones scattered about in utter confusion, almost literally no two in proper juxtaposition. Ribs, carpels, tarsals,

metacarpels, metatarsals, scapulae, clavicles were mostly unbroken, but all long bones had been broken into numerous pieces, both transversely and longitudinally, and apparently hollowed out. Some showed surface alterations as if from heat though there was nowhere any positive evidence of fire. Beneath the stone slabs was found the badly crushed skull (fig. 31), but the mandible was missing. In other respects, too, the skeleton was incomplete, for the right humerus, sternum, and some of the ribs, vertebrae, hand and foot bones were not found. It is tempting, though perhaps not fully warranted, to suspect, on the basis of this breaking, removal of marrow and possible cooking, the practise of cannibalism, although there may have been nothing more than a reburial performed by a particularly vituperative grave-digger. It was certainly not a cremation.

Pit E. About 4.5 meters northeast of Pit D was a shallow, nearly rectangular pit, about 45 centimeters deep and 1.50 by 1.85 meters in plan. Its floor was hard but uneven, and it was lined with walls of large and very irregular basalt boulders on three sides; the northeasterly wall was missing. Few fallen stones lay about, and the pit contained nothing but undifferentiated fill.

Pit F. This was a roughly oval pit dug into the hard caliche, 1.25 meters deep, 1.60 meters long by 1.10 meters wide, with vertical sides and level floor. There was no masonry. It too was filled only with loose debris of cinders, earth, sherds, etc.

No explanation of the use of these pits can be given other than for storage of food or possibly as sweat houses in the case of the largest one, E. None contained evidence of fire.

CHAPTER VII

SITE N. A. 537, CRACK-IN-ROCK PUEBLO

PLANS AND PROFILE: Figures 32, 33.
PHOTOGRAPH: Figure 34.
POTTERY CHART: Table 3.

IN addition to the excavations of four sites in Big Hawk Valley, test excavations were carried out at a Pueblo III ruin of the Klethla Focus of the Kayenta Branch situated some 10 miles northeast of the others in the Little Colorado Valley. This was the well-known ruin of Crack-in-Rock (N.A. 537), so-called because the main portion of it consists of an 8-room fortified pueblo situated on the almost inaccessible summit of an isolated mesa (fig. 32). Entrance to the pueblo was formerly achieved through a narrow cleft in the cap rock of the mesa that led upward from the talus slope on the southeast side and debouched literally through the floor of one of the rooms. The mesa itself is one of a row of steep-sided remnants of the Moencopi sandstone that lie along the southwest side of the valley about a mile from the river, their long dimensions sloping downward toward it. That on which N.A. 537 lies is about 300 feet long by about 50 to 60 feet wide. Along the summit of the talus on the southeast side was an additional row of rooms that were built against the vertical face of the mesa and were partly protected from above by the overhanging ledge that formed the mesa top. Since these ledge rooms had been kept dry they were expected to contain articles of perishable materials, and two rooms were excavated partly for the purpose of recovering such specimens and partly to determine whether or not one of them had been a kiva. Since Crack-in-Rock is the most northerly known site in the San Francisco Mountain region as well as relatively late in time, belonging as it did to the Klethla Focus and having an almost pure Kayenta Branch pottery complex, it is unique in the area.[1]

In connection with the excavation a careful plane-table plan of the entire site was made, and is reproduced herein in figure 32. This plan supersedes a sketch previously published, which was only approximately correct.[2]

ROOM 3

The rooms excavated were those designated 3 and 4 on this plan. Room 3, which appears to have been a kiva, will be described first. It is shown in enlarged scale in figure 33. This room was approximately rectangular and measured 3.1 by 2.4 meters, the longer dimension being approximately parallel to the wall of the cliff, and oriented about North 20° East. Its northwest and southeast corners were square but rounded, while the northeast and southwest corners were bevelled, making the room a sort of mis-shapen hexagon. The floor was hard red clay laid smoothly over the native rock at the back of the room and over the talus

[1] For further data, see Colton, 1932a, pp. 39–41; 1946, pp. 68–70.
[2] Colton, 1932a, fig. 18; 1946, fig. 36.

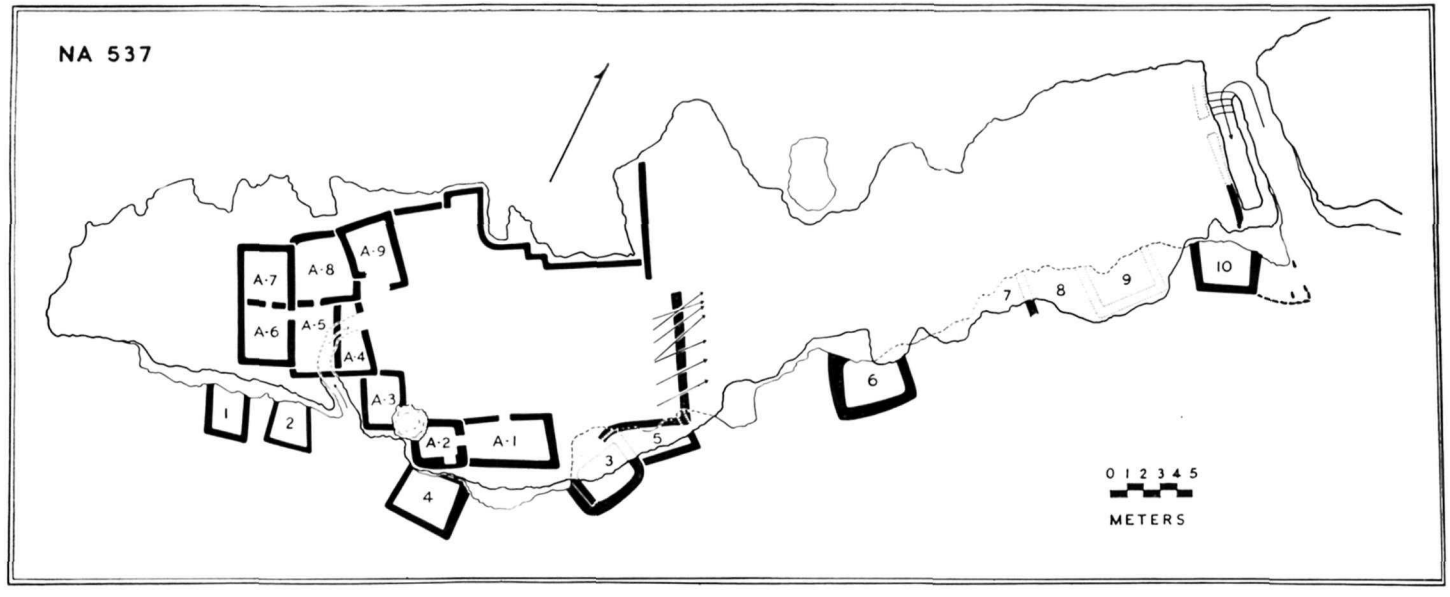


FIG. 32.

Ground plan of Crack-in-Rock Pueblo, N.A. 537, showing outline of the mesa cap with the fortified structure on top and the row of rooms beneath the overhang and along the talus. Arrows indicate direction of loopholes in defensive wall.

at the front. Covering the entire floor was a thin homogeneous layer of clean river sand.

Fire-pit. A roughly circular basin-shaped fire-pit lay near the center of the room, 118 cm. from the north wall and 95 cm. from the northeast bevel. It was 30 cm. in diameter and 16 cm. deep. There was no deflector, but a ventilator tunnel penetrated the bevelled portion of the northeast wall 23 cm. wide. No evidence of any external vertical shaft remained. About 26 cm. from the back or west wall and parallel to it a neatly cut slab of white sandy limestone had been imbedded in the floor, its upper face flush with the floor. It measured 134 cm. long by 18.5 cm. wide at the south end and 15 cm. at the north end, and was 4 to 5 cm. thick. Its corners were square and its edges straight. It rested directly on bed rock and there was no recess beneath it.

Sipapu or resonator. Between this slab and the fire-pit was a similar but larger limestone slab. This one was 125 cm. long by 38 cm. wide at the south and 42 cm. wide at the north end; it was 5 cm. thick. Its north end was 68 cm. from the north wall and it was 12 cm. behind the firepit (figs. 33, 34).

This slab was also recessed into the floor so that its upper surface was flush, and it rested directly on bed rock. But beneath it, and hewn out of the rock was a longitudinal slot oriented in the same direction as the covering slab. This slot was 85 cm. long and 12 to 15 cm. wide. Its ends and sides sloped downward toward the bottom, which was therefore somewhat shorter and narrower than the surface dimensions and about 8 cm. deep. It contained nothing, but had probably served as a resonator for ceremonial dancing, and may have been a sipapu. It is mainly because of the presence of this covered slot that Room 3 has been called a kiva.

The identification of the covered slot as a resonator is made on analogy to modern Pueblo practise, where an exactly similar device, except that the slab is usually of wood, is often constructed in kivas as well as in open ceremonial plazas.[3] At Acoma it occurs in Chief Kiva and is danced on by medicine men to acquire power,[4] and is called "another altar placed under" because at the bottom is thought to be an altar like the one first made by Iyatiku, the Corn Mother,[5] the hole itself being apparently regarded as Shipap or the Place of Emergence.[6]

In the Scalp ceremony at Zuñi two planks are set into the surface of an open court, with cavities beneath them. Girl performers dance upon them, and they are regarded as the "door for the people inside the earth." [7]

In the Hopi towns a similar covered pit is used in the kiva for the Soyal or Winter Solstice ceremony, on which the performers posture and stamp.[8] It is also used during the Niman or Homegoing dance,[9] and during the Snake dance before the *kisi* or snake bower in the open plaza.[10] This foot-drum is a means of communication with the spirits of the underworld and in the cavity have been

[3] Parsons, 1939, pp. 382, 981.
[4] White, 1932, p, 31; Stirling, 1942, pp. 108, 111; Parsons, 1939, pp. 382, 594.
[5] Parsons, 1939, pp. 310–11.
[6] Parsons, 1939, pp. 310–11.
[7] Parsons, 1924, pp. 21–2; 1939, pp. 383, 631.
[8] Parsons, 1939, p. 382.
[9] Stephen, 1936, pp. 10, 17ff, 514.
[10] Stephen, 1936, pp. 10 (note 3), 17ff, 707, 708, 718ff; fig. 6; Voth, 1903, pp. 330, 334ff; pl. 183; Parsons, 1939, pp. 382–3, 511–12, 667; pl. VII.

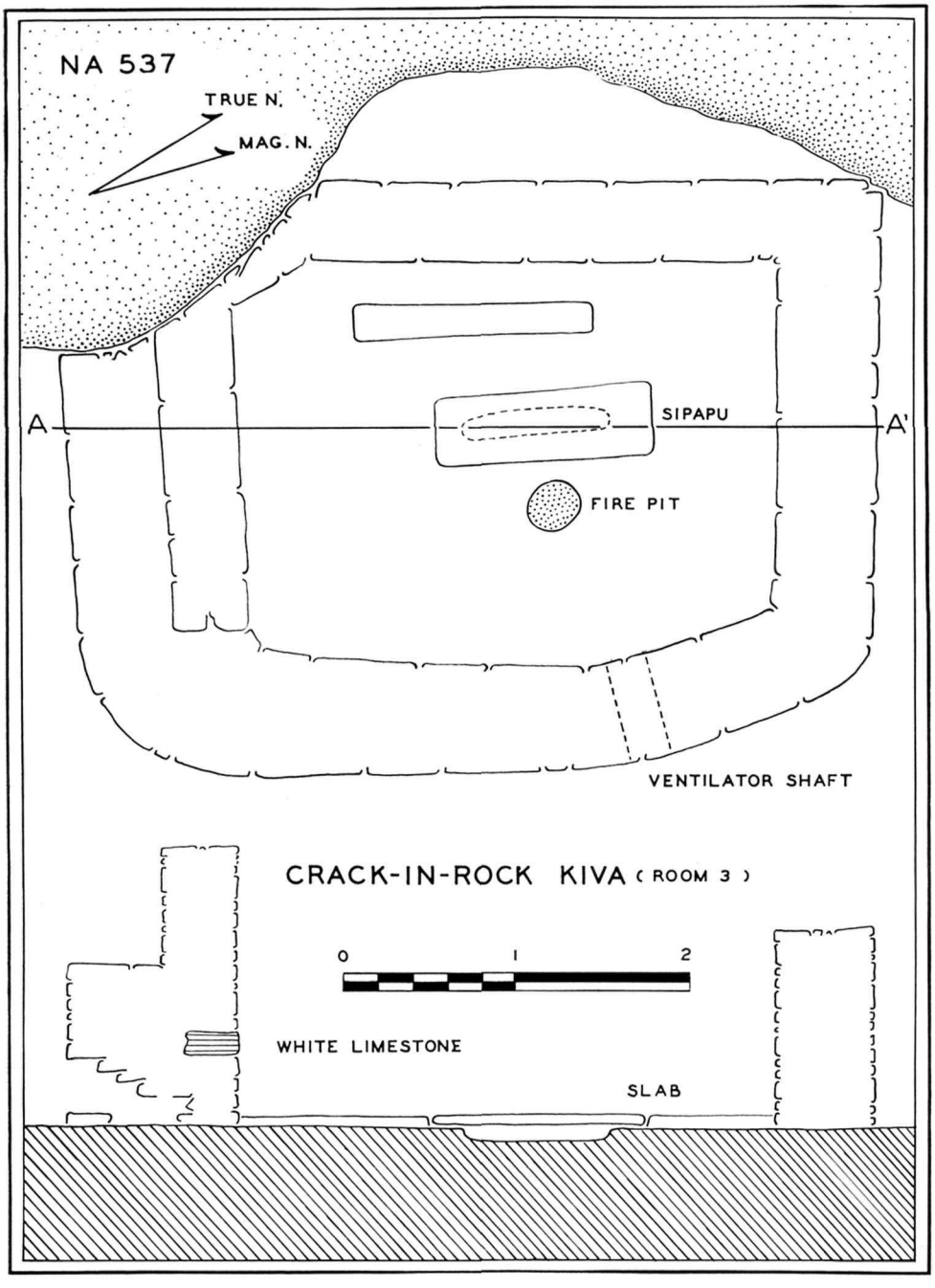


FIG. 33.

Ground plan and profile of Kiva, Room 3, Crack-in-Rock, N.A. 537, showing fire-pit and the 2 slabs recessed into the floor. The dotted lines through the eastern wall indicate the position of the ventilator tunnel, and the shaded block in the profile of the left wall shows the position of a decorative course of white limestone.

placed prayer-sticks.[11] Parsons writes that a representation of it is contained in the sand painting of one of the Oraibi Powamu altars, "a small square set in concentric squares, yellow, blue, red and white, the lower worlds."[12] But she cites no authority for the statement.

Thus, there seems solid evidence for regarding this device as one form of sipapu, and the identity of the one at N.A. 537 is pretty certain. That it was a trait of the Kayenta Branch is indicated by its discovery in the kiva of a Pueblo



FIG. 34.

Detail of floor of Kiva, Room 3, N.A. 537, showing long sandstone slabs used in the back wall. In the foreground is the fire-pit and behind it a slot excavated out of bedrock, which was covered with a square limestone slab that has been removed for the purpose of the photograph. This was probably a sipapu or resonator. Behind it is another limestone slab in situ, beneath which there was, however, no slot or recess.

II site on Black Mesa, R.B. 551;[13] and its frequent presence in the Pueblo IV kivas at Awatovi indicate its general usage in the Jeddito in pre-Conquest times at least.

At Juniper Terrace, 13 miles south of N.A. 537, there occurred in association with a 4-room surface structure, a rectangular subterranean masonry room (N.A. 1814F) that had contained a rectangular board similarly recessed into the floor.[14] This room had certain other kiva-like features; and its ceramic date was between 1130 and 1175. The entire site of which it was a part seemed, however, to represent three components: Elden, Klethla and Hull.

[11] Voth, 1903, pp. 330–31; pl. 179A; Parsons, 1939, p. 383.
[12] Parsons, 1939, p. 310.
[13] Beals, Brainerd and Smith, 1945, p. 52; fig. 10.
[14] Colton, 1946, pp. 152–55; fig. 87.

Walls. The walls of Room 3 were very well laid of large slabs of red Moencopi sandstone, which fractures readily into sections of very uniform thickness with edges normal to the horizontal faces. They were double-faced and unusually heavy, from 45 cm. to 1 meter in thickness, carefully finished both inside and out. In part the lowest course was composed of slabs set vertically, but the upper courses were all horizontal. The south wall was much the thickest in its lower part but at a level 90 cm. above the floor it was stepped back on its outer surface a distance of about 55 cm. and its upper portion was therefore only 45 cm. thick. A single course of white sandstone, 12 cm. thick and 40 cm. above the floor extended the length of the south wall. The walls stood from 70 cm. to 1.5 meters high at the time of excavation and the debris indicated that they had originally extended considerably higher.

Objects recovered. Despite the dryness of the fill in Room 3 very little was found in it. A fragment of what looked like a grass mat lay just above the floor, but it could not be saved. Elsewhere on the floor were a bone pipe (cat. no. 537.477) described on p. 142, an oval cylinder of vesicular basalt (cat. no. 537.294) and a well-smoothed ovoid hammer stone (cat. no. 537.293). In the fill were a quartzite mano (cat. no. 537.288), a finely-smoothed fragment of a quartzite maul (cat. no. 537.342), a small black obsidian point (cat. no. 537.287), a broken bone chisel or gouge (cat. no. 537.487), two boulders used as hammer stones (cat. nos. 537.297 and 537.384), about 15 unretouched flakes, and a bundle of 18 broken sticks (cat. no. 537.458) up to 9 cm. long and 1.2 cm. in diameter. There was no restorable pottery.

ROOM 4

Just west of the kiva one other room was excavated on the talus, designated Room 4 on figure 32. This was also approximately rectangular and measured 2.6 meters from back to front. Its side walls diverged slightly, the width at the back being 3.4 meters and at the front 3 meters. A floor of clay on bed rock was quite featureless and was covered with a thin layer of clean sand, 1 to 2 cm. thick. Above this floor 5 to 8 cm. was a second floor, also of clay, whose only feature was a slab-lined pentagonal fire-pit 15 cm. deep and about 40 to 30 cm. in diameter. Two centimeters of clean white sand covered most of the floor.

Walls. Masonry was of well-laid slabs of red Moencopi sandstone from 15 to 70 cm. long and from 2 to 12 cm. thick. The lowest course of the south wall was formed of vertical slabs, but the rest were all laid horizontally with many small spalls to justify the bearing surfaces. The back wall was masonry in its easterly portion, the westerly part being formed by the native rock of the cliff face, which sloped outward and downward at an angle of about 60°. West and south walls were only about 35 cm. thick but the east wall varied from 60 to 75 cm. At one point in the east wall was a sealed doorway 55 cm. wide and 50 cm. from the southeast corner. It appeared to have been used contemporaneously with the earlier floor but to have been sealed before the later floor was laid down. Imbedded in the east wall was a round stick about 30 cm. above the floor. It was very hard and inflexible, 1.4 by 2 cm. in diameter, and protruded horizontally 28 cm. The outer and smaller end was badly split and there was no indication of its original function.

Objects recovered. On the upper floor lay 2 unshaped hammer-stones (cat. nos. 537.289 and 537.290), 9 unretouched flakes (cat. no. 537.332), two square knots of some vegetable fibre (cat. nos. 537.464 and 537.473), a tapered stick (cat. no. 537.469) and what looked like three fragments of an arrow shaft (cat. nos. 537.457, 537.466 and 537.468).

In the southeast corner was a heavy accumulation of trash, in which were numerous artifacts, including a fragment of a reed mat, woven in a 2-over-2-under twill. It was too fragile for preservation. In addition the following perishable articles were recovered:

11 corn cobs (cat. nos. 537.313; 537.455; 537.456)
Squash fragment (cat. no. 537.461)
Bunches of grass (cat. nos. 537.310, 537.460, 537.471.
45 fragments of reeds (cat. no. 537.462)
10 broken sticks(cat. no. 537.463)
Numerous assorted seeds, apparently corn, pinyon, bean squash, cotton(?) (cat. no. 537.470)
1 wooden needle (cat. no. 537.465)
1 broken weaving batten (cat. no. 537.475)
1 wooden crook(?) (cat. no. 537.476)
1 complete sandal (cat. no. 537.459, Fig. 49)
There were also the following stone artifacts in the fill:
1 quartzite plano-convex scraper (cat. no. 537.483)
2 quartzite hammer stones (cat. nos. 537.327, 537.328)
9 unretouched flakes (cat. nos. 537.329, 537.334, 537.335)
1 oval sandstone hoe (cat. no. 537.292)
1 polishing pebble (cat. no. 537.336)
1 large coarsely chipped projectile point (cat. no. 537.295)

Pottery

Relatively little pottery came from N.A. 537. In a surface collection made some years ago the undecorated sherds were 96% Tusayan Gray, 3% Alameda Brown and 1% Prescott Gray Ware, and the decorated sherds fell in Ceramic Group 7, indicating that the site was practically a pure Kayenta Branch pueblo of the Kelthla Focus, dated between 1150 and 1200.[15] The sherd collections made at the time of excavation corresponded (Table 3). The surface collection was entirely of Kayenta Branch types, as were those from the 2 rooms except for 2 sherds of Little Colorado White Ware on the floor of the kiva. Flagstaff Black-on-white constituted almost the entire collection of decorated white sherds, with one sherd of Wupatki Black-on-white. San Juan Orange Ware was meagerly represented by only 5 sherds, of Tusayan Black-on-red, Citadel and Tusayan Polychromes. Thus the site appears to be contemporary with or a little later than N.A. 681 and N.A. 682, and to be quite without Cohonina or Sinagua components. That it was so carefully fortified and defensively located suggests that it may have been occupied during a period of border warfare, but who may have been the enemy is nowhere indicated.

[15] Colton, 1946, p. 69.

CHAPTER VIII

SITE N. A. 1814 E, JUNIPER TERRACE

PLAN: See *The Sinagua*, Colton, 1946, Fig. 86.
PHOTOGRAPH AND DETAIL DRAWING: Figures 35, 36.

AT A distance of about 13 miles to the south of Crack-in-Rock and 3 miles south of Big Hawk Valley, and at a much higher elevation among the Yellow Pine forest, was a large site (N.A. 1814) consisting of two separate surface pueblos, each with an associated rectangular subterranean masonry room. The site appears to have been occupied in the early and middle 12th century and contained components of significant size from the Elden, Klethla and Hull Foci.[1]

At the time that N.A. 1814 was originally excavated by Lyndon L. Hargrave in 1931 and 1932 one of the subterranean structures, N.A. 1814E, was seen to be a large, nearly square structure, subdivided into 3 small compartments. Since the dividing walls had pretty clearly been built subsequent to the construction of the outer walls, and since the original room had had the very large dimensions of 6.9 by 7.2 meters, it was suspected that it might once have been a kiva.[2] Complete investigation at that time was not, however, carried out.

In 1948 this structure was further excavated by the removal of the easterly half of the thick east-west cross wall. This wall was found to be 1 meter thick and was composed of two distinct facing walls with rubble core. It abutted the eastern peripheral wall of the original room.

EARLY PHASE

When this wall was removed there was found beneath it a floor of well-smoothed clay that had extended apparently over the entire area of the original room. At a point 65 cm. from the east wall and directly beneath the cross wall was a roughly circular basin-shaped fire-pit about 40 cm. in diameter and 10 cm. deep. It contained wood ashes, some sherds and 2 fragments of wall plaster that showed evidence of having once borne a red-painted surface (cat. no. 1814E.6). This fire-pit had been abandoned, however, and was plastered over flush with the floor surface. Through the east wall was a ventilator tunnel, 40 cm. high and 47 cm. wide; its floor was at the same level as that of the room and it was roofed with thin sandstone slabs across the outer orifice. Originally this tunnel had extended outward beyond the east wall of the room a distance of 112 cm. at which point a roughly circular masonry-lined shaft had risen vertically to the surface of the ground. Directly above the tunnel there had been a rectangular recess 1.9 meters wide by 67 cm. deep, the back or outer wall of which formed one side of the vertical shaft, which had been built against its outer surface. The floor of this recess must have been at a level just above the lintel of the ventilator tunnel but nothing remained to indicate the manner in which it had been floored

[1] Colton, 1946, pp. 145–55; figs. 82–87.
[2] Colton, 1946, pp. 151–52; fig. 86.

or paved. Obviously this feature was strikingly like the eastern or southern recess so frequent in San Juan kivas.

In the floor of the main room, between the mouth of the ventilator and the fire-pit were two stones that seem almost surely to have served as a deflector. They are indicated on figures 35 and 36. The larger was a rectangular block of basalt that had been recessed into the floor and stood 20 cm. high above the floor.

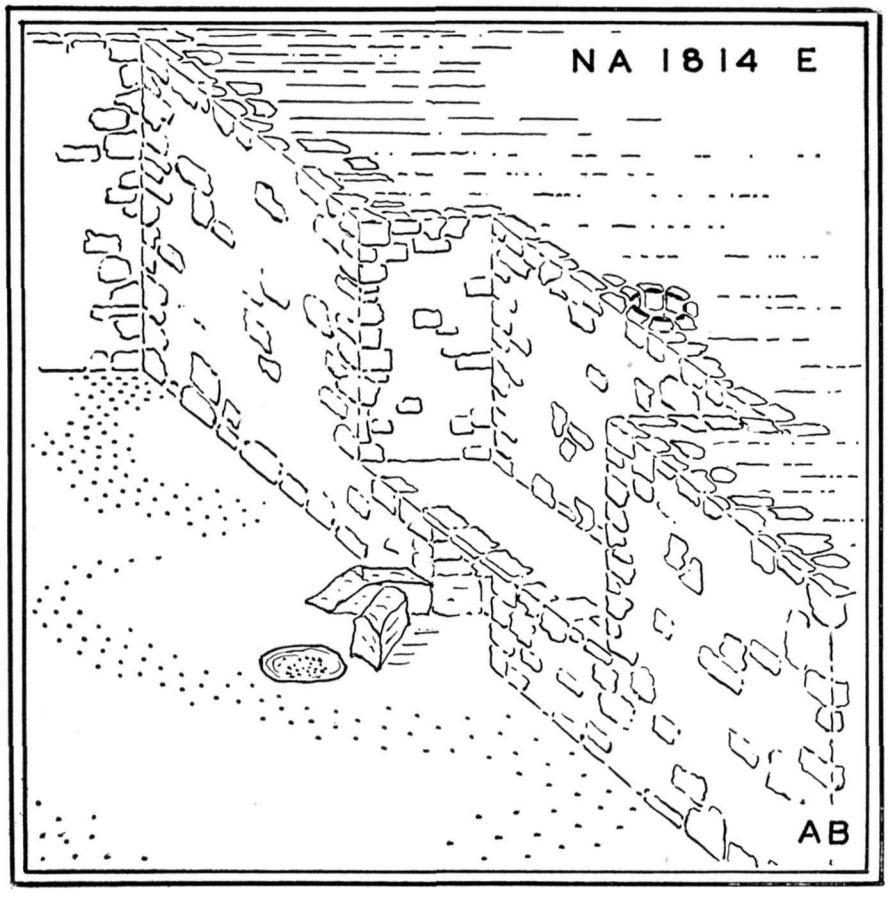


FIG. 35.
Perspective view of east wall of N.A. 1814E as originally constructed.

LATE PHASE

At the time of construction of the secondary cross wall the eastern recess had been completely sealed by carrying its front face up to the full height of the room, so that the east wall of the room presented a continuous surface. The mouth of the ventilator was not, however, sealed. Then the cross wall had been built directly upon the floor, obscuring but not destroying, the fire-pit, deflector and ventilator. At the same time a second floor was laid, about 5 cm. above the earlier one, and its surface was faired into the plaster that coated both the cross

wall and the east wall. Much of this plaster, heavily smoked, was still in place and was composed of at least two layers.

On the upper floor just to the north of the cross wall and against and parallel to the east wall lay charred fragments of 2 pinyon logs, probably from the roof. These were respectively 62 and 80 cm. long by about 15 cm. in diameter. Beneath and at right angles to them lay several smaller pinyon sticks, and the whole was thickly covered by a mat of charred grass, not woven but laid in bunches. About 15 cm. from the east wall and 75 cm. from the cross wall was an apparent post about 10 cm. in diameter. Above the beams lay a number of fully kerneled corn cobs.

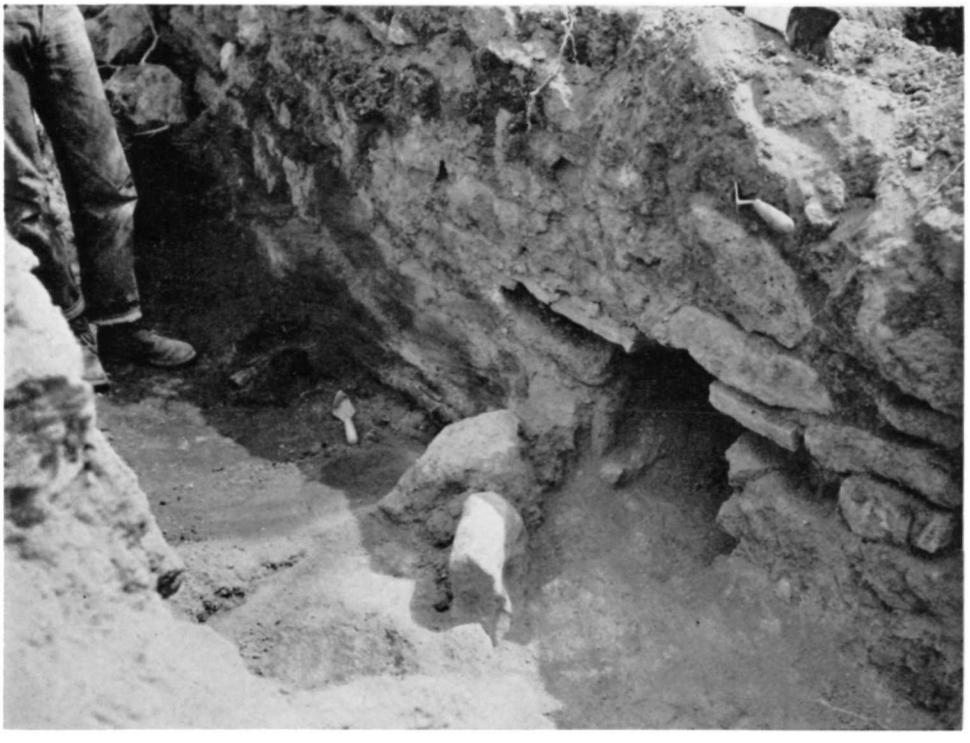


FIG. 36.

Detail of original east wall of N.A. 1814E, showing mouth of ventilator tunnel and diagonal deflector. These features were subsequently obscured by the construction of a partition which has been removed for the purposes of the photograph.

Bins. In the plan of this room at the time of its ultimate arangement,[3] two narrow curving walls had been inserted to form storage bins in the two corners formed by the intersection of the easterly end of the cross wall and the east wall. The original foundation for these bin walls posed something of a problem. They had been built above the level of the charred beams, although no evidence whatever of a third floor-level coincident with their bases was found. Evidently when Hargrave first excavated the structure he dug only to the bottoms of these bins, and there may have been evidence at that time of a corresponding floor that has

[3] Colton, 1946, fig. 86.

since been obliterated by weathering. On the other hand the situation recalls that at Site N.A. 618 where exactly similar bins were found built on fill without foundations or floor in Room 4 and in Pithouse W.[4]

Cultural Components

No sherd collection was made at N.A. 1814E, since an adequate one had been collected at the time of the original excavation. This showed a complex belonging to Ceramic Groups 6 and 7 and consequently indicative of a date between 1100 and 1130, with Alameda Brown, Tusayan Gray and San Francisco Mountain Gray Wares all present in significant quantities. The site therefore was composed of components of the Elden, Klethla and Hull Foci.[5] If the original structure was a kiva, as seems very likely, it would suggest that it was constructed by people of the Kayenta Branch, but with very strong admixtures of Cohonina and Sinagua elements. Moreover, if it was truly a kiva, it represents very nearly the most southerly known example of that architectural feature in the Flagstaff region, except for a dubious room at Elden Pueblo.[6] At any rate N.A. 1814E would seem to correlate very well with sites N.A. 680, N.A. 681 and N.A. 682 in the Big Hawk Valley.

[4] See pp. 14, 20 above.
[5] Colton, 1946, p. 152.
[6] See p. 163.

CHAPTER IX

THE CERAMICS OF BIG HAWK VALLEY

GENERAL DISCUSSION

In the course of excavation of the four sites described in Big Hawk Valley a total of about 40 whole or restorable pottery vessels was recovered, as well as approximately 13,200 pot-sherds. A careful analysis was made of all this material on the basis of the typology already established by previous studies of the Museum of Northern Arizona and others. Almost no pottery was found that did not correspond in all observable features to published descriptions of established types, and consequently no problems of original taxonomy were presented.

All sherds and whole vessels were sorted and counted in accordance with these categories, and for the purposes of this report no additional descriptive data relevant to the types involved need be presented. Detailed statistical studies of thickness, rim forms, vessel sizes and shapes, minor decorative details, and the like, were not made. Such an analysis ought properly to be a part of every archaeological report, but desirable as it may be both in theory and in practice, it was omitted in this case mainly for lack of time and opportunity to carry it out. In some cases such neglect would indeed be scientifically reprehensible, where data of a novel or relatively unknown character are involved, but in the present instance I believe that previously published data bearing on the ceramic types involved have been comprehensive and explicit enough to provide a classificatory basis for the present material, adequate to its reliable statistical study and to the cultural inferences to be drawn from it. Illustrations of certain sherds and whole vessels are included herein, some because they were unusual, others precisely because they were typical of larger groups. No modifications in already published type descriptions are demanded, however, and wherever type names are used herein they will carry, unless specifically qualified, the connotations as described elsewhere. In order to aid the reader in refreshing his memory thereon, however, a list of all types involved, together with references to the most important published discussions, will be presented herein. The grouping of types and the general taxonomy employed will be that worked out by the Museum of Northern Arizona, and the chronological and cultural conclusions drawn therefrom, in terms of both relative and absolute dates and of the recognition of components, foci and branches will also be expressed in harmony with the Museum's scheme, not, however, without some qualifications thereof in such instances as may seem to require further comment or reappraisal.

Numbers vs. Weight in Sherd Counts

In the course of the study of the Big Hawk Valley ceramics it was suggested by Dr. Colton that comparative statistical analysis be made of the sherd collections on the basis not only of numerical quantities in the usual manner, but of relative

weights as well. While he entertained no preconceived theory as to the results to be attained, he felt that some useful information of a statistical nature might evolve from a comparison of data derived from the same material according to these different methods. The sherds of each type in each collection were, therefore, both counted and weighed in terms of ounces avoirdupois (grams might have provided a more sensitive measure) and the resultant statistics were studied comparatively.

Although thorough statistical analyses of the results were not fully carried out, the initial indications were that with respect to reasonably large samples very little practical difference resulted from the use of one method in comparison with the other. Evidence of this may be seen in the tables of type distributions for each of the four Big Hawk Valley sites, as presented on pp. 89–90, 92, 94, and 96. While numerous small discrepancies may be noted there, only 2 or 3 of them are large enough to be possibly very significant, and I believe that in the absence of special circumstances that might obtain in particular cases, the results achieved by one method would usually not be materially at variance with those achieved by the other. The whole matter, however, raises some very complex statistical problems, and pending a thorough analysis by appropriate methods in the hands of a competent investigator, it would be unwise to accept any definitive conclusions.[1]

Field Methods

Field methods of excavation, insofar as they have bearing upon ceramic analyses, deserve a few words. In each site individual rooms and test pits were excavated as discrete units and all sherds and other artifacts recovered therefrom were segregated in bags appropriately labeled. No grid system was employed, since the sites were small and the provenience of all objects recovered could be adequately recorded by notation of their positions in particular rooms or pits with reference to depth below the surface, and distance from walls, which of course provided permanent reference points. Since no middens or refuse mounds existed there was no opportunity to conduct direct stratigraphic tests in which a horizontal and vertical grid would have been appropriate.

From surface indications it was evident that none of the sites had been occupied for very long periods of time, and that there was consequently very little to be learned from a meticulous stratigraphic analysis, in which, for example, every room would be cleared in carefully measured strata of say 30 to 50 centimeters. In practice, therefore, a pragmatic and not altogether consistent method was applied, according to which the fill of each of the surface rooms, none more than 1 meter in depth, should be considered as a unit down to perhaps 5 centimeters above the floor, with the articles lying on the floor itself as a distinct unit. On subsequent inspection it was often found that the floor collection was so small or so nearly like that from the fill above it as to be insignificant, and the two were combined.

In the pithouses, most of which measured from 1 meter to more than 2 meters in depth, a stratigraphic separation was made along the level 1 meter below the

[1] In his study of the pottery from Nalakihu, Dale King also analyzed his material by both methods, with interesting but not significantly different results. King, 1949, pp. 109–10; tables 1, 2, 3, 4.

surface, resulting in two, or in some cases three, collections from these deeper excavations. Admittedly the method applied was somewhat unsystematic and subjective, but I do not feel that it is therefore any the less accurate or valuable. In any such task the personal equation of the excavator is constantly operative anyway, even when a mechanical sort of procedure is followed, and a neat chart or a column of figures is often only what the investigator and reporter makes it, despite its specious appearance of "scientific" exactitude or "objectivity." I have, therefore, no apology to make for what some readers may regard as an "unscientific" approach, since I feel that the appropriate balance between the ultimate ideal of the conjuctive method [2] on the one hand and that of the pot-hunter on the other must be pragmatically determined by realistic consideration of the local equation — a compound of the physical nature of the site itself, time and resources available, formulation of the problem, precedent knowledge of the general background, and last but perhaps most important of all, that elusive quantity called by the military, "calculated risk," by the economist, "informed estimate," and by the rest of us, "hunch."

With the realization, therefore, that statistics, at least in a field such as archaeology, do not in themselves embody absolute and infallible values beyond the possibility of human error in their collection, compilation and interpretation, we may consider the ceramic clues to the construction of the story of prehistoric cultures in Big Hawk Valley as being reasonably reliable. These are only partial clues, to be sure, and must be consolidated with those provided by other sources of data, but for the moment it will be convenient to consider them separately.

POTTERY TYPES RECOGNIZED

The pottery types found in the sites under consideration are listed below with their groupings by wares, and their cultural associations in terms of branches and foci according to the terminology and taxonomy developed by the Museum of Northern Arizona, together with references to some of the more important bibliographical sources of data relative to them:

ALAMEDA BROWN WARE — SINAGUA BRANCH

Winona Brown — Angell and Padre Foci

Colton and Hargrave, 1937, pp. 162–3;
McGregor, 1941, pp. 52–57, fig. 14;
Colton, 1941a, pp. 35–6;
Colton, 1946, pp. 23–6, fig. 9.

Sunset Red — Padre Focus

Colton and Hargrave, 1937, pp. 163–5;
McGregor, 1941, pp. 57–8, fig. 17;
Colton, 1941a, p. 39;
Colton, 1946, p. 23, fig. 11.

Turkey Hill Red — Padre, Elden, Turkey Hill Foci

Colton and Hargrave, 1937, p. 165;
McGregor, 1941, pp. 58–60;
Colton, 1941a, pp. 40–1;
Colton, 1946, p. 26, fig. 12.

Clear Creek Brown — Clear Creek Focus

Colton, 1941a, pp. 43–4.

[2] See Taylor, 1948.

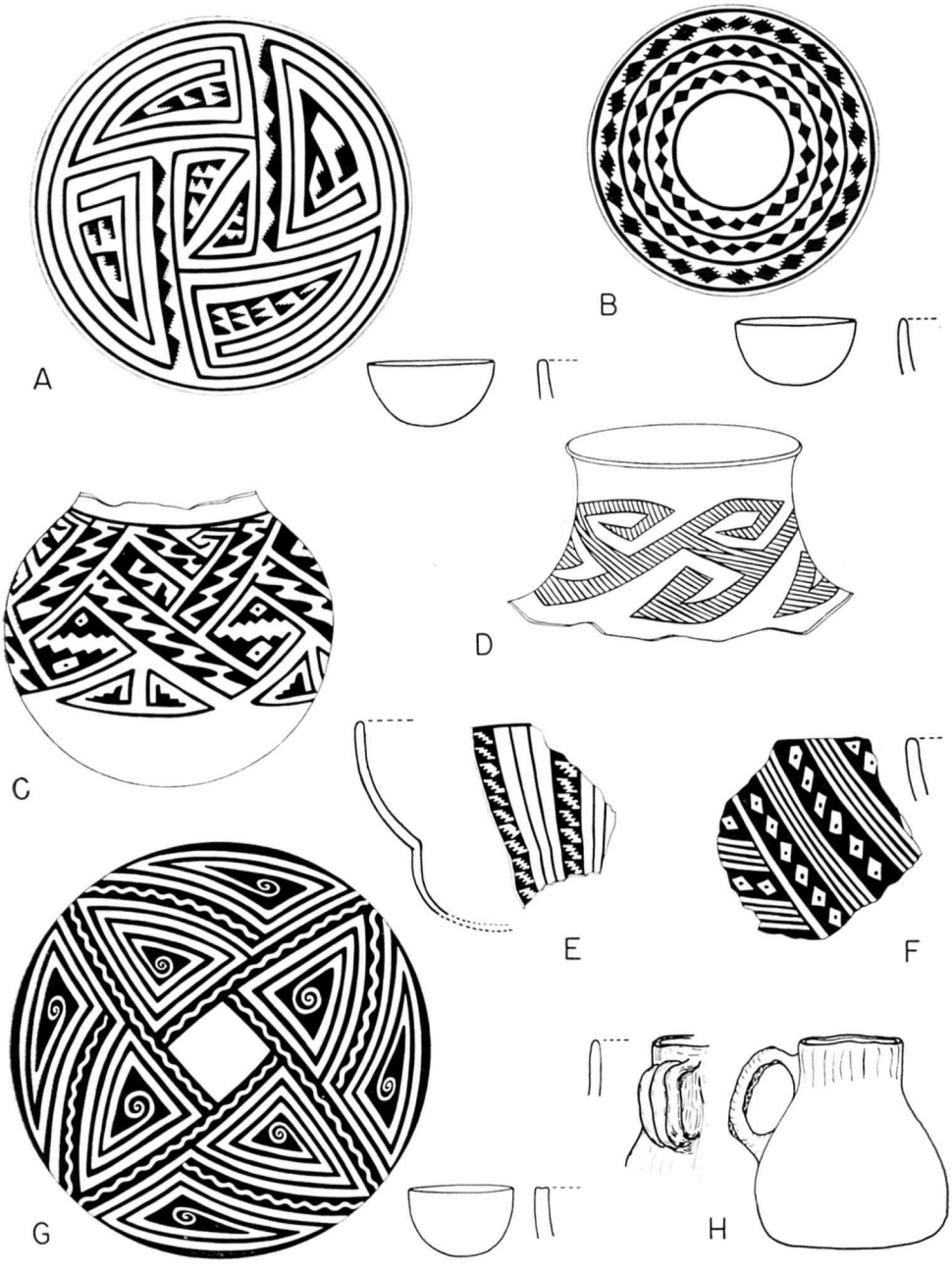


FIG. 37.

Decorated Pottery from Big Hawk Valley Sites: (A) Black Mesa Black-on-white bowl, N.A. 618 (cat. no. 618.391); (B) Black Mesa Black-on-white bowl, N.A. 618 (618.479); (C) Flagstaff Black-on-white jar, N.A. 681 (681.495); (D) Neck of Dogoszbi Black-on-white olla, N.A. 618 (618.366); (E) Sherd of Flagstaff Black-on-white bowl, N.A. 681 (681.71); (F) Sherd of Flagstaff Black-on-white bowl, N.A. 537 (537.353); (G) Flagstaff Black-on-white bowl, N.A. 682 (682.187); (H) Tusayan Gray Ware miniature pitcher, N.A. 618 (618.281).

Note: Angell Brown and Youngs Brown, both recognized by McGregor in his report on Winona and the Ridge Ruin, 1941, pp. 28, 56, 62, essentially as variants of Winona Brown and Sunset Red respectively, have not been considered here. In McGregor's work, with an enormous quantity of material and stratigraphic relationships available, it was possible to differentiate these types. In our work, however, no reliable indentifications of Angell and Youngs Brown could be made, and such shreds as might pehaps be properly so classified have been included in Winona Brown and Sunset Red. I feel sure that no chronological or cultural outrages will have been perpetrated thereby.

SAN FRANCISCO MOUNTAIN GRAY WARE — COHONINA BRANCH

Deadmans Gray — all known foci

Colton and Hargrave, 1937, p. 252;
Colton, 1946, pp. 28–29, 253, fig. 14.

Deadmans Fugitive Red — all known foci

Colton and Hargrave, 1937, p. 252;
Colton, 1946, pp. 29–30, 253, figs. 14, 15.

Deadmans Black-on-Gray — all known foci

Colton and Hargrave, 1937, pp. 253–54, fig. 62;
Colton, 1946, p. 29, fig. 16.

TUSAYAN WHITE WARE — KAYENTA BRANCH

Black Mesa Black-on-White (also, formerly called Deadmans Black-on-White) — Black Mesa Focus

Morss, 1931, p. 4, pl. 2;
Colton, 1932a, p. 10;
Colton and Hargrave, 1937, pp. 208–209;
Colton, 1941a, p. 49;
Colton, 1941b, p. 164;
Colton, 1946, pp. 20, 251, 253;
Beals, Brainerd and Smith, 1945, pp. 99–103, figs. 24, 33, 49, 51.

Dogoszhi Black-on-White — Black Mesa Focus

Colton and Hargrave, 1937, pp. 209–11;
Colton, 1941a, p. 50;
Colton, 1946, pp. 20, 22, 251, 253, fig. 5.
Beals, Brainerd and Smith, 1945, pp. 99, 105, figs. 31, 32, 35.

Sosi Black-on-White — Black Mesa, Klethla Foci

Colton and Hargrave, 1937, pp. 211–13, fig. 51;
Colton, 1941a, p. 51;
Colton, 1946, pp. 20, 22, 251, 253, fig. 5;
Beals, Brainerd and Smith, 1945, pp. 103–5, figs. 26–30, 51.

Flagstaff Black-on-White — Klethla Focus

Colton and Hargrave, 1937, pp. 225–27, fig. 57;
Colton, 1941a, p. 51;
Colton, 1946, pp. 20, 22, 251, 253, fig. 5;
Beals, Brainerd and Smith, 1945, pp. 109–10; figs. 35, 46.

Wupatki Black-on-White — Tsegi Focus

Colton and Hargrave, 1937, pp. 227–29, fig. 58;
Colton, 1941a, p. 52;
Colton, 1946, pp. 20, 22, 251, 253, fig. 5.

LITTLE COLORADO WHITE WARE — WINSLOW BRANCH

Holbrook Black-on-White — Holbrook Focus

Colton and Hargrave, 1937, pp. 235–36;
Colton, 1941a, p. 53, fig. 6;
Colton, 1946, pp. 20, 22, 251, 253.

Walnut Black-on-White — McDonald Focus
Colton and Hargrave, 1937, pp. 237–40; figs. 59, 60;
Colton, 1941a, pp. 54–55;
Colton, 1946, pp. 20, 22, 251, 253, fig. 6.

TUSAYAN GRAY WARE — KAYENTA BRANCH
Tusayan Corrugated — Black Mesa, Klethla Foci
Colton and Hargrave, 1937, pp. 196–97, fig. 43;
Colton, 1941a, p. 48;
Colton, 1946, pp. 28, 252, 253, fig. 13;
Beals, Brainerd and Smith, 1945, pp. 12, 59, 66, 139–41, pl. 28
Moencopi Corrugated — Klethla Focus
Colton and Hargrave, 1937, pp. 197–98, fig. 44;
Colton, 1941a, pp. 48–9;
Colton, 1946, pp. 28, 252, 253, fig. 13;
Beals, Brainerd and Smith, 1945, pp. 139–41, pls. 27, 29.

SAN JUAN ORANGE WARE — KAYENTA BRANCH
Medicine Black-on-Red — Black Mesa Focus
Colton and Hargrave ,1937, pp. 72–73, fig. 14;
Colton, 1941a, p. 32;
Colton, 1946, p. 252.
Tusayan Black-on-Red — Black Mesa, Klethla Foci
Colton and Hargrave, 1937, pp. 74–75, fig. 15;
Colton, 1941a, pp. 32–33;
Colton, 1946, pp. 22–23, 252, 253, fig. 7;
Beals, Brainerd and Smith, 1945, pp. 125–27, figs. 59–62, 66 69
Citadel Polychrome — Klethla Focus
Colton and Hargrave, 1937, pp. 75–77, fig. 16;
Colton, 1941a, pp. 33–34;
Colton, 1946, pp. 22–23, 252, 253, fig. 7.
Tusayan Polychrome — Klethla Focus
Colton and Hargrave, 1937, pp. 96–99, fig. 23;
Colton, 1946, pp. 22–23, 252, 253;
Beals, Brainerd and Smith, 1945, pp. 127–31, figs. 62–70.

PRESCOTT GRAY WARE — PRESCOTT BRANCH
Verde Gray — all known foci
Caywood, 1936, pp. 101–104;
Spicer, 1936, pp. 29–33;
Colton and Hargrave, 1937, p. 184;
Colton, 1939, pp. 15–16;
Colton, 1946, pp. 32, 257.
Verde Black-on-Gray — all known foci
Caywood, 1936, pp. 104–10, figs. 15–16;
Spicer, 1936, pp. 33–43, figs. 9–20, pl. 7;
Colton and Hargrave, 1937, pp. 184–85;
Colton, 1939, pp. 15–16;
Colton, 1946, pp. 32, 257.

VALIDITY OF BRANCHES

In the foregoing table no mention has been made of Stems or Roots, for the reason that the Sinagua, Cohonina and Prescott Branches, although I think legiti-

mate as such,[3] are not in the present state of our knowledge assignable to higher echelons. It will be accepted, however, I think, that the Kayenta Branch belongs to the San Juan Stem of the Anasazi Root and the Winslow Branch to the Little Colorado Stem of the same Root.

CHRONOLOGY AND STRATIGRAPHY

As I have said above, very little direct stratigraphy was possible in excavation of the Big Hawk Valley sites, but nevertheless some inferences on relative chronology may be drawn from a careful analysis of the ceramic collections taken from them. In the discussion to follow I shall attempt to build up a plausible chronology on the basis of what I hope will be legitimate deductions drawn from the application to the ceramic complexes at these sites of data heretofore established elsewhere by means of dendrochronological evidence, stratigraphy, cross-dating by means of intrusive sherds, and the like. In order to render the argument as lucid as possible I shall limit to a minimum throughout the text specific references to bibliographical sources, listing the more important ones for general reference at the beginning,[4] and basing conclusions on general considerations of the consolidated data contained therein. For the purposes of the present discussion the chronology will be constructed mainly upon ceramic evidence, with such corroboration as may be available from architectural, dendrochronological, geographical and other data.

DESCRIPTION OF POTTERY-COMPLEX TABLES

In tables 1, 2, and 3 are presented in tabular form the ceramic breakdown of each collection of sherds saved from the excavations. Surface sherds and whole vessels, found *in situ*, have not been included in these tables, but otherwise they comprise a record of all sherds from the four sites. As already stated, the typology employed is that already developed by the Museum of Northern Arizona. Each table has two parts, the first being a graphic presentation of the proportions by quantity of the several pottery wares involved, without a further breakdown into types. The other part is presentation of the proportion by quantity of sherds of certain selected types to the total number of sherds of the ware of which those types are subdivisions. Since ware groupings are taken as determinants of

[3] I believe this to be true despite the masterly brief presented on behalf of the plaintiff in the case of Gladwin *vs* The Sinagua, with its argument in derogation of the legitimacy of the latter and its forceful marshaling of evidence to show that the archaeology of the San Francisco Mountain area establishes simply a manifestation of one homogeneous culture, and that the several branches propounded by the Museum of Northern Arizona have no validity as such. *See* Gladwin, 1943. Whether or not the cultural complex in this area may eventually be shown to have been homogeneous in its end results, I think that existing evidence justifies the working hypothesis of its having been compounded from several components of widely separated origins, which may for purposes of analytical discussion be called branches, quite without present commitment as to the attribution of these branches to stems or roots — a higher stage in the taxonomic hierarchy to which, in this particular association, we have not yet advanced.

[4] These sources are: Colton and Hargrave, 1937, *passim*; McGregor, 1938, *passim*; McGregor, 1941, pp. 60–66; Beals, Brainerd and Smith, 1945, pp. 56–66, 85–86, 95–150; Colton, 1945, pp. 345–55; Colton, 1946, *passim*, but especially pp. 20–32, 248–54; Gladwin, 1943, *passim*; Gladwin, 1944, *passim*.

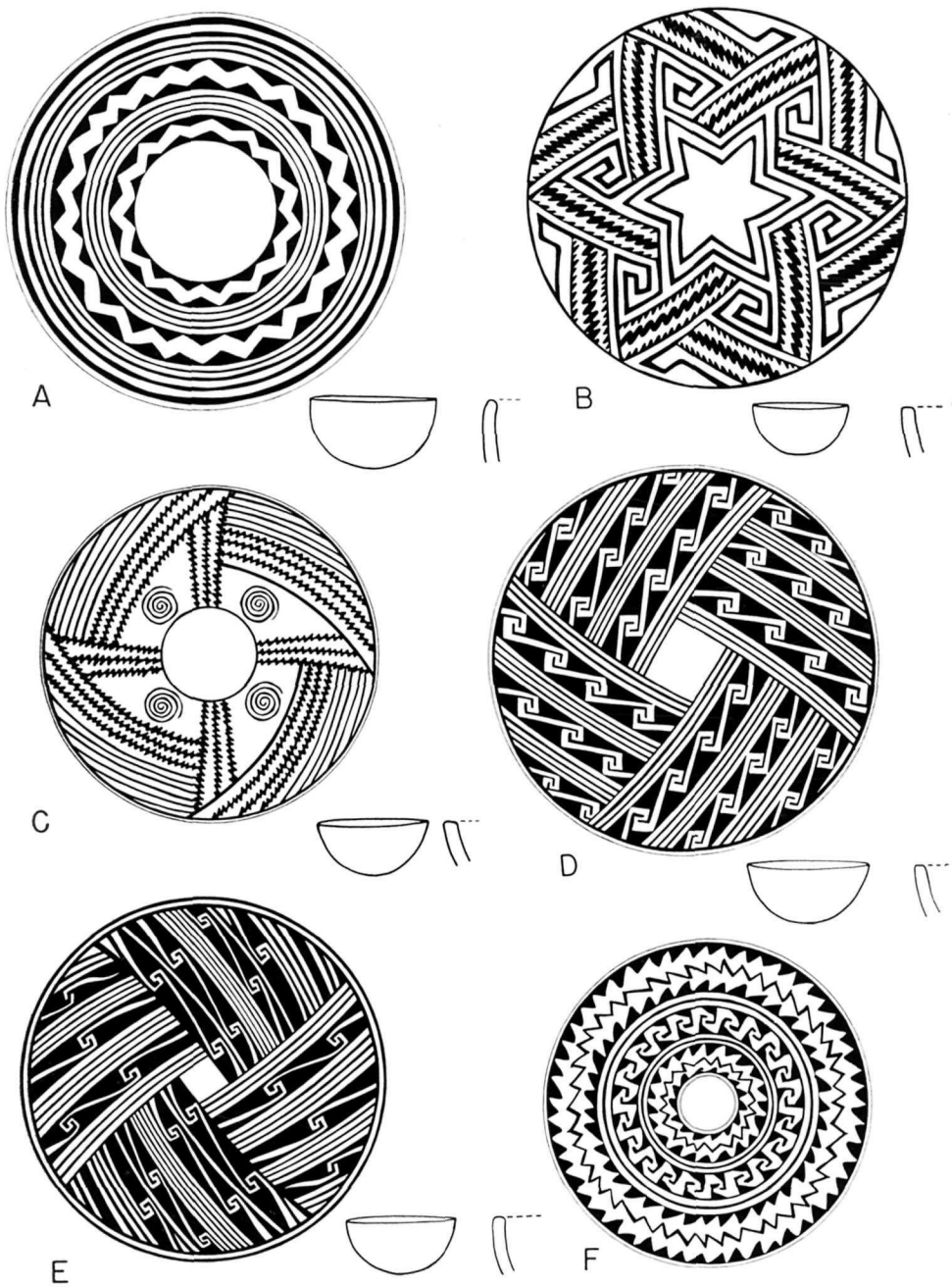


FIG. 38.

Flagstaff Black-on-white bowls: (A) N.A. 618 (cat. no. 618.494); (B) N.A. 680 (680.491); (C) N.A. 681 (681.205); (D) N.A. 681 (681.83); (E) N.A. 618 (618.368); (F) N.A. 681 (681.496).

branches, but have no direct chronological value, the first part of each table therefore presents the relative importance of the components of each of the branches represented; but since some types may be used as time criteria, the second part of each table will indicate the chronological position of the several collections contained in it. For the latter purpose, only those types have been considered that have elsewhere been established as possessed of dating values.

The strip graphs within each table correspond to particular sherd collections, as indicated at the extreme left of each strip, and the thickness of the strips suggests approximately the relative size of the sample, the thicker the strip the larger the sample; the absolute number of sherds in each case is, however, also stated. No breakdown has been indicated between bowl and jar sherds, since our studies suggested that no significant conclusions could be drawn therefrom. The sequence in which the strips have been arranged is largely arbitrary, but in general is in accordance with what I believe to represent approximately the relative chronology within each site or portion thereof, if and when any internal chronology at all can reasonably be inferred. The presumably later collections are placed at the top, the earlier at the bottom of each grouping, and the groups themselves are in the same relative order. Since the justification for these chronological hypotheses will not be automatically apparent from a casual view of the graphs themselves, it must be said that they are the result of a reconciliation between the pottery complexes as such and the positional evidence provided by the architecture and physical arrangement of the site. That is to say, there are some instances in which the chronology may be taken from the established positions of known pottery types, others in which two parts of a site can be recognized as of different dates by their positional relation to each other, wholly aside from any ceramic evidence. In constructing the story derivable from the data, both sources of evidence have been considered. Whenever they are corroborative, well and good; wherever they appear to be in conflict an attempt will be made to reconcile them by a critical analysis of the whole situation.

The several graphs will first be considered site by site, after which some general statements will be made upon all of them taken together.

SITE N. A. 618

The distribution of pottery types from N.A. 618 as a whole, in terms of both number and weight of sherds, is summarized as follows:

Painted types	*No.*	*%*	*Wght.*	*%*
Black Mesa Black-on-white	35	7	26	9
Dogoszhi Black-on-white	56	11	45	16
Sosi Black-on-white	37	7	29	10
Tusayan White Ware	158	33	64	23
Holbrook Black-on-white	1	T	1	T
Medicine Black-on-red	12	2	10	3
Tusayan Black-on-red	175	35	91	32
Citadel Polychrome	12	2	7	3
San Juan Orange Ware	17	3	8	3
Deadmans Black-on-gray	3	T	2	T
	506	100	283	99

Unpainted types				
Winona Brown	909	25	563	24
Sunset Red	10	T	7	T
Turkey Hill Red	1	T	1	T
Tusayan Corrugated	423	12	247	11
Moencopi Corrugated	64	2	55	2
Deadmans Gray	814	23	506	22
Deadmans Fugitive Red	1280	37	906	40
Prescott Gray	10	T	12	T
	3511	99	2297	99

Restorable vessels *in situ* are not calculated. The letter T indicates "trace" or less than 1%.

When reduced to graphic form the ware groupings in the several collections taken from different parts of N.A. 618 appear as presented in table 1.

In the upper group of that table the sherds of the three wares characteristic of the Kayenta Branch total more than 40% of the whole; those of Alameda Brown Ware, characteristic of the Sinagua Branch, total 25% or less; and those of San Francisco Mountain Gray Ware, characteristic of the Cohonina Branch, total less than 30%.

In the middle group, however, the wares of the Kayenta Branch make up less than 30% of the total, those of the Sinagua Branch vary from 25% to more than 40%, and those of the Cohonina Branch from more than 30% to nearly 50%.

In the bottom group, the Kayenta Branch wares have dwindled to less than 20%, the Sinagua have dropped slightly to a range between 15% and 30%, while the Cohonina have risen to the very large proportoin of 60% to 80%.

In three of the sherd collections, one in each group, there are very small occurrences of Prescott Gray Ware, which can have significance only as evidence of exchange relations with the peoples of the Prescott area. Since our knowledge of the time position of those types is quite inadequate, they cannot be directly useful as chronological guides. One single occurrence of Little Colorado White Ware appears in the form of one sherd of Holbrook Black-on-white, doubtless a trade specimen and insufficient to be significant either culturally or chronologically.

These three groups, each relatively consistent within itself, suggest, *prima facie*, rather notable differences in the proportions of the three cultural components evidently present. It would thus appear that in the upper group the Kayenta Branch was dominant, in the middle group all three were roughly equal, and in the lower group, the Cohonina Branch was dominant. If these hypotheses are sound, namely that at this site three different componential complexes were present, there must be implied thereby either of two propostions: (1) that the incidences of the three complexes differed in time; or (2) that three different cultural groups occupied different parts of the site at the same time. The second supposition appears dubious, if only because the site is too small to permit of such a situation, while the first seemes to be corroborated by a study of the positional relationship of the several parts of the site and the sherd collections from them. For the moment we shall not elaborate this thesis; it can be more intelligibly considered in connection with the pottery complexes of the other three local sites as well as with the architectural features of all the sites, and we shall return to it after all the other pertinent data have been presented.

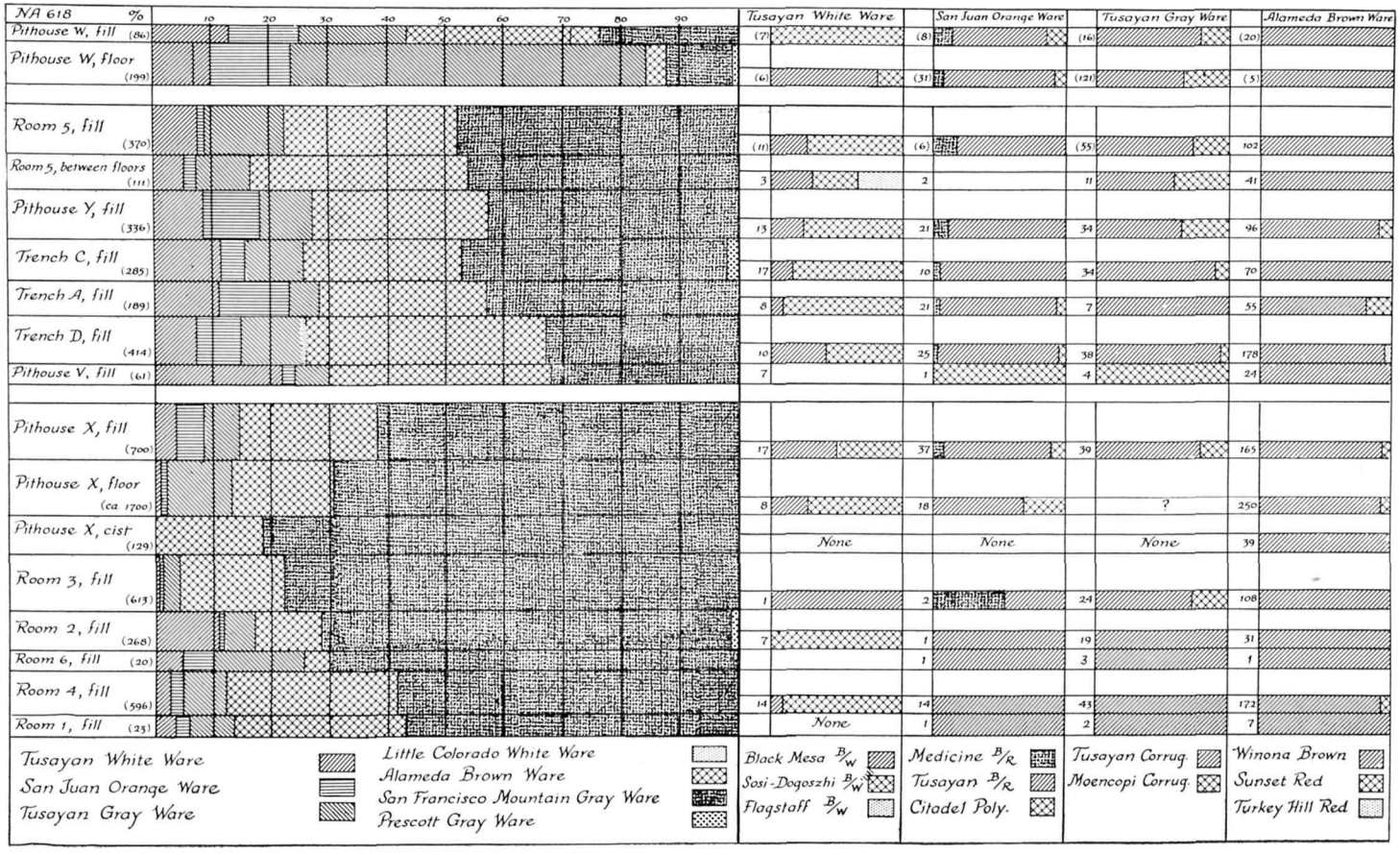


TABLE 1.

Graphic analysis of sherd collections from N.A. 618. The left-hand section of the table indicates the proportion of each pottery ware present in each collection from the site. The provenience and number of sherds for each collection is provided at the left. The thickness of each strip-graph is roughly indicative of the size of the corresponding collection, and they are arranged in accordance with the supposed chronology, the most recent at the top.

The right-hand section of the table shows the proportion of types within each of four wares, considered independently, for each collection. The figures at the left end of each strip-graph indicate the total number of sherds in the corresponding sample. This table is discussed on pages 87–89, 90.

SITE N. A. 680

The distribution of pottery types from N.A. 680 as a whole, in terms of both numbers and weight of sherds, is summarized as follows:

Painted types	*No.*	*%*	*Wght.*	*%*
Black Mesa Black-on-white	42	4	21	6
Shato Black-on-white	1	T	1	T
Dogoszhi Black-on-white	113	11	37	10
Sosi Black-on white	31	3	12	3
Flagstaff Black-on-white	222	21	70	19
Wupatki Black-on-white	3	T	1	T
Tusayan White Ware (types indeterminate)	202	20	55	15
Walnut Black-on-white	43	4	21	6
Medicine Black-on-red	18	2	11	3
Tusayan Black-on-red	179	16	55	15
Citadel Polychrome	44	4	16	4
San Juan Orange Ware (types indeterminate)	120	11	41	11
Deadmans Black-on-gray	47	4	23	6
Verde Black-on-gray	7	T	3	T
	1072	99	367	98
Unpainted types				
Winona Brown	63	2	26	3
Sunset Red	31	1	10	1
Turkey Hill Red	17	T	8	T
Clear Creek Brown	3	T	1	T
Tusayan Corrugated	1018	39	321	36
Moencopi Corrugated	260	10	94	10
Deadmans Gray	829	32	300	34
Deadmans Fugitive Red	414	15	134	15
Prescott Gray	15	T	10	1
	2650	99	884	100

The strip graphs of wares in the sherd collections from this site fall fairly readily into two distinguishable groups as displayed in table 2, the upper one of which is made up of a major component of wares of the Kayenta Branch varying from 65% to 85%, a minor component of San Francisco Mountain Gray Ware of the Cohonina Branch varying from 12% to 28%, and very small representations of Alameda Brown Ware (not over 5%), Little Colorado White Ware (not over 2%) and Prescott Gray Ware (not over 5%).

In the graphs of the lower group the proportion of wares of the Kayenta Branch has fallen to a range between 45% and 55%, while that of San Francisco Mountain Gray Ware has risen to a range between 38% and 53%. Very small quantities of the other three wares also appear, not significantly different from their proportions in the upper group.

It will at once be seen that this set of graphs differs markedly from that belonging to N.A. 618. Most notable is the near absence at N.A. 680 of Alameda Brown Ware, and the considerable proportional increase in the wares of the

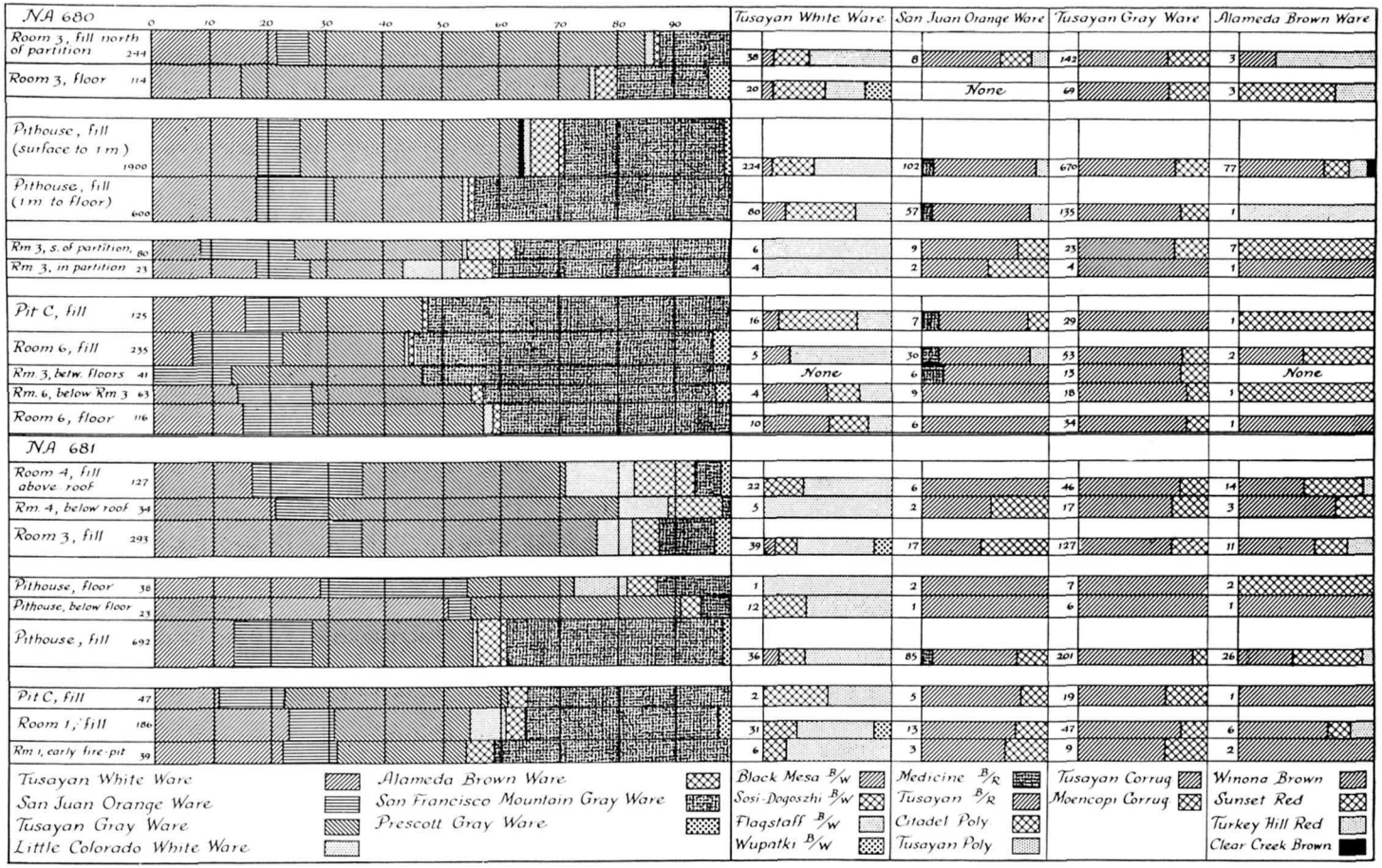


TABLE 2.

Graphic analysis of sherd collections from N.A. 680 and N.A. 681. The left-hand section of the table indicates the proportion of each pottery ware present in each collection from the site. The provenience and number of sherds for each collection is provided at the left. The thickness of each strip-graph is roughly indicative of the size of the corresponding collection, and they are arranged in accordance with the supposed chronology, the most recent at the top.

The right-hand section of the table shows the proportion of types within each of four wares, considered independently, for each collection. The figures at the left end of each strip-graph indicate the total number of sherds in the corresponding sample. This table is discussed on pages 87–89, 92, 94–95.

Kayenta Branch. Correlatively the proportions of San Francisco Mountain Gray Ware have dropped slightly, especially in comparison with the bottom group at N.A. 618; the proportions of that ware in the lower group of graphs at N.A. 680 are very nearly the same, however, as they are in the middle group at N.A. 618.

It would thus appear that at N.A. 680 two major components entered into the cultural complex, namely those of the Kayenta and Cohonina Branches, and that the element of Sinagua was so small as to be negligible, or at most to be regarded perhaps merely as evidence of trade rather than of indigenous participation. Futhermore, as will later be spelled out more fully when we come to consider the time sequences involved, there seems to have been a considerable degree of increase in the relative size of the Kayenta component at the expense of the Cohonina, in the later period of the occupation of the site.

SITE N. A. 681

The distribution of pottery types from N.A. 681 as a whole, in terms of both numbers and weight of sherds, is summarized as follows:

Painted types	*No.*	*%*	*Wght.*	*%*
Black Mesa Black-on-white	8	T	4	2
Dogoszhi Black-on-white	19	4	10	5
Sosi Black-on-white	12	2	8	4
Flagstaff Black-on-white	110	22	40	20
Wupatki Black-on-white	8	T	3	1
Tusayan White Ware (types indeterminate)	155	29	49	25
Holbrook Black-on-white	2	T	1	T
Walnut Black-on-white	46	9	19	9
Little Colorado White Ware (types indeterminate)	9	1	3	1
Medicine Black-on-red	5	1	2	1
Tusayan Black-on-red	96	18	28	14
Citadel Polychrome	32	6	16	8
San Juan Orange Ware (types indeterminate)	33	6	17	9
Deadmans Black-on-gray	10	T	7	T
Verde Black-on-gray	1	T	1	T
	546	100	207	99
Unpainted types				
Winona Brown	35	4	16	5
Sunset Red	25	3	13	5
Turkey Hill Red	6	T	4	T
Tusayan Corrugated	408	43	140	42
Moencopi Corrugated	71	8	35	11
Deadmans Gray	263	27	78	24
Deadmans Fugitive Red	130	14	35	11
Prescott Gray	17	T	8	T
	955	99	329	98

When reduced to graphic form the ware groupings in the several collections taken from different parts of N.A. 681 appear as presented in table 2.

The strip graphs in that table fall readily into two groups, the upper being composed of a very large proportion of Kayenta wares, varying from 72% to 92%, with small proportions of Cohonina ware varying from only 5% to 12%, and still smaller proportions of wares of the other three branches. In the lower group the proportions of Kayenta wares are smaller than in the upper group, being between 55% and 62%, while those of the Cohonina are correspondingly larger, from 32% to 40%, and those of the other branches about the same as in

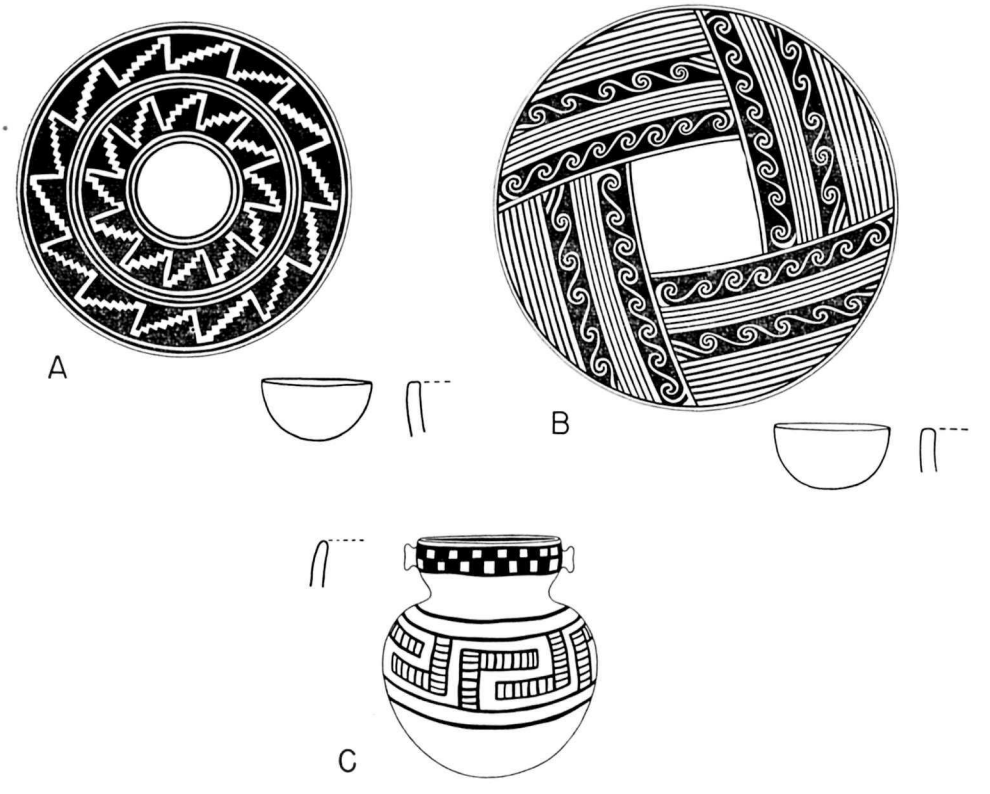


FIG. 39.

Little Colorado White Ware vessels: (A) Walnut Black-on-white bowl, N.A. 680; (cat. no. 680.69); (B) Walnut Black-on-white bowl, N.A. 682 (682.256); (C) Padre Black-on-white miniature jar, N.A. 618 (618.486).

the upper group. These relative quantities are not markedly different from those apparent at N.A. 680, although the Kayenta proportions here are, on the whole, slightly greater, and those of the Little Colorado White Ware are relatively considerably greater. As in N.A. 680 it appears that the site represents the presence of two major componets, namely the Kayenta and Cohonina Branches, with a possible slight increase of the former during the later period of occupation; the argument for this last hypothesis must await a consideration of the time-scale of all the sites taken together. Probably the pottery of the three meagerly represented branches indicates trade relations rather than indigenous presence.

SITE N. A. 682

The distribution of pottery types from N.A. 682, as a whole, in terms of both numbers and weight of sherds, is summarized as follows:

Painted types	*No.*	*%*	*Wght.*	*%*
Black Mesa Black-on-white	8	2	4	2
Shato Black-on-white	1	T	1	T
Dogoszhi Black-on-white	55	13	19	10
Sosi Black-on-white	15	4	10	5
Flagstaff Black-on-white	100	24	49	25
Tusayan White Ware (types indeterminate)	117	28	51	25
Walnut Black-on-white	18	5	9	4
Medicine Black-on-red	6	1	3	2
Tusayan Black-on-red	48	11	25	13
Citadel Polychrome	19	4	10	5
San Juan Orange Ware (types indeterminate)	26	6	12	6
Deadmans Black-on-gray	6	1	4	2
Verde Black-on-gray	3	T	3	1
	422	99	200	100
Unpainted types				
Winona Brown	17	2	13	2
Sunset Red	9	1	10	1
Turkey Hill Red	2	T	1	T
Tusayan Corrugated	615	53	305	48
Moencopi Corrugated	262	22	225	35
Deadmans Gray	119	10	37	6
Deadmans Fugitive Red	90	8	37	6
Prescott Gray	41	4	16	2
	1155	100	644	98

When reduced to graphic form the ware groupings in the several collections taken from different parts of N.A. 682 appear as presented in table 3.

The pottery complexes here, as shown by the strip graphs in that table, do not differ markedly from those of N.A. 681. Again, the individual sherd collections may be separated into two groups, the upper having a dominant proportion of the Kayenta wares from 80% to 95% and a smaller proportion of the Cohonina, from 5% to 18%, with smaller proportions of the three other wares. The lower group contains somewhat smaller proportions of Kayenta wares, from 55% to 70%, correspondingly greater proportions of Cohonina, from 28% to 43%, and proportions of the other three wares closely similar to those in the upper group. In all essential particulars these pottery complexes resemble closely those of N.A. 681, and doubtless also indicate the presence at this site of a dominant Kayenta component, becoming somewhat more prominent in the later period of occupation, with a lesser Cohonina component, tending to diminish as the other increased. As to the wares of the other three branches, Little Colorado White

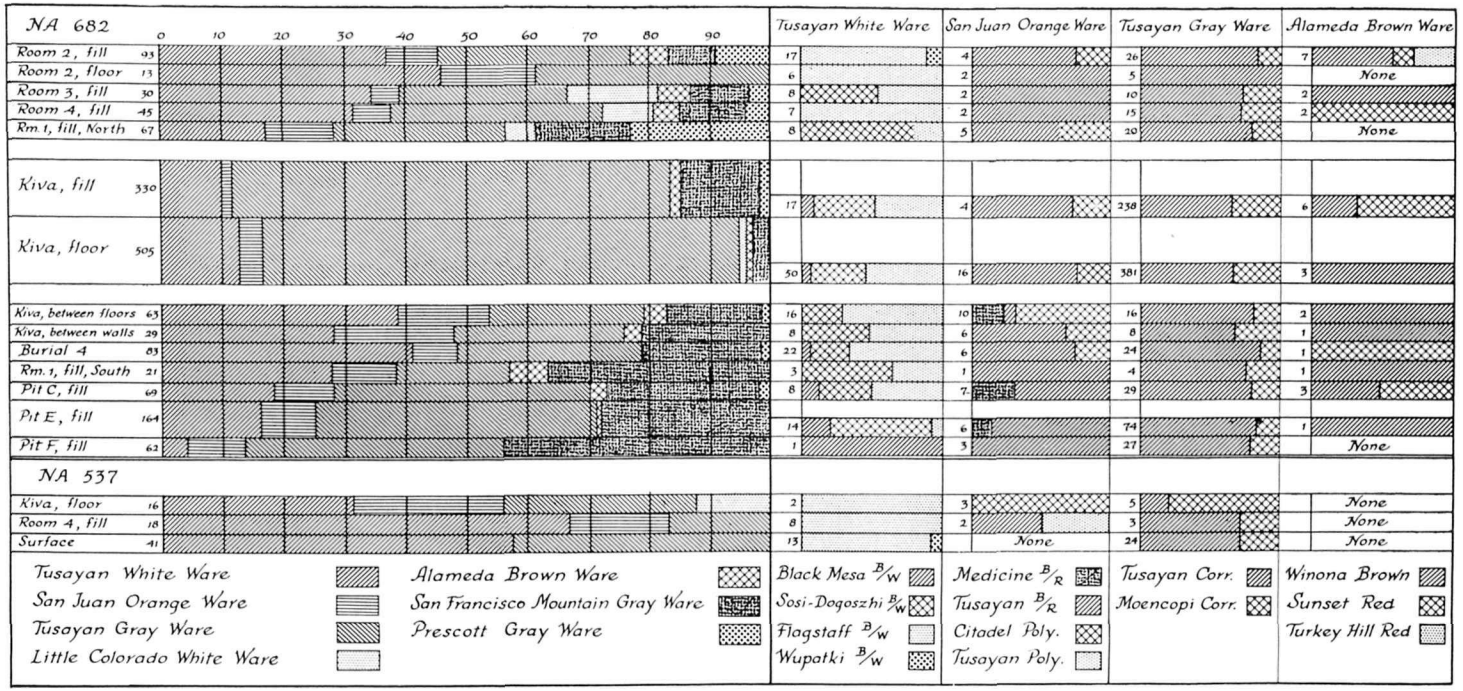


TABLE 3.

Graphic analysis of sherd collections from N.A. 682 and N.A. 537. The left-hand section of the table indicates the proportion of each pottery ware present in each collection from thesite. The provenience and number of sherds for each collection is provided at the left. The thickness of each strip-graph is roughly indicative of the size of the corresponding collection, and they are arranged in accordance with the supposed chronology, the most recent at the top.

The right-hand section of the table shows the proportion of types within each of four wares, considered independently, for each collection. The figures at the left end of each strip-graph indicate the total number of sherds in the corresponding sample. This table is discussed on pages 76, 87–89, 96–98.

Ware seems to be slightly less important than at N.A. 681, whereas Prescott Gray Ware seems slightly more so. But these differences hardly appear significant, and in each case probably indicate trade relations only.

CHRONOLOGY AS INDICATED BY THE POTTERY

General Discussion

Having thus far considered the pottery of the four Big Hawk Valley sites solely on the basis of its indications of cultural components therein, it becomes desirable to attempt some analysis of the time sequences involved, both between the several sites as well as within each of them. To do this for each site individually would be much more difficult and less satisfactory than to consider all four collectively, and it would also be difficult if not impossible to reach any convincing conclusions on the basis of ceramic statistics alone. For these reasons, in the discussion to follow, we shall make constant comparisons between the sites and shall also consider very carefully the positional relations to each other of the various rooms and areas within each site. Finally, we shall draw on architectural and artifactual evidence if and when these factors may have a chronological bearing.

To begin with, all sites were certainly first occupied after the eruption of Sunset Crater, since there was no evidence in any of them of direct-fall cinders deposited above the floor of any room. If the date of that occurrence was around A.D. 1070, as now calculated,[5] we have a definable early limit for the construction of all the sites. Exactly how much later they were actually built we cannot determine, partly because none of the charcoal specimens recovered has provided a reliable date, and partly because pottery and architecture can, in the nature of things, give only approximate dates. In all probability, however, the area covered by the Sunset ash fall could not have been occupied at once, but must have remained desolate until its condition had become such as to entice into it the peripheral populations, attracted by the improved possibility of agriculture and the presence of water due to mulching effect of the ash fall that covered the basalt and limestone surface.[6] How long this might have required I do not know — five, ten, twenty years perhaps? At any rate it would seem safe to postulate a beginning date for occupation of the area somewhere late in the eleventh or early in the twelfth century. Let us see, then, what further conclusions can be drawn from the pottery analyses.

Use of Datable Types

As has already been pointed out, Tables 1, 2, and 3 contain two parts, the first of which, including ware subdivisions only, have already been considered. The second parts are composed of strip graphs in which certain pottery types from four wares have been selected for consideration because of their dating value as already established in previous archaeological investigations. The relative quantity

[5] Colton, 1945.

[6] For discussions of this ecological change see Colton, 1932b, p. 589; 1936a, p. 341; 1938, p. 65; 1945, pp. 345, 355.

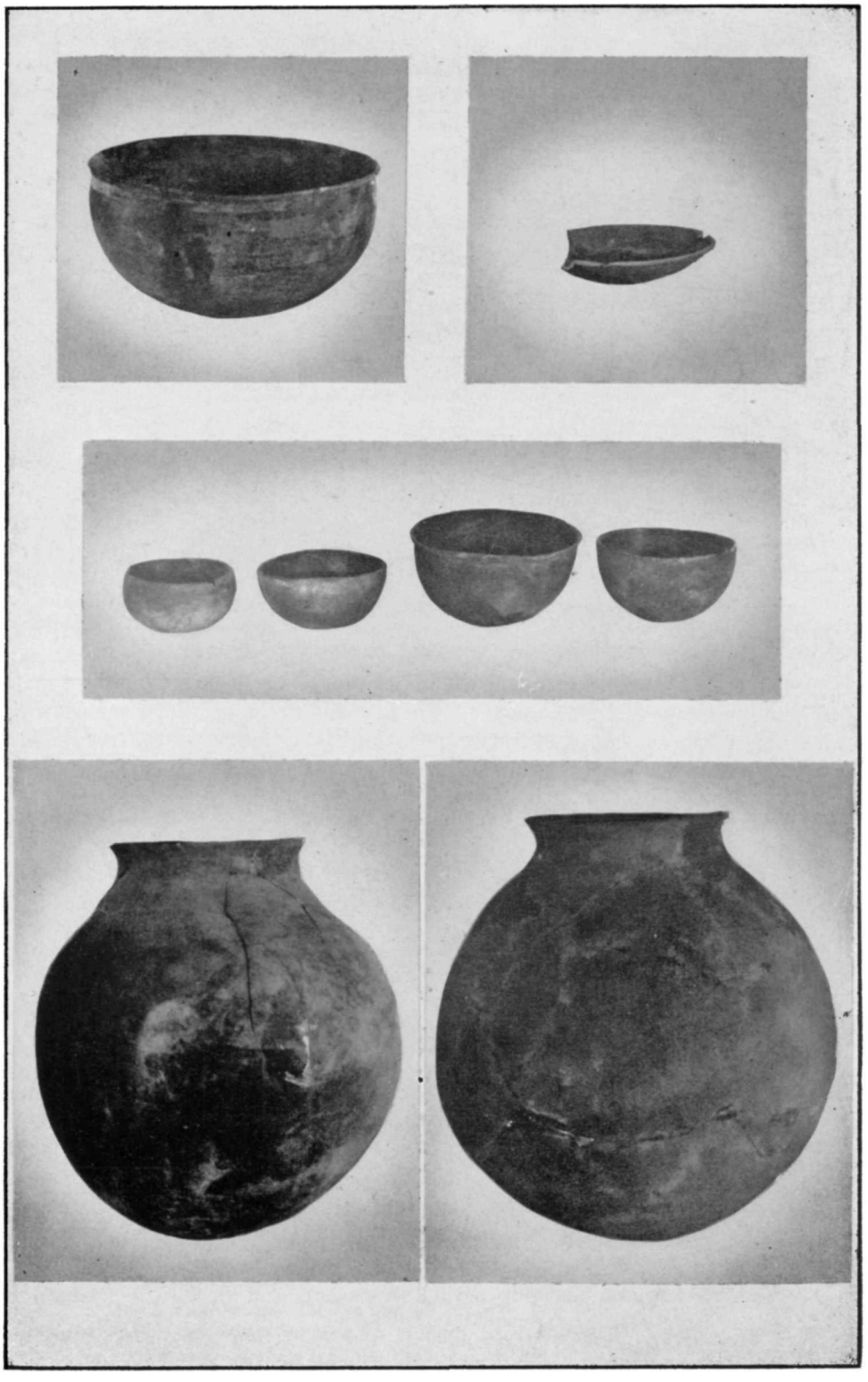


FIG. 40.

Vessels of Alameda Brown Ware. Storage and cooking pottery of the Sinagua Branch (after Colton, "The Sinagua," fig. 8).

of each of these types, present in each collection, has been shown in proportion to other similarly datable types *within its own ware*, each of the four wares being independently analyzed. Types of little or no dating value have been completely ignored for this purpose. The types chosen with the dates assigned to them by Dr. Colton in his work on the Sinagua [7] are as follows:

Tusayan White Ware
- Black Mesa Black-on-white, 900–1100
- Sosi Black-on-white and Dogoszhi Black-on-white (the two combined), 1075–1150
- Flagstaff Black-on-white, 1120–1225
- Wupatki Black-on-white, 1200–1300

San Juan Orange Ware
- Medicine Black-on-red, 800–1050
- Tusayan Black-on-red, 1050–1150
- Citadel Polychrome, 1075–1175
- Tusayan Polychrome, 1150–1300

Tusayan Gray Ware
- Tusayan Corrugated, 950–1275
- Moencopi Corrugated, 1050–1275

Alameda Brown Ware
- Winona Brown (including Angell Brown and Youngs Brown), 1075–1150
- Sunset Red, 1075–1250
- Turkey Hill Red, 1150–1275

Whether or not the dates assigned above are correct in the absolute sense cannot, of course, be dogmatically assumed, but I believe that their chronological position relative to each other can be pretty confidently accepted, on the basis of the work done by the Museum of Northern Arizona in the Flagstaff and San Francisco Mountain areas and by Beals, Brainerd and Smith, Kidder and Guernsey, and others in the Marsh Pass-Tsegi-Black Mesa-Kayenta region. Should our present studies suggest significant errors in the accepted sequence they will be pointed out.

N.A. 618. Turning first to the typological portions of Table 1 for N.A. 618, we shall see that the component of Tusayan White Ware is throughout the site divided between Black Mesa Black-on-white and Sosi-Dogoszhi Black-on-white, the latter being in about a 3/4 or 2/3 majority in most instances, and making up the entire collection in a few. The two exceptions to this situation occur in the fill of Room 3, where there is only 1 sherd, obviously too inconsequential to be significant; and on the floor of Pithouse W, where the collection is also very small, comprising only 6 sherds. Between the two floors of Room 5 was found one sherd of Flagstaff Black-on-white, again hardly of statistical value.

Since previous work has indicated that Black Mesa Black-on-white was generally diagnostic of middle Pueblo II while the other types here considered were diagnostic of late Pueblo II and early Pueblo III, and that the former disappeared from general use soon after the latter originated, approximately around 1100 A.D.,[8] we may suppose that the period represented by these type collections

[7] Colton, 1946, pp, 248–54.
[8] Colton, 1946, pp. 251, 253; Beals, Brainerd and Smith, 1945, p. 59.

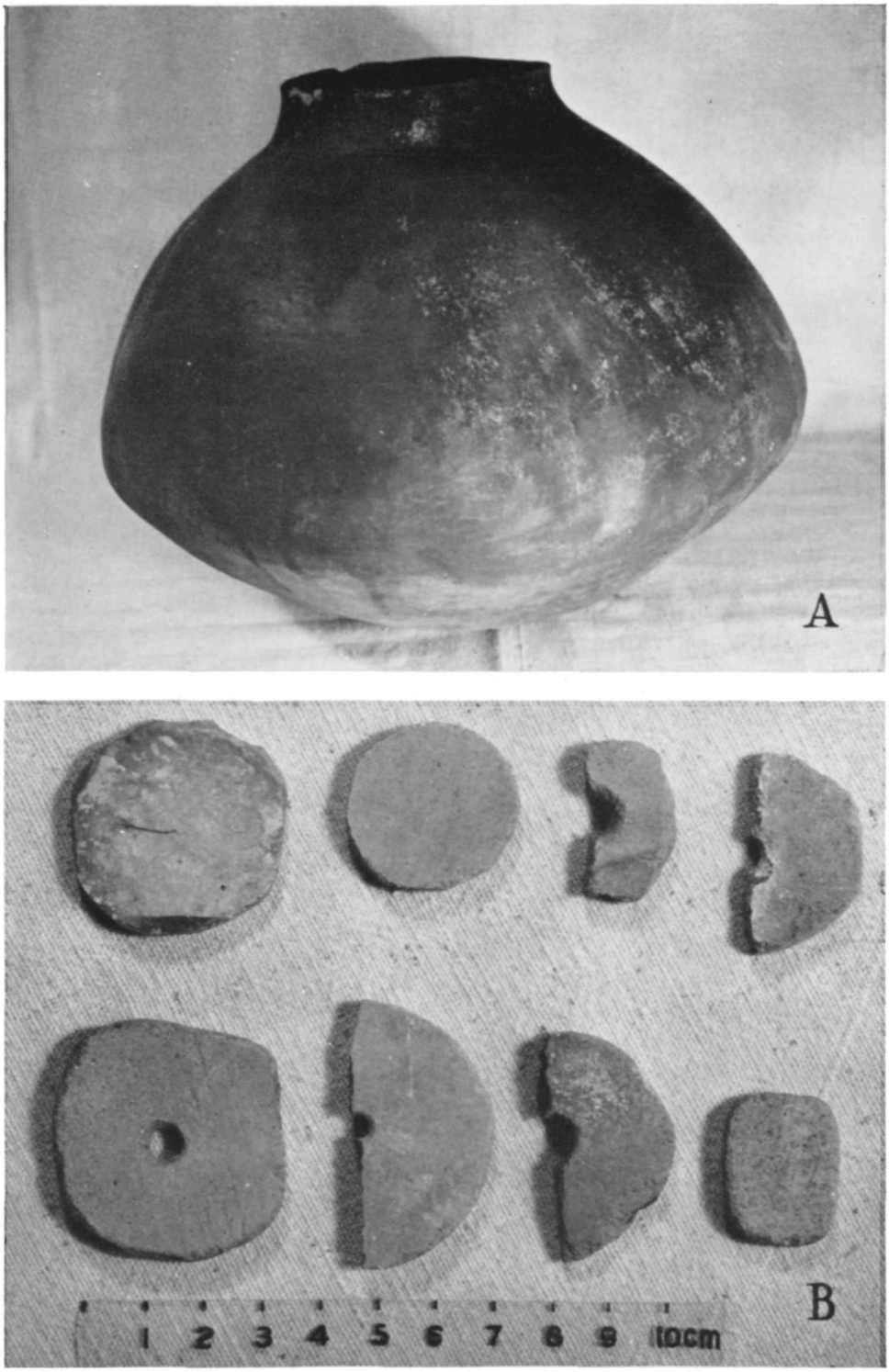


FIG. 41.

A. Winona Brown jar from N.A. 618, showing Gila shoulder.

B. Perforated and unperforated disks of pottery. Those in the upper row and the left-hand specimen in the lower row are all from N.A. 680 (cat. nos. respectively 680.209, 680.451, 680.29, 680.429, 680.430). The others are, left to right, from N.A. 682 (cat. no. 682.196), N.A. 681 (cat. no. 681.114), and N.A. 618 (cat. no. 618.272).

was perhaps shortly after 1100. There seems to be no time differentiation within the site, judged on this ware alone.

In terms of San Juan Orange Ware, most of the collections show a very strong predominance of Tusayan Black-on-red, with small proportions of Medicine Black-on-red in 9 of the collections and of Citadel Polychrome in 7 of them. Tusayan Black-on-red is the arch-type of late Pueblo II, while Citadel Polychrome was beginning to come into use during this same period. Medicine Black-on-red was almost surely from an earlier horizon, but the persistence of a few sherds into a later period would not be unexpected. These collections again suggest a date of around 1100, and point to no significant change during the period of occupation.

The Tusayan Gray Ware components are made up wholly or predominantly of Tusayan Corrugated in majorities of 60% to 90% over Moencopi Corrugated, the only exception being in the fill of Pithouse V, where the total number of 4 sherds is insignificant. While both of these types existed together throughout a long period of time, it is established that the former developed and flourished during early and late Pueblo II while the latter did not come into use at all until late Pueblo II and tended to replace the former during Pueblo III.[9] Here, then we have another corroboration of the postulated date of about 1100 for this site, with little evidence of significant change throughout its occupation.

The Alameda Brown Ware component is made up, in all collections, of Winona Brown, either wholly or with extremely small representations of Sunset Red, of which the maximum is 9%, and one instance of Turkey Hill Red, in which only 2 sherds form a ratio of slightly over 2%. None of these small samples is probably significant, but since Winona Brown flourished in the early 12th century, its predominance is consistent with the date postulated on the basis of the other types. In one case two sherds of Holbrook Black-on-white appear, a type thought to have occurred between 1050 and 1125.

In sum, every one of the sherd collections from N.A. 618 falls within what Dr. Colton has called Ceramic Group 6B, dated, according to him, from 1070 to 1130.[10]

N.A. 680. An inspection of the typological chart for Site N.A. 680, shown in the second part of Table 2, will indicate a rather different complex from that found at N.A. 618. Within Tusayan White Ware the predominant type in most of the collections is Flagstaff Black-on-white, with Sosi and Dogoszhi Black-on-white in considerably smaller quantities, except in two cases, and with Black Mesa Black-on-white very scarce, except on the floor of Room 6, a room that was stratigraphically earlier than the rest of the site, as explained above (see pp. 33–35). In one instance, on the floor of Room 3, there were a few sherds of Wupatki Black-on-white. Since Flagstaff Black-on-white is thought to have made its first appearance about 1120, probably after Black Mesa Black-on-white had ceased to be made, and certainly was on the increase at a time when Sosi and Dogoszhi Black-on-white were waning, it would appear that Site N.A. 680 must have been occupied slightly later than N.A. 618, or that if their existences overlapped, N.A. 680 began later and ended later than did N.A. 618.

From the San Juan Orange Ware samples we get only small assistance, Tusayan Black-on-red being the dominant type here, as also at N.A. 618, with Medicine

[9] Beals, Brainerd and Smith, 1945, tables 4, 6; p. 140.
[10] Colton, 1946, pp. 20, 254; fig. 141.

Black-on-red and Citadel Polychrome in small representation. But there is evidence in 4 instances of the introduction of Tusayan Polychrome, a type that Dr. Colton has regarded as coming into use not before 1150.[11] I think he has erred somewhat here, for on the basis of associations at Marsh Pass, I feel that at least in that area Tusayan Polychrome may have originated a little earlier and have

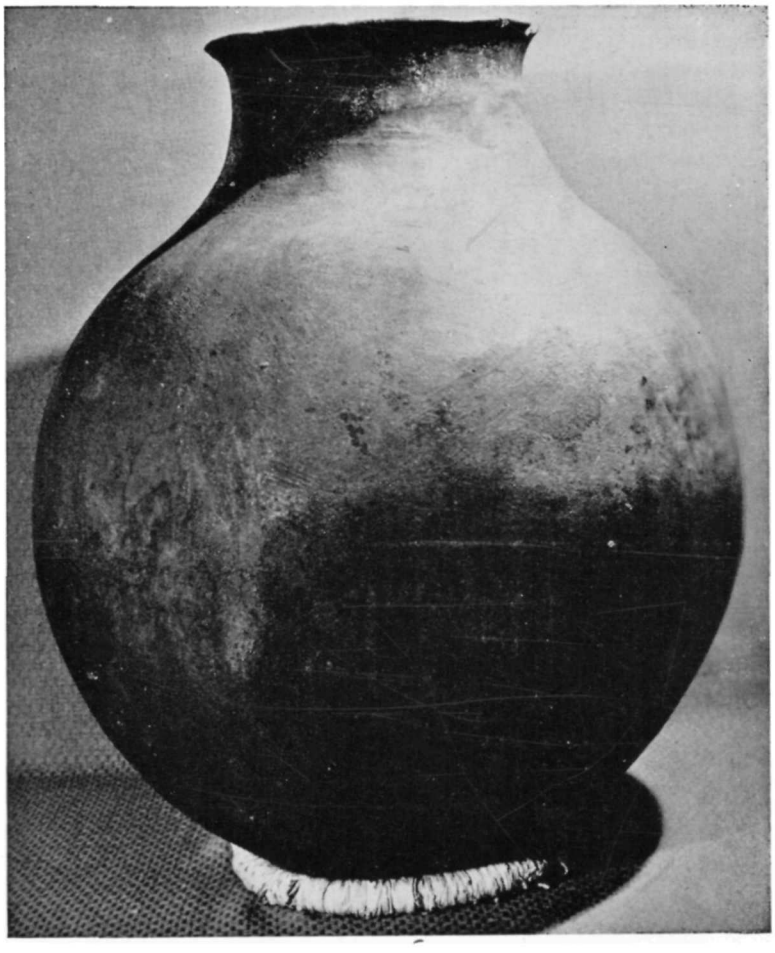


FIG. 42.
Deadmans Fugitive Red jar.

existed during late Pueblo II, so that its presence here is consistent with a date in the early 1100's. Irrespective of this conclusion, however, its presence pretty surely helps to fix this site somewhat later than N.A. 618.

The relative proportions of Tusayan and Moencopi Corrugated are not essentially different from those at N.A. 618, but as said above, their dating value is observable only within pretty broad limits and is not sensitive enough to record changes within a few years.

[11] Colton, 1946, pp. 252, 253.

Alameda Brown Ware, on the other hand, shows notable alterations from its pattern of almost complete domination by Winona Brown at N.A. 618. Here Winona Brown is dominant in only three cases, two of which consisted of only 1 sherd each and were therefore insignificant. Sunset Red has come into its own, and although nearly all the samples of this ware are very small, it is relatively much more prominent than at N.A. 618. Furthermore, Turkey Hill Red, which showed only 2 sherds at N.A. 618, is here fairly prominent, and since it is thought to have originated around 1150, we have another indication of a later date for this site. As in the case of Tusayan Polychrome, however, I suspect that Turkey Hill Red may have begun slightly earlier than that, and consequently that we may herein find corroboration for a date approximating 1120 for the site.

In 8 small appearances of sherds of Little Colorado White Ware, all are of Walnut Black-on-white, a type dated as beginning at about 1120. The presence of 3 sherds of Clear Creek Brown in the Pithouse fill is consistent since this type elsewhere is thought to have been made between 1000 and 1200.[12]

Thus, each of the collections from this site falls within Dr. Colton's Ceramic Group 7, thought to have existed from about 1130 to 1210.

N.A. 681. At Site N.A. 681 only very slight changes from the situation at N.A. 680 can be discerned as evidenced in Table 2, although within the samples of Tusayan White Ware these are not without significance. Black Mesa Black-on-white ware has all but disappeared, and occurs meagrely in only 2 collections. Flagstaff Black-on-white is more consistently dominant at the expense of Sosi and Dogoszhi Black-on-white than at N.A. 680, and Wupatki Black-on-white is slightly more prominent. San Juan Orange, Tusayan Gray and Alameda Brown Wares show little or no change. As for Little Colorado White Ware, all samples are composed entirely of Walnut Black-on-white except for 3 scattered sherds of Holbrook Black-on-white.

This site falls within Ceramic Group 7, at or after about 1130, but there would seem to be some indication that it is very slightly later than N.A. 680.

N.A. 682. The ceramic pattern at N.A. 682 is almost exactly like that at N.A. 681, as may be seen in Table 3, although in the presence of a slightly larger quantity of Black Mesa Black-on-white and of Medicine Black-on-red it more closely resembles N.A. 680. Its samples of Little Colorado White Ware, which are smaller than at either N.A. 680 or N.A. 681, are all of Walnut Black-on-white. Thus, the pottery complex here falls within Ceramic Group 7, and is not appreciably different in date from those of Sites N.A. 680 and N.A. 681, at or after about 1130.

While the quantities of Prescott Gray Ware are too small in all four sites to be of great significance, its relative increase from practically nothing at N.A. 618 through larger percentages at N.A. 680, 681 and 682 is at least consistent with the chronological sequence otherwise indicated for these sites. This inference is drawn from the apparent fact that in the region as a whole Prescott Gray seems to have made its appearance as an import round 1100 and to have increased slightly throughout the following century, although I repeat, this seeming tendency cannot be regarded as conclusive.[13]

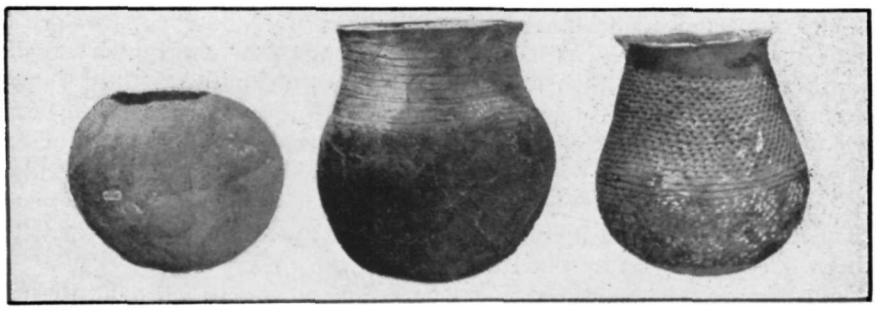
[12] Colton, 1941a, p. 43.

[13] This hypothesis is based on an examination of the ceramic statistics published for numerous sites in Colton, 1946.

UNUSUAL SHERDS

Among the ceramic material recovered from all the sites excavated, there was a very small number of unusual sherds that did not exactly fit into any well-established typological category. A few, however, should be mentioned.

At N.A. 618, in the fill of Room 2, was found a sherd (cat. no. 618.419) of unknown type, measuring about 60 by 40 by 8 mm. It had come from a bowl of moderate size and possessed paste, temper and surface closely similar to



A B C

FIG. 43.

Tusayan Gray Ware vessels: A. Lino Gray, 500–700 A.D.; B. Kana-a Gray, 700–900 A.D.; C. Tusayan Corrugated, 950–1275 A.D.

Winona Brown. Its exterior, however, was coated with a bright red, thick, powdery paint, and its interior with a light buff paint. After the application of the buff paint, a design had been applied by first rather crudely scratching away the buff paint, in a continuous rectangular fretted line about 2 mm. wide, and then applying bright red paint over and along the lines that had been thus prepared. This red paint was not very permanent and had worn off in some places. The identity of this sherd is not recognized, unless it can be a variant of one of the types described by Caywood from Fitzmaurice Ruin in the Chino Valley.[14]

Another sherd of problematical affiliations was found in the fill of Room 3 at N.A. 680 (cat. no. 680.225). It measured 32 by 47 by 7 mm. and had been a portion of the rim of a fairly large bowl. The rim was direct, rounded, nearly vertical, and slightly tapering from the exterior surface. The sherd was buff on both surfaces, unslipped, the exterior polished, the interior smoothed but not slick. Its core showed a temper of abundant but fine grayish angular fragments, with a pronounced carbon streak. On the interior had been applied in dense bright red paint a bold design, the only remnant being two nearly vertical lines, from 5 mm. to 1 cm. in width, forming a close V and running up to the rim. It appears very likely to fall within the definition of Winona Red-on-buff,[15] which was found sparingly at Winona Village in houses of the Winona and Padre Foci.[16]

Among the large quantity of corrugated pottery only two examples were found varying significantly from the normal style. At N.A. 1814E was a sherd of

[14] Caywood, 1936, pp. 102–106.
[15] Colton and Hargrave, 1937, pp. 181–82.
[16] McGregor, 1941, pp. 44–46, 62, 92.

Tusayan Corrugated (cat. no. 1814E.5) that had been embellished by a series of incised markings made by a rounded instrument that had been drawn diagonally downward across the finger-dented coils while the clay was still damp. These incisions were about 2 mm. wide by 1 mm. deep and were spaced from 6 to 12 mm. apart.

At N.A. 681 a small globular olla of Moencopi Corrugated (cat. no. 681.493) had a single vertical strap handle, the upper part of which had been fashioned into what looked like an elementary representation of a cradle containing a baby. The outer surface of the handle was spanned transversely by a single flat fillet of clay about 3 or 4 mm. wide. This fillet or strap was about 15 mm. from the rim of the vessel and it rose above the handle in an arch about 5 mm. high. The sides of the handle between its point of attachment to the rim of the vessel and the position of the arched fillet were pinched upward slightly to form a shallow longitudinal concavity. Into this trough and beneath the arched fillet was inserted a simplified figurine consisting of a rounded tapering "body" and a circular discoidal "head," the only feature on which was a slightly pinched-up ridge in the position of a nose. The entire figurine was 2.6 cm. long, and the diameter of the head 1.2 cm. It had been placed in position while still damp and had therefore been fixed permanently when fired.

In the entire pottery collection only one fragment of a ladle or dipper handle was found. This came from N.A. 681 and was apparently from a vessel of Deadmans Gray (cat. no. 681.135). It was very crudely circular in cross section, about 2.5 cm. in diameter, and its extremity was tapered to a rounded tip and bent at an angle of about 130° from the axis of its central portion.

Two sherds were found that in all respects but one corresponded exactly to standard typological criteria. One was a jar sherd of Tusayan Corrugated from the fill of Pithouse X at N.A. 618, the other a jar sherd of Tusayan White Ware from the fill of the kiva at N.A. 682. Both bore bright red fugitive paint on the interior; whether this represented a decorative feature or merely their use as containers for pigment cannot be positively known.

CHAPTER X

CRAFTS OTHER THAN ARCHITECTURE AND CERAMICS

GENERAL DISCUSSION

In the presentation of archaeological or ethnographic objects of material culture the reporter is seemingly caught in a dilemma. He may present his material merely in the form of statistical data, which is really nothing but an abstraction and has little or nothing to do with the functional significance of the objects as usable tools in the hands of their makers; or he may content himself with broad general inferences as to the processes of life and thought of the people, inferences drawn, to be sure, from his knowledge of the objects of their material culture, but neglecting the substantiation of his conclusions by adequate reference to those objects themselves. The professional archaeologist has often erred in the former manner, the traveller and popular writer in the latter.

There has been a tendency of late to deplore the mere publication of statistics, and I think with good reason, for, as Malinowski states, an object of material culture is properly defined rather by function than by form, "the part it plays within a system of human activities." [1] Nevertheless, I believe that the gods of statistics and of function may both be served, and adequately, by an adherence to the usual system of initial classification of objects according to material constituents, size, shape, *et cetera*, followed by comments upon their functional significance within that framework, and I shall attempt to adhere to it in the following pages. In justification thereof I can do no better than to incorporate by reference the excellent analysis of this question by Dr. J. O. Brew in his report on Alkali Ridge, with which I wholly agree,[2] and to proceed forthwith to the presentation of the data, the latter ameliorated where possible by comments, hypotheses and relevant comparisons.

OBJECTS OF STONE

The quantity of specimens belonging to particular groups of stone implements at the sites excavated was perhaps not large enough to warrant the creation of an elaborate typology or a thorough comparative analysis. But in order that the material may be usefully studied in comparison with that from other sites it has seemed desirable to apply to its study classificatory methods already evolved and accepted elsewhere. In general the standard typology pretty well fits the present material and will be applied wherever possible.

As in most Southwestern sites the most numerous and significant artifacts, other than pottery, were milling stones, which we shall consider first.

Manos. In all our excavations a total of 91 manos or fragments thereof was recovered from 6 sites, distributed as shown in table 4. As there indicated, 3

[1] Malinowski, 1931, p. 625.
[2] Brew, 1946, pp. 230–31.

Site and Catalog Number	Complete	Longitudinal Section: Convex	Longitudinal Section: Flat	Length: 150+	Length: 150 or less	Width: 90+	Width: 90 or less	Thickness: 35+	Thickness: 35 or less	Faces: Parallel	Faces: Wedge	Faces: Convex	Finger Grips	Grinding Surfaces: One	Grinding Surfaces: 2 opposite	Shape: Oval	Shape: Rounded rectangle	Material: Quartzite	Material: Sandstone	Material: Limestone	Material: Vesicular Basalt	Material: Dense Basalt	Provenience
NA 618-285	✓	✓		245			90		33	✓				✓			✓				✓		R. 2, floor
286	✓		✓	256		100		80		✓				✓			✓				✓		R. 2, fill
405	✓	✓		211		98			24	✓				✓			✓				✓		R. 5, fill
386	✓		✓	100+		100			19		✓			✓			✓		✓				W, floor
387			✓	158		98			23	✓				✓			✓		✓				W, fill
449			✓	85+		95			20	✓				✓			✓		✓				W, floor
(a) 340	✓				60		60	37		✓					✓	✓						✓	Tr. H, fill
NA 680-2	✓	✓		152			83		30		✓			✓			✓			✓			R. 3, fill
3		✓		130+		109			25	✓				✓			✓			✓			Surface
15			✓	112+		110		55				✓		✓			✓		✓				R. 3, fill
18		✓		90+			90		32			✓		✓		✓					✓		R. 3, fill
30	✓	✓		180		93			32	✓				✓			✓				✓		R. 3, floor
31	Lost																						R. 3, ventilator
33			✓	85+		104		37		✓				✓		✓			✓				R. 3, floor
35	✓	✓		275		120		75			✓			✓			✓				✓		R. 3, floor
38		✓		145+		118		62				✓		✓			✓		✓				R. 3, floor
39	✓			157		107			20			✓		✓		✓			✓				R. 3, floor
40		✓		100+			90		33			✓		✓			✓		✓				R. 3, floor
(b) 41			✓	110+		98			30			✓		✓			✓				✓		R. 3, floor
(b) 41	✓		✓		110	98			30			✓		✓		✓					✓		R. 3, floor
42	✓	✓		223		111			24	✓				✓			✓				✓		R. 3, floor
43	✓	✓		200		110		40			✓		1	✓			✓				✓		R. 3, floor
(b) 44		✓		137+		116	58				✓		1	✓			✓		✓				R. 3, floor
(b) 44	✓	✓			137	116	58				✓		1	✓			✓		✓				R. 3, floor
45	✓		✓		128		85	40				✓		✓		✓					✓		R. 3, floor
56		✓		136+		110			35	✓				✓			✓				✓		Surface
57		✓		105+		92		36				✓		✓			✓		?				Surface
77	✓		✓	309		133		80				✓		✓			✓				✓		R. 6, floor
78	✓	✓			103		82	39				✓		✓		✓					✓		Surface
84	✓	✓			115	97			24		✓			✓		✓			✓				R. 6, floor
151		✓		117+		110			30	✓				✓			✓			✓			Kiva, surf. - 1 m.
152		✓		81+		100			19			✓		✓			✓		✓				Kiva, surf. - 1 m.
231		✓		95+		98			35			✓		✓			✓				✓		Kiva, 1 m. to floor
232		✓		90+			75	45				✓		✓			✓				✓		Kiva, 1 m. to floor
235		✓		94+		100			19		✓			✓			✓			✓			Kiva, floor
428		✓		55+			72		21		✓			✓			✓	✓					R. 6, fill
(a) 17	✓		✓		75		70	50		✓					✓	✓		✓					R. 3, floor
(a) 47	✓		✓		72		62	60				✓		✓			✓		✓				R. 3, floor

(a) Reused hammer (b) Reused

TABLE 4, PART 1.

Statistical analysis of all manos from N.A. 618 and N.A. 680, showing catalog number, provenience, size, material and significant morphological characteristics. Comparable data for manos from other sites are presented in Table 4, parts 2 and 3. Manos are discussed on pages 107–115.

Site and Catalog Number	Complete	Convex	Flat	Length 150+	Length 150 or less	Width 90+	Width 90 or less	Thickness 35+	Thickness 35 or less	Faces Parallel	Faces Wedge	Faces Convex	No. of Finger Grips	Grinding Surfaces One	Grinding Surfaces 2 opposite	Shape Oval	Shape Round Rectangle	Material Quartzite	Material Sandstone	Material Limestone	Material Vesicular Basalt	Material Dense Basalt	Provenience
NA 681.91	✓	✓		180		93		60		✓				✓			✓				✓		R. 4, fill
92	✓	✓			147		90	40		✓				✓			✓		✓				R. 4, fill
99		✓		140+		120		45				✓		✓			✓				✓		R. 4, fill
100		✓		142+		95			25	✓				✓			✓				✓		R. 1, fill
101		✓			74+		65		20		✓			✓			✓		✓				R. 4, fill
102	✓		✓		75		70	40		✓					✓	✓						✓	R. 3, fill
106	✓	✓		162			83		16		✓			✓			✓					✓	R. 3, fill
127		✓		100+		105			25			✓		✓			✓				✓		R. 3, floor
128	✓	✓		195		100			35		✓			✓			✓		✓				R. 3, floor
129	✓	✓			112		90	38			✓		1		✓	✓			✓				R. 3, floor
130	✓	✓		167		95			15		✓			✓			✓				✓		R. 3, fill
(a) 131		✓		135+			82		30			✓		✓			?					✓	R. 3, fill
133		✓		105+			75		35		(d)			✓			✓						R. 3, floor
134			✓	130+			90	60			✓			✓			✓			?			R. 3, fill
136	✓	✓		157		115			17			✓		✓		✓			✓				R. 3, fill
137		✓		107+			85	40				✓		✓			✓				✓		R. 4, ventilator
138		✓		107+		102		50				✓		✓			✓		✓				R. 3, in East wall
(b) 138	✓		✓		107	102		50				✓		✓			✓		✓				
140			✓	128+			90		22		✓			✓			✓		✓				R. 3, floor
156		?		58+			90		28	✓				✓		?			✓			✓	R. 4, floor
158		✓		120+			74		7	✓				✓			✓			✓			R. 4, floor
160		✓		125+		115		53				✓		✓			✓		✓				R. 4, floor
161	✓	✓		170		105		43			✓			✓			✓				✓		R. 4, floor
162	✓	✓		142		100		58				✓		✓		✓		✓					R. 4, floor
163		✓		80+		98			25			✓		✓			✓				✓		R. 3, floor
164		✓		102+			87		26		✓			✓		✓			✓				R. 3, floor
165			✓	90+		110		50				✓		✓			✓		✓				R. 4, floor
166		✓		65+		95			32			✓		✓		✓						✓	R. 3, floor
167		✓		115+		100			32	✓				✓			✓				✓		R. 3, floor
(c) 182	✓			65			63	45				✓		✓		✓						✓	Kiva, fill
202		✓		100+			90		22		✓			✓			✓		✓				R. 1, floor
212		✓		127+		105		40				✓		✓			✓			✓			Kiva, fill
217			✓	110+		96		43		✓					✓		✓		✓				Kiva, fill
218		✓		105+			90		22			✓		✓		✓				✓			Kiva, fill
222		✓		95+		98			25		✓			✓			✓				✓		Kiva, fill
247	✓		✓	205		100		45		✓			2	✓			✓					✓	Kiva, below floor
262	✓	✓		180			87		24	✓				✓			✓		✓				Kiva, below floor

(a) Reused maul
(b) Reused
(c) Reused hammer
(d) Made from metate

TABLE 4, PART 2.

Statistical analysis of all manos from N.A. 681, showing catalog number, provenience, size, material and significant morphological characteristics. Comparable data for manos from other sites are presented in Table 4, parts 1 and 3. Manos are discussed on pages 107–115.

Site and Catalog Number	Complete	Long. Section: Convex	Long. Section: Flat	Length: 150+	Length: 150 or less	Width: 90+	Width: 90 or less	Thickness: 35+	Thickness: 35 or less	Faces: Parallel	Faces: Wedge	Faces: Convex	Finger Grip	Grinding Surfaces: One	Grinding Surfaces: 2 opposite	Shape: Oval	Shape: Rounded Rectangle	Material: Quartzite	Material: Sandstone	Material: Limestone	Material: Vesicular Basalt	Material: Basalt	Provenience
NA 682																							
194	✓	✓			119		77		32			✓		✓		✓			✓				Room 3, fill
199	✓	✓		182			84		23			✓		✓			✓			✓			Room 1, floor
200	✓	✓		203	105				27			✓		✓			✓				✓		Room 3, fill
201	✓		✓	185			77+	43			(a)			✓			✓		✓				Room 2, floor
223		✓		130+		103		47		✓		(b)		✓			✓				✓		Room 4, fill
224		✓		105+		110		58		✓				✓			✓				✓		Room 4, fill
234	✓	✓		157		100			30					✓			✓				✓		Room 2, fill
236	✓		✓	192		93			27					✓			✓		✓				Room 1 (s), fill
237	✓	✓		155			76		28					✓			✓		✓				Room 1, fill
238	✓	✓		210		95		65						✓			✓				✓		Room 1, fill
261		✓		100+		100		40						✓		✓					✓		Kiva, floor
265	✓	✓		220		120		75						✓		✓					✓		Kiva, floor
266	✓		✓		145	100		70						✓		✓		✓					Kiva, floor
267	✓	✓		180		110			33					✓			✓				✓		Kiva, floor
413		✓		130+		95			32					✓			✓				✓		Kiva, fill
441		✓		120+		98			30						✓		✓				✓		Kiva, fill
NA 537																							
288	✓		✓		150		87	48			✓			✓		✓		✓					Kiva, fill
291	✓		✓	164			65		35	✓				✓			✓	✓					Surface
444	✓	✓		203			72		35		✓			✓		✓			✓				Surface
NA 1814 E																							
1	✓		✓	150+		100		50				✓		✓			✓				✓		Early floor

(a) Made from trough metate
(b) Long trough on grinding face

TABLE 4, PART 3.

Statistical analysis of all manos from N.A. 682, N.A. 537, and N.A. 1814E, showing catalog number, provenience, size, material and significant morphological characteristics. Comparable data for manos from other sites are presented in Table 4, parts 1 and 2. Manos are discussed on pages 107–115.

of them had been reused as manos of different types, one had been reused as a maul, and 4 had been used also as hammer stones. These "double-duty" specimens thus will be considered twice in the statistical calculations that follow.

The factors that have been considered in classifying these 91 manos are those of provenience, material, shape, number and character of grinding surfaces, presence or absence of finger grips, and dimensions. Table 4 is self-explanatory so far as most of these features go, but a few words are desirable as to the manner in which shapes and surfaces were classified. The most frequent shape in terms of horizontal section was what may best be called a "rounded rectangle," a form in which the long edges were straight and parallel, the short edges either straight and parallel or very bluntly convex, and the "corners" sharply rounded. A smaller number, called "oval," had convex edges all the way around and usually were less elongated than the "rounded rectangle" type. Grinding surfaces were either one or two (no specimen had more) and the upper face of the manos was either parallel to the grinding face, inclined toward it (thus producing a wedge-shaped vertical section) or convex (producing a bread-loaf vertical sec-

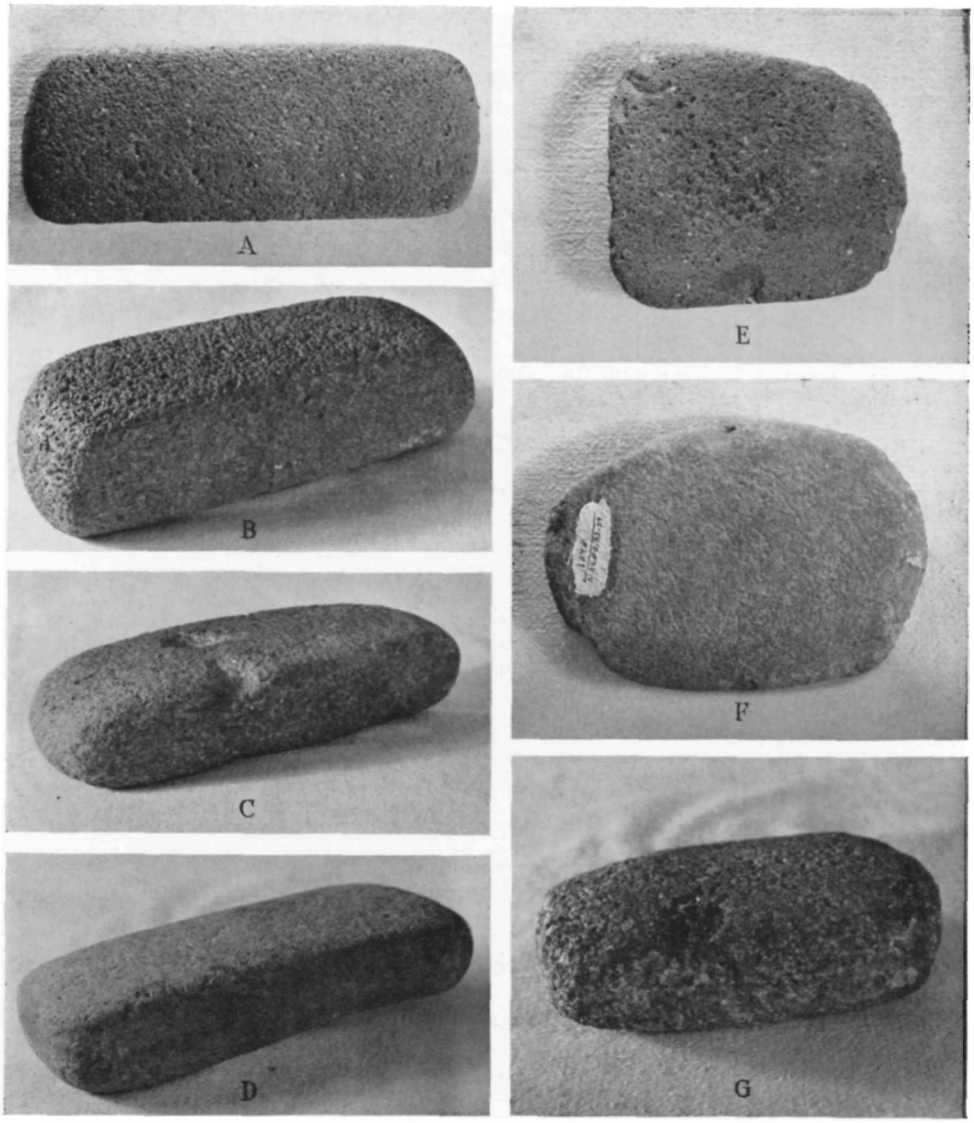


FIG. 44.

Manos from Big Hawk Valley sites and Crack-in-Rock Pueblo:
A. From site N.A. 618 (cat. no. 618.255),
B. From site N.A. 618 (cat. no. 618.286),
C. From site N.A. 681 (cat. no. 681.247),
D. From site N.A. 537 (cat. no. 537.291),
E. From site N.A. 680 (cat. no. 680.44),
F. From site N.A. 680 (cat. no. 680.39),
G. From site N.A. 682 (cat. no. 682.194).

tion). Thickness varied greatly, but I do not think that this is typologically significant; it is rather only an indication of the degree of use of the particular specimen. The grinding surfaces of almost all manos were slightly convex along the long axis, indicating use with troughed metates, a situation consistent with the metates discovered, as indicated in table 5.

Site and Catalog Number	Types (After McGregor 1941)						Length	Width	Thickness	Width of Trough	Length of Trough	Diameter of Basin	Depth of Basin	Material				Provenience
	A or B	C	D or E	*F	*G	*H								Sandstone	Limestone	Vesicular Basalt	Dense Basalt	
NA618-282		✓					225+	277	42	235	27			✓				R.2, floor
389	✓						365+	305	165	220	70				✓			Pit W, floor
406	✓						405+	275	112	215	57					✓		R.5, fill
NA680-5	✓						250+	310	100	210	30				✓			R.3, fill
6						✓	260+	200	105	55/60	16/13					✓		R.3, fill
16				✓			280	160	105			70x100	15			✓		R.3, floor
37		✓					130+	197	85	130	12					✓		Trench A
46	✓						185+	210	55	?	25			✓				R.3, floor
60		✓					480	345	130	225	65					✓		R.6, fill
95	✓						285+	280	60	180	23			✓				R.3, in cross wall
148		✓					110+	140	35	120	2			✓				K, surface to 1 m.
NA681-94	✓						435	260+	120	200+	55					✓		R.3, fill
110	✓						500	355	138	245	102			✓				R.3, fill
172			✓				180	160	70						✓			2 sides
172				✓			180	160	70			110	3					R.4, fill
175	✓						320+	360	80	300	20					✓		R.4, fill
176		✓					490	335	91	245	63			✓				R.3, fill
173			✓				338	214	180						✓			R.4, fill
87				✓			215	133	60			40	10				✓	R.4, surface
141		✓					115+	120+	35	?	10			✓				R.3, floor
155				✓			380	255	63			230x110	8	✓				R.4, floor
NA682-198				✓			260	140	50			85/85	8/10	✓				R.2, fill
220			✓				?	?	?					✓				R.4, fill
226				✓			315	245	65			120x170	28				✓	R.2, fill
239	✓						340+	310	134	225	38					✓		R.4, floor
246					✓		98+	85+	?			60	45			✓		R.4, fill
283		✓					380	187	85	187	19			✓				K., floor
375		✓					350+	240	85	150	16						✓	K, in wall at SW corner
415		✓					320+	205+	100	140+	65			✓				K, in E wall, upper room
M.3			✓				?	?	15					✓				Surface

* F = Shallow, circular grinding areas
G = Mortar or bowl
H = Two longitudinal troughs

TABLE 5.

Statistical analysis of metates and mortars from Big Hawk Valley sites showing catalog number, provenience, size, material and significant morphological characteristics. Metates are discussed on pages 115–117.

Perhaps the most striking fact revealed by table 4 is the very small number of manos found at Site N.A. 618 in comparison with those at N.A. 680 and N.A. 681 despite the larger size and perhaps longer occupation of N.A. 618. As will be seen in table 5 a corresponding dearth of metates also existed at N.A. 618. I have no logical explanation for this; considerable corn was found in various parts of N.A. 618 and its inhabitants must have engaged extensively in agriculture. Whether they did their milling at another place, contracted for it with the people of other neighboring sites, or took their stones with them when they left I do not know. Only one short, or one-hand, mano was found at N.A. 618 and it was a reused hammer. It is interesting that records of the Museum of Northern Arizona indicate that in other Sinagua and Cohonina sites the quantity of milling tools is as large as in Kayenta sites. Perhaps the tools from N.A. 618 were reused later at such sites as N.A. 680, 681 and 682, which were occupied at a slightly later date. Of the seven manos that were found at N.A. 618, however, three were unusually large, two of them (cat. nos. 618.285 and 618.286, fig. 44, B) being the largest recovered during the season, and none had a convex upper face, a situation very different from that at the other Big Hawk Valley sites, where convex-back manos strongly outnumbered other types.

Site	101-120	121-140	141-160	161-180	181-200	201-220	221-240	241-260	261-280	281-300	Maximum Width	Minimum Width	Totals
NA 618						2	1				235	215	3
NA 680	1	1		1		1	1				225	120	5
NA 681								2		1	300	245	3
NA 682			1		1	1					225	150	3
Totals	1	1	1	1	1	4	2	2	0	1			14

TABLE 6.

Distribution of metates for each site according to widths of grinding surfaces. Metates are discussed on pages 115–117.

At N.A. 680, indeed, the flat or parallel-back specimens were all somewhat unusual in other respects: cat. no. 680.15 was very thick and only slightly used; 680.33 was a small fragment; 680.39, 680.41 and 680.45 were all very short; 680.77 was unused; 680.17 and 680.47 were reused hammer stones. These last two were also the only quartzite specimens found at N.A. 680.

At N.A. 681, also, the parallel-back manos were mostly unusual: cat. no. 681.102 and 681.138 were short; 681.165 was only a small fragment; 681.217 had 2 grinding surfaces; 681.247 (fig. 44, C) was very thick and had finger grips on both edges; and 681.182 was a reused hammer.

Other comments appropriate to the manos at N.A. 681 include the observation that no. 681.131 (fig. 46, D) was later made into a grooved maul and reshaped somewhat; no. 681.129 was unusual, having 2 grinding surfaces, a short oval shape and a wedge profile. No. 681.162 was a large water-worn quartzite boulder (the only specimen at the site made of this material) and seemed to be in process of manufacture as a mano.

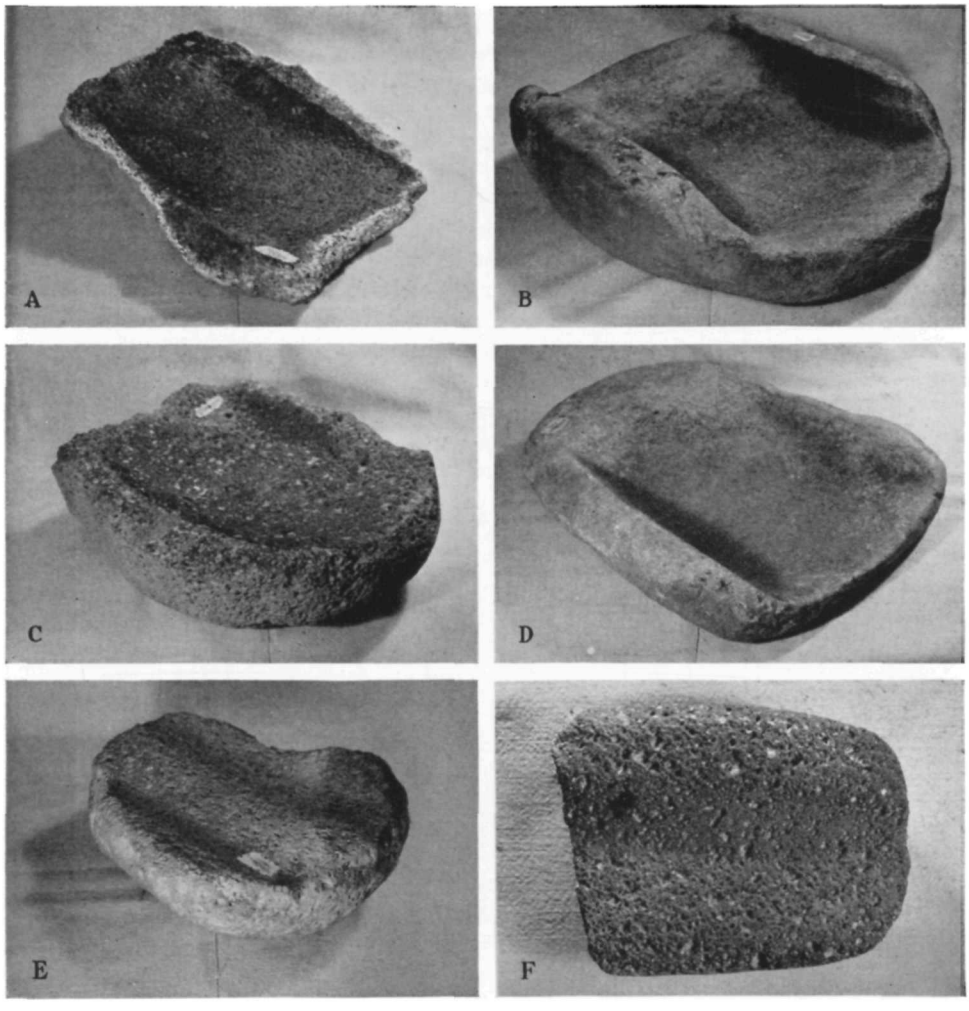


FIG. 45.

Grinding Implements from Big Hawk Valley sites:
A. Metate, from site N.A. 618 (cat. no. 618.406);
B. Metate, from site N.A. 681 (cat. no. 681.110);
C. Metate, from site N.A. 682 (cat. no. 682.239);
D. Metate, from site N.A. 681 (cat. no. 681.176);
E. Possible "double-trough" metate, from site N.A. 680 (cat. no. 680.36);
F. Possible mano, from site N.A. 682 (cat. no. 682.223). This specimen may have been used with a metate similar to the one illustrated in E, the channel of the "mano" fitting over the central ridge of the "metate," and being moved longitudinally, so that the meal could work out sidewards into the two troughs.

At N.A. 682 all specimens were long (or two-handed). In other respects, several were unusual. No. 682.201 was made from a fragment of a troughed metate, and its upper face was therefore slightly concave. No. 682.223 (fig. 45, F) was unique, and had a fairly deep trough on its face, running longitudinally, 38 mm. wide by 4 mm. deep. This groove is too wide to have served as an arrow-shaft smoother, and it looks as if it might have been used with a double metate such as one found at N.A. 680 (cat. no. 680.36), as shown in figure 45, E. Cat. no. 682.266 was a large water-worn quartzite boulder (the only specimen of this stone at this site), very thick with a smooth lower surface. It was not deliberately shaped and like no. 681.162 was perhaps only casually used as a mano.

We can thus see that the manos of Big Hawk Valley conform generally to the character of those usually found in sites of this period throughout the San Francisco Mountain area, and for that matter in the Plateau region generally. The best published study of the subject is that by Katharine Bartlett [3] on milling stones of the San Francisco Mountain area. An examination of her monograph will show that the basic type is rounded-rectangular, with one grinding surface and long enough for use with two hands. She found no triangular manos in association with troughed metates (p. 28), nor did we, and she points out that this form developed later and was used on flat metates (pp. 15–16). She did find, however, small numbers of specimens with the same peculiarities and variations that were represented in our collections. Other studies of manos from the north and south of Big Hawk Valley in areas representative of the Kayenta Branch and Sinagua Branch [4] respectively, show no differences that can point the way to significant cultural associations in one direction more strongly than in another.[5]

Metates and mortars. The distribution and characteristics of the 29 metates recovered are shown in table 5, and only a few comments need be made upon them. As with manos, site N.A. 618 was deficient, containing only 3 in comparison with 8, 11 and 8 respectively at the other Big Hawk Valley sites. Again I have no explanation to offer for this peculiar lack at N.A. 618, although it seems to be consistent with the situation found by McGregor at Winona, where he says that "in not one case was a metate found with houses or trash of a Winona Focus site. This fact in conjunction with the very few, only four, manos found in this focus would certainly indicate that the use of such grinding stones was not characteristic of this focus, or these people. To replace them great quantities of small stone slabs, of irregular form, but showing polishing or grinding were found in every house of this focus, and abundantly in the trash mounds." [6] At another point he says: "In general neither metates nor manos were as abundant in [Winona] sites as might be expected, nor were they as abundant as are often found in surrounding Pueblo sites." [7] Since at least parts of N.A. 618

[3] Bartlett, 1933.

[4] Beals, Brainerd and Smith, 1945, pp. 41, 54, 77 (Kayenta Branch); McGregor, 1941, pp. 166–69 (Sinagua Branch); King, 1949, p. 86; fig. 65 (foci of both branches).

[5] In making a comparative study of mano types as well as of other stone implements I have used extensively and profitably the exhaustive doctoral thesis of Richard B. Woodbury, presented to the Department of Anthropology at Harvard University in 1948. This monograph is unpublished at this date, but constitutes the best and most complete study of stone artifacts of the Southwest thus far brought to my attention.

[6] McGregor, 1941, p. 170.

[7] McGregor, 1941, p. 171.

belong to the Winona Focus the dearth of manos and metates, then, may not be surprising, especially since that focus is thought to represent a northerly extension of the Hohokam culture [8] in which manos and metates were rather less frequent than among the more northern peoples. It remains difficult to explain, however, the absence at N.A. 618 of the small slabs described by McGregor as characteristic of the Winona Focus at Winona Village.

In terms of shape, 6 types were recognized in the collections, 3 of which were similar to those from Winona called by McGregor types B, C and D (or E).[9] I have used McGregor's designations wherever they apply, but in addition three other shapes were recognized, as follows:

F was a block of stone, flat on one surface, with a shallow, circular grinding basin much smaller than the entire surface. It should perhaps not be called a metate at all, but it was not on the other hand large or deep enough to be called a mortar. Examples occurred at all sites except N.A. 618.

G was a proper mortar. Only one example was found, at N.A. 682.

H was an unusual form with two parallel shallow concave grinding troughs with a ridge between them, which also showed evidence of grinding (fig. 45, E). The troughs could have been used independently, or with a grooved mano like one from N.A. 682 (cat. no. 682.223, fig. 45, F), the groove in the mano fitting over the ridge on the metate. I know of no report of an exactly similar object, although large metates with 2, 3 and 4 independent grinding surfaces have been found,[10] but none of these appears to have had the smoothly convex ridge between the troughs as did that from N.A. 682.

Types B and C are both of the troughed variety, the former open at both ends, the latter open at only one end. These were the most common types at all sites and were the only types found at N.A. 618. Types D and E (which I do not think can be very readily distinguished from each other and which I have therefore combined) were rare and occurred only at N.A. 681 and N.A. 682. There was no evident distinction in the entire collection on the basis of material in relation to either shape or provenience. There was no evidence at any site of a slab box in which a metate could have been emplaced.

The width of the trough in examples of types B and C varied within fairly wide limits, but without apparent significance except perhaps at N.A. 681, where the 3 complete examples all had troughs wider than those of any that occurred elsewhere. They were not longer than the examples elsewhere, however. Table 6 presents the range in trough widths.

Although the number of metates is not large, it will be of some interest to consider their typological relationship to those from other areas of the Southwest. Katharine Bartlett in her excellent study of Pueblo milling stones [11] describes several types of metates from the San Francisco Mountain region, all of which were troughed, open at both ends and usually not emplaced in stone boxes (pp. 5–11, 20). She points out, however, that modern Hopi metates are always flat and boxed (p. 17), and she shows that the troughed type was general all over the Plateau up to late Pueblo III, when the flat type appeared at Betatakin, Marsh Pass, Aztec, Pueblo Bonito and Pecos, among other places, and subsequently completely displaced the troughed type (pp. 22, 26) in the North.

[8] Colton, 1945, p. 270.
[9] McGregor, 1941, fig. 58.
[10] West, 1925, p. 14; fig. 12; Pepper, 1920, p. 85; fig. 29.
[11] Bartlett, 1933.

Throughout Pueblo III, however, the troughed type was universal in the Mountain areas and in the South, and during Pueblo IV the slab type invaded the Mountains but did not reach the southern Deserts until Pueblo V (p. 26).

Woodbury's researches on the basis of his analysis of metates from Awatovi [12] generally confirm Bartlett's conclusions. He finds further that the troughed metate with one open end was the earliest form in the La Plata District,[13] and in the Pine Lawn Phase of the Mogollon.[14] Troughs open at both ends were characteristic of early phases in the Gila-Salt River region. Flat metates began to appear in Pueblo II and early Pueblo III, and have been recorded in that horizon from the following places:

Alkali Ridge, Utah, Site 12 (Pueblo II),[15] Marsh Pass, Arizona, Site RB 551 (Pueblo II);[16] Village of the Great Kivas, New Mexico (early Pueblo III);[17] La Plata District in Colorado and New Mexico (early Pueblo III);[18] Chaco Canyon, New Mexico, Site Bc 51 (Pueblo II or early Pueblo III).[19] This distribution argues for an Anasazi origin of the flat metate, which is consistent with its appearance in the Kayenta Branch sites, N.A. 681 and N.A. 682, of early Pueblo III date, and its absence from N.A. 618, which was mainly a Sinagua-Cohonina site, and from N.A. 680, which seems to have been slightly earlier than N.A. 681 and 682.

At Nalakihu, a masonry ruin approximately 2 miles northeast of our Big Hawk Valley sites and containing components of the Kayenta, Sinagua and Chino Branches, 6 out of 9 metates were of the troughed variety, types A and B,[20] a situation not essentially different from that at Winona and Big Hawk Valley. Nalakihu has been dated in the late 12th Century,[21] perhaps 2 generations later than the sites here considered.

Hammer stones and mauls. A total of 53 stones that appear to have been used for striking or pounding were found in the sites excavated, the significant features of which are indicated in table 7. The majority of them were irregular chunks of stone, mostly quartzite or dense basalt, of a size to fit comfortably into a clenched fist. Most of them had originally been water-worn boulders, sometimes unmodified, but usually crudely shaped by having had flakes knocked from their surfaces, producing from 2 to 6 facets, the angles between which had been used as points of percussion. The final form was usually approximately spherical, sometimes almost cubical, and occasionally elongated or flattened.

Only 6 were shaped by grinding into the conventional ovoid form of a maul, and these came mostly from the sites of relatively later occupation. Two (cat. nos. 537.293 and 537.342) were found at Crack-in-Rock Pueblo (N.A. 537). Two came from N.A. 681 (cat. nos. 681.131, fig. 46, D; and 681.185) both of which seemed to have had a full groove for hafting. In one case the specimen was broken transversely along the apparent groove; in the other case it had been reused as a mano, so that one face had been ground flat, obliterating a part

[12] Woodbury, 1948, pp. 157–60.
[13] See also Morris, 1939, p. 133.
[14] Rinaldo, 1940, p. 35.
[15] Brew, 1946, fig. 174d.
[16] Beals, Brainerd and Smith, 1945, p. 54.
[17] Roberts, 1932, p. 139.
[18] Morris, 1939, p. 133.
[19] Woodbury, 1939, p. 58.
[20] King, 1949, p. 85; fig. 65.
[21] King, 1949, p. 132.

Site and Catalog Number	Dimensions	Unshaped	No. of facets	Ground	Grinding Surfaces	Material				Provenience	Remarks
						Quartzite	Chert	Vesicular Basalt	Basalt		
NA 618. 340	60 × 60 × 37		2		2 opp				✓	Trench H, fill	Red stained
358	65 × 60 × 55		1						✓	Room 3, floor	
NA 680. 4	60 × 52 × 50		2						✓	Room 3, fill	
17	75 × 70 × 50		2		2 opp	✓				Room 3, floor	Used as mano
47	62 × 72 × 60			✓	1	✓				Room 3, floor	Reused as mano
50	52 × 48 × 40		4			✓				Room 3, floor	
52	65 × 50 × 40		?						✓	Room 3, floor	
54	65 × 55 × 45		6			✓				Room 3, floor	
61	72 × 60 × 50		4			✓				Room 6, fill	
72	67 × 60 × 50		4			✓				Kiva, fill	
76	155 × 97 × 50	✓						✓		Room 6, fill	
89	70 × 60 × 50		5				✓			Room 6, floor	
90	60 × 50 × 45	✓							✓	Room 6, floor	
147	65 × 60 × 22	✓							✓	Kiva, surface - 1m	
150	85 × 72 × 60		4			✓				Kiva, surface - 1m	
153	50 × 46 × 40		2			✓				Kiva, surface - 1m	
154	65 × 60 × 58	✓							✓	Kiva, surface - 1m	
183	80 × 75 × 72		4			✓				Kiva, surface - 1m	
184	64 × 60 × 55		2			✓				Kiva, surface - 1m.	
210	60 × 45 × 45	✓						✓		Surface	
427	55 × 53 × 50	✓							✓	Room 3, fill	
484	65 × 60 × 52	✓				✓				Kiva, fill	
NA 681. 85	70 × 70 × 70		4					✓		Room 3, fill	
88	70 × 65 × 35		?		2 opp	✓				Room 4, fill	
103	92 × 70 × 30	✓					?			Room 3, fill	
104	83 × 80 × 45		3					✓		Surface	
107	40 × 40 × 40		5			✓				Room 4, fill	
131	135 × 82 × 30			✓					✓	Room 3, floor	Groove for hafting
132	50 × 40 × 50		3			✓				Room 3, floor	
139	85 × 75 × 35	✓							✓	Room 3, in East wall	
142	67 × 50 × 30	✓					✓			Room 3, floor	
168	80 × 60 × 40		1						✓	Room 3, floor	
171	55 × 55 × 33	✓							✓	Room 3, floor	
182	65 × 63 × 45		3		1				✓	Kiva, fill	
185	90+ × 90 × 70			✓		✓				Kiva, fill	Groove for hafting
213	93 × 75 × 45	✓				✓				Kiva, 1 m. to floor	
214	74 × 62 × 47		4						✓	Kiva, 1 m. to floor	
215	40 × 40 × 40		6						✓	Kiva, 1 m. to floor	
216	55 × 55 × 45		4			✓				Kiva, 1 m. to floor	
NA 682. 219	128 × 73 × 55			✓				✓		Room 4, fill	Pestle? - 2 single notches
225	65 × 65 × 38		2						✓	Room 4, fill	
250	60 × 55 × 40		3						✓	Room 5, fill	
258	88 × 72 × 40		?						✓	Kiva, floor	
269	60 × 60 × 42	✓					✓			Kiva, floor	
270	58 × 52 × 32	✓				✓				Kiva, floor	
271	40 × 75 × 32		?						✓	Kiva, floor	
NA 537. 289	72 × 52 × 40		6			✓				Room 4, floor	
290	92 × 65 × 50		?				✓			Room 4, floor	Red stained
293	105 × 70 × 65					✓				Kiva, floor	
297	52 × 45 × 40		6			✓				Kiva, fill	
327	74 × 70 × 70		?			✓				Room 4, fill	
328	95 × 68 × 38		?			✓				Room 4, fill	
342	85+ × 88 × 48			✓		✓				Kiva, fill	Broken, smooth
384	68 × 50 × 43	✓				✓				Kiva, fill	

TABLE 7.

Statistical analysis of hammer stones and mauls, showing catalog number, provenience, size, material and significant morphological characteristics. Hammers and mauls are discussed on pages 117–119.

of the groove. One was found at N.A. 680 (cat. no. 680.47); and one at N.A. 682 (cat. no. 682.219) which was unusually long, approximately cylindrical, and had two shallow depressions or finger grips on its sides. This may have been used as a pestle, an inference corroborated by the fact that the only mortar recovered in the entire season also was found in the same room of the same site (Room 4, N.A. 682).

Four hammer stones had been reused as manos. Two of these that were originally roughly spherical (cat. nos. 618.340 and 680.17) had been reduced to the shape of thick disks by the grinding down of two opposite faces into parallel surfaces. An exactly similar object was found in a Padre Focus site at Winona Village.[22] Another specimen (cat. no. 681.182) was of the roughly spherical, three-faceted style, one facet of which had also been used as a grinding surface. Still another, which had originally been ground to the ovoid maul shape (cat. no. 680.47) had been broken in half transversely and then used as a mano, producing a flat grinding surface on one face parallel to the original long axis.

Although Morris says[23] that hammer or pecking stones are "the implement found with greatest frequency at sites of all ages in the La Plata country," he does not discuss them very fully, an omission committed by practically all reporters in the Southwest. Fewkes remarked that the "number of small stones showing pecking or artificial working which can be found at a Southwestern ruin is much larger than the proportion in collections would seem to indicate. From their great weight, as well as their numbers, the majority have to be left behind, and as a rule those which are destitute of a special form are rejected."[24] His comment well applies to most published reports, with the consequence that little comparative study between sites or areas is possible. One other area in which a thorough and careful analysis of stone implements has been made, however, is the Jeddito region, where numerous sites from Basket Maker III to Pueblo V were excavated by the Peabody Museum. It is interesting to note in Woodbury's study of the Jeddito material that the percentage there of hammer or pecking stones to the total number of stone implements of all kinds varied from 18% in the Basket Maker III — early Pueblo I horizon, through 27% in the Pueblo II horizon, to 6% during Pueblo V. It was 23% in early Pueblo III, exactly the same proportions as at the Big Hawk Valley sites considered collectively.

Axes. Only one axe was found in the entire collection (cat. no. 682.195, fig. 46, E) on the floor of Room 1 in N.A. 682. It was made of dense basalt, well polished and ground to a fairly sharp edge, ovoid in horizontal section, with a full groove 28 mm. wide and 3 to 7 mm. deep. Its overall dimensions were 165 by 78 by 50 mm. No extensive or convincing inferences can be drawn from a single specimen, but the very paucity of axes in Big Hawk Valley suggests the situation at Winona Village, where only 8 were found,[25] and at Nalakihu, where there was only one.[26] These were, however, all three-quarter-grooved, in contrast to the full-grooved example from N.A. 681 and the two full-grooved hafted mauls already described (p. 117 above).

[22] McGregor, 1941, p. 173; fig. 59c.
[23] Morris, 1939, p. 128.
[24] Fewkes, 1904, p. 159.
[25] McGregor, 1941, pp. 173–74.
[26] King, 1949, pp. 88–90; fig. 74, F, G.

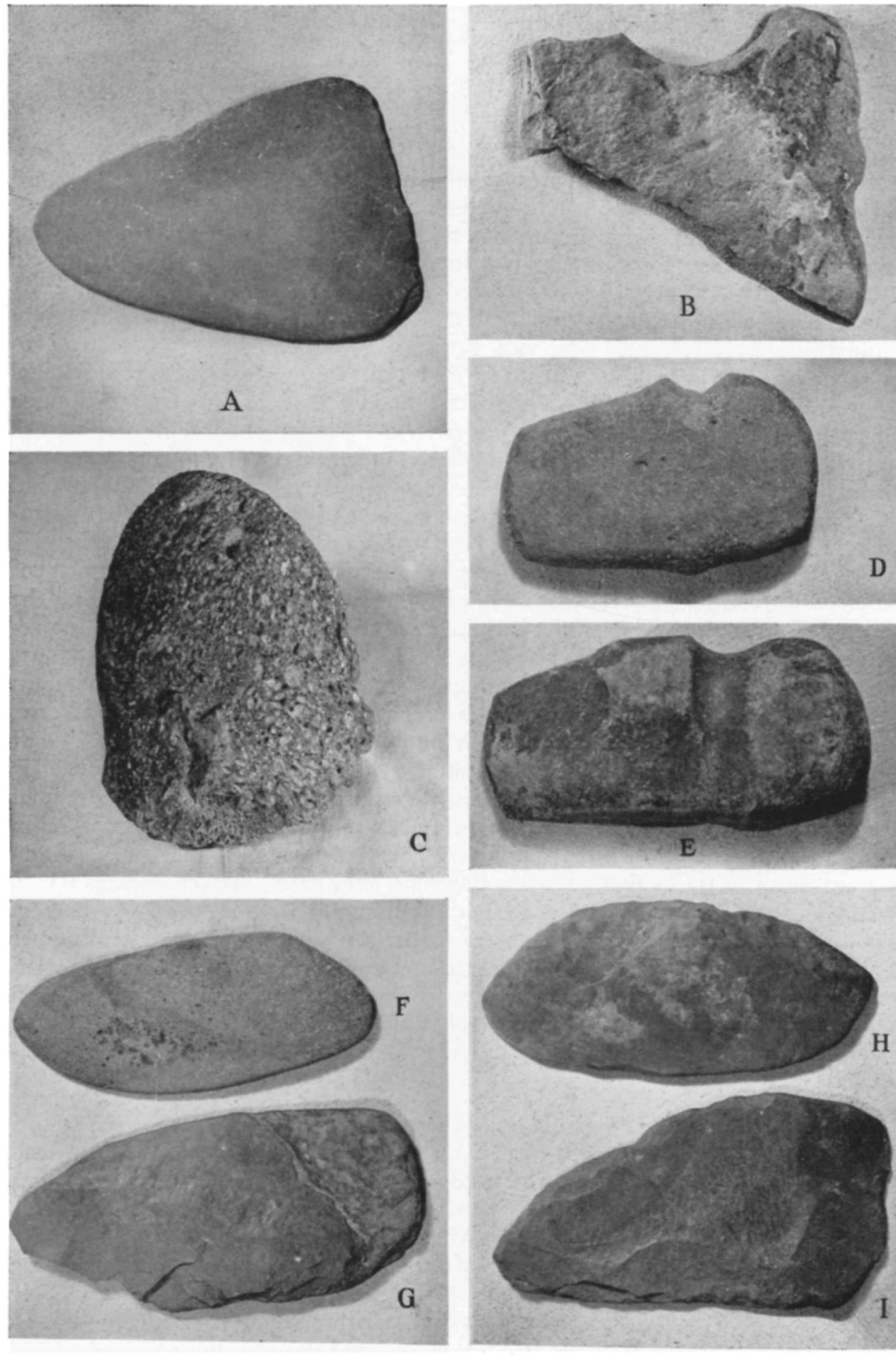


FIG. 46.

Hoes, axes, mauls and miscellaneous objects of stone.

A. Triangular hoe, type 1, made of sandstone, from site N.A. 618 (cat. no. 618.374);
B. Upper portion of possible floor-beam support from site N.A. 618 (cat. no. (618.338);
C. Possible "corn mound" of vesicular basalt from site N.A. 682 (cat. no. 682.203);
D. Full-groove maul from site N.A. 681 (cat. no. 681.131), subsequently reused as a mano, with resultant obliteration of groove on the face shown here;
E. Full-groove axe from site N.A. 682 (cat. no. 682.195);
F. Elliptical hoe, type 2, from site N.A. 1814E (cat. no. 1814E.3);
G. Triangular hoe, type 1, from site N.A. 682 (cat. no. 682.272);
H. Elliptical hoe, type 2, from site N.A. 1814E (cat. no. 1814E.2);
I. Elliptical hoe, type 2, from site 1179 (cat. no. 1179.M2).

As is well known the three-quarter-grooved axe or maul had a southern origin, ultimately perhaps from Mexico or Texas, and reached the Plateau relatively late from the Gila Basin by way of the Verde Valley, and first appears in Sinagua sites during Pueblo II.[27] The full-grooved style, on the other hand, was probably of San Juan origin and was never used by the Hohokam. Even in the north it

Site and Catalog Number	Triangular	Ovoid	Rounded Rectangle	Handled	Pick	Dimensions	Material: Sandstone	Material: Basalt	Provenience	Remarks
NA 618.356				✓		128+ x 92 x 7.5	✓		Pithouse V, fill	
374	✓					190 x 137 x 5	✓		Pithouse W, fill	
388	?					90+ x 139 x 5	✓		Room 4, fill	
NA 680.48	✓					168 x 147 x 8	✓		Room 3, floor	
49	✓					153 x 145 x 5	✓		Room 3, floor	
NA 681.144		✓				157 x 92 x 5		✓		Might be classed as triangular
339	✓					143+ x 105 x 5	✓		Surface	
NA 682.221			✓			98+ x 58 x 20	✓		Surface	Shaped like axe, but called hoe because sandstone
249			✓			162+ x 92 x 10	✓			
272	✓					190 x 102 x 5		✓	Kiva, floor	Elongated triangle
411	✓					98+ x 85 x 5	✓		Kiva, between walls	
412					✓	171+ x 60 x 49	✓		Kiva, between walls	Pointed; no cutting edge
NA 537.292		✓				173 x 83 x 4	✓		Room 4, fill	
NA 1814 E.2		✓				170 x 66 x 11		✓	Surface	
3		✓				182 x 84 x 15		✓	Surface	
NA 1179.M2		✓				193 x 90 x 6		✓	Surface	

TABLE 8.

Statistical analysis of hoes and picks from all sites, showing catalog number, provenience, size, material, and significant morphological characteristics. Hoes and picks are discussed on pages 121–123.

was not plentiful before Pueblo III.[28] Probably, then, about all that we can say is that the style of the three full-grooved examples at N.A. 681 and 682 provides corroborative evidence for the attribution of those sites to the Kayenta Branch, and that their numerical rarity is consistent with the assumption of a Pueblo II date.

Hoes. Surprisingly large numbers of thin medium-sized stone slabs with carefully chipped or ground edges were found in every site excavated. These have been called hoes, partly because their size and shape suggest such a use more

[27] McGregor, 1941, pp. 173–74; Colton, 1946, p. 312. They were also found near Prescott in Fitzmaurice Ruin (Caywood, 1936, p. 112) and King's Ruin (Spicer, 1936, pp. 55–56; pls. 17, 18).

[28] This whole subject is carefully considered by Woodbury, 1948, pp. 70–77, 88–95, with full citation and discussion of other authorities.

strongly than any other, and partly because the same designation has been applied to similar objects elsewhere. Based on shape, these fifteen hoes may be grouped in four classes, as indicated in table 8.

Type 1 was an inverted roughly isosceles triangle, with a relatively square upper edge and blunted point. Its maximum width was close to the upper edge and was more than 2/3 of its length (fig. 46, A, G).

Type 2 was an elongated ovoid, with one end slightly more pointed than the other. The maximum width was at about the mid-riff and less than ½ the length (fig. 46, H, I).

Type 3 was a rounded rectangle, with a straight cutting edge at one end, like that of an axe or adze.

Type 4 was spatulate with a broad flat "handle" at the upper edge and a straight cutting edge.

All were thin, from 5 to 15 mm., and varied in length from about 150 to 200 mm. Edges were chipped to a fairly sharp edge and were sometimes ground in addition. None showed evidence of hafting. They were mostly of sandstone, with a smaller number of basalt. Their distribution was fairly constant, although N.A. 682 had the largest number, four.

These hoes present a very interesting subject, and seem to be especially characteristic of Sinagua sites in this region. Dr. Colton has pointed out that the hoe was a standard Sinagua implement from about 600 A.D. to 1150 A.D., and that prior to the eruption of Sunset Crater it was usually made of basalt. Thereafter the softer sandstone was apparently feasible for work in the loose ashes and cinders.[29] Curiously enough only one hoe was found at Winona, but McGregor's remark that they are usually found in the fields and not in houses,[30] though plausible, is not borne out by the excavations at Big Hawk where all were found in direct association with houses. Two sandstone hoes were found at Nalakihu, both of them in room fill.[31]

Since the hoe is a Sinagua feature, it is not surprising to find it of fairly common occurrence in the south and southeast. Haury says that next to the slate palette and the three-quarter grooved axe, the "hoe is probably the most typical of the stone artifacts in the Gila-Salt region."[32] His very full and lucid discussion of the many hoes found at Los Muertos, all from the Classical Period of Hohokam occupation, bears out his dictum, but the types described were rather unlike those from our excavations in that they are less carefully shaped and their cutting edge was usually along the longer dimension instead of the end or tip, as with the Sinagua hoes.[33] At Tres Alamos, a Hohokam site of the Sedentary and Classic Periods, hoes were found similar to those from Los Muertos.[34] But it seems that at Snaketown only one such hoe was recorded, this one in the Sacaton Phase.[35]

At Canyon Creek in the Sierra Ancha, a Salado site dated in the 1300's, hoes were found, at least some of which resemble those of Sinagua provenience.[36]

[29] Colton, 1946, pp. 286–87. Sites are therein listed in which hoes of both kinds were found.
[30] McGregor, 1941, p. 171.
[31] King, 1949, p. 88; fig. 68, A, B.
[32] Haury, 1945, p. 134.
[33] Haury, 1945, pp. 134–35; figs. 79, 104*a*; pls. 50–56.
[34] Tuthill, 1947, p. 75; pl. 27.
[35] Gladwin, Haury, Sayles and Gladwin, 1937, p. 104, pl. XL*a*.
[36] Haury, 1934, p. 120; fig. 72, *c*–*g*.

Haury is also authority for the statement that the hoe was used extensively by the Mogollon peoples, but he is not sure whether or not they derived it from the Hohokam.[37] That it may not have been an indigenous Mogollon trait is suggested by its very rare occurrence at the relatively early SU site, where only 2 were reported.[38] Hoes are said to occur throughout the Mimbres region, and some were found at the Swarts Ruin resembling the elongated ovoid type of the Sinagua.[39] They have also been found in the Prescott area, at King's Ruin.[40]

In the northern Anasazi region, however, hoes were very rare or entirely absent. Woodbury [41] suggests that this fact apparently indicates the more general use of the digging stick in that area, an inference also supported by Haury.[42] Morris does not mention them in his exhaustive study of the La Plata area,[43] and few references to them occur in other literature. At Alkali Ridge, Utah, Brew found only 3, all from Pueblo I and II horizons, 2 of them notched, the other somewhat resembling the Big Hawk triangular type.[44]

At Awatovi there were only 4 specimens that could possibly be called hoes, all with elongated "handles" somewhat but not closely suggestive of one Big Hawk example (cat. no. 618.356).[45]

In the foregoing review I have deliberately omitted discussion of the ceremonial stone objects sometimes called "hoes" or *chamahias*, since they are quite distinct from true utilitarian hoes. Nothing like them was found in the Big Hawk sites.

It would seem, from a consideration of the data available, that hoes came into the Big Hawk Valley as a Sinagua importation, but that they were adopted by the people of the Kayenta Branch who occupied sites in the area. Their number again emphasizes the intensive nature of the agriculture that must have been pursued there during the short period of occupation.

Pick. A single object that might be called a pick (cat. no. 682.412) was found in N.A. 682, and was made of sandstone. It was broken off at the upper end, but was at least 171 mm. long and had been worked down to a fairly sharp tapering point, the horizontal section being about square. A similar specimen came from Winona,[46] and they have been reported from the Jeddito,[47] and the Camp Verde salt mine.[48]

Scrapers, knives and flakes. These terms are not really very satisfactory, since they have been used in the literature with such a wide variety of meanings, often carrying functional implications for which there may or may not have been adequate warrant. In almost all "stone age" sites, however, whether in the Southwest or elsewhere in the world, great numbers of sharp-edged stone fragments are found, many of them merely unretouched flakes or cores, others more

[37] Haury, 1936, p. 36; pl. 14*b*. The specimen illustrated resembles those from the Big Hawk sites.
[38] Martin, 1940, pp. 314, 319.
[39] Cosgrove, 1932, pp. 45–46; fig. 4; pl. 44.
[40] Spicer, 1936, p. 53.
[41] Woodbury, 1948, p. 461.
[42] Haury, 1936, p. 105.
[43] Morris, 1939.
[44] Brew, 1946, p. 240; fig. 49*h*, *i*, *j*.
[45] Woodbury, 1948, p. 465; pl. 35*r*, *s*, *t*, *u*.
[46] McGregor, 1941, p. 174; fig. 60, *F*.
[47] Woodbury, 1948, p. 505; Colton, 1936b, p. 60.
[48] Morris, 1928, p. 89; fig. 6, *a–d*.

or less carefully shaped and dressed, and all capable of having been used for some form of cutting, chopping or scraping. Exactly how they were in fact used, or whether they were used at all, is often quite unanswerable, and taxonomic groupings that prejudge their function or manner of use are often not desirable. In the absence of more objectively descriptive terms, however, we must preforce fall back on the familiar ones, but with special definitions suited to their present application. As here used these terms will be defined as follows:

Scraper or chopper. A relatively large flake or core, formed by percussion but having some secondary retouching; of no particular shape, but never elongated, and always fairly thick (*i.e.* 10 mm. or more); usually plano-convex, but sometimes convex on both faces; chipped along the edges at a relatively obtuse angle to the plane of the flat or nearly flat surface, the chips being removed only from the convex surface.

Knife. Frequently, but not always, smaller than the scraper or chopper, and always relatively thin (*i.e.* 4 to 8 mm.); of no consistent shape, but often elongated, with one or more edges fairly carefully retouched on both faces by pressure flaking, usually not all the way round, one end often remaining blunt; retouching usually finer than on scrapers or choppers and at a much more acute angle to the plane of the longer dimensions.

Flake. Any relatively thin spall or fragment with a sharp edge that has been knocked from a larger pebble or boulder and is completely unretouched.

Specimens of all three of these categories were found fairly evenly distributed at all the sites, as indicated in table 9. Since there is so little adequate comparative data available on objects of this sort from sites other than those of pre-pottery horizons, no very profitable comparative study can be made. It is interesting to note, however, that at site N.A. 618 all types were relatively rare, a situation consistent with the scarcity of other lithic artifacts at that site. Furthermore the quantity of indiscriminate flakes at Crack-in-Rock (N.A. 537) was remarkably large, and, while this may be partly due to their more ready recognition in excavating there, since N.A. 537 was a cave site with little debris, instead of a deeply buried open site, some other factors must be invloved. Crack-in-Rock was a defended site — perhaps the making of projectile points was a major industry there.

Drills. Only 2 specimens of stone were recovered that might be called drills or awls. One (cat. no. 618.314) was made of chert 27 mm. long, its butt end diamond-shaped in section and measuring 9 by 7 mm. It had been chipped along all edges to a sharp tapering point. It was found in the fill of Pithouse X at N.A. 618, and was similar to some that were found at Winona and called by McGregor Type A.[49] The other specimen, which might perhaps be called a graver, was an irregular flake of chert blunt at the butt end but carefully chipped to a sharp point at the other. It measured 38 by 20 by 13 mm. and was found on the surface at site N.A. 537.

The small number of drills at the Big Hawk sites is surprising, especially in view of the large number found at Winona, on the basis of which McGregor

[49] McGregor, 1941, p. 190; fig. 65, *A*.

Site and Catalog Number	Plano-convex	Convex on both faces	Dimensions	Materials: Chert	Jasper	Black Obsidian	Basalt	Quartzite	Provenience	Remarks
Scrapers										
NA 618. 251 a		✓	75 × 60 × 20				✓		Surface	
251 b		✓	70 × 50 × 22				✓		Surface	
268	✓		42 × 38 × 10						Trench B, fill	Small, thin; might be knife
NA 680. 19	?		90 × 40 × 12				✓		R. 3, floor	
32		✓	94 × 67 × 62	✓					R. 3, fill	Maybe only a core
51	✓		73 × 65 × 17				✓		R. 3, floor	
55	✓		65 × 50 × 40	✓					R. 3, floor	
80	✓		45 × 37 × 11	✓					R. 3, early floor	Small, thin; might be knife
422	✓		75 × 65 × 28	✓					R. 6, fill	
NA 682. 211 a	✓		52 × 35 × 12	✓					Surface	Small, thin; might be knife
211 c	✓		35 × 25 × 10	✓					Surface	Small, thin; might be knife
NA 537. 483	✓		60 × 42 × 20					✓	R. 4, fill	
Knives										
NA 618. 251 c			33 × 30 × 7	✓					Surface	
NA 680. 74			43 × 26 × 6	✓					R. 6, fill	
75			48 × 22 × 8				✓		R. 6, floor	
NA 681. 109			65 × 50 × 10				✓		R. 4, fill	
116			45 × 50 × 5	✓					R. 1, fill	Seems to have 2 opposed notches, as if originally a point
NA 682. 211 b			40 × 20 × 7	✓					Surface	
211 d			30 × 22 × 9	✓					Surface	
211 e			50 × 30 × 4	✓					Surface	
248			33 × 20 × 4			✓			R. 3, fill	
264			55 × 25 × 5				✓		R. 1, floor	
435			48 × 25 × 6		✓				Kiva, fill	Plano-convex, but called a knife because of thinness
NA 1179. M 5			32 × 22 × 6	✓					Surface	
Flakes										
	Quantity								Provenience	
NA 618	1			✓					R. 5, fill	
NA 680	3			✓					R. 3, floor	
	1						✓		R. 3, floor	
	1			✓					R. 6, fill	
NA 682	3			✓		✓			Surface	
NA 537	5			✓					Surface	
	5			✓					R. 4, fill	
	9			✓					R. 4, floor	
	13			✓					Kiva, fill	
Extreme dimensions of flakes: Maximum 70 × 55 × 35; Minimum 25 × 14 × 5										

TABLE 9.

Statistical analysis of scrapers, knives, and flakes from all sites, showing catalog number, provenience, size, material, and significant morphological characteristics. They are discussed on pages 123–124.

felt them to be "a characteristic culture trait of this group." [50] They were not characteristic at Snaketown, however, where only 2 doubtful examples were recovered,[51] and they are generally rare in the San Francisco Mountain region,[52] as well as in other parts of the Plateau.[53] They were more plentiful at the Swarts Ruin, however,[54] and have been reported from Mogollon Village [55] and from the Upper Gila.[56] Perhaps they are basically a Mogollon specialty.

Polishing pebbles. Surprisingly few small water-worn pebbles were recovered, which is especially peculiar in view of the discovery of 130 at Winona [57] and Bartlett's statement that they are "fairly common" at all sites in the region.[58] Such as they were, however, the four recovered were all of quartzite and ranged in size from maximum dimensions of 74 by 48 by 33 mm. to minimum of 30 by 22 by 7 mm. Site N.A. 618 provided 2, and sites N.A. 680 and N.A. 681 one each.

Grooved abraders or shaft smoothers. In nearly all sites in the Southwest there appear a variety of small irregularly shaped slabs, across the faces of which have been developed by a process of abrasion one or more semi-circular slots or troughs. These objects conform to no easily definable types, and have been variously called "shaft smoothers," "arrow straighteners," "grooved abraders" and the like. What they were actually used for is not always apparent, though doubtless in many cases they were rubbed along the shaft of a projectile to smooth or taper its surface. Certainly they were not "straighteners," a term more appropriate to a wrench-like object, sometimes also found archaeologically. In some sites abraders have been found with a ridge running at right angles to the groove, which might have served as a straightening device for projectile shafts, but nothing of this sort was discovered at the sites under consideration.

Of the two abraders found, one (cat. no. 680.208) came from the surface at N.A. 680 and was a small irregular fragment of sandstone 53 by 45 by 17 mm. in dimensions, with a semi-circular groove 5 mm. deep across its face. The other was a block of vesicular basalt, 155 by 142 by 132 mm. in size, with three grooves, nearly parallel and all on the same surface. These grooves measured respectively in width and depth: 22 by 7 mm., 22 by 10 mm., and 20 by 13 mm.

At Winona, seven similar objects were found, but all from the Padre and Elden Foci, and therefore probably later in date than those from Big Hawk Valley. If McGregor was correct that they were not in general use before Pueblo III and that those from Winona "appear to be the earliest occurrences" then known in the Southwest,[59] it is possible that the Big Hawk examples were slightly earlier still, or at least equally early. The best study of the subject is

[50] McGregor, 1941, pp. 188–90.

[51] Gladwin, Haury, Sayles and Gladwin, 1937, p. 112; pl. XCIV, *c*, *b*.

[52] Bartlett, 1934, p. 17; fig. 15.

[53] For example Morris says they are "not plentiful" in the La Plata District (Morris, 1939, pp. 126–27); Brew found only 1 at Alkali Ridge (Brew, 1946, p. 241); very few appeared in the Marsh Pass-Tsegi area (Beals, Brainerd and Smith, 1945, p. 55); none at Lowry Ruin (Martin, 1936, p. 54). Woodbury, 1948, pp. 369–71 has adequately treated the subject.

[54] Cosgrove, H. S. and C. B., 1932, p. 48.

[55] Haury, 1936, pl. XVIII.

[56] Hough, 1914, figs. 34–38.

[57] McGregor, 1941, p. 173.

[58] Bartlett, 1934, p. 21.

[59] McGregor, 1941, p. 182.

by Joseph H. Toulouse, Jr., to which reference is made for further comparative data.[60]

Cylinders. A number of objects, all made of vesicular basalt, found during the excavations, can best be described merely as stone cylinders, since their actual purpose and function are not apparent. The term "cylinder" is reasonably

Site and Catalog Number	Length	Maximum and minimum diameters	Provenience	Remarks
NA 618. 259	58	22 - 15	Room 1, floor	Tapered; slight constriction below head
359	55	24 - 15	Room 3, floor	Tapered; bulge below head
NA 680. 20	78	26 - 23	Room 3, floor	Slightly curved
21	60	35 - 33	Room 3, floor	Slight taper at one end
58	75	30 - 28	Room 3, floor	Slight taper at one end
59	60	32 - 22	Room 6, floor	
482	90	38 - 35	Kiva, fill	Bulge on one side
NA 681. 108	45+	30 - 28	Room 4, fill	
169	90	28 - 25	Room 3, floor	Slight taper at one end
170	80	24 - 22	Room 3, floor	Slight flattening at one end
NA 537. 294	65	35 - 20	Kiva, floor	Flat oval in section
454	45	33 - 25	Room 4, fill	Stubby; oval in section
NA 1814 E. 4	75	40 - 35	Fill	Curved; bulge below head

Distribution by lengths in mm.				
45 - 54	55 - 64	65 - 74	75 - 84	85 - 94
1	4	1	4	2

Distribution by diameters in mm.									
22 - 23	24 - 25	26 - 27	28 - 29	30 - 31	32 - 33	34 - 35	36 - 37	38 - 39	40 - 41
1	2	1	1	2	3	1	0	1	1

TABLE 10.

Statistical analysis of stone cylinders from all sites, showing catalog number, provenience, size, material, and significant morphological characteristics. Cylinders are discussed on pages 127–129.

exact in its application to most of them, which are circular in cross section and fairly uniform in diameter, with bluntly rounded ends, though a few are slightly tapered, others are somewhat flattened in cross section, a few are slightly curved along the axis, and several have various minor irregularities that are probably the

[60] Toulouse, 1939.

result rather of carelessness than of design. Table 10 presents their features and distribution, and it will be noted that while their lengths vary considerably most fall within two groups. Diameters also vary widely, the largest number falling about in the middle of the range between 30 and 33 mm. There seems to be no correlation between length and diameter.

According to McGregor, stone cylinders "form one of the most characteristic classes of artifacts" of the Sinagua beginning with the Padre Focus.[61] At Winona, however, he found none in the Winona Focus, a fact that aroused his curiosity, since he felt that they were probably derived from the Hohokam and should therefore logically be found in that focus. As a matter of fact, at Snaketown 23 somewhat comparable objects of vesicular lava were found, but only 4 of them were truly cylindrical like those from Winona and the Big Hawk sites[62]; the others were rather more pencil-like, with a slight taper, and, what is perhaps more significant than their actual shape, an encircling groove near the larger end, as if for suspension, a feature that led Sayles to call them "plummets." Grooved and tapered stones similar to these last also have been reported from other Hohokam sites, including Los Muertos[63] and Los Hornos,[64] but they were also reported from Pecos,[65] and can hardly therefore be regarded as peculiarly Hohokam. Similar stones were also common on the California coast, where they are referred to as "charmstones."

At Winona, out of 29 specimens, 21 were truly cylindrical, 8 were tapered, of which 3 had grooves, and 2 were bifurcated at the larger end.[66] In the Big Hawk sites only 2 were appreciably tapered and none was either grooved or bifurcated. The 2 tapered specimens came from site N.A. 618, at least part of which was of the Winona Focus, and one of them (cat. no. 618.259), while not having a definable groove, was sharply constricted below its butt to an extent that would have made possible suspension by an encircling cord or thong. Those grooved specimens that have been illustrated in other publications look strikingly like one of the more common types of Pueblo *pahos* or prayer sticks, which are nowadays made of wood, but might just as well occasionally have been manufactured from stone. They are used singly or tied together in pairs, and are sometimes encircled by grooves or constricted areas around which are tied strings for the attachment of feathers.[67] The grooved and tapered archaeological specimens, moreover, do not really resemble very closely the larger, cruder and generally fatter cylinders that constitute the bulk of the collections from Winona and the Big Hawk sites, and I suspect that they may not have had at all the same functions as the latter. All the truly cylindrical examples were from sites N.A. 680 and N.A. 681; none at all came from N.A. 682, and the 2 specimens from N.A. 537 (Crack-in-Rock, a Pueblo III Kayenta site) differed from the others in being decidedly oval in cross section.

It may be, therefore, that the tapered style was derived from the Hohokam since it appears at Winona (although the few instances are somewhat late) and at N.A. 618, but that the truly cylindrical style had some other affiliation, and may indeed be entirely unrelated to the other in purpose and function. Before

[61] McGregor, 1941, p. 178.
[62] Gladwin, Haury, Sayles and Gladwin, 1937, p. 112; pl. LXXXI, *e*.
[63] Haury, 1945, fig. 106, *b*.
[64] Haury, 1945, p. 182; fig. 86, *b*, *c*.
[65] Kidder, 1932, p. 93; figs. 68, *a*, *b*; 70, *b*.
[66] McGregor, 1941, p. 178; fig. 62.
[67] Stephen, 1936, figs. 49, 50.

entering upon an investigation of their occurrence elsewhere, I should say that I do not consider them either as pestles or as nose plugs. They are not pestles because they are generally too small, and there is an absence of mortars with which they could have been used, and they do not show abrasions at the ends. They are not nose plugs because they are too thick; all examples of nose plugs that have been reported are much thinner and in most instances also shorter.

Bartlett states[68] that cylinders of this sort are general in the San Francisco Mountain area, but she does not indicate the sites from which they came. Colton, more specifically, mentions them[69] from Ridge Ruin (N.A. 1785), Wupatki (N.A. 405) where 105 were recorded, and Juniper Terrace (N.A. 1814). All these were Sinagua sites of the Elden focus. Twenty such cylinders were found at Nalakihu, which also contained an Elden focus component.[70] Colton also reports them from the Cohonina site at Pittsberg (N.A. 3577), which was much earlier in time than the Sinagua occurrences thus far known.[71]

They have also been reported from the Verde Valley at Tuzigoot[72] and King's Ruin.[73] To the eastward they have been found at Stone Axe Ruin in the Petrified Forest,[74] at the SU site in the Mogollon area,[75] which seems to be the earliest recorded occurrence, and in the Jeddito region, where 27 of them were recorded, mostly from Pueblo V horizons at Awatovi, long after the use of mortars had ceased. These varied in length from 60 to 140 mm. and in diameter from 30 to 80, thus conforming fairly closely in size to the Big Hawk specimens.

Two objects of comparable size and shape were discovered at White Mound, but they were of a hard, dense stone, highly polished.[76]

What these objects were still remains unknown. They have been called "phallic symbols," which seems a little too facile; tokens carried in relay races, on analogy to the wooden cylinders carried today by the Hopi; objects used for kicking, again on analogy to modern Pueblo usage; abrasive tools for wood or stone; corn shellers, a function suggested by Dr. Colton as well as by Jim Kewanwytewa, a Hopi of Moencopi, and others.[77] Any or all of these explanations may be correct, but for what it is worth I will add my own guess that the cylinders may have been the prototypes of certain modern ceremonial objects of similar size and shape, but made from willow and embellished with feathers in the manner of a *paho*, still used by the Hopi in various ceremonies.[78] The question is not closed, however, and new proposals may still be submitted.

Points. Despite the extensive literature on the subject of projectile points and the several very thorough classificatory systems that have been promulgated, the adequate treatment of these objects in archaeological reports still remains one of the rarest and most difficult of achievements. The most general and far-ranging

[68] Bartlett, 1934, p. 26; fig. 20.
[69] Colton, 1946, pp. 220, 288.
[70] King, 1949, pp. 91–93; fig. 70.
[71] Colton, 1946, pp. 220, 288.
[72] Bartlett, 1934, p. 26; Colton, 1946, p. 288.
[73] Spicer, 1936, p. 58.
[74] Hough, 1903, p. 322.
[75] Rinaldo, 1940, p. 62; fig. 28.
[76] Gladwin, 1945, pl. XXXI, *f*.
[77] King, 1949, pp. 50, 93.
[78] Stephen, 1936, p. 802; fig. 436 (Flute ceremony); p. 595; fig. 331 (Snake-Antelope ceremony); pp. 521, 530, 535; fig. 292 (Niman ceremony); Fewkes, 1892, pp. 132–33.

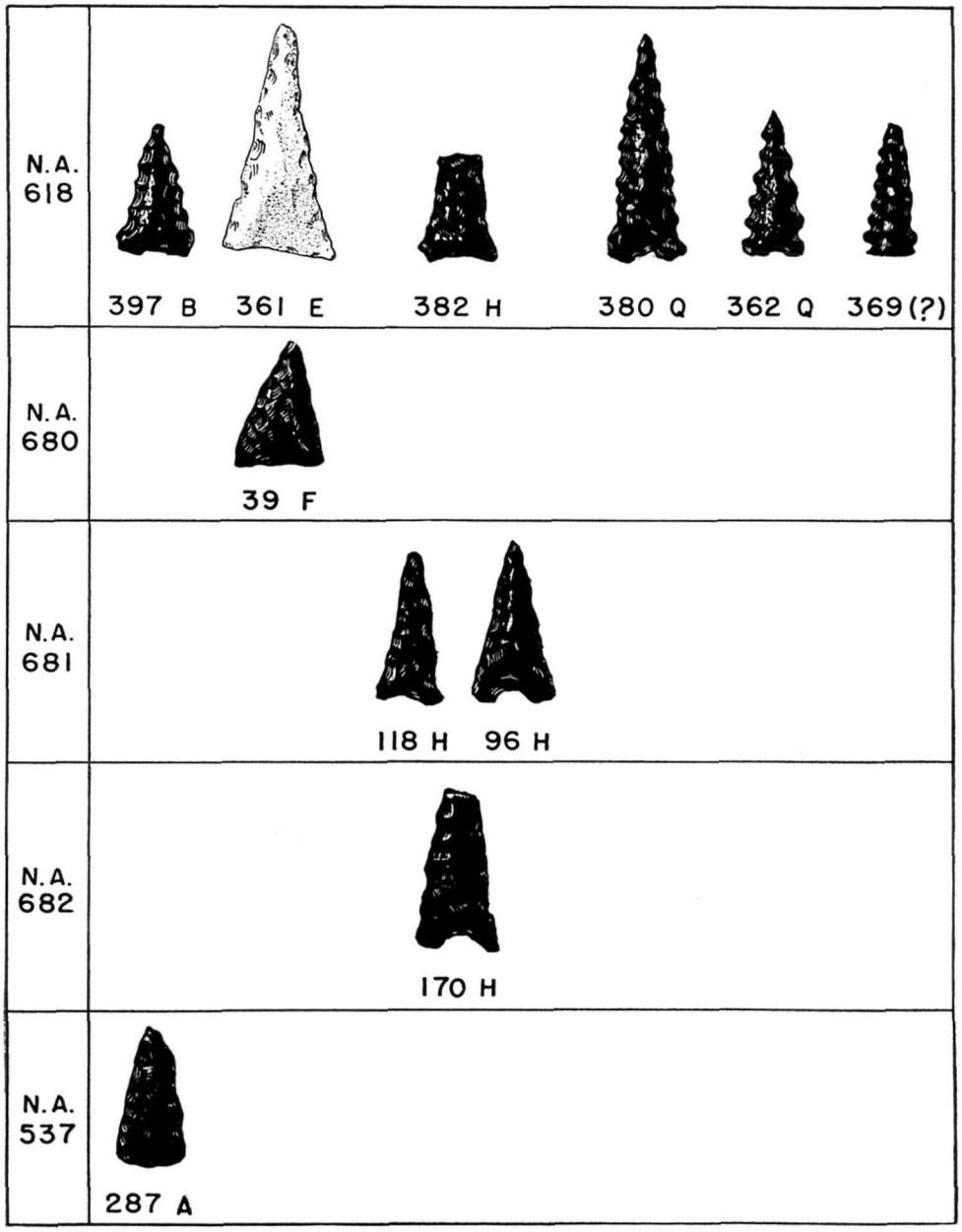


FIG. 47.

Projectile points from five sites. These examples are classified in accordance with McGregor's typology. The numerals and letters under each specimen indicate respectively the catalog number and the type, as shown in Table 11.

work on the subject has been done by Dr. E. B. Renaud,[79] but for our particular part of the Southwest an adaptation of his method made by Colton and McGregor is perhaps more closely applicable.[80] Having attempted, however, to fit the Big Hawk Valley points exactly into one or another of the published systems, I confess failure and shall have to fall back on a confessedly inadequate *ad hoc* terminology, amplified by verbal description and by reference to other published data wherever possible. All significant characteristics of the Big Hawk points are indicated in table 11, which has been constructed on the analyses underlying both Renaud's and Colton and McGregor's systems.

The number of points found was small, comprising only 13 complete specimens and 6 fragments, all of which lacked the critical basal portion. Moreover, most specimens were fairly small in size, only 3 being 40 mm. or more in length. This fact argues for their probable use in the hunting of birds and small mammals, an inference that is supported by the species of animal bones found at the several sites.[81] Turning to the collection of points from Winona as the most fully reported in the region, we shall find no close correspondence between that collection[82] and our own. In the Winona group the vast majority were notched, whereas in the Big Hawk collection not a single notched example was found. Colton[83] summarizes the local situation and concludes that the characteristic Sinagua point was notched, and that this same feature also marked both Hohokam and Kayenta types. He says, however, that most of the Cohonina points were long and slender, straight-based and without notches. This seems to leave our predominantly concave-based points under a shadow of illegitimacy.

As a matter of fact, however, two broken points from N.A. 618 (cat. nos. 618.362 and 618.380) might belong to McGregor's type Q, in which it is very difficult to distinguish the notch from the serrations of the edges.

Of the 12 points definitely without stems or notches, all had straight or very slightly convex lateral edges, three of them being serrated. The latter were, incidentally, the most elongate in the collection, suggesting the characteristic type from Snaketown. Eight had very pronounced concave basal edges and 4 had straight basal edges. Eight were more than twice as long as wide and 4 were less. There seemed to be some correlation between proportions and shape in that 7 of the 8 specimens in the elongate group had straight lateral edges and concave bases, and would conform fairly closely to McGregor's types E, F, G and H.[84] It may be significant, also, that 3 of the 4 straight-base specimens came from Crack-in-Rock (N.A. 537), which was a pure Kayenta site of later date than the others.

Only one specimen had a stem, short, broad and slightly expanding (cat. no. 681.180). Fourteen were of black obsidian, and 4 of chert.

It would be futile to attempt on the basis of these few points any extensive comparative study of types from other sites, but it may be of interest to point out that at King's Ruin and at Fitzmaurice Ruin near Prescott many of the points

[79] Renaud, 1938, 1940, 1941.

[80] McGregor, 1941, figs. 64, 65; Colton, 1946, figs. 167, 168. The typology used on work sheets prepared by the Museum of Northern Arizona, but not available in published form, provides a good analytical study framework.

[81] See Appendix 2 and table 16 herein.

[82] McGregor, 1941, pp. 183–88.

[83] Colton, 1946, p. 290.

[84] McGregor, 1941, table 5; fig. 64.

Site and Catalog Number	Type			Size and Proportion					Thickness in mm.	Lateral Edges			Base		Material		Provenience
				Length			Width										
	Notchless and Stemless	Stemmed	McGregor's Types	Less than 25mm	26 to 40 mm.	More than 40mm	More than ½ length	Less than ½ length		Straight	Convex	Serrate	Straight	Concave	Black Obsidian	Chert	
Complete Specimens																	
NA 618. 361	✓		E		36			17	5	✓				✓		✓	Pithouse X, fill
362	✓		H or Q		36			12	3	✓		✓		✓	✓		Room 4, fill
380	✓		F or Q	22				10	3	✓		✓		✓	✓		Pithouse W, floor
382	✓		H		40			11	4	✓				✓	✓		Room 4, fill
397	✓		B	20			12		4	✓			✓		✓		Room 4, fill
NA 680. 9	✓		F	19			14		4		✓			✓	✓		Room 3, fill
NA 681. 96	✓		H	25				12	4	✓				✓	✓		Room 3, fill
118	✓		H	24				10	3	✓				✓	✓		Room 3, fill
180		✓	U			45		19	5		✓		✓			✓	Surface
NA 682. 190	✓		F		36			13	4	✓				✓	✓		Room 3, fill
NA 537. 287	✓		A	21				10	5		✓		✓		✓		Kiva, fill
295	✓					47	24		6		✓		✓			✓	Room 4, fill
480a	✓		B		27		17		4	✓			✓			✓	Surface
Fragments																	
NA 618. 396	?			21+				9	3	✓		✓	?		✓		Room 4, fill
NA 680. 417	?			?			?		4	✓			?		✓		Surface
NA 681. 179	?			?			?		7		✓		?			✓	Surface
NA 682. 263	?			?			?		7	✓			?		✓		Surface
484	?			?			?		6	✓			?		✓		Surface
NA 537. 480b	?			?			?		4		✓		?			✓	Surface

TABLE 11.

Statistical analysis of points from all sites, showing catalog number, provenience, size, material, and significant morphological characteristics. Points are discussed on pages 129–133.

seemed to be similar to those from the Big Hawk sites, fairly squat with straight or concave bases, lacking notches and stems and not serrated.[85]

Some characteristic points are illustrated in figure 50.

Beads and pendants. Only 4 beads were found, one a small disk of gray mudstone from the surface near an unidentified site. It measured 5 mm. in diameter by 1.5 mm. thick and was pierced by a hole 1.5 mm. in diameter, which did not display any bevel on either surface.

At site N.A. 618 three small disks of turquoise (cat. no. 618.395) were recovered from the fill of Room 4, whose dimensions in millimeters were as follows:

diameter	thickness	diameter of hole
5	1.5	1.0
5	1.5	1.0
5	2.5	1.5

The holes were slightly bevelled from both surfaces.

A single roughly rectangular pendant of red mudstone was found in the fill of Room 2 at site N.A. 682 (cat. no. 682.233, fig. 48, C). It was 47 mm. long, 37 mm. wide at its upper end and 41 mm. at its lower end, with a thickness of 8 mm. All the edges were carefully smoothed and the corners were rounded. Near the smaller upper end was a hole drilled from both sides to produce a marked bevel on each surface, the inner and outer diameters being 3 and 7 mm. respectively. This specimen resembled closely some pottery disks of similar shape (pp. 149–153).

Cone or "corn mountain." A very interesting object made of coarse vesicular basalt was found in the fill of Room 2 at N.A. 682 (cat. no. 682.203, fig. 46, C). It had been carefully worked into a generally conical form, with a flat base, a nearly circular cross section, and a slightly rounded tip. Its basal diameters were 200 and 180 mm. and its height 215 mm. Objects of this sort have been reported from various locations in the Southwest, all of them, however, in the Anasazi region. They have been variously identified, and it will be of interest to review the literature with reference to them.

In many modern Pueblo altar arrangements small mounds or cones are employed to serve as pedestals for various objects such as prayer-sticks, feathers, ears of corn, artificial flowers, and the like. They are formed with a flat, circular base, the upper surface being smoothly convex and either approximately hemispherical, cylindrical with a dome-shaped top, or tapered upward into a rounded cone exactly like the specimen from N.A. 682. They are made of clay, wood or stone, and sometimes have small holes drilled in them to serve as receptacles for the objects they are designed to support.

Frequently, however, they remain unperforated and are set in rows before Hopi altars or around sand paintings, sometimes painted to resemble ears of corn [86] or studded with an appliqued integument of actual kernels.[87] These are said to represent the "Germ Goddess" and are often referred to as "Corn Mountains." Dr. Fewkes equated with them some stones that he found in Oak Tree

[85] Spicer, 1936, pl. XIII, *a*, *b*, *c*, *d*; Caywood, 1936, pl. LIV.

[86] Stephen, 1936, figs. 287, 313; Fewkes, 1924, p. 388; fig. 3.

[87] Fewkes and Owens, 1892, fig. on p. 114; Fewkes and Stephen, 1892, p. 213; Fewkes, 1922, p. 602; Voth, 1912, pp. 52–53; pl. XIII.

House and Cliff Palace at Mesa Verde,[88] stones that very closely resemble the one under consideration here.

In modern Hopi ritual, however, these cones are sometimes called "cloud mountains," on which the clouds are thought to perch,[89] and Mrs. Parsons notes that a stone of the same shape occurs on Laguna altars.[90] Pictorial representations of similar cones occurred frequently on the kiva mural paintings of Pueblo IV date at Awatovi and Kawaika-a in the Jeddito area,[91] although none were actually found in the excavations at these villages.

Earl Morris records and illustrates three almost exactly similar stone cones from the La Plata District and regards them as "fertility emblems," [92] a symbolism that is quite consistent with a representational function of either corn or clouds. They have also been found at the Village of the Great Kivas near Zuñi,[93] and on the bench of a kiva at Site 13 on Alkali Ridge, Utah.[94] Other archaeological examples are from the Chama Valley,[95] and the Gallina Region [96] of New Mexico. And they have been reported in modern use at Santa Clara [97] and at Zuñi.[98] Charles H. Lange, Jr., has published a very good survey of their ancient and modern occurrences,[99] to which reference is made.

Plumed Serpent figurine (?). A curious stone object made of quartzite or very dense sandstone was found in the fill of the kiva or pithouse at N.A. 680 (cat. no. 680.86). One end had been broken off but the remaining portion showed it to have been carefully made, very symmetrically formed and well polished. It was elongate, flat on one face, probably its base, from which the sides and top rose in semi-elliptical contours. At the unbroken end it was rounded to a blunt point, the extremity being at or just above the base, from which the upper profile curved upward and backward in a smooth circular curve forming a slight dome, behind which it dipped gently and then tapered slightly toward the broken end. The object was about 16 cm. long by about 7 cm. high at its maximum and 5 cm. thick at the base.

Despite the fact that this object was incomplete and was characterized by highly generalized contours, it strongly suggests the anterior portion of a figurine of the Great Snake or Plumed Serpent, especially that form called Palülükong by the Hopi and used in the Soyal or Winter Solstice ceremony. Figurines made out of clay and closely similar to this one are described by Dr. Fewkes as having been placed before the Soyal altars at Hano.[100] They were embellished with a stubby clay horn atop their heads, and with eyes, teeth and other features in

[88] Fewkes, 1911, p. 67; 1916, pp. 111–12.

[89] Stephen, 1936, pp. 47, 739, 747, 792–93, 838; figs. 31, 396, 426; Fewkes, 1898, pl. I; Dorsey and Voth, 1901, p. 42; pl. XVIII.

[90] Parsons, 1920, p. 118, note 4; fig. 19, *a*.

[91] These paintings were excavated and have been exhaustively studied by the writer of this report. Smith, 1951.

[92] Morris, 1939, pp. 139–40; pl. 137.

[93] Roberts, 1932, pp. 61, 143; pls. 10, *b*; 55, *d*, *e*.

[94] Brew, 1946, p. 241; pl. 51, *l*.

[95] Jeançon, 1923, pp. 24, 64; pls. 20, *d*; 21.

[96] Lange, 1941, pp. 44–45; pl. 20.

[97] Jeançon, 1926, pp. 133–37; figs. 1–3.

[98] Roberts, 1932, p. 61.

[99] Lange, 1944, pp. 446–48.

[100] Fewkes, 1899, pp. 266–67, 268; pls. XVIII, XIX.

meal or paint. The object from N.A. 680, similarly accoutred, would very closely resemble those Hano specimens.

Concretions. Two small sandstone concretions were found together in the fill of the pithouse or kiva at N.A. 680 (cat. no. 680.79), each in the shape of a small hemispherical bowl. The larger was almost exactly circular in cross section, with a diameter of about 65 mm. at its equator. The interior cavity was 23 by 30 mm. in diameter at its orifice, but it flared somewhat half way to its bottom. Its depth was 34 mm. The smaller concretion was rather less than a hemisphere, with diameters of 28 and 30 mm. and a height of 15 mm. Its cavity was 20 by 24 mm. in diameter and 11 mm. deep. No evidence of paint or other material was found in either specimen, but the smaller one was of a size and shape to fit very neatly as a cover for the larger.

Balls. Two stone balls, possibly concretions, unbroken and nearly spherical, were found in the pithouse at N.A. 681 (cat. no. 681.407). They measured respectively 50 by 50 by 45 mm. and 47 by 45 by 44 mm. Their surfaces were rough but showed some evidence of abrasion. Since they were too small and too soft for use as hammers they may have been gaming pieces of some sort. In a Pueblo IV kiva at Awatovi a cache of 17 such stone balls was found in a bin beneath the southern bench or platform [101] and others have been reported from numerous sites.

Floor-beam support. A small stone fragment found in the fill of pit Y at N.A. 618 (cat. no. 618.38, fig. 46, B) may have been a very significant discovery. It was apparently the broken upper end of a sandstone slab such as have been found elsewhere *in situ* as supports for the beams of elevated pithouse floors. This specimen was 183 mm. wide and 13 mm. thick; its length was indeterminable, since it had been broken across diagonally, leaving its parallel sides extending downward 157 mm. on one side and 60 mm. on the other. Approximately in the center of the upper edge a sub-semicircular notch had been chipped out, 85 mm. across its top and 25 mm. deep. The edges of this notch had been coarsely but neatly chipped on both faces.

At the colonial Hohokam site, Roosevelt:9:6, on the Salt River 38 miles north of Globe, Arizona, a large village of shallow pithouses was excavated by Dr. Haury. He describes in his report the presence *in situ* of rows of sandstone slabs, precisely like the Big Hawk specimen, set into the earth in the bottoms of the pits. The stones were arranged parallel to the long axis of the room, and were set transversely thereto, so that the notches of the stones in each row would be in alignment and could serve as cradles for a horizontal log or stringer, on which in turn Haury believed the floor had been laid. More than half of the houses at Roosevelt:9:6 contained this feature, and the stones varied in width from 100 to 225 mm., were all about 50 mm. thick, and had notches 60 to 100 mm. wide and from 12 to 50 mm. deep. Thus, the Big Hawk specimen falls within the range of those at Roosevelt:9:6, except that the latter were very much thicker.[102]

At Fitzmaurice Ruin in the Chino Valley, three similar notched stones were found *in situ* in a room within a large masonry pueblo. They measured respec-

[101] Woodbury, 1948, pp. 480–84.

[102] Haury, 1932, pp. 14–15, 16–19, 38–41; figs. 4, 5, 10, 11, 12; pls. II, III, XIA, XIIA, XIIB, XIV, XV, XVI, XVIII.

tively 1 by 6 by 20 inches, 5 by 16 by 17 inches and 1 by 8 by 23 inches. In a slab-lined shallow pithouse at the same site lay one similar stone flat on the floor, 1¼ by 7 by 15 inches.[103]

The only other area in which such stones have been reported is that of the Mimbres. Fewkes and Morris found them there [104] and Cosgrove reports 7 from the Swarts Ruin and 4 from other sites, none, however, in position. These were made variously of sandstone, tuff and vesicular basalt and were secondarily flaked around the edges. They varied from 9½ to 39 inches in length, from 7 to 10½ inches in width and from 1 to 1½ inches in thickness. Some were unusual in having side notches just below the top, which Cosgrove suggests might have been used to hold lashings.[105]

Other examples have been found in the San Francisco Mountain area, and are in the collections of the Museum of Northern Arizona.

This peculiar distribution is very puzzling. The stones were not a standard Hohokam feature, for they were not found at the Grewe site, Snaketown or Tres Alamos. They were certainly rare in the Sinagua region and apparently were not general in the Mogollon. At present we can only regard them as posing one more unsolved problem in the slough of diffusion.

If they were used at N.A. 618 as floor piles it seems very peculiar that only one was recovered, for on analogy to Roosevelt:9:6 their most likely use would have been in Pithouse X, where at least 20 or 25 would have been required.

Unidentified stone artifacts. A number of objects of worked stone were found that were not readily identifiable and to which names cannot be convincingly applied. They will be described, however, as clearly as possible.

A small bit of red sandstone (cat. no. 680.68) may have been the corner of a paint palette, though no evidence of paint remained upon it, or perhaps of a cooking slab. It was 8 mm. thick with well smoothed faces; and portions of two edges at right angles to each other measured 36 and 40 mm. long respectively. The edges had been ground round as had the corner itself. There was no indication of the original size of the slab, for it had been broken diagonally across and only this corner remained.

Another sandstone slab (cat. no. 681.181), 30 mm. thick, was well smoothed on one face but showed the characteristic Moencopi sandstone ripple marks on the other. Three edges were carefully worked into a rectangular form, but the slab had broken irregularly across the fourth edge. The portion that remained was 26 cm. wide and 41 and 29 cm. long on its two other sides. Diagonally across one corner were incised three straight marks, 17, 16 and 14 cm. long respectively and 1 mm. wide.

Another sandstone slab (cat. no. 681.414), this time of limestone, was probably a paint palette. It was 16 mm. thick, the under surface plane but irregular, the upper ground smooth but slightly convex with a sharply rounded bevel around the edges. In shape the stone was elliptical, although not much more than half of it remained, and measured 113 by 83 mm. At one point on its upper surface a very small area of red paint was visible.

A small bit of gypsum (cat. no. 680.452), 11 mm. thick, was found, both faces well smoothed, two rounded edges at right angles to each other, the corner

[103] Caywood, 1936, pp. 96, 100–101; pls. XXXV, *a*, *b*; XXXVIII.
[104] Fewkes, 1914, p. 20; Cosgrove, 1932, p. 50.
[105] Cosgrove, 1932, pp. 49–50.

between them also rounded. The specimen was only a corner of a larger piece, and had been broken irregularly. It measured 34 by 22 mm.

A large irregular block of basalt (cat. no. 618.284), from which flakes had been struck, was probably some artifact in the making. One corner had been ground down into a circular curve. It measured 29 by 26 by 6 cm.

A thin water-worn slab (cat. no. 680.53) had been modified into a very approximate ovoid shape, with all edges ground and rounded. It measured 50 by 65 mm., was from 10 to 13 mm. thick, and showed no evidence of use.

A small fragment of sandstone (cat. no. 618.450), 23 mm. thick, with parallel faces, one well smoothed, the other unfinished, may have been part of a pot cover or a door slab. It had been broken into a pie-shaped segment, and the circumferential edge was worked into the form of a circular curve. It measured 100 by 75 mm.

A rough sandstone slab (cat. no. 682.204) approximately 20 mm. thick and very asymmetrical in shape at first glance suggested the floor beam support from N.A. 618, described above. Its edges had been roughly flaked from both faces and its two long edges were approximately parallel for about half their length, although toward one end they turned and approached each other as if to form a blunt point, which however had been broken off. The other end had also been broken off straight across, but on at least one side there was a large semi-circular notch. The shape was not unlike that of a hoe but the object was too large, measuring 43 by 37.5 cm.

A small piece of quartzite (cat. no. 618.360), flat on the bottom, rounded on top and blunt tipped at the end, somewhat resembled the supposed Great Serpent figurine discussed above. One part of its convex upper surface seemed to have been used for grinding, and a semi-circular groove had been incised in its lower flat surface. It was broken off transversely and measured 73 by 44 by 23 mm.

A large block of basalt (cat. no. 680.34) very closely resembled a human foot in horizontal section, and was also just about the proper size, being 277 mm. long by 91 mm. wide across the ball of the foot and 80 mm. across the heel. It was, however, bowed upward from toe to heel, so that its base was definitely convex in the long axis but straight along the short axis. It was from 77 to 82 mm. thick, its vertical faces rose sharply from the base, and were rounded at the upper extremity into the upper surface. The convex base had been ground smooth, and the object may have been an unusual type of mano, for it could have fitted a troughed metate. On the other hand the resemblance to a foot was so striking that its possible use as a last cannot be denied, despite its great thickness, which distinguishes it from the style of slabs that are usually regarded as lasts in the Southwest.

Pigments. Eleven small bits of colored minerals were found, all of them almost certainly used as pigments for face painting or other ceremonial use. There was nothing unusual about any of these fragments and they will be listed below with their catalog numbers, dimensions and provenience:

Catalog Number	Dimensions in mm.	Provenience
Hematite		
680.10	22 × 12 × 9 (1 smooth face)	R. 3 floor
618.325	10 × 8 × 4	Pit X floor
416	25 × 17 × 16 (smooth on 1 face)	R. 4 fill
381	33 × 22 × 14 (1 smooth face)	Pit W floor
Yellow Ochre		
680.82	? × ? × ? (1 smooth face)	Pit C fill
Azurite		
618.364	Powder (ca. 8 cc.)	Pit V fill
402	28 × 18 × 15 (not polished)	Pit W cist in floor
Malachite		
680.8	15 × 9 × 9 (1 smooth face)	R. 4 floor
618.399	3 small frags. (not smoothed)	R. 4 fill
Red mudstone		
681.113	3 small frags.	R. 3 floor
618.278	24 × 11 × 6 (4 long facets smoothed on widest)	Surface

At this point should be mentioned the possible evidence found of paint on plastered walls. At site N.A. 1814E were 2 fragments of wall plaster, with small areas coated with what was almost certainly hematite (cat. no. 1814E.6) and in the pithouse at N.A. 681 were several fragments with black surfaces, but whether of paint or soot was not certain.

OBJECTS OF BONE

Implements made from animal bones were much less numerous than those of stone, and the collection was not remarkable for any unusual character in its individual specimens. Represented was one tubular pipe, 2 bone dice, 2 unidentifiable artifacts, and 35 awls, needles or gouges.

Awls, needles, gouges. All specimens within the latter three categories are fully described in table 12, where their characteristics, dimensions and provenience are listed. See figure 48 for illustrations. As a basis for the typological classification I have adopted the method followed by McGregor in his report on Winona bone artifacts,[106] which were in general very much like ours. The distribution and typology are shown in table 13, in which the capital letters at the head of each column indicate types as identified by McGregor. In a few cases his types have been further broken down into "long" and "short," "light" and "heavy" subdivisions. In the left-hand column are the site numbers in which particular specimens were found, and the numbers in the several type groups indicate the catalogue numbers of each specimen, whereby they can be correlated with the data presented in table 12.

Some qualifications of McGregor's grouping must be mentioned, however. His type B was limited to deer or antelope metatarsals, but in tables 12 and 13 herein this type has been expanded to include two ulnae (cat. nos. 682.206 and 682.227, fig. 48, D) and an antler (cat. no. 618.385, fig. 48, D) because of their

[106] McGregor, 1941, pp. 227–30; fig. 74; table 12. This typology is essentially the same as that created by Kidder for the Pecos artifacts (Kidder, 1932, p. 211; figs, 173–77) and adopted by Morris (1939, pp. 119–121; pls. 102–109) and Brew, (1946, p. 243; figs. 176–84).

Catalog Number	McGregor's type	Complete	Incomplete	Length		Maximum diameter	Split	Not split	Condition of head						Tip			Bone					Species			Provenience
				90+	90 or less				Not altered	Eagleness tapered	Partly around	Removed	Pierced	Missing	Pointed	Spatulate	Missing	Metatarsal	Radius	Ulna	Antler	Unidentified	Antelope	Deer	Unident	
NA 618																										
298			✓	45+		16+	✓							✓	✓							✓			✓	R. 3, fill
351	C		✓	30+		15+	✓		✓				✓				✓	✓					✓			R. 3, fill
352	B short	✓			70	17	✓		✓						✓			✓					✓			X, floor
383	D long	✓		128		14	✓					✓			✓			✓					✓			W., floor
384	J	✓		145		8	✓						✓			✓						✓			✓	W., floor
385	B short	✓			70	32			None						✓						✓				✓	W., floor
NA 680																										
1			✓	85+		9+	✓							✓	✓							✓			✓	R. 3, fill
12	D short	✓			77	16	✓					✓			✓			✓					✓			R. 3, floor
13	B long	✓		100		15	✓				✓				✓							✓	✓			R. 3, floor
14	F light	✓			80	6	✓						✓		✓							✓			✓	R. 3, floor
23	B short	✓			65	17	✓		✓						✓			✓						✓		R. 3, fill
27			✓	60+		8+	✓							✓	✓							✓			✓	R. 3, floor
178	B short	✓			76	22	✓		✓						✓			✓						✓		K., surface, 1 m.
NA 681																										
97			✓	78+		14	✓							✓	✓			✓					✓			R. 4, fill
98	B short		✓	50+		20	✓		✓								✓	✓					✓			R. 3, fill
121			✓	73+		11+	✓							✓	✓							✓			✓	R. 3, floor
122	F heavy	✓		135		18	✓		✓						✓				✓				✓			R. 3, fill
123	B short	✓			78	20	✓		✓						✓			✓					✓			R. 3, floor
124	B short	✓			63	20	✓		✓						✓			✓					✓			R. 3, fill
125			✓	96+		9+	✓							✓	✓							✓			✓	R. 3, fill
126	B short	✓			90	20	✓		✓						✓			✓					✓			R. 3, floor
177	B long	✓		155		19	✓		✓						✓			✓					✓			R.1, below floor
191			✓	90+		17+	✓							✓	✓			✓					✓			K., floor
243	A		✓		70+	26		✓	✓						✓		✓	✓					✓			K., below floor
244	J		✓	97+		16+	✓							✓		✓						✓			✓	K., below floor
NA 682																										
192	G	✓		162		13	✓					✓	✓		✓							✓			✓	R. 2, floor
193	G	✓		200		10	✓					✓	✓		✓							✓			✓	R. 3, fill
206	B short	✓			80	32		✓	✓						✓					✓			✓			R. 4, floor
207	F heavy	✓		112		14	✓					✓			✓							✓			✓	R. 4, floor
227	B short	✓		105		28		✓	✓						✓					✓			✓			R. 4, floor
255			✓	40+		6+	✓							✓	✓							✓			✓	R. 1, fill
273	G	✓		140		13	✓					✓	✓		✓							✓			✓	K., floor
410	F heavy	✓		155		17	✓					✓			✓							✓			✓	K., fill
448			✓		70+	10+	✓							✓	✓							✓			✓	K., fill
NA 537																										
487	J		✓	105+		11+	✓							✓		✓										K., fill

TABLE 12.

Statistical analysis of bone awls, needles and gouges from all sites, showing catalog number, provenience, size, nature of bone, parent animal, and significant morphological characteristics. The letters in the second column refer to types recognized by McGregor, 1941, pp. 227–230; fig. 74; table 12. They are discussed on pages 138–142.

similarity in shape and presumably similar function. An example which lacks the epipheses (cat. no. 680.13) is also included here.

Only one example (cat. no. 680.14, fig. 48, B) properly belongs to type F, but three others have been included because they are long, finely pointed and have no enlarged head. Their distal ends are, however, relatively heavy.

Type C-G is not exactly represented in McGregor's collection. The specimens so denominated resemble his type G in having no epipheses, but are like his type C in having elbow eyelets drilled longitudinally into the butt to meet holes drilled half way through from one side.

Site	A	B short	B long	C	D short	D long	E	F light	F heavy	C-G	H	I	J	Broken-not typed	Totals
NA 680		23 178	13		12			14						1 27	7
NA 681	243	98 123 124 126							122				244	97 121 125 191	12
NA 682		206 227							207 410	192 193 273				255 448	9
NA 618		352 385		351		383							384	298	6
NA 537													487		1
Totals	1	10	2	1	1	1	0	1	3	3	0	0	3	9	35

TABLE 13.

Distribution of types of bone awls, needles and gouges for each site. The column headings correspond to the types recognized by McGregor, 1941, pp. 227–230; fig. 74; table 12. The figures in each column refer to catalog numbers. They are discussed herein on pages 138–142.

The most frequent type at all sites except N.A. 682 was B, a short, split antelope metatarsal with unaltered head. At N.A. 682, however, type F equals it and type C-G surpasses it, and it is interesting that F occurs elsewhere only once, and C-G not at all, thus setting N.A. 682 rather apart from the other sites in terms of this class of artifacts. Bone tools were relatively rare at N.A. 618, as were stone artifacts, and were most numerous at N.A. 681, as also were stone. At N.A. 681, moreover, 7 out of 12 bone implements were in Room 3, where 17 out of 37 manos and 4 out of 8 metates were also found. It would appear that Room 3 was a busy place, and perhaps the last room to be abandoned. The same may be said for Pithouse W at site N.A. 618, on the floor of which half the small collection of bone objects from the entire site were found.

The distribution of types is not closely consistent with McGregor's, if we

assume site N.A. 618 to belong to the Winona-Angell Foci and the other sites to the Padre Focus, since in his collection, type F was predominant.

Most of the large collections of bone needles and awls, such as those from Pecos, Alkali Ridge, the La Plata District and others, contain essentially the same types as those from the Big Hawk sites, and about all that can be said is

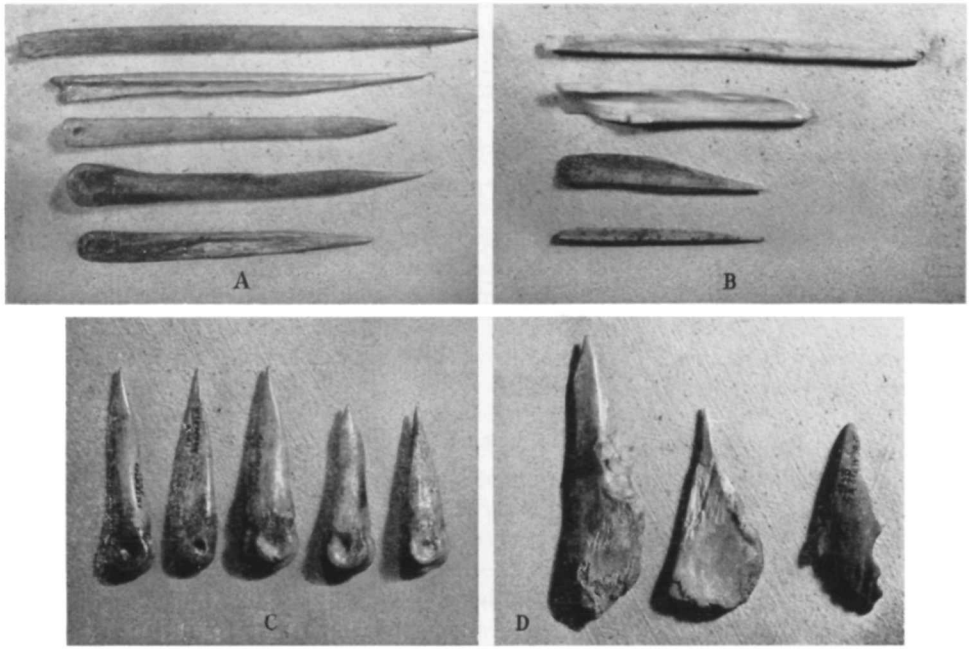


FIG. 48.

Bone awls, needles and gouges.

A. Awls and needles, top to bottom, from sites N.A. 682 (cat. nos. 682.193, type G; 682.192, type G; 682.273, type G), N.A. 681 (cat. no. 681.177, type B, long), and N.A. 618 (cat. no. 618.383, type D, long);

B. Awls and gouges, top to bottom, from sites N.A. 618 (cat. nos. 618.384, type J; 681.244, type J), N.A. 681 (cat. no. 681.97), and N.A. 680 (cat. no. 680.14, type F, light);

C. Awls, left to right, from sites N.A. 681 (cat. no. 681.123, type B, short), N.A. 680 (cat. nos. 680.178,type B, short; 680.23, type B, short; 680.12, type D, short), N.A. 618 (cat. no. 681.124, type B, short);

D. Awls, left to right, from sites N.A. 682 (cat. nos. 682.227, type B, short; 682.206, type B, short), N.A. 618 (cat. no. 618.385, type B, short).

that this collection is consistent with the general Anasazi tradition. In the La Plata material Morris states that he saw little or no change in bone-working from Basketmaker III to Pueblo III and that no chronological inferences of value could be drawn from the industry there.[107]

Nearly all identifiable specimens in our collection were of antelope bones. Fifteen were such, and only 2 were from deer. And of the 18 whose species was

[107] Morris, 1939, p. 124.

indeterminate, 14 were metatarsals, 1 was a radius, 1 an antler and 2 were ulnae. The specimens from Nalakihu as described by King display no significant variations from the general pattern.[108]

Dice. Two small rounded rectangles cut from the long bones of a fairly large mammal were found on the floor of Room 3 at N.A. 681 (cat. no. 681.119). They were carefully polished and slightly curved in the direction of the short axis. Both had slightly convex sides, measured 25 by 16 mm., and were from 2 to 3 mm. thick. Although they bore no surface markings, they may have been gaming pieces or dice. Such articles are apparently rare in the San Francisco mountain area. Only one was found at Winona,[109] and two at Nalakihu.[110]

Pipe. Only one pipe of any kind was found, this one (cat. no. 537.477) being a tubular bone specimen from the floor of the kiva at Crack-in-Rock Pueblo. It was barrel-shaped, 45 mm. long, 20 by 17 mm. in diameter at the larger end and 16 by 14 mm. at the smaller. It had apparently been completely hollowed out and then partially plugged with some plastic substance, perhaps clay, at a point about 2/3 of the length from the smaller end. A small hole pierced the plug, however, to provide passage for air. The larger orifice was 14 by 13 mm. in diameter, the smaller 10 by 7 mm.

Unidentified implements. On the floor of Pithouse W at N.A. 618 was a thin flat bone of roughly triangular shape that might have been part of a scapula or pelvis of a large mammal. It measured 50 by 45 mm. and had a maximum thickness of 18 mm. It had been worked to a blunt tip, and conceivably might have been used as a flaking tool, since the broad slightly rounded butt would have fitted nicely into the palm of the hand.

A fragment of antelope metatarsal (cat. no. 682.442) was found in the fill of the kiva at N.A. 682. It had been roughly broken at both ends, and across the center was a transverse incision made by some sharp instrument preparatory to breaking. Clearly this was the beginning of some artifact, the ultimate nature of which could not be determined.

OBJECTS OF SHELL

Very few examples of shell came to light at the Big Hawk sites, and none that was unworked. This was in strong contrast to Winona, where much shell, both worked and unworked, was found.[111] The paucity of specimens makes any classification futile and the objects will therefore be described individually.

One olivella bead (cat. no. 681.188) lay on the floor of the pithouse at N.A. 681. Both ends had been ground off in the manner of McGregor's type G, of which he found 400 at Winona and the Ridge Ruin.[112]

A long curved section of abalone shell (cat. no. 618.404) was in the floor cist in Pithouse W at site N.A. 618. It was 50 mm. long, 12 and 7 mm. wide at its respective ends, and from 2 to 5 mm. thick.

[108] King, 1949, pp. 99–100; fig. 75.
[109] McGregor, 1941, p. 233; fig. 75, K.
[110] King, 1949, p. 100; fig. 75, B.
[111] McGregor, 1941, pp. 214–26.
[112] McGregor, 1941, p. 219; fig. 72; table 11.

Glycimeris was represented by several specimens. One was an almost complete bracelet (cat. no. 618.365, fig. 49, E) formed of a section cut from such a shell. In outside diameters it measured 70 and 65 mm., the width of the band varied from 5 to 7 mm. and its thickness was uniformly about 8 mm. Three fragments of what may have been one or more similar bracelets (cat. nos. 618.276, 618.403, 618.408) were contained in the fill of Room 5 at N.A. 618. They measured respectively 25, 33 and 35 mm. in length.

Another small piece of unidentified shell came from the fill of the pithouse at N.A. 680. It was a rounded rectangle, 18 mm. long, 8 mm. wide and 3 mm. thick, and was slightly curved on the long axis. The edges of the sides and ends had been ground round, and across each end was incised a shallow groove about 1 mm. wide and deep. Perhaps this object was a gaming piece.

JET "BUTTONS"

Two perfect specimens of jet were found, one of discoidal shape on the floor of Pithouse X at N.A. 618 (cat. no. 618.324, fig. 49, A), the other a rounded rectangle on the floor of the kiva at N.A. 682 (cat. no. 682.277, fig. 49, B). Articles of this type, usually called buttons, have turned up widely distributed over the Southwest, but never in large quantity. Before considering their possible affiliations, however, we shall describe those found in the Big Hawk sites.

The one from N.A. 618 was almost circular, 39 by 35 mm. in diameter and from 5 to 6 mm. thick in its body portion. The edges were plane but slightly rounded at their junctions with the faces of the disk. From one surface rose two parallel ridges; 18 mm. long by 10 mm. wide at the base. They rose 3 mm. in height and were gently rounded on top, their sides curving outward and downward to fair smoothly into the surface of the disk. They were symmetrically placed from side to side but longitudinally they were somewhat off center. Into each ridge two tapered holes had been drilled; the holes were directly opposite each other and were directed downward to meet at the center, thus producing a single downward curving perforation through and beneath each ridge. The holes were about 4 mm. in diameter at their orifices, and about 2 mm. at their mid-points. They must surely have been used for lacings of some sort. The entire surface of the specimen had been very highly polished, almost burnished, and though somewhat checked from contact with dry air, it was a beautifully executed artifact.

The other button, illustrated in figure 49, B, from N.A. 682, was a rounded rectangle 63 by 48 mm. in dimensions and 9 mm. thick. Its edges had been ground to form a fairly sharp angle with its one plane face, but were bevelled toward the other face, which was very slightly convex. This button had a single ridge along the center of the long axis, 37 mm. long and 8 mm. wide. This ridge, however, had been formed by the cutting of a channel on either side 3 or 4 mm. below the original surface of the disk. These channels were steepsided on the edges next to the central ridge but sloped upward gradually toward their outer edges. They also sloped upward from their mid-points toward their ends and faired imperceptibly into the surface of the disk. Two perforations had been drilled through the ridge in exactly the manner employed in the specimen from N.A. 618, one being 20 mm. from one end of the button and the

other 25 mm. from the other end. Their outer diameters were 5 mm. The entire surface of this specimen also had been very highly polished.

The affiliations of these buttons would appear to be mainly Anasazi, from the fact that most other such buttons and jet artifacts of whatever kind have been reported from that region. The word "lignite" is often erroneously used in the

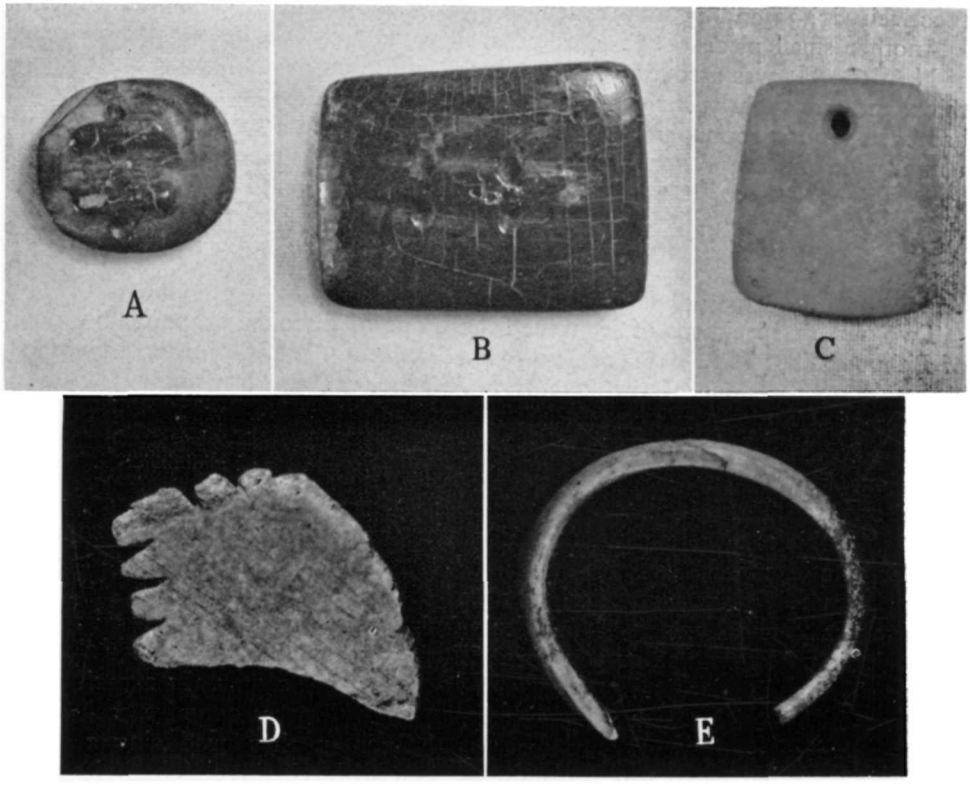


FIG. 49.

Miscellaneous small objects.

A. Reverse of circular jet "button," showing two pierced ridges, from site N.A. 618 (cat. no. 618.324);

B. Reverse of rectangular jet "button" with double perforations through a single ridge, from site N.A. 682 (cat. no. 682.277);

C. Red mudstone pendant from site N.A. 682 (cat. no. 682.233);

D. Notched sherd from site N.A. 618 (cat. no. 618.371);

E. Glycimeris shell bracelet, from site N.A. 618 (cat. no. 618.365).

literature, but jet is clearly the more accurate term. In the Marsh Pass-Tsegi area several specimens have been recovered. A disk with one ridge and one perforation came from Cave 1 in Kinboko near Marsh Pass. It was 3 inches in diameter and ¼ inch thick and was highly polished. Kidder and Guernsey, who excavated it, were not certain of its age.[113] Another specimen, this time a rectangle, with one ridge and one perforation, 2 by 2½ inches, was found in the

[113] Kidder and Guernsey, 1919, pp. 77, 147, 151; figs. 62, *k*, 69; pl. 54, *b*.

same area,[114] and at Betatakin a discoidal example, with one ridge and two holes, was recovered. It measured 47 mm. in diameter by 12 mm. in thickness.[115] Fewkes apparently found several such buttons in the Little Colorado area, though he describes and illustrates only one from Chevlon, this one discoidal with a central ridge formed by incised lunettes as on the specimen from N.A. 682.[116]

At Pueblo Bonito there were found several objects of jet. One was called a "buckle" and was a rounded rectangle in form, with a groove midway along the short axis on the reverse, spanned by 2 bridgelike arches. It was well polished and was embellished on its face by means of small turquoise disks set into each corner.[117] From the same room came also a jet pendant, rectangular and pierced at one end for suspension, and 2 jet "buttons" in the form of oblate spheroids.[118]

Jet ornaments of other forms have also been found. In a Basketmaker cave in the Tsegi was a fiber-cord necklace with "two very beautiful lignite disks strung" on it. These were simple disks with a single hole through the center.[119] And from other Basketmaker caves in Sayodneechee in Monument Valley a "large number" of spherical "lignite" beads and some tear-drop "lignite" pendants were found.[120] Fewkes also found in a burial at Chevlon what he called a lignite ear-pendant, which was a rectangular plate, with a small suspension hole near one end and five small disks of turquoise inlay, one at each corner and one in the center.[121]

From the La Plata region Morris describes a rectangular jet plate 79 mm. long by 54 mm. wide, embellished on one face with 12 small disks of inlaid turquoise. "At the center of the back, a low ridge .8 cm. wide, extends downward almost one-half the length of the plate. From opposite sides of it, 1.2 cm. from the top, two slanting drill holes converge at about one-half the thickness of the plate to provide an eyelet for suspension." [122] Two other jet pendants are described from the La Plata, one rectangular and the other trapezoidal, both pierced near one end for suspension.[123]

In a Basket Maker horizon in the Dinosaur National Monument in Northwestern Colorado was found a series of jet beads strung on a fiber cord. They were flat plates, 2 inches square, with bevelled corners and were perforated by a slot for the purpose of stringing.[124]

There have been, however, two finds of jet buttons from the Sinagua area. One was found in the notable burial at Ridge Ruin, in the form of a disk, with a ridge across one face, through which a hole had been drilled from opposite sides.[125] The other is from Nalakihu. It is discoidal and is not ridged, but bears two conical holes drilled diagonally downward so as to intersect near the center of one face.[126]

[114] Guernsey, 1931, p. 104; pl. 24, *c*.
[115] Judd, 1930, pp. 56, 75; fig. 7.
[116] Fewkes, 1904, pp. 87–88, fig. 45.
[117] Pepper, 1905, pp. 190–91; pl. 17; 1920, p. 186; pl. I.
[118] Pepper, 1905, pp. 193–94.
[119] Guernsey and Kidder, 1921, p. 47; fig. 17, *b*.
[120] Kidder and Guernsey, 1919, p. 163; fig. 75; pl. 70, *l*, *m*, *o*.
[121] Fewkes, 1904, pp. 87–88; fig. 44.
[122] Morris, 1939, p. 141; pl. 174, *b*.
[123] Morris, 1939, p. 141; pl. 174, *a*, *c*.
[124] Burgh and Scoggin, 1948, p. 40; fig. 10.
[125] McGregor, 1943, pp. 281, 297.
[126] King, 1949, p. 95; fig. 71, A.

OBJECTS OF WOOD

As would be expected from open sites, hardly any perishable objects were preserved in the Big Hawk Valley except such as had been charred, and no wooden artifacts whatever were recovered therefrom. In the limited excavation carried out at Crack-in-Rock (N.A. 537), however, several wooden articles were found perfectly preserved in the dry debris of the rooms protected by the overhanging cap-rock of the mesa.

One object (cat. no. 537.476) was a crooked stick, perhaps of cottonwood. It had been broken at both ends, but the surviving portion of the shaft was 23 cm. long by 3 cm. in diameter. At the smaller end was a natural bend of more than a right angle, forming a short stubby hook. The stick had not been artificially worked and its use was not evident.

Another stick (cat. no. 537.475) was almost surely a weaving batten. It was made of juniper, 31 cm. long and from 6 to 9 mm. thick. One long edge, which had been split, was nearly straight, while the other had been rounded into an elongated keel shape, and ground to a fairly fine but smooth edge. It was 2 cm. wide at its maximum, and closely resembled a modern Hopi or Navajo batten.

A carefully smoothed stick (cat. no. 537.465), ovoid in section and ground to a sharp tapering point, seemed to have been a needle. It was 95 mm. long with diameters of 10 mm. and 6 mm. There was no eyelet apparent, but the butt had evidently been broken off.

Three small fragments of wood in Room 4 (cat. nos. 537.457, 537.468 and 537.469) may well have been parts of an arrow shaft. One piece, which had a nock 5 mm. wide by 5 mm. deep in its larger end and a shallow longitudinal groove along one side, perhaps for feathering, was certainly the butt of an arrow. It was 60 mm. long, 17 mm. in diameter at the butt and tapered slightly to a diameter of 16 mm. at the other end, where it was broken. The second segment was 68 mm. long, and tapered from 15 to 9 mm., while the third, which was the tip, was 29 mm. long, and 5 mm. in diameter for about half its length, from which point it tapered rapidly to a sharp point. All three pieces were very symmetrical and smoothly ground.

Another similar rounded stick was 16.5 cm. long, and tapered from 8 to 5 mm. in diameter. The larger end had been broken, but the smaller had been carefully rounded by abrasion to a bunt-like point.

OBJECTS OF FIBER

A very badly decayed basket was found on the floor of Pithouse W at N.A. 618 (cat. no. 618.379) in direct association with an unbroken Black Mesa Black-on-white bowl (cat. no. 618.391, fig. 37, A) and a bone awl (cat. no. 618.383, fig. 48, A). Only some small fragments of the basket could be saved, and its detailed characteristics were not clear. It appeared, however, to have been about 23 cm. in diameter with a flat bottom and nearly vertical or slightly flaring sides. The coils averaged about 4 mm. wide and were apparently of a 2-rod and bundle construction, although the stitch was not clearly discernible.

At N.A. 537 a good deal of grass, reeds and other fibrous material was preserved, but there were only 2 artifacts of such material. The most outstanding

was a sandal (cat. no. 537.459) found in the fallen roof structure of the kiva. This was a perfectly preserved specimen and is illustrated in figure 50.

Also on the floor of the kiva at N.A. 537 were found 2 square knots of some reed or grass (cat. nos. 537.464 and 537.473). There was no associational evidence to indicate in what manner they had been used.

OBJECTS OF SHERD OR CLAY

A very few artifacts of clay, either fired or unfired, other than pottery vessels themselves, were recovered, all but one of which had been secondarily made from sherds of vessels. The exception was a crude disk of clay with coarse sand temper, sun-baked but not fired, 10 by 11 cm. in diameter and 2 cm. thick (cat. no. 682.341). It was probably a jar cover.

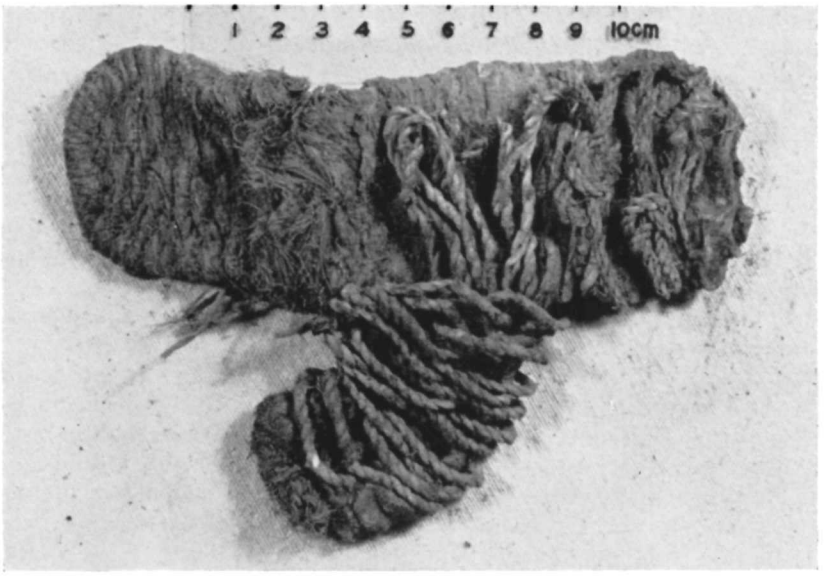


FIG. 50.
Sandal from Crack-in-Rock Pueblo (cat. no. 537.459).

A sherd of Winona Brown, broadly spatulate in shape, with the broad end rounded and bevelled, was found on the surface. It measured 160 by 92 mm. and was 6 mm. thick. It had probably been used as a scraper to smooth the interior of large ollas.

Three sherds of no definable shape showed rounded edges carefully ground, though two had been broken and their functions were problematical. The complete one, made of Tusayan White Ware, from N.A. 618 (cat. no. 618.420), was nearly rectangular, but with one corner cut off diagonally. All edges were ground smooth and it measured 53 by 22 mm. and was 4 mm. thick. Perhaps it was a pendant, not yet perforated. Another (cat. no. 691.447), from Room 3 in N.A. 681, was of Citadel Polychrome and was only a fragment. The third (cat. no. 682.439) was from the kiva of N.A. 682 and was made of a Black-on-white type of Tusayan White Ware. It too was only a small fragment with 2 edges smoothed.

Notched sherd. One sherd, however (cat. no. 618.371), was of more than casual interest. It was found on the floor of Pithouse X at N.A. 618. It is illustrated in figure 48, D, and was very carefully made from a fragment of a Deadmans Fugitive Red olla. Its original shape was not certain, for it had been broken, but it may perhaps have been approximately ovoid, with the two sides and one end ground smooth and the other end cut by a series of notches into a serrated pattern. The length was 70 mm. and the width had originally been about 60 mm. It was 5 mm. thick. There were 7 notches (perhaps one or 2 were missing), all of which had been cut by a knife or saw of some kind. They varied in shape, some being V-shaped, some U-shaped and some nearly rectangular, but their arrangement was pretty accurately radial. They varied in depth from 4 to 6 mm. and in external width from 3 to 5 mm. and formed a row of irregular "teeth" from 2 to 6 mm. wide at their outer extremities.

I have no idea what to call this object. Perhaps it was a comb, perhaps a ratchet against which was rubbed a stick or bone to produce the characteristic noise still made in some Pueblo ceremonials. In any case it represents a class of widely distributed though not numerous artifacts made of a variety of materials and in a variety of forms, but having in common the same sort of serrated edges.

The specimen most closely resembling our example was a sherd of brownish pottery from the Peñasco phase at Cave Creek Village, on the east side of the Chiricahua Mountains in southeast Arizona. Although only a small fragment, its teeth and notches were very closely similar to those of the sherd from N.A. 618 and it appeared to have been circular or elliptical in shape.[127] Cave Creek belongs to the San Simon Branch, which is said to have Mogollon affiliations, and the Peñasco is its earliest phase, following closely on the San Pedro stage of the Cochise Culture. The earliest datable intrusive pottery at San Simon was Sweetwater Red-on-gray in the Pinaleño phase, considerably later than the Peñasco phase,[128] and since this pottery type was from the Sweetwater phase at Snaketown it must be very considerably earlier than Pueblo II, even allowing for a revision upward in the Snaketown dating as originally published.

From Snaketown itself came shell objects with serrated edges, usually circular in form, mostly from the Sacaton and Santa Cruz phases.[129] And similar shell objects, probably pendants, were reported from Tres Alamos,[130] as well as from Los Muertos,[131] both Classic Hohokam sites. From Los Muertos also came a square pendant of schist similarly notched.[132]

At the Swarts Ruin in the Mimbres area was a stone pendant, notched all the way around its elliptical periphery.[133] At Winona two rectangular sherds with notches were found in the Padre focus, but these were dissimilar in that the notches were independent and did not form continuous serrated series.[134]

A few sherds, ground smooth around the edges and notched along one edge in the same pattern as the specimen from N.A. 618, have been reported from the Huasteca area of Mexico.[135]

[127] Sayles, 1945, p. 15; pl. XII, *b*.
[128] Sayles, 1945, p. 46; fig. 32.
[129] Gladwin, Haury, Sayles, and Gladwin, 1937, pl. CXIX.
[130] Tuthill, 1947, p. 73; pls. 31, *d*, *i*.
[131] Haury, 1945, p. 150; fig. 92.
[132] Haury, 1945, p. 144; fig. 87, *c*.
[133] Cosgrove, 1932, pl. 70, *f*.
[134] McGregor, 1941, fig. 21, F; table 1 on p. 70.
[135] Eckholm, 1944, p. 470; fig. 48, *e*, *f*, *g*, *h*.

It might seem from the foregoing that the trait of notching was peculiar to southern cultures, but for the existence of notched sticks used today by the Pueblos, and also a few rare archaeological finds in the Anasazi area. In a Basketmaker III cave in the Kayenta area Guernsey and Kidder found a piece of mountain sheep horn that had been flattened out and notched along both ends,[136] and Brew reports a square piece of bone with two notches in one end from Alkali Ridge, which he calls a "net-guage or thread-winder." [137]

Comparable techniques have also been reported as applied to the making of saws from flint or other hard stone,[138] but this was probably effected by flaking in the manner applied to the making of a serrated projectile point, and was not quite the same thing as the notching of a soft or dull-edged object such as shell or bone or pottery.

The technique of making slight incisions around the edge of a stone or bone pendant by an engraving process is also something rather different. Examples of that occur at Pecos,[139] in the La Plata District,[140] on Alkali Ridge [141] and elsewhere.

Pottery disks. One of the most numerous classes or artifacts of any kind was composed of pottery disks of various sizes from about 70 to 15 mm. in diameter and made from nearly every pottery type locally used. Although the specimens recovered were mostly made from pot sherds,[142] they represent morphologically a type of artifact that is of wide distribution, and that occurs elsewhere made from a variety of materials, including stone, bone, wood and gourd or squash rind. Since the ceramic character of the objects seems secondary, therefore, they are considered here rather than in the chapter on ceramics. The distribution and characteristics of these disks are presented in table 14. They are illustrated in figure 41, B. Out of a total of 29 specimens, 14 had been perforated at or near the center by the process of drilling a tapered hole from each face, the resultant perforation having the shape of an hour-glass. These holes varied in outer diameter from about 4 mm. to 9 mm. One (cat. no. 680.7) differed from the others in having 2 holes opposite each other and near the periphery. Some were very neatly finished with ground edges, others were rough and asymmetrical. The 9 unperforated examples may be merely unfinished blanks, yet to be perforated, as were 4 others that had been drilled only half through from one side. One had been drilled straight through from one face only (cat. no. 680.451a, fig. 41, B). It was not a sherd, but seemed to have been made from pure untempered grayish-white clay and was unfired; it was unique in seemingly having been directly fabricated from the original material, all the others having been secondarily made from sherds. Three were rounded rectangles rather than disks but are classifiable functionally with the rest of the group, I believe.

It is noticeable that these disks were rare at N.A. 618, where only 2 were found, in comparison with 11, 9, and 8 respectively at the other sites. This is consistent with the general paucity of artifacts of all sorts at that site, but a

[136] Guernsey and Kidder, 1921, p. 50; pl. 17, *i*.
[137] Brew, 1945, fig. 188, *k*.
[138] Brew, 1946, fig. 171.
[139] Kidder, 1932, figs. 131, *i*; 164, *f*.
[140] Morris, 1939, p. 141; fig. 173, *i*.
[141] Brew, 1946, fig. 188.
[142] One exception was specially molded of clay, and had apparently not been fired.

Catalog Number	Pottery Types								Maximum and Minimum Diameters in mm.	Thickness in mm.	Perforated	Not perforated	Provenience	Remarks
	Deadmans Gray	Deadmans Fug. Red	Winona Brown	Tusayan Gray	Tusayan Red-on-Orange	Tusayan White	Moencopi Corrugated	Tusayan Black-on-Red						
NA 618														
372	✓								40 x 40	5	✓		X., floor	
390				✓					53 x 50	7		✓	W., floor	
NA 680														
7	?								18 x 18	4	✓		Tr. A., fill	Unfired (?); gray; 2 holes
29		✓							31 x 29	5		✓	R. 3, vent.	
81		✓							18 x 16	4		✓	Pit C	
209		✓							40 x 35	5	✓		Surface	
418								✓	80(?)	5-6	✓		Surface	
423							✓		28 x 25	4	✓		R. 4, fill	Drilled ½ way through
429						✓			37 x 40	4		✓	Tr. 4, fill	
430	✓								25 x 19	5		✓	R. 4, floor	Rounded rectangle
451a	✓								32 x 30	5	✓		K., fill	Drilled through from 1 side only
451b					✓				30 x 27	3.5	✓		K., fill	Drilled ½ way through
453		✓							38 x 33	5	✓		K., fill	
NA 681														
114		✓							47 x 47	5	✓		R. 3, floor	
115					✓				42 x 42	5	✓		R. 3, fill	Drilled ½ way through
117		✓							50 x 40	6	✓		R. 3, floor	
120		✓							60 x 60	5	✓		R. 3, floor	
189	✓								16 x 16 / 13 x 13	4		✓	K., floor	Edges bevelled on one face only
432	✓								42 x 40	6	✓		K., below floor	
445	✓								50 x 50	5		✓	K., fill	Either clear Creek Brown, Adamana Brown or oxidized Deadmans Gray
446	?								65 x 65	5	✓		K., fill	
NA 682														
196	✓								45 x 40	7	✓		Surface	
228	✓								26 x 23	5		✓	Surface	
373	✓								30 x 30	4	✓		C., fill	
433		✓							45 x 45	5	✓		K., fill	
434	✓								35 x 35	5	✓		K., between walls	
436		✓							40 x 33	6		✓	E., fill	
438		✓							28 x 26	5	✓		K., fill	Rounded rectangle; hole drilled ½ way; not in center; perhaps a pendant like 681.186
440			✓						38 x 33	9	✓		K., fill	

TABLE 14.

Statistical analysis of pottery disks from all sites, showing catalog number, provenience, size, pottery type, and significant morphological characteristics. Disks are discussed on pages 149–153.

very peculiar fact is the predominance of disks made from San Francisco Mountain Gray Ware in sites at which that ware was not dominant. At N.A. 680, for example, 6 specimens were of that ware, while only 4 were of Kayenta Branch wares and 1 was indeterminate. At N.A. 681, 7 specimens were of San Francisco Mountain Gray, and 2 of Kayenta types. At N.A. 682, 7 specimens were of San Francisco Mountain Gray and 1 of Alameda Brown Ware. It appears, then, that the inhabitants of the Kayenta-style sites, where Kayenta Branch pottery was dominant, preferred disks of a pottery type that predominated only at another and earlier site, whose inhabitants in turn did not much care for disks at all. There must surely be some cross-cultural significance to this paradox, but I can hazard no guess. An examination of the size distribution will show that most of the larger disks, over 40 mm. in diameter, were at N.A. 681, where also only 1 small one occurred, but again I am at a loss to account for this situation.

The purpose for which these disks were made is problematical despite their frequent and wide-spread occurrence throughout the Southwest. They have been called game counters, spindle whorls, pendants and buttons, but all such designations are hypothetical. One might be inclined to question the spindle-whorl assignment, since they seem too light for such a purpose, were it not for the discovery by Haury in the cliff ruins of the Sierra Ancha of several slender wooden shafts, tapering at the points and "fitted, near the centers, with wooden discoidal whorls, which were seated on a wrapping of cotton or other fiber." The whorls were made of pine, never more than ¼ inch thick and from 2½ to 4½ inches in diameter.[143] Corroborative evidence of such a function is also provided by modern Pueblo examples, of which James Stevenson collected several from Walpi and Zuñi more than 60 years ago. The specimens that he illustrates were used on rotary drills as well as on spindles, and were between 75 and 100 mm. in diameter. They were made of "earthenware," wood, stone, bone, and horn.[144] In appearance they very closely resemble the prehistoric pottery disks, although they are considerably larger than most of the latter. Objects that are unquestionably spindle whorls, but of quite different shape have also been discovered archaeologically.[145] These objects are much thickened in the center and resemble spools.

In excavations north and east of Flagstaff the Museum of Northern Arizona has heretofore recorded 313 pottery disks. Dr. Colton states that they were rarely made of Alameda Brown ware, which is borne out by the presence of only 1 specimen of that ware in the Big Hawk Valley sites, but he says that they are common in Sinagua sites of all foci up to but not after 1200 A.D.[146] This is corroborated by the finds at Winona, where 78 were discovered, most numerously in the Padre Focus,[147] and at Turkey Tank pithouse, where 9 were found.[148] At Nalakihu only 4 ceramic disks were found, however, 3 of them from Kayenta Branch pottery types, one from Deadmans Gray.[149] Their rarity in the Winona Focus at Winona is consistent with the small number at N.A. 618.

[143] Haury, 1934, p. 110; pl. 66.
[144] Stevenson, 1883, pp. 370, 392; figs. 494, 547; 1884, p. 590; pl. 44.
[145] See examples from Snaketown in Gladwin, Haury, Sayles and Gladwin, 1937, p. 245; pl. CCXIII, *l*, *m*.
[146] Colton, 1946, p. 291.
[147] McGregor, 1941, pp. 72–73; fig. 21, A, B; table 1.
[148] McGregor, 1941, pp. 293–94.
[149] King, 1949, p. 101; fig. 74, D, E.

In Cohonina sites, such disks are relatively more common and the preference was for the indigenous San Francisco Mountain Gray Ware,[150] a fact that recalls the great predominance of disks of that ware at N.A. 680, N.A. 681 and N.A. 682, although those were certainly not Cohonina sites.

Such disks seem to have been rare in the Middle Verde Valley sites,[151] but more numerous in the Upper Verde area at Kings Ruin.[152] They were pretty numerous in Hohokam sites, especially of the Classic Period,[153] and occurred in the Sierra Ancha,[154] in Winchester Cave, southeastern Arizona, where they were tied in bundles of 2,[155] at the Mogollon SU site,[156] at the Harris site,[157] and at Starkweather Ruin in the Mimbres.[158] In the Anasazi region they have been reported from Pecos,[159] from Alkali Ridge, Utah, where one had been specially made of clay, and was not a reused sherd,[160] and the Kayenta-Marsh Pass area, where they were made of a variety of materials.[161]

As Haury points out[162] such disks are common not only in the Southwest but also in other parts of the world. In Middle Mississippi Valley sites almost identical objects occur in great quantity, of about the same size, drilled in the same manner, and nearly always made from sherds, though occasionally originally molded from clay.[163] They also have been reported from eastern Tennessee and northern Georgia.[164]

Gordon Eckholm collected in the Huasteca area of Mexico 22 "perforated clay disks which are apparently the wheels from small toy vehicles. The wheels range in size from three to seven centimeters in diameter and vary accordingly in thickness, the average thickness being about six millimeters. They are undecorated and very crudely made. Many are far from being perfectly circular and the perforations are in some cases considerably off center. . . ."[165] Some clay toys were actually found with the wheels in position with reference to pierced lugs attached to the toy, which had once formed the journals for wooden axles.[166] While it is not expressly so stated in the text, the illustrations of the Mexican disks show plainly that they were not sherds, but had been molded from

[150] Colton, 1946, p. 291.

[151] References cited by Colton, 1946, p. 291, notes 19, 20, 21.

[152] Spicer, 1936, p. 46.

[153] *Salt River Valley generally*: Schroeder, 1940, p. 107;
Snaketown: Gladwin, Haury, Sayles and Gladwin, 1937, p. 242; pl. 209;
Tres Alamos: Tuthill, 1947, p. 80;
Los Muertos: Haury, 1945, p. 116; fig. 71, *d*, *e*.

[154] Haury, 1934, p. 110; pl. 66. Here they were mostly made of wood.

[155] Futlon, 1941, p. 24; pl. VII, *a*.

[156] Rinaldo, 1940, p. 74; fig. 34.

[157] Haury, 1936, pl. XXX.

[158] Nesbitt, 1938, p. 99; pl. 42.

[159] Kidder, 1932, pp. 145–46, 240; figs. 128, 129, 135, 199.

[160] Brew, 1946, figs. 165; 175, *b*.

[161] Kidder and Guernsey, 1919, p. 121; pl. 51, *a* (sherd); *b* (material not stated); *c*, *d* (wood); *e* (mountain sheep horn); *f* (squash rind); Guernsey and Kidder, 1921, p. 47; pl. 17, *b* (lignite); p. 49; pl. 17, *c*, *d* (abalone shell); Beals, Brainerd and Smith, 1945, pp. 55–56 (stone).

[162] Haury, 1945, pp. 118–19.

[163] I am indebted for this data to Dr. Philip Phillips of the Peabody Museum, Harvard University, who permitted me to examine his large collection from that region. The majority were unperforated, but those that had holes were drilled in the same manner as the Southwestern specimens.

[164] Fowke, 1896, p. 109; fig. 108.

[165] Eckholm, 1944, p. 472; fig. 48, *u*, *v*, *w*, *x*.

[166] Eckholm, 1944, p. 474; fig. 49.

clay and the hole pierced before the clay had hardened. I do not suggest that the ubiquitous sherd disks of the Southwest indicate a vehicular civilization, but their similarity to the Mexican examples is provocative.

What may, however, be a reasonable explanation of the function of these disks is suggested by the discovery at Medicine Cave near the San Francisco Mountains of a specimen that was strung on a knotted raw-hide thong.[167] It may indeed have served as a button, but we are reminded of Dr. Fewkes' description of the Niman Kachina ceremony at Walpi:

> Among the characteristic objects manufactured by the priests in the kib-va were sixteen little disks made of gourds about two inches in diameter. These disks were painted on both concave and convex sides in four colors . . . . In the middle of each disk was tied a cotton string with a feather at one end, and each disk was attached to a small bush in such a way that there were four disks of different colors on each bush. Next morning one of the participants went to the west end of the mesa and in a small cleft in the rocks placed the bushes to which the variegated gourd disks were attached.[168]

[167] Bartlett, 1934, fig. 35; Colton, 1946, pp. 86, 291; fig. 169.

[168] Fewkes, 1892, pp. 72–73, 93. A drawing of the object appears on p. 72. Stephen describes the similar use of leather disks at the Niman ceremony. Stephen, 1936, p. 573; figs. 321, 322.

CHAPTER XI

WHEN IS A KIVA?

GENERAL DISCUSSION OF THE PROBLEM

THERE are many pitfalls for the unwary Southwesternist, but perhaps the easiest to fall into and most difficult to climb out of is that of the kiva. Almost anyone can stumble into a kiva but unless he is like the Monarch of Mo he cannot usually extricate himself with dignity and grace.[1] In Big Hawk Valley three subterranean structures were excavated that might be regarded either as kivas or as pithouses, depending upon the definition thereof to be adopted. The kiva, defined as a specialized ceremonial room, with few or no functions of a domestic nature, is apparently limited to the Anasazi area, and seems always to have been one of the basic criteria of Anasazi culture. It has certainly not been recognized in the Hohokam or on the Plains and the determination of its presence or absence in intermediate areas occupied by peoples of such clouded legitimacy as the Sinagua and the Mogollon becomes obviously a matter of great importance to the establishment of their proper social status. If they had kivas, perhaps they were culturally affiliated with the people on the right side of the tracks; if they lacked them, perhaps with those on the other, since presumably a feature so intimately integrated into the usually conservative religious and ceremonial pattern of a culture would likely be both consistent and persistent throughout the extent of that culture in both areal and temporal dimensions.

The objective of research in this regard, therefore, especially in frontier areas such as the Big Hawk Valley, is to determine the presence or absence of kivas at particular sites by establishing their associations in terms of other traits. If kivas were objectively identifiable through their universal and exclusive possession of some one or more constant features, the problem would be simple. Unfortunately there seems to be no such feature or combination of features that can be depended upon automatically to provide the answer, despite the fact that in certain areas and at certain times the architectural arrangement of kivas did indeed become remarkably well standardized. Over a wider range, however, the criteria for kivas seem not always to have been expressed in terms of structural pattern, but rather in the mental concepts of those who used them as such. As with the Christians, whose communal worship in any place where a number are gathered together makes that place *ipso facto* a church or shrine, even if used at times for other purposes as well, so I suspect that with the Anasazi a place was a kiva if they said it was and even despite its occasional use for secular purposes.

But since we cannot read the minds of the Anasazi we must attempt to interpret their way of life by means of their material remains, and when we analyse those remains for a common denominator for kivas we find the problem rather more

[1] The Monarch of Mo once fell into a very deep pit from which he was unable to climb; but, being a resourceful fellow, he picked up the pit, turned it upside down, and thus finding himself at the top, brushed himself off and walked away. See L. Frank Baum, *The Surprising Adventures of the Magical Monarch of Mo and his People*, p. 44. Bobbs-Merrill Co., Indianapolis, Indiana, 1900.

complex than has often been realized. The use of words as descriptive symbols is very convenient, but we must constantly be on watch against the danger of confusing the word with the thing. If the kiva is peculiar to the Anasazi culture, then it is sound deductive logic to conclude that a site plainly containing a kiva had Anasazi affiliations. But to call a particular room a kiva will not make it such, unless we can isolate some recognizable and universal feature of kivas generically. When we examine the record critically we shall see that the quest for this essential determinant is not a happy one, and in making an investigation we should be concerned not only with the objective or physical character of the rooms reported as kivas but also with collateral factors that may have influenced the reporters in making their determinations.

DEVELOPMENT OF KIVAS IN THE SAN JUAN

It is generally accepted now, I believe, that the kiva as finally evolved in its most highly standardized form at Mesa Verde, the Hopi country, Chaco Canyon and the Rio Grande, during Pueblo III and later, was at first an outgrowth of an earlier form of pithouse that had originally served simply as a dwelling. This subject has been thoroughly explored by J. O. Brew with great clarity.[2] His historical outline is quite convincing, and my purpose here is neither to add to nor to modify it, but rather to seek a handy means of determining in individual cases "When is a kiva and why?" For the purposes of this investigation it will probably prove sufficient to confine ourselves to the San Juan and lower Little Colorado areas, since the variety of what have been called kivas in those areas is probably as great as in the Anasazi region as a whole. And we shall not attempt an exhaustive survey, but consider only a representative selection from published material.

Since the Chinlee-Kayenta-Tsegi-Marsh Pass area was one major center of the San Juan Stem's development, where undoubted kivas did exist in Pueblo III times, and because any intrusion of the kiva concept into the San Francisco Mountain area would probably have come from there, let us see what standards, if any, have been applied there to the recognition and identification of kivas. For convenience and brevity I propose to summarize the published descriptions of rooms in this area whose possible function as kivas has been considered, giving also in each case the location, the reporter's determination of function and the bibliographical reference. If from this data we can isolate any one feature or group of features that is possessed in common by all alleged kivas and that at the same time is not possessed by other rooms, then we may see that a determinant has been established. If, on the other hand, we can find no such feature we shall be forced to the conclusion that, in its absence, we have no reliable key whatever to the definitive recognition of a kiva, and that the ascription of ceremonial function in a given instance must rest largely on an inferential basis and will be only a more or less convincing hypothesis. Since the published descriptions are in most cases woefully incomplete it is possible that additional information might further elucidate the problem, but in the present state of the literature this cannot be had without extensive field work and reappraisal. In the following summary some abbreviation and rearrangement of data have been made but no available information has been omitted. Whenever specific features are not

[2] Brew, 1946, pp. 203–14.

mentioned as either present or absent, it may be assumed that the original authority was silent on that point. Since the excavations of Kidder and Guernsey were the pioneer work in the area, and were also the most widespread, we shall begin with them, and follow with the reports of other investigators.

Published Data on Particular Kivas

Kidder and Guernsey, 1919.

Hagoé Canyon, Flute Player House (Ruin 5), pp. 43–44; fig. 18. Subterranean, circular, 10′ × 11′. Not maasonry. Lacked firepit, sipapu, ventilator. Pueblo III. *Not a kiva.*

Hagoé Canyon, Ruin 6, p. 46; fig. 19. Rounded rectangle, 9′ × 9′. Masonry, plastered walls, central firepit. Lacked bench, sipapu, deflector, niches. Wall where ventilator might have been collapsed. Pueblo II–III. *"Probably" a kiva.*

Comb Ridge, Olla House (Ruin 7), p. 49; fig. 21; pl. 15. Subterranean, circular, 11′ diameter. Masonry; recess with bench half way around on northeast side opposite ventilator; deflector, firepit. Lacked niches and wall plaster. Pueblo III. *Kiva.*

Marsh Pass, Ruin 8, Kiva 1, pp. 59–60; fig. 24. Semi-subterranean rounded rectangle. Masonry; "back" wall slightly bulging; "front" wall, which might have had ventilator, missing; bench all across back wall; firepit; two holes in floor that might have been sipapus. Lacked niches. Pueblo III. *"Probably" a kiva.*

Marsh Pass, Ruin 8, Kiva 2, p. 60; fig. 24. Semi-subterranean, rounded rectangle, 10′ × 12′. Masonry; one side wall bulging; "front" wall, which might have contained ventilator, missing; central firepit, sipapu, 2 rows of loom holes. Lacked deflector, bench niches. Pueblo III. *Kiva.*

Marsh Pass, Unnumbered Ruin, pp. 64–65; fig. 25. Subterranean, circular, diameter 10′. Masonry, bench all around, recess at southeast with ventilator tunnel beneath it and shaft outside; deflector, firepit, sipapu. Pueblo II or III. *Kiva.*

Chinlee, Waterfall Ruin (Ruin 9), pp. 72–73; fig. 27. Subterranean, rounded square. Masonry, ventilator on south side, rectangular firepit, sipapu(?), "probably" a deflector, 2 rows of loom holes, 3 posts set into wall. Pueblo III. *Kiva.*

Sayodneechee, Ruin 2, Kiva 1, pp. 20–21; figs. 3, 5. Semi-subterranean, circular, diameter 14′. Masonry; firepit; sipapu and deflector "cannot be determined"; ventilator outside south wall. Lacked bench, niches. Pueblo II(?) *Kiva.*

Sayodneechee, Ruin 2, Kiva 2, pp. 22–23. Semi-subterranean, circular, diameter 12′. Masonry, recess on north side opposite ventilator; firepit. Lacked sipapu, deflector. Pueblo II(?) *Kiva.*

Monument Valley, Ruin 4, pp. 37–38; fig. 14. Semi-subterranean, rounded square, 7′ × 7′. Masonry, plastered walls, firepit, sipapu, deflector, ventilator at southwest corner. Lacked bench, recess, niches. Pueblo II(?) *Kiva.*

Guernsey and Kidder, 1921.

Comb Ridge, White Dog Cave, pp. 23–24; fig. 7; pl. 10, *a*. Subterranean, flattened circle, diameter 12′. Masonry, ventilator, firepit, probably 4 posts. Lacked deflector, bench. Area of possible sipapu not excavated. Pueblo II(?) *Kiva*(?)

Guernsey, 1931.

Chinlee, Poncho House, p. 53; fig. 18. Not subterranean, roughly rectangular, 15′ × 11′. Masonry, fireplace, deflector, ventilator, 4 loom holes. Lacked bench, sipapu. Pueblo III. *Kiva.*

Bubbling Springs Wash, Cave 1, p. 5, fig. 2. Two kivas are said to exist in this Pueblo III ruin, but they are not described, beyond being circular and of masonry.

Bubbling Springs Wash, Cave 2, p. 12, fig. 3. Oval, ventilator on south. Not further described. Pueblo II. *Kiva.*

Chinlee, Ford House, pp. 43–44; fig. 16. Semi-subterranean, circular, diameter 12′. Masonry, firepit, ventilator. Lacked bench. No other features mentioned. Pueblo III. *Kiva.* Subsequent re-use as secular room determined by presence of two mealing bins directly over firepit.

Keet Seel Canyon, Cave 2, pp. 62–64, fig. 23. Early occupation: subterranean, circular, diameter 15′. Masonry, firepit, ventilator, southeast recess. Lacked bench. Pueblo III. *Kiva.* Later occupation: subterranean, circular, flattened on one side, diameter 11′ × 12′. Masonry, firepit, deflector, ventilator, 4 loom holes, 3 other holes that might have been sipapu, 2 posts set in wall. Lacked bench, recess. Pueblo III. *Kiva.*

WEST, 1927.

Navajo Canyon, Ruin 3, p. 23. Circular, diameter 10′, ventilator at southeast. No further description. Pueblo III. *Kiva.*

Inscription House, 3 rooms, p. 31. One was oval with battered walls, 13′ × 10′; two were circular, diameter 7′. No further description. Pueblo III. *Kivas.*

CUMMINGS, 1915.

"*On the Kayenta*," p. 276. Circular, diameter 15′, bench half way around. No further description. *Kiva.*

Water Lily Canyon, Twin Cave House, p. 276. Circular, diameter 20′; bench all around, firepit, deflector, ventilator, wall niches, rectangular box 4″ × 8″ in floor that might have been a sipapu. *Kiva.*

Nitznoeboko, Pine Tree House, p. 278. Circular, diameter 8½′, semi-subterranean, firepit against wall, ventilator 3′ to its right. No further description. *Kiva.*

Same, p. 279. Square, 10 × 10′; firepit, sipapu, 24″ × 10″ × 5″, covered with plank. No further description. *Kiva.*

BEALS, BRAINERD AND SMITH, 1945.

Black Mesa, Site R.B. 551, pp. 49–52; fig. 10; pls. 9, *b;* 10, *a.* Circular, diameter 21′, subterranean. Masonry, bench all around; firepit, deflector; ventilator at southeast; rectangular box covered with board that might have been sipapu; 4 posts in face of bench. Lacked niches, recess. Pueblo II. *Kiva.*

Tsegi Canyon, Site R.B. 1006, pp. 69–70; fig. 13. Roughly circular, diameter 11′, subterranean. Masonry; recess on east side with ventilator tunnel beneath it; bench ⅓ way around opposite side; deflector, firepit, one niche. Lacked sipapu. Pueblo II. *Function not certain.*

Kaycuddie Canyon, Site R.B. 568, Room P, pp. 82–83; fig. 17. Semi-subterranean, rounded rectangle, 8′ × 7′. Masonry, plastered walls, ventilator, firepit, deflector. Lacked sipapu, bench, recess. Pueblo II–III. *Function not certain.*

Same, Room Q, pp. 82–83, fig. 17. Rounded rectangle, 7′ × 9′, semi-subterranean. Masonry, deflector, ventilator at southeast corner. Lacked firepit, sipapu, bench, recess. Pueblo II–III. *Function not certain.*

Farther to the West but still within the area of the San Juan Stem is the Tusayan Ruin on the South Rim of the Grand Canyon, which was excavated by Haury and in which were two rooms that are of interest here.

HAURY, 1931.

Tusayan Ruin, Grand Canyon, Kiva A, pp. 6–12; fig. 2. Partially subterranean, crudely circular, diameter 19′. No masonry. Firepit, sipapu, ventilator on southeast, bench half way around opposite ventilator; 4-post roof support. Lacked deflector. Pueblo III. *Kiva.*

Same, Kiva B, pp. 15–20; fig. 3. Partially subterranean, flattened circular, diameter 20′. No masonry. Firepit, ventilator to east, bench all around, 4-post roof support. Pueblo III. *Kiva.*

Betatakin

At Betatakin, a Pueblo III ruin in the Tsegi Canyon system, a thorough investigation was carried out by Neil M. Judd and room-by-room descriptions were published.[3] These data are not always complete or adequate but they include Judd's identifications as kivas of 5 rooms out of a total of 135. It is interesting to study his notes and to analyse the characteristics of his putative kivas in comparison with those of other rooms in this ruin, as well as with alleged kivas in other ruins of the general region. It will serve no useful purpose here to recapitulate in detail all the specifications of each room at Betatakin, but an attempt to isolate those features that conceivably might be diagnostic in identifying a kiva will be valuable.

In describing the 135 rooms in the ruin, Judd classified them in 6 groups: kivas, dwelling rooms, storage rooms, open courts, unidentified rooms, and unexcavated or destroyed rooms. For the purposes of this inquiry we may ignore the storage rooms, which were usually small and relatively featureless, the open courts and the unexcavated and destroyed rooms. There remain 20 rooms that Judd called either kivas or dwelling rooms. The data for 16 others was too incomplete for their functional identification. Table 15 presents in concise form the features of these rooms to the extent provided by the original report; where a particular item was not mentioned as present there was usually no positive statement that it was lacking but since Judd's notes were pretty carefully compiled its omission from them may probably be taken as evidence of its absence.

A study of table 15 will reveal several things. First, there were no circular rooms in Betatakin, so that if there were kivas at all they must have been rectangular. Secondly, the five alleged kivas have only one characteristic certainly common to all of them, namely plastered walls. Four of them also possessed fire-pits, deflectors and a ventilator hole in the wall, and it is very likely (though not expressly stated) that the fifth, Room 55, also had those features, since Judd thought it was "obviously a ceremonial chamber. Like other Betatakin kivas, its special function is evidenced by certain furnishings never present in secular structures." Moreover its walls were smoked.[4]

Four of the five "kivas" were relatively large, being more than 3 meters in at least one dimension, and the fifth was not much smaller. No other single feature was common to more than two. We might, then, conclude tentatively that a kiva at Betatakin was characterized by relatively large size, plastered walls, fire-pit, deflector and ventilator. But when we investigate the 15 alleged "dwelling rooms" we will see that a good many of them possess one or several or, in some cases, all of those same characteristics.

Although in general the "dwelling rooms" are smaller, 2 of them are of sizes comparable to the "kivas." At least 6 are definitely stated to have had plastered walls, and very likely others had them also, since that was a general characteristic of Pueblo II and III architecture everywhere. Twelve rooms had firepits, which certainly cannot be regarded as peculiar to kivas anyway, 7 had deflectors, and 4 had ventilators. Two "dwelling rooms" had benches, while only 2 "kivas" had them. Four "dwellings" and only one "kiva" had loom holes. Five "dwellings" and only one "kiva" had wall niches. One "dwelling" had a floor cist, whereas

[3] Judd, 1930.
[4] Judd, 1930, pp. 35–36.

Room Number	Dimensions in meters	More than 3 m. in one dimension	Less than 3 m. in both dimensions	Mealing bins	Plastered walls	Sipapu	Door or hatch	Platform	Firepit	Deflector	Wall ventilator hole	Bench	Loom holes	Shelf or niche	Decorated walls	Cist	Remarks
"Kivas"																	
11	3.3 × 2.6	✓			✓		H		✓	✓	✓				✓		
14	2.8 × 2.7		✓		✓		D	✓	✓	✓	✓						Also in Cummings; 1915, p. 277
18	3.5 × 2.8	✓			✓		D	✓	✓	✓	✓						
22	3.0 × 2.2	✓			✓		H		✓	✓	✓	✓			✓		
55	3.8 × 2.2	✓			✓							✓	✓	✓			
"Dwelling Rooms"																	
3	2.9 × 2.1		✓		✓		D		✓	✓			✓				
7	2.6 × 1.8		✓		✓												
27	2.5 × 2.4		✓		✓		D		✓	✓				✓			
29	2.8 × 2.4		✓		✓		H		✓	✓	✓	✓	✓				
30	? × ?													✓			
35	3.2 × 3.1	✓			✓				✓		✓			✓			
39	2.7 × 2.1		✓		✓		D		✓	✓		✓	✓				
43	1.9 × 2.1		✓				D		✓								
66	2.4 × 2.1		✓				D	✓	✓	✓							
79	2.2 × 2.1		✓				D	✓	✓	✓	✓			✓			
81	2.3 × 1.5		✓														
89	1.9 × 1.8		✓				D		✓		✓			✓			
93	2.1 × 1.6		✓				D		✓								
95	2.8 × 2.4		✓				D	✓	✓	✓			✓				
121	3.3 × 2.6	✓					D		✓							✓	
"Unidentified Rooms"																	
4	1.9 × 1.8		✓		✓		D		✓	✓							
16	3.3 × 1.7	✓												✓			Long and narrow
23	1.8 × 1.6		✓						✓								
25	2.8 × 2.6		✓				D		✓	✓	✓			✓		✓	
41	3.6 × 2.1	✓					D		✓	✓							
46	3.2 × 3.1	✓															
48	1.2 × 0.8		✓														
49	4.2 × 1.4	✓					D		✓					✓			
56	3.3 × 1.7	✓		✓													Long and narrow
57	2.9 × 2.1		✓														
75	3.0 × 2.4	✓			✓	*							*		✓		* Shallow hole 2" diam. in floor near East wall
80	2.0 × 1.8		✓						✓								
82	2.5 × 2.4		✓		✓		D		✓	✓	✓						
117	3.4 × 2.2	✓		✓													
126	2.5 × 2.2		✓						✓			✓					
127	? × ?						D										

TABLE 15.

Statistical analysis of all features of "kivas," "dwelling rooms," and "unidentified rooms" at Betatakin, as reported by Judd, 1930, showing room numbers, dimensions, and all recorded characteristics. These rooms are discussed on pages 158–161.

there was none among the "kivas." Walls decorated with incised markings existed in 2 "kivas" and not in any "dwelling." Two "kivas" had hatchway entrances, but this occurred in only one "dwelling." Only a single questionable "sipapu" occurred, and this in an unidentified room that also was larger than normal and had some incised decoration on its wall. It would seem that this room was thus as much entitled to be called a kiva as any of the others, especially by reason of its possible sipapu. This is a feature whose presence, if positively established, should serve beyond question to identify a room as a kiva, since its ceremonial significance is such that it could not occur in a purely secular room. But it is not, on the other hand, an essential feature of a kiva,[5] many of which, in both modern and ancient Pueblo villages, lack them. Furthermore its identification is in many instances open to question, since we cannot be sure that any little hole toward the center of the floor was really a sipapu. Conceivably it might have been a posthole, a ladder socket, a floor cist or something else, and consequently a published identification categorically identifying a sipapu without further description is always suspect; there was certainly a hole in the floor, large or small, round or rectangular, but that it was a sipapu is purely inferential. In many cases doubtless it was such but we should be very careful not to jump to conclusions.[6]

Even allowing for some incompleteness in the descriptions, it is very difficult to see on what standard Judd based his identifications, for his classifications are certainly not mutually exclusive. Only three rooms, Nos. 11, 22 and 29, possessed hatchways, a feature peculiar to kivas in the Mesa Verde area and elsewhere, but they did not have all the other features in common, and Judd has called two of them kivas and one a dwelling. It looks as if he had had in mind the notion that in a general way kivas were relatively large and tended to possess certain other features, none of which was, however, conclusively diagnostic, and that his estimates were largely subjective or intuitive, as he himself frequently implies by the use of expressions of uncertainty.

This is said in no wise disparagingly. I have pointed out the discrepancies in the Betatakin data only in order to emphasize the belief that even in this highly evolved Pueblo III village the diagnostics of kivas are practically impossible to recognize.

Little else pertinent here has been published for the Kayenta-Marsh Pass-Tsegi-Lower Chinlee area but some writers have expressed general views as to the characteristics of kivas there. Cummings thought that the earliest kivas were circular and that the later ones were rectangular[7] and he seemed also to believe that they had to be subterranean and to possess a sipapu.[8] Guernsey and Kidder at one time wrote that ". . . the mere presence of a ventilating apparatus . . . and the subterranean situation . . . are all features perfectly normal in Cliff-dweller kivas."[9] Normal, perhaps, but certainly not universal or exclusive. They added, however, that kivas in the western San Juan area, during Pueblo II and early Pueblo III, were notable for their "variability and characterlessness."[10]

[5] Brew, 1946, p. 211.

[6] This subject has been further discussed with reference to Crack-in-Rock (N.A. 537) on pp. 72–74.

[7] Cummings, 1915, pp. 275, 279.

[8] Cummings, 1915, p. 272.

[9] Guernsey and Kidder, 1921, p. 26.

[10] Kidder, 1924, p. 72; Kidder and Guernsey, 1919, p. 201; Guernsey and Kidder, 1921, p. 26.

This last observation, originally made over 30 years ago, remains valid, and I am convinced that no workable definition or trait list can be compiled on the basis of present knowledge whereby a kiva can certainly be recognized in the western San Juan area, at least during Pueblo II and early Pueblo III.

ALKALI RIDGE

Because of the great thoroughness with which the data have been amassed and presented, it is also helpful to consider here Brew's report on pithouses and kivas on Alkali Ridge.[11] The variability during the Developmental Pueblo Period is nowhere better shown than there, where 14 kivas and 15 pithouses are analysed for 40 different characteristics. In the majority of cases these characteristics occur in some but not all of the rooms of each class. There are several features that occur in some pithouses but never in kivas: slab or post-supported walls, partitions, floor ridges, and southern antechambers. Two features occur in some kivas, but never in pithouses: coursed masonry and benches. In terms of shape all kivas are round, whereas pithouses are both round and rectangular, and pilasters occur in all kivas but never in pithouses. Even at Alkali Ridge, then, there was a good deal of kiva variability, which will appear much greater when these kivas are compared with those already described from farther west and south. The one feature that was limited to kivas at Alkali Ridge, namely, pilasters, certainly was not a criterion across the San Juan River, where it did not occur at all.

THE PROBLEM OF IDENTIFICATION

As a consequence of this lack of uniformity in kiva architecture even in this part of its homeland there is therefore no acceptable standard by which particular rooms, either above the surface or subterranean, can be certainly identified as kivas in frontier areas like that of the San Francisco Mountain region, where the situation is further complicated by foreign influences. That does not mean, however, that hypothetical identifications cannot be made on consideration of a balance of numerous factors. Looking back over the data already adduced from the home grounds of the Kayenta Branch, it seems to me that the most convincing determinant in most cases lies not in the specific features of any particular room taken in the absolute, but rather in that room's relationship to other rooms in the architectural unit of which it was a part. There is not one architectural feature that is either universally present in all kivas and universally absent from all non-kivas, or *vice versa*. Every single recognized feature of the rooms described in the preceding pages either may often be absent or may occur reasonably often in rooms of the other class. While I have spelled out the situation at Betatakin most fully, a similar analysis of the other instances listed will produce comparable results. This is not to say that reasonable identifications are not possible, or even that those heretofore made are incorrect. It does imply, however, that the assigned reasons for the determination may often not have been the actual reasons.

It is my feeling that in a large number of cases a given room may have served for both secular and ceremonial uses, and that in most of those cases there is no

[11] Brew, 1946, table 5 on pp. 204–205.

way whatever of certainly determining the fact. On the other hand, there are many cases in which the relationships of a particular room within its architectural complex, its difference in shape or size from other associated rooms, and its positional relation to them, will be of greater significance in its identification than any or all of its internal features as such. A critical examination of the original reports that have been summarized above will reveal that nearly always the room called a kiva was regarded as such becuse it differed in some way from the other rooms of its unit, or stood apart from them positionally; and not primarily because it possessed or lacked any particular internal feature or complex of features. For example, in many of the ruins considered, one room was perhaps circular while all the others were rectangular; it was subterranean while the others were built upon the surface; it was relatively larger than most of the others; it stood apart from the others, perhaps to the south or southeast; although obviously contemporary, it possessed the only ventilator or the only bench or recess in the unit. Thus it was set apart; to be a kiva it did not have to be square or round, subterranean or surficial, to be equipped with any particular kind of roof, to possess a ventilator or a bench or even a sipapu. It merely had to be different. Guernsey and Kidder had this idea in mind, I think, in discussing a room at White Dog Cave in Comb Ridge. A Basketmaker site occupied the cave, but there was also a circular, masonry, subterranean room, equipped with a fire-pit and ventilator, which pretty clearly represented a much later occupation of what they then (1921) called "Cliff-dweller" type. They saw that it resembled other rooms that had been called kivas. "On the other hand we have never seen, nor have we read of, a kiva built as is this room all by itself with no living chambers in the vicinity. All kivas with which we are familiar form integral parts of house clusters." [12] In other words they were reluctant to regard it as a kiva on its morphological features alone, in view of its peculiarly isolated position.

POSSIBLE KIVAS IN SAN FRANCISCO MOUNTAIN AREA

If the San Juan kiva was evolved during Pueblo II out of an early pithouse type of dwelling and did not reach any high degree of specialization or standardization until well into Pueblo III, as is usually believed and very convincingly expounded by Brew,[13] then it seems probable that, when this kiva concept, during its transitional period, was introduced, as apparently it was, into an area like that of the San Francisco Mountains in which one or two differing cultures were also present, it would become manifest in a spectacular galaxy of mutations.

In that region there existed traditions of variously shaped pithouses, both shallow and deep with either side or top entrances, and with and without ventilators, as well as surface structures of various sorts. The impingement of a still uncrystallized kiva concept on this situation could only result in something rather variable and unstable. Let us look at those rooms or houses in the region that for one reason or another have been called kivas by their excavators.

At Elden Pueblo, near Flagstaff, a Sinagua site in a cultural position corresponding to Pueblo III, there was a rounded rectangular room, much larger than any of the other rooms in the pueblo, with a bench all around, but lacking any other

[12] Guernsey and Kidder, 1921, pp. 26–27.
[13] Brew, 1946, pp. 203–14.

very distinctive features. Dr. Fewkes, who excavated and partly restored Elden Pueblo, reported that this room was "half-underground" and that it had a ventilator tunnel through the east wall at floor level. "The vertical portion of this shaft is enclosed by stone masonry bulging from the external wall of the room." He found no deflector or fire-pit, but observed that the room had "great similarity" to kivas at Marsh Pass.[14] Perhaps it had, but no more than to many dwelling rooms at Marsh Pass also.

Since the existence of kivas in Sinagua sites has not up to this time been established, the proper identification of the large room at Elden Pueblo is of considerable importance. Fortunately there is additional direct evidence available. Dr. Colton, who was present at the site during the period of Dr. Fewkes' excavations, says that the room was not in fact below the level of the ground, and that in the position at which Fewkes depicts a ventilator there was merely a pile of stones. He adds, however, that since Dr. Fewkes strongly felt the need for a kiva somewhere in the ruin, he felt justified in postulating a ventilator because he thought there ought to be one.[15] It thus becomes apparent that the evidence for a kiva at Elden can be made to depend only on the large size of the room in question and the existence of the bench within it. These features do distinguish it from the other rooms in the Pueblo, and it may well have had ceremonial function. But its positive designation as a kiva is obviously quite unwarranted.

At N.A. 1814, a site of mingled cultures, 3 miles south of Big Hawk Valley, there were two surface masonry houses of 9 and 4 rooms respectively. A short distance to the east of each surface unit was a subterranean rectangular masonry structure. One (N.A. 1814E) was unusually large, and had an eastern recess with ventilator beneath it, deflector and fire-pit.[16] The other (N.A. 1814F) had an alcove in the northeast corner, but no recess or bench, a ventilator at the southeast, a fire-pit, a probable sipapu covered with a board like that at N.A. 537 and 2 rows of loom holes.[17] Again I believe this room may well have been a kiva, not only because it had an apparent sipapu, but because of its positional relation to the surface structure nearby. If the latter was a dwelling, as it seems to have been, then it does not seem likely that a contemporary subterranean structure in close association with it would also have been a dwelling.

At Lebarron Ranch on the rim of Walnut Canyon is situated site N.A. 521, consisting of a surface pueblo of 7 rooms and a rectangular subterranean room of masonry. The latter had a central fireplace, deflector and ventilator, but no bench, recess or other special features, except a round hole in the floor approximately where a sipapu might have been. It was closely similar to Padre Focus pithouses, but its relation to the pueblo strongly suggests that it was a kiva.[18]

Heiser Spring Ruin (N.A. 1754), a site several miles east of Big Hawk Valley, contained a Kayenta component consisting of a masonry surface structure of three rectangular rooms, all large enough for dwelling purposes, and east of it an oval subterranean room, also of masonry, with a bench all around, an eastern recess, beneath which passed a ventilator, a fire-pit, a deflector, possible loom holes, 2 wall niches and 4 posts set against the face of the bench; a rectangular hole in the floor west of the fire-pit might have been a sipapu. That this was a

[14] Fewkes, 1927, p. 213; fig. 207.
[15] Colton, Harold S., personal communication.
[16] This structure is fully discussed on pp. 77–80 herein. See also Colton, 1946, pp. 151–52.
[17] Colton, 1946, pp. 152–54, fig. 87.
[18] Colton, 1931, p. 28; 1946, pp. 67–68; fig. 35.

kiva seems almost certain, both because of its internal features and because of its position and association.[19] That the features in themselves, however, were not sufficient for identification of the room as a kiva was emphasized by Hargrave, who pointed out that any or all of them are known to have occurred in pithouses that were certainly not kivas. And he adds that "we must look outside the structure for an explanation of its use." [20]

The Citadel (N.A. 355), 2 miles northeast of the Big Hawk sites, another Kayenta pueblo of about 30 rooms, has never been fully excavated, and in two published descriptions by Colton no reference is made to possible kivas.[21] On the other hand an earlier report by Barrett mentions a "rectangular kiva" 13′ by 11′; it had a wall niche but no bench; and no further details are supplied.[22] Since this pueblo belonged to the Klethla Focus of middle Pueblo III, however, it would seem likely that it did have a kiva, even though its objective features were not very distinctive.

At Nalakihu, near the Citadel, King reports that one room "displayed features which hint strongly the room had once been used as a kiva: e.g., fire-pit, hole for deflector, hole possibly for ladder base, and possible sipapu. Other floor features exist, but it is significant that the above named, and those only, were plastered over, presumably when a second story was added and Room 2 was converted into a storeroom." [23] With reference to another room King points to the presence of ventilator, fire-pit and loomholes as possibly suggesting its use as a kiva, but adds cautiously that those features "are not sufficient to establish" it as such.[24]

The only other sites in the general region in which possible kivas have been described are Wupatki (N.A. 405) and Crack-in-Rock (N.A. 537). The latter pretty certainly had a kiva, which is discussed herein on pages 70–75. At Wupatki, a mixed site with a Klethla focus component, there was a very large circular surface structure of masonry, 50′ in diameter, with a northeast entrance, a bench all around and a fire-pit. No means for supporting a roof were found but this room may have served as a kiva.[25]

In recapitulation, then, it seems to me that the certain determination of any given structure as a kiva during Pueblo II and early Pueblo III in the San Francisco Mountain area is a well-nigh impossible task, but that reasonable hypothetical identifications can be made by a broad consideration of the morphological features of the room in connection with its positional relationships. On this basis I believe that very likely the three subterranean structures at N.A. 680, N.A. 681 and N.A. 682 were all kivas. That at N.A. 682 was most convincingly so, because it had most of the features, excepting only the bench, that might be expected in a kiva, and it bore an appropriate relation to its surface pueblo. That at N.A. 680 is slightly less convincing, since its possession of a sipapu was not certain, though in other respects it was kiva-like and it too was properly located with reference to the surface structure. That both of these rooms were quite unlike the rectangular masonry pithouse of contemporary Sinagua sites provides additional evidence that they were kivas. The subterranean room at

[19] Hargrave, 1933, pp. 58–64; figs. 20, 23. Colton, 1946, pp. 130–31; figs. 70, 73.
[20] Hargrave, 1933, p. 64.
[21] Colton, 1932, pp. 33–36; fig. 15; 1946, pp. 52–53; fig. 25.
[22] Barrett, 1927, pp. 46–47; figs. 34, 40.
[23] King, 1949, pp. 22, 50.
[24] King, 1949, p. 30.
[25] Colton, 1946, p. 57; figs. 28, 30.

N.A. 681 is more problematical. It possesses no feature that could not have been found in a contemporary Sinagua pithouse of the Padre Focus, and in fact was strikingly like most of them. On the other hand there was almost no ceramic or other evidence of Sinagua origin at N.A. 681, and the entire site seemed to belong to the Kayenta Branch. That being so, and the positional relationship of the subterranean room to the surface pueblo being identical with that at N.A. 680 and N.A. 681 I feel that it was very likely used as a kiva.

CHAPTER XII

RECAPITULATIONS AND CONCLUSIONS

With a detailed study of the architecture, the pottery and the other classes of material remains from all four sites before us, we may now view them more broadly and attempt to fix their probable cultural and chronological positions against the background of the setting and in terms of their complete archaeological complex.

VALIDITY OF BRANCH NAMES AS APPLIED TO LOCAL CULTURE COMPONENTS

We may, I think, accept the hypothesis that none of these sites, nor for that matter any others that are known in Big Hawk Valley, began its existence much if any before 1100 A.D. If the dating of the eruption of Sunset Crater is correct, ecological factors incident to that cataclysm would pretty well establish this early limit. We know, from previous archaeological work, that at that time there were peoples living all around the area of Big Hawk Valley, who have for convenience been designated as belonging to several cultural branches, the interrelationships of which with each other are only partly known. These branches have been called the Kayenta, which was across the Little Colorado River toward the northeast, the Winslow in the middle Little Colorado Valley to the east, the Sinagua just over the Coconino Divide to the south, and the Cohonina beyond the San Francisco Mountain lava fields to the west. It would seem that all these peoples had long had knowledge of and contacts with each other, and it is not necessary that we assume wide cultural divergences between them; they may in fact, as some observers believe, have been the possessors of different manifestations of what was a basic and reasonably homogeneous culture. That they did possess some recognizably different traits of material culture seems, however, fairly clear, the differences being especially marked in the fields of architecture and ceramics.

Wholly aside from any pertinent questions of their ultimate origin it seems to me plain that the pottery complexes identified as San Francisco Mountain Gray Ware, Alameda Brown Ware and the several wares of the Kayenta and Winslow Branches are discrete entities, and while they may have been made on occasion by people actually living together in a single village or have been freely traded back and forth between the inhabitants of neighboring villages, they still represent manifestations of cultural groups differing from each other in some consistent manner, which may or may not have been of a degree sufficient to warrant their differentiation, in terms such as focus, phase, clan, branch, tribe, stem, root or whatnot. Entry into the lists of that taxonomic joust seems to me at this point quite needless and conducive only to utter frustration in a verbal quagmire. That these people were different, that they came, like the hosts of Lars Porsena of Clusium, from West and South and East and North, that their colors and their arms were blazoned on the pots that they carried on their backs

and perhaps the kilts that girt their loins, and that their identities may be recognized by these criteria, is the real point. Whether they were focus friends, branch brothers or stem siblings was of no consequence to them, nor should it be to us a primary consideration. Our task is to ascertain, if possible, as many of the distinguishing factors about them and their cultures as we can; and whether the sum of those differences induces us to place them on one or another level in a synthetic taxonomic skyscraper seems totally unimportant, insofar as the people and cultures themselves are concerned. There is no magic in words, except as we bemuse ourselves with them, and whether we presume to categorize our poor dead Yoricks as members of phases, foci, branches or the Populist Party will change them not one whit. They will remain what they made themselves, and the problems that they compounded will not be solved simply by calling them names. For purposes of our own verbal convenience, however, names we must have, and since the system in general use in the Southwest, promulgated by Mr. and Mrs. Harold S. Gladwin of Gila Pueblo,[1] has met with general approval and acceptance its use here is to be desired.

That system was promulgated for the Southwest at almost the same time that a different system was proposed for the Midwest by W. C. McKern.[2] The Midwestern system is based on the premise that archaeological cultural entities can best be differentiated according to statistical features only, and its subdivisions therefore carry no temporal or areal connotations. The Gladwin system, on the other hand, differs through the imputation to its subdivisions of areal and especially of chronological implications, and thus is very different in concept from that of the Midwesternists.

The Gladwin system has been adopted by the Museum of Northern Arizona, but with two small changes in terminology, namely the substitution of McKern's word *focus* to designate the smallest unit, instead of Gladwin's *phase*, and the addition of the word *component*, for the manifestation of a particular focus at a given site, also after McKern.[3] The same precedent has been followed in this report.

Beyond the *phase* (or *focus*) in the Gladwinian system is the *branch*, and still beyond that the *stem* and *root*. These terms are not chronologically limited, but designate culture-complexes undefined in time but existing within rather flexible geographical boundaries. None of Mr. Gladwin's categories was exactly defined, nor could they have been, but they still serve as useful classificatory devices.

The Gladwinian *root* refers essentially to an underlying cultural tradition, with only incidental emphasis on geographical distribution; whereas the *stem* and *branch* designate essentially local manifestations of that tradition within fairly well-defined geographical areas.

These simplified definitions are my own, but they represent, I think, the manner in which the words have come to be used in practice, and on this basis it seems appropriate to refer to the several manifestations that we have dealt with herein as *branches*. As a designation this word serves as a convenient verbal tool and need have no greater specificity or permanence than our knowledge of

[1] Gladwin, W. and H. S., 1934.

[2] McKern, 1934, 1939.

[3] The reasons for these changes are explained in Colton, 1939 b, pp. 6–11. Since Gladwin and McKern had each used *phase*, but with different meanings, it was felt desirable to drop it altogether and substitute McKern's *focus*, which was approximately correlative to Gladwin's *phase*, but retaining all Gladwin's other terms.

the particular case permits.[4] It may be used to designate a local cultural manifestation without necessarily implying a position for the latter within any specific *stem* or *root*, and without qualitative implications relative to any other branch. It designates, that is, an independent "working unit" in archaeological research and does not require its commitment in terms of "genetic" relationship to any other branch, stem or root, but on the contrary it permits these broader associations and consolidations to wait on the acquisition of increased knowledge. As a name it certainly need not commit its unhappy bearer to ineluctable sanguinal or affinal ties, but should serve merely to distinguish him from some other fellow who looks somewhat like him and who in fact, when more information is available, *may* turn out to be his brother, but who, pending settlement of his case, is entitled to be regarded tentatively as a separable entity for the mere purpose of further study, and not with any implications of finality as to his cultural kinship.

For present purposes, then, but without dogmatism, I have retained, as useful terms of reference, the branch names accorded to the several groups of people involved in our mystery drama.

EVIDENCE OF DIFFERENT COMPONENTS AT SITE N. A. 618

At N.A. 618 there appears to be present a variety of architectural styles, which may indicate the presence there of more than one component, either simultaneously or successively. Pithouse Z, since it was stratigraphically situated beneath the plaza wall of the surface masonry unit, was perhaps the earliest structure there, but since there was no pottery that could be directly associated with it and virtually nothing determinable of its architecture, we can only surmise its probable associations. We cannot even be certain whether it was a dwelling or merely a storage pit. The mere fact, however, that it was a fairly large, roughly oval pit, something over 30 centimeters in depth, suggests that it had affiliations with either the Sinagua or Cohonina Branches, in both of which there existed the tradition of shallow pit houses, a feature that was certainly foreign to the Anasazi, except at a much earlier date.

Sinagua Affiliations of Pithouse X

Perhaps contemporaneous with Pithouse Z, and almost surely somewhat earlier than Pithouse W and the surface structure, was Pithouse X. As already described (see pp. 20–25, figs. 8–9) the distinctive features of this structure were its depth of about 1 meter, its rounded rectangular shape, about 7.5 by 4 meters in size, its short eastern entrance with ramp and steps, its two-post roof support, its peripheral row of wall stakes, and its lack of masonry. All these features point to certain very similar houses situated to the south in the area of Sinagua occupation. The one most like Pithouse X was at N.A. 1814C on Juniper Terrace about 3 miles to the south,[5] which Colton felt was "hard to place" because the pottery suggested the presence of components from three branches: Sinagua (35%) , Kayenta (18%) and Cohonina (46%), but he felt that on the evidence of datable sherds which belonged to Ceramic Group 6, the house had probably

[4] Mr. Gladwin defined branch simply as corresponding to "the culture areas named by Kidder: Kayenta, Chaco, etc." Gladwin, W. and H. S., 1934, p. 10.

[5] Colton, 1946, pp. 149–50; fig. 85.

been occupied between 1100 and 1150, and that it might have been built by people of the Sinagua Branch.[6] The pottery complex at N.A. 1814C was strikingly similar to that in Pithouse X, and we may consequently suppose that they were built by similar people at nearly the same time.

Architecture. Other houses suggestive of Pithouse X were found at Winona Village some 20 miles to the southeast, the most notable being N.A. 2133A,[7] which, however, did not have an upward-sloping ramp inside its entranceway. McGregor assigned this house to the Winona Focus of the Sinagua Branch and reported twelve beam specimens that provided cutting dates between 1071 and 1086 A.D.[8] Both he and Colton likened it to houses typical of the Sedentary Period of the Hohokam, and there were indeed found within it a Winona Red-on-buff jar with a Gila shoulder.[9] We should here recall that on the floor of Pithouse X was an olla of Winona Brown with a Gila shoulder. The pottery complex of N.A. 2133A as a whole showed Alameda Brown Ware at 60%, San Francisco Mountain Gray Ware at 23%, and the Kayenta wares at 13%, a distribution differing from that in Pithouse X in the reversal of relative proportions of the Sinagua and Cohonina components.

Without going too deply into the matter, it will be of value to point the way briefly to certain similar housetypes in other areas of the Southwest. At Snaketown all houses from the Snaketown through the Sacaton phases were generally similar in size, shape, depth, post arrangement and side entranceway, the principal difference being that at Snaketown the entranceways did not slope upward.[10] Of all the houses at Snaketown, however, those of the Sacaton Phase of the Sedentary Period were most nearly like the Sinagua examples that we have been discussing. Since the Sacaton Phase corresponds in date with Pueblo II[11] the extension of Hohokam influence into the San Francisco Mountain area at about that time is strongly suggested by Pithouse X.

At San Simon Village, a Hohokam site in southeastern Arizona, the houses of all phases had inclined entranceways with a step at the outer end and sometimes another half way along the passage as well, and were generally similar to the Sacaton Phase houses at Snaketown.[12] And at Tres Alamos, another Hohokam site, that had, however, been strongly influenced by later Salado contacts, there were some pithouses with side entrances containing a step and upward-sloping ramp.[13]

Although it was not excavated, a Hohokam type ball court exists within about 1/3 mile southeast from Site N.A. 618, a fact very strongly corroborative of the hypothesis for Hohokam influences in Pithouse X, since it seems plausible at least that the latter might have been constructed in association with the court. This one seems to be the most northerly ball court to be reported in the Southwest.

In the Mogollon area there have been pithouses excavated at the Harris site in Catron County, New Mexico, that are much like Pithouse X, rounded-rectangular in shape, with a two-post roof support and an inclined side entrance

[6] Colton, 1946, p. 154.
[7] McGregor, 1941, pp. 89–92; fig. 27; Colton, 1946, pp. 185–86; fig. 103.
[8] McGregor, 1941, p. 18; Colton, 1946, p. 185.
[9] McGregor, 1941, p. 92; Colton, 1946, p. 185.
[10] Gladwin, Haury, Sayles and Gladwin, 1937, pp. 61–84; figs. 21, 22, 24, 25, 36.
[11] Gladwin, Haury, Sayles and Gladwin, 1937, p. 247.
[12] Sayles, 1945, pp. 20–30; pl. 14, *b*; figs. 17–21, 23.
[13] Tuthill, 1947, p. 23.

with a step.[14] At the Starkweather site also there were rectangular pithouses with inclined lateral entranceways.[15] These Mogollon similarities seem somewhat tenuous, and may be only fortuitous, but the close parallelism between Pithouse X, N.A. 1814C, and N.A. 2133A on the one hand and the Hohokam houses of Sedentary date on the other surely argue strongly for the recognition of Hohokam influence at N.A. 618 — not directly exerted doubtless, but rather transmitted through the medium of the Sinagua peoples in the intervening area.

Pottery complex. How does it happen, then, as shown in table 1, that in Pithouse X, particularly upon its floor, where at least 18 large ollas were found *in situ*, the vast bulk of the pottery was San Francisco Mountain Gray Ware, characteristic of the Cohonina Branch? One possible hypothesis in explanation of this paradox would be that the room was built by Sinagua people, who later gave place to a Cohonina group, the latter retaining some of the Sinagua vessels but adding a larger number of their own manufacture. Another hypothesis would be the one favored by Mr. Gladwin, that both Alameda Brown Ware and San Francisco Mountain Gray Ware were made by a people of a single cultural group anyway and do not therefore imply the presence of two separate components.[16]

Sinagua Affiliations of Pithouse W

Just north of Pithouse X was another large subterranean structure, Pithouse W. It was comparable in some respects to Pithouse X, but in other features was completely different. Since it has been fully described above on pp. 17–20 I will here simply emphasize certain of its features including its depth of about 1.5 meters, its two-post roof support, its heavy masonry walls with posts set into them, and its rectangular easterly entranceway with two steps and sloping floor. These features all point to a close correlation with several other pithouses previously excavated toward the southeast, namely N.A. 3644C,[17] N.A. 3644J,[18] both at Winona Village, N.A. 3673R,[19] N.A. 1785C,[20] both at Ridge Ruin, and N.A. 2098A, near Turkey Tanks about 15 miles toward the south, as it had been originally constructed and before alteration.[21]

McGregor has assigned all of these houses, except N.A. 1785C, to a position late in the Angell Focus of the Sinagua Branch,[22] and he places N.A. 1785C in the Padre Focus.[23] The Angell Focus was felt by him to be transitional during the early 12th century between the Winona Focus, with its provocative Hohokam characteristics, and the Padre Focus, which was a development of the deep pithouse with the addition of masonry and the substitution of a small ventilator mechanism for the large side entrance.[24] The time differential, however, between

[14] Haury, 1936, p. 116; fig. 25.
[15] Nesbitt, 1938, pp. 32–33.
[16] See note 3 on p. 00, and Gladwin, 1943.
[17] McGregor, 1941, p. 110; fig. 36; Colton, 1946, pp. 225–26; fig. 127.
[18] McGregor, 1941, pp. 112–14; fig. 38; Colton, 1946, pp. 228–29; fig. 129.
[19] McGregor, 1941, pp. 136–39; fig. 48; Colton, 1946, pp. 237–38; fig. 136.
[20] McGregor, 1941, pp. 141–43; fig. 50; Colton, 1946, pp. 140–41; fig. 80.
[21] Colton, 1946, pp. 176–79; fig. 98.
[22] McGregor, 1941, pp. 120–21.
[23] McGregor, 1941, p. 142.
[24] For a full discussion of the sequential evolution of Sinagua house types see McGregor, 1941, pp. 159–66; figs. 55, 56.

the Winona, Angell, Padre and Elden Foci, the latter with its surface pueblo, was very slight, and all three forms may have been utilized simultaneously in the early 12th century.

Pottery complex. We might, therefore, confidently assign Pithouse W to the Angell Focus at, say, 1100 A.D., but for the startling pottery situation within it. The sherd collection from its floor was composed 85% of Kayenta types, with virtually no Alameda Brown Ware and about 11% of San Francisco Mountain Gray Ware, although there remained *in situ* three Deadmans Fugitive Red ollas, two Winona Brown ollas, and one Black Mesa Black-on-white bowl. The upper part of the fill of the room also contained a much larger percentage of Kayenta types than any other area within the site. A possible explanation of this strange phenomenon will be proposed at a later point, after consideration has been given to certain other factors involved in the site as a whole.[25]

AFFILIATIONS OF SURFACE PUEBLO

Coming up out of the pithouses we are confronted with the surface structure, which on the basis of architectural criteria could also have been built by Sinagua people, this time during the Elden Focus. Although it is not so large it has a good deal in common in its general plan with the Ridge Ruin, N.A. 1785A, a Sinagua site, about 20 miles to the southeast, near Winona Village. That structure was also a multi-roomed surface pueblo with an irregular walled compound to the south and east, and although its masonry was largely sandstone and limestone instead of basalt blocks as at N.A. 618, this difference was probably only a reflection of the local availability of the respective materials.[26] Site N.A. 1814, situated on Juniper Terrace, about 3 miles south of N.A. 618, also involved a masonry pueblo with a walled enclosure to the east.[27] Other Sinagua sites of similar style were a group on New Caves Hill (N.A. 486–503, 723–34).[28]

COMPOUNDS

That this feature of walled compounds came up originally from the south or southeast, is, I believe, indicated by its complete absence in the "pure" Anasazi areas, by its numerous occurrences in Hohokam sites beginning in the late Sedentary Period and by its presence in the Upper Gila area. At Los Muertos in the Salt River Valley near Tempe, Arizona, occur many sites comprising groups of rooms within walled compounds, all belonging to the Classic Period, but some of them in the Soho Phase, which was before the supposed Salado invasion, and some in the Civano Phase, which was afterward.[29] At Sacaton:9:6, a Hohokam site of the Sedentary Period, in the Santan Mountains, abandoned prior to the coming of the Salado, there were compound walls of mud.[30] At Tres Alamos, near Bisbee, Arizona, a Classic Hohokam site, there were two

[25] See p. 173.
[26] See McGregor, 1941, pp. 148–57; figs. 4, 52a, 52b; Colton, 1946, pp. 138–40; figs. 76, 77, 78.
[27] Colton, 1946, pp. 145–55; figs. 82, 83, 84.
[28] Colton, 1946, pp. 66–67.
[29] Haury, 1945, pp. 17–37; figs. 3–22.
[30] Gladwin, 1929, p. 31; pl. VII.

walled compounds enclosing rooms.[31] At Casa Grande compounds existed,[32] though apparently not at Snaketown. They also existed in another culture area, the Upper Gila, as reported by Hough, at ruins near Luna, New Mexico.[33] These latter occurrences all seem to have been relatively late, probably during Pueblo III or IV.

The question of diffusion of this trait is not, however, a simple one. Haury has pointed out that it first appears in the Gila Basin toward the end of the Sedentary Period, and adds: "It is so radical a departure from the local and earlier house form that its introduction, from some other area seems a fact. Ruins in the Pueblo territory to the north embodying the same idea — that of enclosing courts and room clusters with walls — have been found as far north as Flagstaff and as early as Pueblo II. They have also been noted on the Verde, chiefly along the southern part of the stream, along Tonto and Rye Creeks, and in the vicinity of Globe, where the building material was usually stone in place of adobe. The idea was therefore well represented in the Pueblo area and at a relatively early time and over a considerable region. The assumption of a Pueblo-Hohokam diffusion, therefore, is logical. Once adopted, and apparently with reservations, there was little change until after the arrival of the Salado people when this type of architecture was climaxed." [34]

I cannot completely agree with Haury in his supposition of diffusion from the north to the Gila Basin. It is true that compounds existed around the San Francisco Mountain area in late Pueblo II and early Pueblo III but this is not appreciably earlier than their appearance in the Sedentary Period of the Hohokam, and moreover the export balance at that time seems to have been all from south to north. Besides, there are no more antecedents for the trait in the northern area than in the southern, since I do not know of it in earlier horizons anywhere on the Plateau; and the instances cited by Haury in the Verde Valley do not, I think, entirely substantiate his thesis. As described by Mindeleff [35] these sites are referred to as "boulder-marked" and apparently did not contain actual walled plazas, but only scattered stones or rows of stones, like windbreaks.

I suspect that the source will eventually be found in the Upper Gila region, where excavations have recently been done by the Peabody Museum, and if so it may prove to have diffused from there both to the Hohokam and to the Sinagua. The instances cited by Haury near Globe would likely have come from the same source. The fact that the trait appears among the Hohokam before the "Salado invasion" does not necessarily militate against this theory, for certain particular traits might have diffused without any actual movement of peoples. In fact the Hohokam had been getting intrusive pottery from the Upper Gila as far back as the Pioneer Period.

POTTERY OF N. A. 618 COMPARED WITH THAT OF CERTAIN OTHER SITES

To get back to our main theme, however, after this digression, we must note that despite the architectural similarities between N.A. 618 and the other sites referred to, their ceramic complexes vary enormously.

[31] Tuthill, 1947, pp. 18–19; unnumbered map inside back cover.
[32] Gladwin, 1928, p. 7.
[33] Hough, 1907, figs. 24, 31, 33, 47.
[34] Haury, 1945, pp. 36–37.
[35] Mindeleff, 1896, pp. 235–38.

At Ridge Ruin, Alameda Brown Ware was in such predominance as to constitute over 90% of all sherds, with the Kayenta wares in very small quantity and San Francisco Mountain Gray Ware practically absent. At Juniper Terrace, although the relative proportions differed somewhat at different parts of the site, in the pueblo itself the Kayenta wares were the dominant group with about 50% of the total, whereas Alameda Brown Ware constituted only about 16% and San Francisco Mountain Gray Ware about 32%. At N.A. 618, the sequence changed again, for there about half the sherds were of San Francisco Mountain Gray Ware, with Alameda Brown Ware well behind and the Kayenta a very poor third.

Still further study of the sherd collections will show that at Ridge Ruin the proportion of decorated sherds (mostly of Kayenta types) was only 11% of the total number of sherds; at Juniper Terrace it was up to the very large ratio of 31%, while at N.A. 618 (even disregarding all the restorable undecorated ollas on the floors of Pithouses X and W) it was only 10%.

As to indications of dates for the three sites provided by key pottery types, both Ridge Ruin and Juniper Terrace appear to have been somewhat later than N.A. 618. The sherds from the two former sites fall into Ceramic Group 7, while those from the latter fall into Group 6, the criteria being mainly the presence or absence of Flagstaff Black-on-white and Walnut Black-on-white.[36]

We seem therefore to be at a complete impasse in any attempt to reconcile the architecture of these three sites with their ceramic complexes. Architecturally, the evidence is that they were all of Sinagua origin, but if so, they did not all continue uncontaminated. Ridge Ruin remained pure, since the relatively small quantity of Kayenta types may be explainable as imports. But there seems later to have been a great invasion of Kayenta peoples, or at least of their pottery, into Juniper Terrace, with a smaller but still significant influx of Cohonina people and/or pottery at the same site. At N.A. 618 the place seems to have been taken over almost completely by the Cohonina. In attempting to interpret this situation we must not overlook the very important fact that the datable pottery at Juniper Terrace was somewhat later than was that at N.A. 618, and that this pottery was mostly of a Kayenta origin. Putting all this together, then, I am about to hazard the glorified guess that all three sites were originally built and occupied by Sinagua people, that subsequently groups of Cohonina people were added to the populations at both N.A. 618 and at Juniper Terrace and that finally an influx of Kayenta people took place at Juniper Terrace and to a very limited extent at N.A. 618, where they occupied only Pithouse W, as evidenced by the 85% of Kayenta sherds left on the floor of that room and in the fill above it.

This postulation of an original occupation by Sinagua people, augmented by a later Cohonina component, and finally by a Kayenta component is further corroborated by the evidence provided at the other sites excavated in Big Hawk Valley, N.A. 680, N.A. 681 and N.A. 682. In many respects these sites are closely comparable, their common features including the presence of a small surface structure with from 3 to 6 rooms, low wing walls extending toward the east, a deep pithouse, with ventilator but no side entrance, within the area embraced by wing walls, and subsurface storage pits. The ceramic complexes are generally similar also, being composed predominantly of Kayenta Branch types, with a smaller but substantial proportion of Cohonina Branch types, and exceedingly small representations of Alameda Brown Ware, Little Colorado White Ware

[36] Colton, 1946, pp. 20, 144, 149. See pp. 89–90 and table 1.

and Prescott Gray Ware. The substantial and consistent occurrence of Flagstaff and Walnut Black-on-white places them all in Ceramic Group 7,[37] somewhat later than anything at N.A. 618 except the fill in Pithouse W.

RELATION OF SURFACE PUEBLOS TO PITHOUSES (OR KIVAS)

There is no certainty that the surface houses and the pithouses at these sites necessarily belong to each other as parts of the same occupational unit. But the very close similarity of their arrangements with respect to each other, as well as the close correlation of pottery collections in them, in each of the three sites strongly suggests that they do, despite the wide dissimilarities between the pithouses themselves. And although no other sites in the immediate vicinity were excavated, the areal survey showed numerous others in the Valley that seemed, from surface indications, to conform to the same pattern. This pattern in itself is not perfectly distinctive, but perhaps its most obvious correlation is with the widely distributed surface-house-kiva combination that is so characteristic of Pueblo II in the San Juan Anasazi area, originally called by Prudden the "unit type." The predominance of Kayenta Branch pottery would almost clinch such a determination, were there not also present the sizable Cohonina ceramic component.

Little is known of Cohonina architecture, but there is some evidence that a similar arrangement of surface rooms and pithouse may have been used by the people of that Branch. At N.A. 192–94, just to the south in Deadmans Flat, two surface granaries with wing walls and a pithouse on the east were found to contain a pottery complex 82% to 89% San Francisco Mountain Gray Ware, and were regarded by Hargrave and Colton as belonging to the Medicine Valley Focus of the Cohonina Branch, dated approximately at the end of the 11th century.[38]

N.A. 1764, on Deadmans Mesa, was also composed of a masonry surface unit of two rooms with a rectangular masonry pithouse to the east. It did not have wing walls, however. The pottery contained more than 50% Cohonina sherds, with Sinagua and Kayenta sherds each in about half that proportion. Datable types place the site in Ceramic Groups 6 and 7, or early in the 12th century.

N.A. 1608 in Medicine Valley, about 8 miles to the southwest, also comprised a masonry pithouse with a masonry surface structure of one very large room and a wing wall to the east. The ceramic complex showed a great predominance of San Francisco Mountain Gray Ware, the datable sherds being in Ceramic Group 6, but since the site was not fully excavated it contributes only incidentally to the solution of the problem.[39] These sites, however, are all peripheral to the Cohonina area, and may well have been strongly affected by Sinagua or Kayenta influences. Dr. Colton notes that surveys by Gladwin and Wilder south of the Grand Canyon prove the predominance there of San Francisco Mountain Gray Ware but do not indicate the presence of deep pithouses. He believes that the deep pithouses do not belong properly to the Cohonina Branch, but come from the Sinagua or Kayenta Branches,[40] though Cohonina people may have occupied them in some cases.

[37] Colton, 1946, p. 20.
[38] Hargrave, 1933, pp. 46–47; fig. 17; Colton, 1946, pp. 46–49; fig. 24.
[39] Colton, 1946, pp. 119–20; fig. 63.
[40] Colton, 1946, p. 274.

While the deep pithouse certainly was an ubiquitous characteristic of the Sinagua during the Angell and Padre Foci, it was apparently not ordinarily associated with a masonry surface structure to form a "unit type" combination. Dr. Colton has remarked that some Sinagua pueblos of the Elden Focus "have masonry pithouses in just the right place in relation to the pueblo to be kivas, but in several cases the pithouses have been proved to be earlier than the pueblos. . . More field work must be undertaken. . ." [41]

CULTURAL ASSOCIATIONS OF WING WALLS

The eastern wing walls that characterize all these sites are uncertain in their architectural affiliations. There is nothing very similar to them in the Anasazi area to the north and east, unless it be the long rows of stones that were and still are used in the Hopi country as wind breaks in agricultural fields. In Big Hawk Valley, however, many sites possess them [42] and perhaps they represent a degeneration of the walled-compound, like that at N.A. 618, which was evidently a Sinagua characteristic, possibly derived from the south.[43] Very possibly the architecture of these sites represents basically Kayenta ideas in the use of masonry, vertical ventilators and "unit-type" arrangement, modified by wing-walls and two-post roof support adopted from the Sinagua. Nalakihu, which contained a strong Sinagua component, had a similar wing wall at its northeast corner,[44] a common feature also of other ruins in its immediate vicinity.[45]

SIMILARITY OF BIG HAWK SITES TO "UNIT TYPE" OF KAYENTA BRANCH

It looks then, as if we must come back to the identification of these "unit-type" houses with the Kayenta Branch of the Anasazi, and we are not without corroborative evidence in this general area. At N.A. 1754, near Heiser Spring, about 10 miles to the east, there was a surface masonry unit of 3 rooms and an oval masonry pithouse with peripheral bench, recess and ventilator. This combination was certainly a typically Kayenta manifestation, and it contained about 70% of Kayenta sherds with a smaller mount of Alameda Brown Ware and very little San Francisco Mountain Gray Ware. The datable sherds were of Ceramic Group 7, with a considerable proportion of Flagstaff Black-on-white, implying a date in the early 12th century.[46]

CERAMIC DATES

On a consideration of the probable ceramic dates of the sites in Big Hawk Valley as well as those in surrounding areas, taken in correlation with their architectural features and with the relative proportions of ceramic branch deter-

[41] Colton, 1946, p. 273.

[42] Among such sites are N.A. 357, N.A. 449, N.A. 457, N.A. 459, N.A. 474, N.A. 479, N.A. 625, N.A. 678, N.A. 682, all shown in Colton, 1932, figs. 13, 14, 15, 17. Still other such sites were located in the course of the survey in 1948. See figure 2 herein.

[43] See pp. 171–172.

[44] King, 1949, p. 40; figs. 12, 13.

[45] King, 1949, pp. 145, 160; fig. 81.

[46] Hargrave, 1933, pp. 55–67; fig. 20; Colton, 1946, pp. 128–31; fig. 70.

minants, it appears that with the passage of time in the area generally, the relative proportions of the Sinagua and Cohonina components decreased as that of the Kayenta component increased, and that along with this change in ceramic balance went also changes in architecture tending more and more toward the Kayenta style. Consistently with this trend, the proportions of Kayenta pottery types at the Big Hawk Valley sites increased from early to late at the expense of Sinagua and Cohonina types, bearing out the hypothesis already stated of a Kayenta influx into the region toward the end of its period of occupation. Oddly enough, the period of occupation in Big Hawk Valley itself seems not to have lasted beyond about the middle of the 12th century, but the importance of the Kayenta people in the general area appears to have continued to increase a short distance to the northeast, where the large pueblos of the Citadel (N.A. 355),[47] the beginnings of Wupatki (N.A. 405),[48] and finally Crack-in-Rock (N.A. 537) [49] all seem to have been constructed in the middle or late 12th century as representative of the Klethla Focus of the Kayenta Branch, and without admixture from the Cohonina and Sinagua. Apparently, after an initial period of abundant water and good agriculture in Big Hawk Valley, due to temporary conditions resultant upon the Sunset eruption, the land became overpopulated. Judging from the large number of nearly contemporary sites in that small area there must eventually have been more people there than the land could support; but, for whatever reason, it was in fact abandoned, and the people, now predominantly of the Kayenta Branch, moved northeastward down toward the Little Colorado River, where there was probably a more reliable water supply.

A cloud on this chronological hypothesis is cast by the situation at Nalakihu, a pueblo 2 miles to the northeast, near the Citadel. This structure was a surface pueblo of 10 rooms with an eastern wing wall, but lacking an associated subterranean structure. It was probably built in the late 12th century,[50] contemporaneously with the Citadel and the later parts of Wupatki.[51] Architecturally it looks more Sinagua than Anasazi, but King felt that it might have been either the one or the other.[52] The trouble arises when we inspect its pottery complex. Here the Anasazi component is dominant, with about 40% of the whole, the Sinagua component accounts for about 30%, but, surprisingly, there is the very large component of 28% from the Prescott Branch.[53] This is by far the largest proportion of Prescott pottery found in any site north of the San Francisco mountains, though comparable proportions existed at two one-room sites near Deadmans Fort on Deadmans Mesa near the base of the Peaks.[54] Just what inferences can be drawn from this situation is not apposite here, but if the Prescott component is disregarded, for the moment, the relative proportions of Anasazi, Sinagua and Cohonina components are not so divergent from those at Wupatki and the Citadel as to negative the hypothesis suggested in the immediately preceding paragraph.

An apparent contradiction to the thesis of chronology presented above may, however, be detected in the ceramic statistics for the fills in each of the pithouses

[47] Colton, 1946, pp. 52–3; fig. 25.
[48] Colton, 1946, p. 62.
[49] Colton, 1946, pp. 68–69; fig. 36. See also pp. 70–76 herein.
[50] King, 1949, pp. 46–49, 132; figs. 11, 12, 13.
[51] Colton, 1946, pp. 52, 62.
[52] King, 1949, p. 145.
[53] King, 1949, pp. 117–20, 130–32, 141–42; tables 1–9.
[54] These sites are N.A. 1764B and 1765B. Colton, 1946, pp. 134–35.

at the Big Hawk Valley sites, where the complexes from the floors and lower strata of the fills seem to be in conflict with the postulated sequence. In Pithouse W at site N.A. 618, for example, as shown in table 1, San Francisco Mountain Gray Ware is in very small proportion on the floor, whereas Tusayan Gray Ware is very large and Prescott Gray Ware is present. In the fill, however, San Francisco Mountain Gray Ware is more than twice as important as it was on the floor, Tusayan Gray Ware has only one-third of its floor-proportion, Alameda Brown Ware has risen to 35% from 5% and Prescott Gray Ware is entirely absent. Used as a control for the chronological hypothesis heretofore developed, this situation would at first seem to contradict the sequence proposed, since the ceramic complex on the floor appears later than that of the fill above it. On further consideration, however, this seeming paradox is quite logical, and supports the theory that Pithouse W was occupied latest of all the rooms in N.A. 618, as indicated by the pottery on its floor. Although the fill above was actually deposited in this room at a later date, it contained sherds washed in from other parts of the site that had been occupied previously, and that therefore show an earlier chronological complex.

The same situation obtains in the deep pithouses at N.A. 681 and 682 as well as in some surface rooms at the various sites. As a matter of fact this is quite logical, since the room of latest occupation at any site, would almost inevitably be filled from the surrounding debris that had been laid down at an earlier date. Although this fact seems fairly obvious, it is worth emphasis if only as a caution against the too facile acceptance of vertical stratigraphy without more critical analysis of the manner in which the deposit must have been built up.[55]

PRECEDENTS FOR PEACEFUL MINGLING OF PEOPLES

A question that doubtless will arise in the minds of many people warrants some consideration here. It will perhaps be regarded as sociologically unlikely that such a postulated mingling of peoples representing allegedly different groups actually would have taken place in small separated sites such as those of Big Hawk Valley. I think, however, that this is not a valid objection to the hypothesis, and several documented examples of similar intermixture can be adduced from the Southwest, without seeking farther afield for precedents.

There is the case, for instance, of the sharing of homes in the same sites by eastern Pueblo refugees into the Hopi country within historic times, the most notable of which was the establishment of the Tewa village of Hano on First Mesa. There are also the evidences of peaceful mingling between the widely divergent Hopis and Navajos, grous of whom are supposed to have lived together in the Canyon de Chelly.

But perhaps the most convincing instance is that of Pueblo groups who, during the period from 1670–1770, fled from the Rio Grande Valley to the La Jara-Governador area in northwestern New Mexico, where they achieved apparently complete adjustment with Navajos already living there, even in some cases actually occupying the same sites. During this period of association the respective house types retained their character, but pottery and other features displayed

[55] For some provocative observations on the pitfalls of stratigraphy see Colton, 1946, pp. 297–99.

cross-cultural influences.[56] It is not, then, in any way incredible that small family groups of people from the Sinagua, Cohonina and Kayenta Branches might have lived for a time in close association, and have managed very well to preserve not only the peace but also their own cultural integrities, and I believe that this did actually take place during the 12th century.

[56] Kuer, 1944.

APPENDIX 1

BURIALS

THE human skeletal remains found in the Big Hawk Valley sites have already been discussed in connection with the individual site descriptions, but for convenience the data relative to them will be consolidated here.

N.A. 618 Burial 1. In Trench C; parts of right leg, pelvis and a few other fragments; had been previously disturbed by pothunters.

Burial 2. In fill of Pithouse W, probably intrusive, 70 centimeters above the floor near center of room. Part of Wupatki Black-on-white bowl (cat. no. 618.368, fig. 38, E) over head. Very young baby; skeleton complete, but skull and some other bones very badly crushed.

Burial 3. In fill of Pithouse W, 70 centimeters above the floor, lying partly in the main room and partly in the entranceway. Consisted of the right femur, patella, tibia, and fibula; the left fibula, and one rib. Adult.

Burial 4. On the floor of Pithouse X. A few fragments of the skull, one carpel, and fragment of a radius.

N.A. 682, Burial 1. In the fill of Room 1. Parts of both legs of an adult; all bones in articulation.

Left Leg: distal half of femur, patella, tibia, fibula, heel bones, some metatarsals.

Right Leg: distal half of femur, patella, proximal half of tibia, fibula.

Burial 2. Scattered about on the later (i.e upper) floor of the kiva; almost no bones in articulation. Young adult female(?)

Skull (median lambdoid flattening), mandible, 2 scapulae, 2 clavicles, sternum, 24 ribs, left humerus, left radius, left ulna, 2 carpels, pelvis, right femur, right patella, coccyx, and 19 vertebrae.

Burial 3. A complete skeleton, lying on its back on the later floor of the kiva, head turned toward the southeast. Skull showed left lambdoid flattening. Young adult female(?) All bones were in articulation except the proximal end of the left femur, which had been pulled away from its socket in the pelvis about 15 centimeters.

Burial 4. A reburial, the bones piled together in Pit D, quite without articulation, and many of them missing. Most of the long bones had been broken transversely, split longitudinally and hollowed out, as if for the removal of marrow. There were no marks of fire or of teeth, however, to support an inference of cannibalism. The bones recovered were:

Skull (crushed), axis, 2 clavicles, 2 scapulae (both incomplete), left humerus (broken), left ulna, right ulna (broken), left raduis (broken), right radius, 3 wrist bones, 6 metacarpels, 6 carpels, 5 vertebrae intact, fragments of about 12 ribs, ischia (fragments), left femur (fragments), right femur (fragments), right patella, left tibia(fragments), right tibia (fragments), left fibula (fragments), right fibula (broken), left calcaneum, right calcaneum, 5 ankle bones, 7 metatarsals, 8 tarsals.

While there is insufficient evidence here to warrant an inference of cannibalism, it may be of interest to compare this burial with one discovered by Hough at Ruin 3, Canyon Butte, in the Petrified Forest. There, as at N.A. 682, burials occurred under sandstone slabs. "A remarkable discovery was made in the cemetery of this ruin. In the midst of the burials the workmen came upon a mass of broken human bones, which proved to be the remains of three individuals. Some of the bones bore traces of fire, and there was no evidence that with them had been in-

terred any organic material; moreover, marks of the implement with which the bones had been fractured were discernible. Undoubtedly here was evidence of cannibalism, but as the find is unique in this region it probably only indicates anthropophagy from necessity."[1]

At a later time Morris made a comparable discovery in the La Plata River Valley. In a rock shelter there he found a burned area in association with Pueblo pottery.

> Mixed through the burned layer were many bones, principally human, most of them splintered and charred wholly or in part. Just forward of the fire area a large corrugated jar had been buried. It was full of human bones, all of them broken, and some blackened in spots by fire. Conspicuous among them were parts of two skulls, leg and arm bones, ribs and vertebrae. Two individuals were represented; one a lightly framed adolescent nearing maturity, the other an adult of massive proportions. Of the latter the breast bone and lumbar vertebrae were the largest and broadest that I have ever seen. There can be little doubt that the two persons were cooked and eaten beneath the shelter of the ledge. Both skulls had been broken open, and most of the long bones splintered, just as would have been done to secure the brains and marrow.[2]

These citations do not prove cannibalism at N.A. 682, but the unmistakable evidence of violence is doubly provocative when considered in connection with the three legs that were found separately buried at N.A. 618 (Burial 3) and at N.A. 682 (Burial 1). In each case the leg was incomplete, but the knee joint was in articulation, and in two cases the femora had been transversely broken. Furthermore the left leg of Burial 3 at N.A. 682 had been separated from the body. All this suggests some conscious and consistent procedure of the removal of legs immediately after death. Possibly all the individuals so treated were victims of violence incident to the abandonment and destruction of these pueblos, and it would be interesting to know whether the custom of severing and burying the legs of defeated enemies was characteristic of any group to whom the destruction could be ascribed.

[1] Hough, 1903, pp. 312–13.
[2] Morris, 1939, p. 75.

APPENDIX 2

ANIMAL AND BIRD BONES

THE quantity of animal and bird bones found in the excavations was surprisingly small. Since very little of the debris was screened some small bones were undoubtedly overlooked, but reasonable care was taken to save all that were seen, and it seems likely that the collection includes examples of all genera that were actually present. It would appear that the meat diet of the inhabitants of Big Hawk Valley was pretty limited, and confined mostly to small rodents and birds. The pronghorn antelope, however, was well represented, and the mule deer and mountain sheep occurred rarely. Most common were the cottontail rabbit and the prairie dog, both of which would have provided satisfactory human food.

Animals that were determined as present from identifiable bones were:

Mammals:
- Mule deer, *Odocoileus hemionus*
- Mountain sheep, *Ovis canadensis*
- Pronghorn antelope, *Antilocapra americana*
- Jack rabbit, *Lepus californicus*
- Cottontail rabbit, *Sylvilagus* (? sp.)
- Dog or Coyote, *Canis* (? sp.)
- Chipmunk, *Eutamias* (? sp.)
- Ground squirrel, *Citellus* (? sp.)
- Wood rat, *Neotoma* (? sp.)
- Deer mouse, *Peromyscus* (? sp.)

Birds:
- Sparrow hawk, *Falco sparverius*
- Red-tailed hawk, *Buteo borealis*
- American raven, *Corvus corax*
- Road runner, *Geococcyx californianus*

The identifications were made by Mr. Milton A. Wetherill, from comparative material in the Museum of Northern Arizona. Table 16 shows the distribution of identifiable bones among the several genera and at the various sites. There is nothing surprising in the collection, since all the genera listed are still native to the region except the mountain sheep, but it is known to have flourished there until relatively recent times.

In comparison, however, with the collection of bones from the Winona area,[1] that from the Big Hawk sites is notably meagre. At Winona were discovered remains of bison, elk, porcupine, gopher, wild cat, fox, skunk, badger and bear, none of which was found in our excavations. It may be said, however, that all or most of these animals find their natural habitat in forested country, and consequently would probably not have lived in the open plains of the Big Hawk Valley area.

In terms of birds the Winona collection was even more strikingly superior to that from Big Hawk Valley. Whereas only four species were represented in our

[1] McGregor, 1941, pp. 255–60.

Site	Bone	Odocoileus hemionus (Mule deer)	Ovis canadensis (Mountain sheep)	Antilocapra americana (Prong-horn)	Lepus californicus (Jack rabbit)	Sylvilagus (Cottontail)	Canis (Coyote or dog)	Cynomys (Prairie dog)	Eutamias (Chipmunk)	Citellus (Ground squirrel)	Neotoma (Wood rat)	Peromyscus (Deer mouse)
NA 618	Cranium											
	Mandible				1	1						
	Ulna											
	Humerus				1 / 1	1						
	Tibia					1						
	Femur					1 / 1		1				
	Pelvis				1 / 1			1				
	Metatarsal			2*								
	Tooth			1				1				
NA 680	Cranium							1			1	
	Mandible		1	1		1 / 2		2 / 1	1 / 1			
	Radius	1				4		1				
	Ulna	1				2 / 2		1				
	Humerus	1		1		1 / 2		1 / 1	1	1		
	Scapula				1			1				
	Tibia					3 / 4		1				
	Femur					1 / 3		2 / 4	1			1
	Pelvis	1 / 1			1	3 / 2		2				
	Metatarsal 1			1 / 1		2						
	Metatarsal 2	2*		1*		1 / 8						
	Calcaneum			1 / 1								
	Astragalus			1								
NA 681	Mandible							2 / 2				
	Radius	1		1*				2				
	Ulna				1		1	1				
	Humerus			1 / 1		2 / 1		1				
	Scapula				1							
	Tibia					1 / 2						
	Femur				1	1 / 3	1	3	2			
	Pelvis					2 / 1						
	Metatarsal 1				1	1	1					
	Metatarsal 2			8*		1						
NA 682	Mandible					3						
	Radius					1						
	Ulna					1		1				
	Humerus			1	1							
	Scapula			1 / 1		1						
	Tibia				1	2 / 4						
	Femur					2	1	1 / 1				
	Pelvis					1		1 / 1				
	Metatarsal			2								
	Calcaneum					1						

*Specimen modified for use as artifact

TABLE 16, PART 1.

Distribution of all mammal bones recovered from Big Hawk Valley sites, showing nature of bones, parent animal and quantity. In those boxes in the chart that are subdivided by a diagonal bar, the numeral at the upper left indicates the quantity of bones from the left side of the animal, that in the lower right the quantity from the right side. Bones are discussed on pages 181–183.

Site	Bone	*Antilocapra americana* (Prong-horn)	*Lepus californicus* (Jack rabbit)	*Sylvilagus* (Cottontail)	*Cynomis* (Prairie dog)
NA 537	Humerus			1 /	
	Scapula	/ 1		/ 1	
	Tibia	1 /		1 / 1	
	Femur				/ 1
	Pelvis				1 /
	Metatarsal 1	1 /	1 / 1	1 / 1	
	Metatarsal 2			1 / 1	
	Astragalus	/ 1			

Site	Bone	*Falco sparverius* (Sparrow hawk)	*Buteo borealis* (Red-tailed hawk)	*Corvus corax* (American raven)	*Geococcyx californianus* (Road runner)
NA 680	Humerus	1 /	1 /		
	Pelvis	/ 1			
	Carpometacarpus		/ 1		
NA 682	Radius			/ 2	1 /
	Ulna			/ 1	
	Humerus			/ 2	
	Tibia-metatarsal			1 /	
	Carpometacarpus			/ 1	
	Phalanx			1	

TABLE 16, PART 2.

Distribution of all mammal bones from N.A. 537 and all bird bones recovered from Big Hawk Valley sites, showing nature of bone, parent animal and quantity. In those boxes in the chart that are subdivided by a diagonal bar, the numeral at the upper left indicates the quantity of bones from the left side of the animal, that in the lower right the quantity from the right side. Bones are discussed on pages 181–183.

collection, there were no less than 24 species at Winona, and the quantity also was incomparably larger. Some of those notably absent from our collection were the duck, turkey, macaw, flicker, dove and lark. Again this may perhaps be explained by the absence of trees in the Big Hawk region, which would surely make the capture of birds more difficult, even if it did not also minimize their numbers.

No fish bones were identified in our excavations, although there was a very considerable number and variety at Winona.[2] This is not surprising, however, since there is little likelihood that ponds or permanent streams ever existed in the vicinity of Big Hawk Valley as possible habitats for fish.

On the whole we may conclude that the Big Hawk dwellers probably ate very little meat of any kind, and subsisted mainly on agricultural produce.

[2] McGregor, 1941, pp. 259–60.

APPENDIX 3

HUMAN SKELETAL REMAINS FROM BIG HAWK VALLEY

BY GEORGE ENNIS

Two practically complete human skeletons were found on the floor of N.A. 682. As described in the main part of the report, one of these was intact; the other was scattered about. Of the former, all bones were found except for the last lumbar vertebra. Several bones are missing from the scattered skeleton. The skulls of both skeletons are moderately well preserved though water-eroded. The long bones of the scattered skeleton are broken, and their epiphyses are missing in most cases. This is probably the work of pack rats.

Both skeletons seem to have been females, judging from the skulls and pelves. That they met sudden ends seems quite evident. They might have been killed in a raid carried out by a hostile group of Indians. Being females, they were evidently not subjected to bone-breaking and scattering, as would seem to have been the local custom with the bones of male victims.

Following are tables giving observations and instrumentally determined data concerning the two skeletons found at N.A. 682. We shall designate them N.A. 682B2 and N.A. 682B3 respectively, the latter being the one found intact.

I. CRANIAL MEASUREMENTS	N.A. 682B2	N.A. 682B3
Cranial Length		
Maximum (gl-op)*	165 mm.†	154 mm
Cranial base length (endo-na)	105	97
Foramen magnum length (ba-op)	35	38
Cranial Breadth		
Maximum (eu-eu)	146	138
Minimum frontal (ft-ft)	97	92
Maximum frontal (co-co)	28	118
Maximum occipital (ast-ast)	104	98
Foramen magnum breadth	31	29
Cranial Height		
Basio-bregmatic (ba-br)	147	138
Vertical auricular (bpo-ap)	126	119
Cranial Circumference		
Glabellar-horizontal	460	455
Cranial Arcs		
Median sagittal (na-opis)	294	276
Frontal (na-br)	127	114
Parietal (br-la)	109	115
Occipital (la-opis)	58	47
Cranial Chords		
Frontal (na-br)	112	101
Parietal (br-la)	96	96
Occipital (la-opis)	56	48

Facial Height		
Morphological (gn-na)	114	99
Upper facial (uap-na)	69 (estimated)	60
Facial Breadth		
Upper (fmt-fmt)	104	104
Biorbital (ect-ect)	97	97
Total (zyg-zyg)	140	130
Mid facial (zmi-zmi)	137	93
Facial Length		
Upper (endo-na)	105	97
Mid (endo-pro)	96 (alveolar bone chipped)	98
Midline or Interorbital Breadth		
Anterior interorb. (mf-mf)	19	18
Interorbital (da-da)	21	19
Nasal Skeleton		
Height (na-nsp)	48.5 (av.) mm.	41 mm.
Breadth	23	23
Minimum br. of nasal bones	9	7
Orbit		
Height	32 r. & l.	33
Breadth	41 r. & l.	37 r. & l.
Palate		
Maxillo-alveolar length (pro-alv)	49	49
Maxillo-alveolar breadth (em-em)	60	64
Palate length (sta-or)	43 (chipped alveolar bone)	41
Palate breadth (end-end)	39	42

* Parentheses indicate the points or cranial landmarks used in determining the measurements shown in the table.

† Maximum cranial length as here shown represents the distance from glabella to that point instrumentally determined as being the most posterior on the occipital surface of the skull. The latter point is not to be considered as true opisthocranion, since by definition opisthocranion must lie in the mid-sagittal plane. Because of deformity here I have located our landmark off the M. P. S., following the procedure of Hrdlička (1939, p. 126).

II. INDICES ON THE CRANIUM

Cranial Index:	N.A. 682B2	88.5 Hyperbrachycranic
	N.A. 682B3	89.6 Hyperbrachycranic
Facial Index:	N.A. 682B2	81.4 Euryprosopic
(*morph. total*)	N.A. 682B3	76.1 Hypereuryprosopic
Length-auricular Height Index:	N.A. 682B2	76.4 Hypsicranic
	N.A. 682B3	77.3 Hypsicranic
Breadth-auricular Height Index:	N.A. 682B2	86.3 Acrocranic
	N.A. 682B3	86.2 Acrocranic
Nasal Index:	N.A. 682B2	47.4 Hyperleptorrhine
	N.A. 682B3	56.0 Leptorrhine

III. Cranial Deformity

N.A. 682B2. Extreme asymmetrical lambo-occipital flattening leaning toward the left side.
N.A. 682B3. Symmetrical flattening.

Both of the above skulls show pronounced flattening such as one would expect to find in skulls of a prehistoric Pueblo population of the Kayenta Branch. Early Pueblo people evidently induced cranial flattening by strapping the heads of their infants to a certain type of cradle board. This was probably done with an eye toward shaping the head in a manner that was considered modish. The early Maya of Yucatan were masters at this art. One can hardly believe that cranial deformity was a mere incident of cradling among early Pueblo people. Stewart considers that particular cultural implications go with a particular type of cranial deformity.[1]

IV. Assessment of Segmental Closure in Cranial Vaults

N.A. 682B2

Suture	Segment I	Segment II	Segment III	Segment IV
	(pars bregmatica)	(pars verticus)	(pars lambdica)	(pars obelica)
Sagittal	1 *	0	0	0
		(pars pterica)	(pars complicata)	(pars bregmatica)
Coronal	—	0	0	0
		(pars lambdica)	(pars inominata)	(pars astericha)
Lambdoid	—	1	0	1

* Arabic numbers indicate stage of closure progressing from 0 (open) to 4 (completely closed).

Age Interpretations: The spheno-frontal suture has started to close. This can be noted on the left side, where erosion has not eaten into the bone table as it has on the right side. This factor plus the incipient closure shown in two parts of the lambdoid suture indicates that the original owner of this skull was around 26 years old at the time she died.

N.A. 682B3

Suture	Segment I	Segment II	Segment III	Segment IV
Sagittal	0	0	0	0
Coronal	—	0	0	1
Lambdoid	—	1	*	*

* Suture sprung due to induced deformity (same schematization as given in table for N.A. 682B2).

Age Interpretation: On the basis of a fairly well closed spheno-frontal suture and incipient closure in both the coronal and lambdoid sutures one would say that this individual was between 24 and 26 years of age at the time she died. This is held to be true in spite of the fact that the lower third molars have not erupted, as shown in the next table.

[1] Stewart, 1937, pp. 169–71.

V. DENTITION

N.A. 682B2

Right Maxilla								*Left Maxilla*							
M3	M2	M1	Pm2	Pm1	C	I2	I1	I1	I2	C	Pm1	Pm2	M1	M2	M3
Up	V	V	V	V	X	X	X	X	X	X	V	V	V	V	Up
V	V	V	V	X	X	X	X	X	X	V	V	X	V	V	V

N.A. 682B3

Right Mandible								*Left Mandible*							
X	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
O	V	V	X	X	V	V	X	V	X	V	X	V	V	V	U

Key: V indicates tooth present
X indicates tooth missing
O indicates tooth impacted
U indicates tooth unerupted
Up indicates tooth partially erupted

The teeth that were found in place or those that were replaceable were all in fairly healthy condition with no sign of caries. The incisors of N.A. 682B3 showed considerable accumulation of tartar. They were shovel-shaped in a typical Mongoloid pattern. The incisors and most of the canines from N.A. 682B2 were missing except for the roots. The projecting portions of these teeth appear to have been knocked off with a sharp instrument. This undoubtedly took place after death because there is no resorption of the alveolar bone. In the process whereby these incisors were knocked out much of the alveolar surface of the maxilla was chipped off. A slight amount of wear is exhibited in all the molars although the enamel remains intact. Portions of the upper incisor roots of N.A. 682B3 show through the anterior maxillary surface. This condition may have been caused by paradental pyorrhea during lifetime.

VI. DIMENSIONS OF LONG BONES, N.A. 682B3 ONLY [2]

	Circumference at midlevel	*Morphological length*	*Index of Robusticity* [3]
Leg:			
r. Femur	76 cm.	407 cm.	18.7
l. Femur	74	410	18.0
r. Tibia	76	340	22.4
l. Tibia	78	342	22.8
r. Fibula	37	323	11.5
l. Fibula	35	327	10.7
Arm:			
r. Humerus	55 cm.	294 cm.	18.7
l. Humerus	53	297	17.8
r. Radius	35	216	16.2
l. Radius	35	216	16.2
r. Ulna	38	234	12.0
l. Ulna	37	234	11.5

[2] Bones of N.A. 682B2 were not whole enough to measure.

[3] Index of Robusticity $= \frac{\text{Circumference at midlevel} \times 100}{\text{Morphological Length}}$.

Stature: Using Pearson's [4] formula the living stature of B3 may be calculated as having been 168.49 cm.[5] This puts her 9 cm. above the tallest female found by Hooton in a series of 82 Pueblo female skeletons at Pecos.[6] Such height is not excessive, however, compared to the maximum obtained by Hrdlička [7] in a sample of 59 living Pueblo females from northern Mexico and southwestern United States. The range found by Hrdlička in his Pueblo sample was 143.5–168.4 cm.

[4] Pearson, 1898, pp. 169–244.
[5] Equivalent to 66.3 inches.
[6] Hooton, 1930, p. 178.
[7] Hrdlička, 1908, pp. 132–137.

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INDEX

In the following index certain abbreviations are used, as follows: B.H.V., Big Hawk Valley area; S.F.M., San Francisco Mountain area; W.S.J., Western San Juan area.

The letters N.A. are the prefix applied to all sites recorded by the Museum of Northern Arizona; references herein to such sites are listed numerically under the main heading N.A.

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